



HBMWD Mad River Pipeline Crossing Project

Contract Documents and Technical Specifications



February 2018

www.ghd.com



**HUMBOLDT BAY MUNICIPAL
WATER DISTRICT**

Mad River Pipeline Crossing Project

February 2018

Prepared for

Humboldt Bay Municipal Water District
828 Seventh Street
Eureka, California 95501

BOARD OF DIRECTORS

Sheri Woo, President
Neal Latt, Vice President
J. Bruce Rupp, Secretary-Treasurer
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Michelle Fuller, Director

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Prepared by

GHD Inc.
718 Third Street, Eureka, CA 95501
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ADVERTISEMENT FOR BIDS

Humboldt Bay Municipal Water District
Owner

828 Seventh Street
Eureka, CA 95501
Address

Separate sealed bids will be received for the Mad River Pipeline Crossing Project.

A conditional or qualified bid will not be accepted if it modifies the Plans or Specifications or method of work.

A non-mandatory, but highly recommended, pre-bid meeting will be held to familiarize potential bidders with the project and is scheduled for 10:00 a.m., Thursday, February 22nd, 2018, at the HBMWD Essex Office, 7270 West End Road, Arcata, California. A site overview outside of this meeting time can be arranged by contacting Pat Kaspari or Nathan Stevens at GHD Inc. by telephone at (707) 443-8326.

The Humboldt Bay Municipal Water District (HBMWD) owns a 14-inch water main that serves the City of Blue Lake and the Fieldbrook-Glendale Community Services District. This water main is attached to an old, deteriorating North Coast Railroad Authority bridge over the Mad River that is no longer maintained. In the event of a catastrophic failure of this bridge, the water main will fail, and HBMWD will have no way of delivering water to these customers. The work for this project includes furnishing all labor, materials, equipment, and supervision required for installing a new water main, connecting the new water main to the existing asbestos cement water main on each side of the river, and performing other miscellaneous work items associated with the installation of the new water main. Construction of the new water main will include horizontal directional drilling (HDD) approximately 1,180 linear feet (LF) of 18-inch outside diameter high-density polyethylene pipe (primarily through fresh, hard meta-argillite bedrock) and trenching in approximately 150 LF of 14-inch polyvinyl chloride pipe (PVC).

Contractors shall submit a Qualifications Statement as a part of their bid. The HDD contractor shall demonstrate at least five (5) years of successful experience installing pipelines using the HDD process on at least five (5) projects with similar diameters, installation lengths, and ground and groundwater conditions. At least three (3) of the projects must demonstrate successful completion of horizontal directional drilling in rock. At least two (2) projects must include individual bore lengths of at least 1,000 feet under similar soil conditions. The contractor shall furnish evidence of successful experience by including project owner, project name, location, diameter of pipe, length of pipe, depth of bore, ground conditions, any problems encountered and how they were resolved, original project bid, final project cost, and any claims presented and how they were resolved. The address and telephone number of the owner's representative with knowledge of the project shall also be provided.

The contractor shall employ skilled, experienced superintendent(s), drill rig operators, fusion machine operators, and key personnel. The superintendent(s) and drill rig operators shall have at least three (3) years of successful experience using the HDD process on at least five (5) projects with similar diameters, pullback length, and ground conditions. The superintendent(s), drill rig operator, and fusion machine operators shall demonstrate successful completion of at least three (3) projects in rock. At least two (2) projects must include individual bore lengths of at least 1,000 feet under similar soil conditions. Contractors shall furnish with their Qualifications Statement resumes of the superintendent(s) and operators. Personnel experience records shall include project names, locations, pullback lengths, ground conditions, pipe materials, project description, project owner, engineer, and references with names, addresses, and telephone numbers. The superintendent and operators listed in the submittal shall be on site during all construction related activities required for the HDD installation.

Bids will be received by the General Manager of the Humboldt Bay Municipal Water District at the District Office, 828 Seventh Street, Eureka, California, 95501 until 3:00 p.m. Pacific Time, March 7, 2018, and

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then at said office publicly opened and read aloud. If forwarded by mail, the sealed envelope containing the bid must be enclosed in another envelope addressed to the Owner at Humboldt Bay Municipal Water District, P.O. Box 95, Eureka, CA 95502 and must be delivered by the above referenced time and date.

The Contract Documents are available and can be examined at the following locations:

HBMWD Website: www.hbmwd.com
Humboldt Builders Exchange, Eureka
North Coast Builders Exchange, Santa Rosa
Shasta Builders Exchange, Redding
Sacramento Builders Exchange, Sacramento

Contractors may obtain an electronic copy of the Contract Documents from GHD Inc. for free by emailing a request to Pat Kaspari (pat.kaspari@ghd.com) or Nathan Stevens (nathan.stevens@ghd.com). Hardcopies of the Contract Documents can be obtained at the office of GHD Inc., located at 718 Third Street, Eureka, California, 95501, (707) 443-8326 upon a non-refundable payment of \$50.00 for each set.

Each proposal must be submitted on the prescribed form and accompanied by a certified check or Bid Bond in an amount of not less than 10 percent of the amount bid. Successful bidders will be required to furnish both a Payment Bond and Performance Bond in the full amount of the Contract Price. In accordance with Public Contract Code Section 10263, the Contractor will be allowed to substitute securities for monies normally withheld by the owner to insure performance under this contract.

This is a Public Works Project funded with Federal (FEMA) and State of California Proposition 84 grant money. Therefore, both California State prevailing wage rates and Federal prevailing wage rates will be required on this project, whichever wages are higher. This project is subject to compliance monitoring and enforcement by the Department of Industrial Relations, State of California. The general prevailing wage rates applicable to the work are set by the Director of the Department of Industrial Relations.

Humboldt Bay Municipal Water District requires that all contractors and subcontractors working on this project keep certified payroll records in accordance with Labor Code 1776 and submit copies to the District. All contractors and subcontractors must also furnish electronic certified payroll records directly to the Labor Commissioner (Division of Labor Standards Enforcement).

It shall be mandatory upon the contractor herein and upon any subcontractors to pay not less than the said specified rates to all laborers, workers and mechanics employed by them in the execution of the Agreement pursuant to CA Labor Code 1774. The Contractor will be required to comply with any changes in these wage rates as they are updated by the State and/or Federal government at no cost to the Owner.

Attention is directed to the provisions in section 1777.5 and sections 1777.6 of the Labor Code concerning the requirement to employ apprentices by the contractor or any subcontractor under it.

The Contractor shall comply with and shall ensure all subcontractors comply with all laws and regulations governing the contractor's and subcontractors' performance on this project including, but not limited to: anti-discrimination laws, workers' compensation laws, and prevailing wage laws as set forth in CA Labor Code, Sections 1720-1861 et seq. and licensing laws, as well as Federal Labor Standards set forth in the Davis-Bacon Act (40 USC 276(a-a5), the Copeland "Anti-Kickback" Act (40 USC 276(c); and the Contract Work Hours and Safety Standards Act (CWHSSA) (40 USC 327-333). The contractor is required to include the prevailing wage language in all subcontracts pursuant to CA Labor Code 1775(E)(b)(1). The Contractor shall post, at appropriate conspicuous points on the site of the Project, a schedule showing all the determined general prevailing wage rates.

Pursuant to Senate Bill 854, all contractors bidding on public works projects must register with the Department of Industrial Relations. Contractors are subject to a registration and annual renewal fee. No contractor or subcontractor may be listed on a bid proposal for a public works project (submitted on or after March 1, 2015) unless registered with the Department of Industrial Relations pursuant to Labor

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Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)]. Accordingly, all Prime and Subcontractors contained in a bid must provide valid Department of Industrial Relations registration number(s). Failure to provide valid DIR registration numbers in the bid documents shall disqualify the bid.

Sheri Woo

President
Humboldt Bay Municipal Water District

February 8, 2018
Date

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PART 1
BID REQUIREMENTS

INFORMATION FOR BIDDERS

Project: HBMWD Mad River Pipeline Crossing Project

Bids will be received by Humboldt Bay Municipal Water District (herein called the "Owner"), at 828 Seventh Street, Eureka, CA 95501 until the time listed in the Advertisement for Bids; and then at said office publicly opened and read aloud.

Each bid must be submitted in a sealed envelope, addressed to Humboldt Bay Municipal Water District, 828 Seventh Street, Eureka, CA 95501. Each sealed envelope containing a bid must be plainly marked on the outside as **BID FOR: MAD RIVER PIPELINE CROSSING PROJECT**, and the envelope shall bear on the outside the name of the bidder, their address, and license number. If forwarded by mail, the sealed envelope containing the bid must be enclosed in another envelope addressed to the Owner at Humboldt Bay Municipal Water District, P.O. Box 95, Eureka, CA 95502-0095.

Bids received after the time specified for bid opening will not be considered. The Bidder is solely responsible for timely delivery of their bid.

A non-mandatory pre-bid conference/site visit will be held to familiarize potential Bidders with the project. See the Advertisement for Bids for location, date, and time.

All bids must be made on the required bid form. All blank spaces for bid prices must be filled in, in ink or typewritten, and the bid form must be fully completed and executed when submitted. Only one copy of the bid form is required.

The Owner may waive any informalities or minor defects or reject any and all bids. Any bid may be withdrawn prior to the above scheduled time for the opening of bids or authorized postponement thereof. Any bid received after the time and date specified shall not be considered. No Bidder may withdraw a bid within six (6) months after the actual date of the opening thereof. Should there be reasons why the Contract cannot be awarded within the specified period, the time may be extended by mutual agreement between the Owner and the Bidder.

Bidders must satisfy themselves of the accuracy of the estimated quantities in the bid schedule by examination of the site and a review of the Plans and Specifications, including addenda. After bids have been submitted, the Bidder shall not assert that there was a misunderstanding concerning the quantities of Work or of the nature of the Work to be done.

The Contract Documents contain the provisions required for the construction of the project. Information obtained from an officer, agent, or employee of the Owner or any other person shall not affect the risks or obligations assumed by the Contractor or relieve the Contractor from fulfilling any of the conditions of the Contract.

Each bid must be accompanied by a bid bond payable to the Owner for ten percent of the total amount of the bid. As soon as the bid prices have been compared, the Owner will return the bonds of all except the three lowest responsible bidders. When the Agreement is executed, the bonds of the two remaining unsuccessful bidders will be returned. The bid bond of the successful Bidder(s) will be retained until the payment bond and performance bond have been executed and approved, after which it will be returned. A certified check may be used in lieu of a bid bond.

A performance bond and a payment bond, each in the amount of 100 percent of the contract price, with a corporate surety approved by the Owner, will be required for the faithful performance of the Contract.

Attorneys-in-fact who sign bid bonds or payment bonds and performance bonds must file with each bond a certified and effective dated copy of their power of attorney.

The party to whom the Contract is awarded will be required to execute the Agreement and obtain the

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performance bond, payment bond, and required insurance certificates within twenty one (21) calendar days from the date when Notice of Award is delivered to the Bidder. The Notice of Award shall be accompanied by the necessary Agreement and bond forms. In case of failure of the Bidder to execute the Agreement, the Owner may consider the Bidder in default, in which case the bid bond accompanying the proposal shall become the property of the Owner.

The Owner, within twenty one (21) calendar days of receipt of an acceptable performance bond, payment bond and Agreement signed by the party to whom the Agreement was awarded shall sign the Agreement and return to such party an executed duplicate of the Agreement. Should the Owner not execute the Agreement within such period, the Bidder may submit a written notice to withdraw the signed Agreement. Such notice of withdrawal shall be effective upon receipt of the notice by the Owner.

The Notice to Proceed shall be issued within twenty one (21) calendar days of the execution of the Agreement by the Owner. Should there be reasons why the Notice to Proceed cannot be issued within such period, the time may be extended by mutual agreement between the Owner and Contractor.

If the Notice to Proceed has not been issued within the twenty one (21) day period or within the period mutually agreed upon, the Contractor may terminate the Agreement without further liability on the part of either party.

The Owner may make such investigations as they deem necessary to determine the ability of the Bidder to perform the Work, and the Bidder shall furnish to the Owner all such information and data for this purpose as the Owner may request. The Owner reserves the right to reject any bid if the evidence submitted by, or investigation of, such Bidder fails to satisfy the Owner that such Bidder is properly qualified to carry out the obligations of the Agreement and to complete the Work contemplated therein.

A conditional or qualified bid will not be accepted if it modifies the Plans or Specifications or method of Work. The intent is to award the entire job (all Schedules thereunder) to such Contractor or Contractors that will result in the lowest overall total cost to the Owner.

Awards will be made to the lowest, responsive, responsible Bidder(s).

All applicable laws, ordinances, rules and regulations of all Federal, State and local authorities having jurisdiction over construction of the project shall apply to the Contract throughout.

The Bidder shall supply the names, addresses, and valid DIR registration numbers of major subcontractors, material suppliers (greater than 10% of total contract amount) and/or fabricators with the bid.

The Contract Documents under which it is proposed to execute the Work consist of the Plans and all material bound herewith. These Contract Documents are intended to be mutually cooperative and to provide all details reasonably required for the execution of the proposed Work. Any person contemplating the submission of a Bid shall have thoroughly examined all of the various parts of these Documents, and should there be any doubt as to the meaning or intent of said Contract Documents, the Bidder shall request of the Engineer, in writing at least six (6) working days prior to bid opening, an interpretation thereof. Any interpretation or change in said Contract Documents will be made only in writing, in the form of addenda to the Documents and will be furnished to all Bidders receiving a set of the Documents, issued no later than 72 hours prior to bid opening, who shall submit, or indicate receipt of all addenda with their proposals. The Owner will not be responsible for any other explanation or interpretations of said Documents.

Questions regarding the Plans and Specifications shall be submitted in writing to Engineer: Pat Kaspari at GHD Inc., 718 Third Street, Eureka, CA, 95501 by email at pat.kaspari@ghd.com. Replies to such inquiries will be in the form of addenda or clarification that will be sent to all plan holders. Requests for clarification regarding various portions may be made by phone to Pat Kaspari, at GHD Inc., 707-443-8326.

Copies of Contract Plans and Specifications may be obtained from the office of GHD Inc., as specified in the Advertisement for Bids. The payment will not be refundable.

The Contract Documents are assembled, arranged, and titled generally in conformance with the 48-division format suggested by the Construction Specifications Institute (CSI). Minor variations to the CSI format may be used herein to suit Owner requirements or to better adapt the Documents to particular types of projects.

Portions of these Contract Documents may contain standard preprinted material. The Bidder's attention is called to the General Conditions of the Contract which may modify and add to the preprinted material contained herein. Sentences in the Contract Documents which are phrased in mandatory language, but which include no explicit reference to the party who has responsibility for performing the mandated duty, shall be interpreted as imposing responsibility for performance of the duty described on the Contractor. For example, a directive that "the site shall be kept clean" would impose the duty of keeping the site clean on the Contractor.

Each proposal must be submitted on the prescribed form and be accompanied by a certified check or Bid Bond in an amount of not less than 10 percent of the amount bid. Successful bidders will be required to furnish both a Payment Bond and Performance Bond in the full amount of the Contract Price. In accordance with Public Contract Code Section 10263, the Contractor will be allowed to substitute securities for monies normally withheld by the owner to insure performance under this contract.

Where the Bid Proposal is to be submitted on a unit price basis, unit prices will be accepted on all items of Work set forth in the Bid, except those designated to be paid for as a lump sum. The estimate of quantities of Work to be done is tabulated in the Bid and, although stated with as much accuracy as possible, is approximate only and is assumed solely for the basis of calculation upon which the award of Contract shall be made. Payment to the Contractor will be made on the measurement of the Work actually performed by the Contractor as specified on the Contract Documents. The Owner reserves the right to increase or diminish the amount of any class of Work as may be deemed necessary.

When the Bid Proposal is to be submitted on a lump sum basis, a single lump sum price shall be submitted in the appropriate place. The total amount to be paid the Contractor shall be the amount of the lump sum in the Bid, as adjusted for additions or deletions resulting from changes in construction. After award of Contract, the Contractor may be required to break down the lump sum Bid into unit prices for the various portions to be completed.

All blank spaces in the Bid form must be filled in, in ink, in both words and figures where required. No changes shall be made in the phraseology of the forms. Written amounts shall govern in cases of discrepancy between the amounts stated in writing and the amounts stated in figures. In case of discrepancy between unit prices and totals, unit prices will prevail.

Any Bid Proposal shall be deemed informal which contains omissions, erasures, alterations, or additions of any kind, or prices uncalled for, or in which any of the prices are obviously unbalanced, or which in any manner shall fail to conform to the conditions of the published Advertisement for Bid.

The Bidder shall sign the Bid Proposal in the blank space provided therefore. If Bidder is a corporation, the legal name of the corporation shall be set forth above, together with the signature of the officer or officers authorized to sign contracts on behalf of the corporation. Bid proposals signed by a non-corporate officer shall be invalid. If Bidder is a co-partnership, the true name of the firm shall be set forth above, together with the signature of the general partner or general partners authorized to sign contracts on behalf of the co-partnership. If signature is by an agent, other than an officer of a corporation or a member of a partnership, a Power of Attorney must be on file with the Owner prior to opening of Proposals or submitted with the Proposal, otherwise the Proposal will be regarded as not properly authorized.

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State and local sales and use taxes, as required by the laws and statutes of the State and its political subdivisions, shall be paid by the Contractor. Prices quoted in the Proposal shall include sales tax unless provision is made in the Bid Proposal form to separately itemize the tax.

Any Bidder may modify their bid by telegraphic or written communication at any time prior to the scheduled closing time for receipt of bids, provided such communication is received by the Owner prior to the closing time. The telegraphic or written communication should not reveal the bid price, but should state the addition or subtraction or other modification so that the final prices or terms will not be known by the Owner until the sealed bid is opened.

Each Bidder must inform themselves of the conditions relating to the execution of the Work, and it is assumed that Bidders will inspect the site, site access limitations, subsurface conditions, weather, variations of soil moisture and workability with rainfall, and make themselves thoroughly familiar with all the Contract Documents. The Bidder should check with local contractors regarding local site, surface, subsurface and material conditions and variability. Failure to do so will not relieve the successful Bidder of the obligation to enter into a Contract and complete the contemplated Work in strict accordance with the Contract Documents. The Bidder's attention is called to the General Conditions of the Contract Documents in regards to the Bidder's obligation to verify for himself and to his complete satisfaction all information concerning site and subsurface conditions, and Notice requirements.

No contractor or subcontractor may be listed on a bid proposal for a public works project (submitted on or after March 1, 2015) or be awarded a contract for public work on a public works project (awarded on or after April 1, 2015) unless registered with the State of California Department of Industrial Relations pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)]. This project is subject to compliance monitoring and enforcement by the State of California Department of Industrial Relations. Accordingly, all Prime and Subcontractors contained in a bid must provide valid Department of Industrial Relations registration number(s). Failure to provide valid DIR registration numbers in the bid documents shall disqualify the bid.

Both California State prevailing wage rates and Federal prevailing wage rates will be required on this project, whichever wages are higher. The Contractor will be required to comply with any changes in these wage rates as they are updated by the State and/or Federal government at no cost to the Owner.

All contractors and subcontractors must furnish electronic certified payroll records directly to the Labor Commissioner (Division of Labor Standards Enforcement), electronic Certified Payroll Reporting (eCPR) at the DIR, and also directly submit certified payroll and supporting documents to the Humboldt Bay Municipal Water District. The contact information for the Humboldt Bay Municipal Water District is:

Address:	HBMWD Attn: John Friedenbach PO Box 95 Eureka, CA 95502-0095
Business Phone:	(707) 443-5018
Email:	friedenbach@hbmwd.com

Bidders shall inform themselves of, and the Bidder awarded a Contract shall comply with, Federal, State and local laws, statutes, and ordinances related to the execution of the Work. This requirement includes, but is not limited to, grant requirements as they apply to the Contractor's work, applicable regulations concerning employment of labor, protection of public and employee safety and health, environmental protection, the protection of natural resources, permits, fees, and similar subjects.

BIDDERS' CHECKLIST

This checklist has been prepared and furnished to aid bidders in including all necessary supporting information with their bid. Bidders' submittals shall include, but are not limited to the following:

<u>ITEM</u>	<u>PAGE</u>	<u>CHECKED</u>
1. Bid Proposal	1-7 through 1-9	_____
2. List of Subcontractors (Subcontractor Details)	1-10	_____
3. Bid Bond	1-11 through 1-12	_____
4. Authority to Sign Bid Proposal (if applicable)	(Attached to Bid Bond)	_____
5. Power of Attorney	(Attached to Bid Bond)	_____
6. Qualifications Statement as described in the Advertisement for Bids	(Attached to Bid)	_____

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BID PROPOSAL

Proposal of _____
(hereinafter called "Bidder"), organized and existing under the laws of the State of California,

doing business as _____*.

To the Humboldt Bay Municipal Water District, (hereinafter called "Owner").

In compliance with your Advertisement for Bids, Bidder hereby proposes to perform all Work for the Mad River Pipeline Crossing Project in strict accordance with the Contract Documents, within the time set forth therein, and at the prices stated below.

In the event of a difference between a price quoted in words and a price quoted in figures for the same quotation, the words shall be the amount bid. In the event that the product of a unit price and an estimated quantity does not equal the extended amount quoted, the unit price shall govern and the corrected product of the unit price and the estimated quantity shall be deemed to be the amount bid. If the sum of two or more items in a bidding schedule does not equal the total amounts quoted, the individual items amounts shall govern and the corrected total shall be deemed to be the amount bid.

By submission of this bid, each Bidder certifies, and in the case of a joint bid, each party certifies as to its own organization, that their bid has been arrived at independently, without consultation, communication, or agreement as to any matter relating to this bid with any other Bidder or with any competitor.

Bidder hereby agrees to commence Work under this Contract on or before a date to be specified in the Notice to Proceed and to fully complete the project and pay the liquidated damages as provided in Articles III and IV of the General Conditions.

*Insert "a corporation," "a partnership," or "an individual" as applicable.

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Bidder agrees to perform all the Work described in the Contract Documents for the following prices. Bidder is advised to carefully review all sections of the Plans and Specifications in order to completely understand the Work and all constraints, including the schedule and material requirements.

The Work generally includes, but is not limited to, providing all labor, materials, equipment, and supervision required for horizontal directional drilling and installing the HDPE pipe, trenching in the PVC pipe, connecting to the existing water main in two locations, installing butterfly valves, combination air valves, blowoff assemblies, service connections, related appurtenances, and all other Work required to complete the modifications as shown on the Plans and described in the Specifications.

The following table has been provided for the Bidder's convenience to assist Bidder in quantifying the major components of the Work, and shall in no way be interpreted to be comprehensive. The bid shall be comprehensive and shall include all work associated with the project.

BID SCHEDULE

Item No.	Description	Unit	Qty.	Unit Cost	Total Cost
1.	Mobilization/Demobilization	LS	1	\$ _____	\$ _____
2.	Construction Staking	LS	1	\$ _____	\$ _____
3.	Traffic Control	LS	1	\$ _____	\$ _____
4.	Grading, Access Improvements, and Sediment & Erosion Control	LS	1	\$ _____	\$ _____
5.	Horizontal Directional Drill (HDD) HDPE Water Main	LS	1	\$ _____	\$ _____
6.	Install Water Main from HDD Exit Point and Connect to Existing Water Main at Warren Creek Road	LS	1	\$ _____	\$ _____
7.	Install Water Main from HDD Entry Point and Connect to Existing Water Main	LS	1	\$ _____	\$ _____
8.	New Lateral Connection and Meter for Ford Property	LS	1	\$ _____	\$ _____
9.	New Lateral Connection and Meter for Sundberg Property	LS	1	\$ _____	\$ _____
10.	14-inch Butterfly Valve and Box	EA	3	\$ _____	\$ _____
11.	Abandon Existing Pipes	EA	2	\$ _____	\$ _____

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Item No.	Description	Unit	Qty.	Unit Cost	Total Cost
12.	Sheet Pile Walls and French Drain	LS	1	\$ _____	\$ _____
13.	Combination Air Vacuum/Release Valve Assemblies with Enclosures	EA	2	\$ _____	\$ _____
14.	Blowoff Assemblies	EA	2	\$ _____	\$ _____
15.	4-inch Paving Section	SF	400	\$ _____	\$ _____

Bid for Humboldt Bay Municipal Water District Mad River Pipeline Crossing Project, including all necessary labor, materials, equipment, supervision, sales tax, and all other applicable taxes and fees.

TOTAL OF BID (\$ _____)

TOTAL OF BID IN WORDS: _____

Receipt of the following Addenda is acknowledged:

The representations made herein are made under penalty of perjury.

Respectfully submitted:

Signature

Title

License Number

Date

License Expiration Date

DIR Registration Number

(SEAL - If Bid is by Corporation)

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned,

_____ as Principal, and

_____, as Surety, are hereby held and firmly bound unto

Humboldt Bay Municipal Water District _____,

as Owner, in the penal sum of _____ for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, successors and assigns.

Signed this ____ day of _____, 2018.

The Condition of the above obligation is such that whereas the Principal has submitted to _____ a certain bid, attached hereto and hereby made a part hereof to enter into a contract in writing, for the:

_____ Mad River Pipeline Crossing Project _____

NOW, THEREFORE,

- (a) If said bid shall be rejected, or
- (b) If said bid shall be accepted and the Principal shall execute and deliver a contract in the Form of Contract attached hereto (properly completed in accordance with said Bid), and shall furnish a bond for the faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said bid, 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 claims hereunder shall, in no event, exceed the penal 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 bid; and said Surety does hereby waive notice of any such extension.

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IN WITNESS WHEREOF, the Principal and Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

SEAL:

Principal

By: _____

Title: _____

Surety

By: _____

Title

IMPORTANT - Surety companies executing bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the project is located.

NOTE: Bidder shall provide current "Power of Attorney" for Attorney-in-fact who signs Bid Bond.

PART 2
CONTRACT FORMS

CONTRACT AGREEMENT

THIS AGREEMENT, MADE THIS _____ DAY OF _____, 2018, by and

between the Humboldt Bay Municipal Water District, hereinafter called "Owner," and

doing business as _____, hereinafter called "Contractor"
(insert "a corporation," "a partnership," or "an individual" as applicable).

WITNESSETH: That for and in consideration of the payments and agreements hereinafter mentioned:

1. The Contractor will commence and complete the:
Mad River Pipeline Crossing Project
2. The Contractor will furnish all of the material, supplies, tools, equipment, labor and other services necessary for the construction and completion of the project described herein.
3. The Contractor will commence the Work required by the Contract Documents within
21 calendar days after the date of the Notice to Proceed and will complete the same within the time provided in Section B-35 of the General Conditions, unless the period for completion is extended otherwise by the Contract Documents.
4. The Contractor agrees to perform all of the Work described in the Contract Documents and comply with terms therein for the sum of \$_____, or as shown in the Bid Proposal.
5. The Contract Documents consist of the Bid Requirements, Contract Forms, General Conditions, the Specifications, and the Plans, including all modifications thereof incorporated into the documents before their execution, and including all other requirements incorporated by specific reference thereto. These form the Contract.
6. The Owner will pay to the Contractor in the manner and at such times as set forth in the General Conditions such amounts as required by the Contract Documents.
7. This Agreement shall be binding upon all parties hereto and their respective heirs, executors, administrators, successors, and assigns.

IN WITNESS WHEREOF, the parties hereto have executed, or caused to be executed by their duly authorized officials, this Agreement in quadruplicate, each of which shall be deemed an original on the date first above written.

Owner

Contractor

Title _____

Title _____

Date _____

Date _____

This page left blank intentionally.

PERFORMANCE BOND

KNOW ALL PERSONS BY THESE PRESENTS: that

(Name of Contractor)

(Address of Contractor)

a _____, hereinafter
(Corporation, Partnership, or Individual)

called Principal, and _____
(Name of Surety)

(Address of Surety)

hereinafter called Surety, are held and firmly bound unto

Humboldt Bay Municipal Water District
(Name of Owner)

828 Seventh Street, Eureka, CA 95501
(Address of Owner)

hereinafter called Owner, in the penal sum of

_____ Dollars (\$_____)

in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain Contract with the Owner, dated _____ day of _____, 2018, a copy of which is hereto attached and made a part hereof for the construction of:

Mad River Pipeline Crossing Project

NOW, THEREFORE, If the Principal shall well, truly and faithfully perform its duties, all the undertaking, covenants, terms, conditions, and agreements of said Contract during the original term thereof, and any extensions thereof which may be granted by the Owner, with or without notice to the Surety and during one year (minimum) guaranty period, and if he shall satisfy all claims and demands incurred under such Contract, and shall fully indemnify and save harmless the Owner from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the Owner all outlay and expense which the Owner may incur in making good any default, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the Work to be performed thereunder of the Specifications accompanying the same shall in any way affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract or to the Work or to the Specifications.

PROVIDED, FURTHER, that no final settlement between the Owner and the Contractor shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

Humboldt Bay Municipal Water District
Mad River Pipeline Crossing Project

IN WITNESS WHEREOF, this instrument is executed in 4 counterparts, each one of which shall be deemed an original, this _____ day of _____, 2018.

ATTEST:

(Principal) Secretary

Principal

By _____

Address

Witness as to Principal

Address

Surety

ATTEST:

Witness as to Surety

By _____
Attorney-in-Fact

Address

Address

NOTE: Date of Bond must not be prior to date of Contract. If Contractor is Partnership, all partners should execute Bond.

IMPORTANT: Surety companies executing Bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State where the project is located.

PAYMENT BOND

KNOW ALL PERSONS BY THESE PRESENTS: that

(Name of Contractor)

(Address of Contractor)

a _____, hereinafter
(Corporation, Partnership, or Individual)

called Principal, and _____
(Name of Surety)

(Address of Surety)

hereinafter called Surety, are held and firmly bound unto

Humboldt Bay Municipal Water District
(Name of Owner)

828 Seventh Street, Eureka, CA 95501
(Address of Owner)

hereinafter called Owner, in the penal sum of

_____ Dollars (\$ _____)
in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain Contract with the Owner, dated _____ day of _____, 2018, a copy of which is hereto attached and made a part hereof for the construction of:

Mad River Pipeline Crossing Project

NOW, THEREFORE, if the Principal shall promptly make payment to all persons, firms, Subcontractors, and corporations furnishing materials for or performing labor in the prosecution of the Work provided for in such Contract, and any authorized extension or modification thereof, including all amounts due for materials, lubricants, oil, gasoline, coal and coke, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such Work, and all insurance premiums of said Work, and for all wages and fringe benefits of labor, performed in such Work, whether by Subcontractor or otherwise, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety for value received hereby stipulated and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the Work to be performed thereunder or the Specifications accompanying the same shall in any way affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract or to the Work or to the Specifications.

PROVIDED, FURTHER, that no final settlement between the Owner and the Contractor shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

Humboldt Bay Municipal Water District
Mad River Pipeline Crossing Project

IN WITNESS WHEREOF, this instrument is executed in 4 counterparts, each one of which shall be deemed an original, this _____ day of _____, 2018.

ATTEST:

(Principal) Secretary

Principal

By _____

Address

Witness as to Principal

Address

Surety

ATTEST:

Witness as to Surety

By _____
Attorney-in-Fact

Address

Address

NOTE: Date of bond must not be prior to date of Contract. If Contractor is Partnership, all partners should execute bond.

IMPORTANT: Surety companies executing bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State where the project is located.

NOTICE OF AWARD

TO: _____

PROJECT: Mad River Pipeline Crossing Project

The Owner has considered the bid submitted by you for the above described work in response to its Advertisement for bids dated _____ and Information for Bidders.

You are hereby notified that your bid has been accepted for items in the amount of _____ Dollars (\$ _____)

You are required by the Information for bidders to execute the Agreement and furnish the required Contractor's certificates of insurance within twenty one (21) calendar days from the date this Notice is received by you.

If you fail to execute said Agreement and to furnish said insurance within twenty one (21) calendar days from the date of receipt of this Notice, said Owner will be entitled to consider all your rights arising out of the Owner's acceptance of your BID as abandoned and as a forfeiture of your bid bond. The Owner will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this Notice of Award to the Owner.

Dated this _____ day of _____, 2018.

Owner: Humboldt Bay Municipal Water District

By: _____ Title: General Manager

ACCEPTANCE OF NOTICE

Receipt of the above Notice of Award is hereby acknowledged by:

(Name of Contractor)

Dated this _____ day of _____, 2018.

By: _____ Title: _____

NOTICE TO PROCEED

TO: _____

PROJECT: Mad River Pipeline Crossing Project

You are hereby notified to commence Work in accordance with the Agreement on or before the _____ day of _____, 2018, and you are to complete the Work within 180 consecutive calendar days thereafter.

The date of completion of all Work is therefore _____ day of _____, 2018.

You are required to return an acknowledged copy of this Notice to Proceed to the Owner.

Dated this _____ day of _____, 2018.

Owner: Humboldt Bay Municipal Water District

By: _____ Title: General Manager

ACCEPTANCE OF NOTICE

Receipt of the above Notice to Proceed is hereby acknowledged by:

(Name of Contractor)

Dated this _____ day of _____, 2018.

By: _____ Title: _____

PART 3
GENERAL CONDITIONS

**GENERAL CONDITIONS
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SECTION A
DEFINITIONS AND TERMS

A-1 General

Wherever the following abbreviations and terms, or pronouns in place of them, are used in these Conditions and other Contract Documents of which these Conditions are a part, the intent and meaning shall be interpreted as provided below.

A-2 Abbreviations

The following abbreviations may be used in the Contract Documents:

AA	Aluminum Association
AASHO	American Association of State Highway Officials
ABMA	American Boiler Manufacturer's Association
ACI	The American Concrete Institute
AGA	American Gas Association
AGC	Associated General Contractors
AGMA	American Gear Manufacturer's Association
AI	The Asphalt Institute
AIA	American Institute of Engineers
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
ALSC	American Lumber Standards Committee
ANSI	American National Standards Institute, Inc.
API	American Petroleum Institute
APWA	American Public Works Association
AREA	American Railway Engineering Association
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWPA	American Wood Preservers' Association
AWS	American Welding Society
AWWA	American Water Works Association
BHMA	Builders Hardware Manufacturers Association
CCMTC	California Concrete Masonry Technical Committee
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CRSI	Concrete Reinforcement Steel Institute
DFPA	Douglas Fir Plywood Association
DIR	Department of Industrial Relations
ETL	Electrical Testing Laboratory
FEMA	Federal Emergency Management Agency
FS	Federal Specification
HBMWD	Humboldt Bay Municipal Water District
HMGP	Hazard Mitigation Grant Program
ICBO	International Conference of Building Officials
IEEE	The Institute of Electrical and Electronics Engineers
IES	Illuminating Engineering Society
IPCEA	Insulated Power Cable Engineers Association
MBMA	Metal Building Manufacturer's Association
MSS	Manufacturers Standardization Society of the Valve and Fitting Industry Standards
NBFU	National Board of Fire Underwriters
NBS	National Buildings Standards

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NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NPDES	National Pollution Discharge Elimination System
OSHA	Occupational Safety and Health Act of 1970
PCA	Portland Cement Association
SMACNA	Sheet Metal and Air Conditioning Contractor's National Association
SSPC	Steel Structures Painting Council
SSPWC	Standard Specifications for Public Works Construction
UBC	Uniform Building Code
USPHS	United States Public Health Service
UL	Underwriter's Laboratory
UMC	Uniform Mechanical Code
UPC	Uniform Plumbing Code
USAS	The United States of America Standard Institute
USBR	United States Bureau of Reclamation
WCLIB	West Coast Lumber Inspection Bureau
WIC	Woodwork Institute of California

"Bureau" - United States Bureau of Reclamation

"State" - State of California

"State Standard Specifications" - Standard Specifications issued by the State of California Business and Transportation Agency, Department of Transportation, latest edition, unless a specific edition is referenced.

A-3 Definitions

- a) Acceptance - The formal written acceptance by the DISTRICT of the entire Contract which has been completed in all respects in accordance with the Specifications and any approved modifications.
- b) Addenda - Written or graphic instruments issued prior to the execution of the Agreement which modify or interpret the Contract Documents, Drawings and Specifications by additions, deletions, clarifications or corrections.
- c) As Approved - The words "as approved" unless otherwise qualified, shall be understood to be followed by the words "by the Engineer."
- d) Bid - The offer of the Bidder for the Work when made out and submitted on the prescribed bid form, properly signed and guaranteed. A Bid is also known as a Proposal.
- e) Bid Bond - The cash, cashier's check, certified check, or bidder's bond accompanying the Bid submitted by the bidder, as a guarantee that the Bidder will enter into a Contract with the DISTRICT for the performance of work herein described.
- f) Bidder - Any individual, firm, partnership or corporation submitting a bid for the work contemplated, and acting directly or through a duly authorized representative.
- g) Change Orders - A written order to the Contractor authorizing an addition, deletion, or revision in the work within the general scope of the Contract Documents or authorizing adjustment in the Contract price or Contract time.
- h) Claim - A separate demand by the Contractor for (i) a time extension, (ii) payment of money or damages arising from work done by or on behalf of the Contractor pursuant to the Contract for a public work and payment of which is not otherwise expressly provided for or the claimant is not

otherwise entitled to, or (iii) an amount the payment of which is disputed by the DISTRICT.

- i) Contract - The written agreement covering the performance of the work and the furnishing of labor, materials, tools and equipment in the construction of the Work. The Contract shall include all Contract Documents and supplemental agreements amending or extending the work contemplated which may be required to complete the Work in a substantial and acceptable manner. Supplemental agreements are written agreements covering alterations, amendments or extensions to the Contract and include Addenda and Contract Change Orders.
- j) Contract Documents - The Contract Documents are any or all of the documents listed in Article I of the Contract.
- k) Contract Price - Total monies payable to the Contractor under the terms and conditions of the Contract Documents.
- l) Contract Time - The numbers of days stated in the Contract Documents for the completion of the Work.
- m) Contractor - The person or persons, firm, partnership or corporation or other entity that has entered into the Contract with the DISTRICT to perform the Work.
- n) Contract Drawings - "Contract Drawings" or "drawings" means and includes:
 - (i) all drawings which have been prepared on behalf of the DISTRICT and which are included in the Contract Documents and all modifying drawings issued by addenda thereto;
 - (ii) all drawings submitted pursuant to the terms of the Contract by the Contractor with his proposal and by the Contractor to the DISTRICT during the progress of the Work when accepted by the Engineer. Except where a specific type of drawing is indicated, the terms "Drawings" and "Plans" are used interchangeably throughout the Contract Documents and the Plans are Drawings as defined above.
- o) County - County of Humboldt, California.
- p) Date of Execution of the Contract - The date on which the Contract is signed by the DISTRICT's authorized representative.
- q) Datum - The figures given in the Specifications or upon the Drawings after the word "Elevation" or an abbreviation of it shall mean NAVD 88 datum unless noted otherwise.
- r) Days - Unless otherwise designated, days as used in the Contract Documents shall mean calendar days.
- s) District - The HUMBOLDT BAY MUNICIPAL WATER DISTRICT, may also be referred to as the DISTRICT or OWNER.
- t) Engineer - Wherever in these documents the word "Engineer" appears, it shall be understood to mean GHD Inc. The Engineer will have final authority as regards to contract administration, field inspection, and related items.
- u) Field Order - A written order effecting a change in the Work not involving an adjustment in the Contract Price or an extension of Contract Time, issued by the Engineer to the Contractor during construction.
- v) His - "His" shall include "her" and "its".
- w) Install - "Install" wherever and in whatever manner used shall mean the installation, complete in place of an item.

Humboldt Bay Municipal Water District
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- x) Notice of Award - The written notice of the acceptance of the Bid from the DISTRICT to the successful Bidder.
- y) Notice to Proceed - Written communication issued by the DISTRICT to the Contractor authorizing him to proceed with the Work and establishing the date of commencement of the Work.
- z) Or Equal - The terms "or equal" or "approved equal" shall be understood to indicate that the "equal" product be the same or better than the product named in function, performance, reliability, quality and general configuration. Determination of equality in reference to the project design requirement will be made by the Engineer.
- aa) District Project Representative – The authorized representative of the DISTRICT who is assigned to the project site or any part of thereof.
- bb) Plans or Specification Drawings - The term "Plans or Specification Drawings" refers to the official Plans, profiles, cross sections, elevations, details, and other working drawings and supplementary drawings, or reproductions thereof, signed by the Engineer, which show the location, character, dimensions, and details of the work to be performed. Plans may either be bound in the same book as the balance of the Contract Documents or bound in separate sets, and are a part of the Contract Documents, regardless of the method of binding.
- cc) Project - The undertaking performed as provided by the Contract Documents.
- dd) Provide - "Provide" wherever and in whatever manner used shall be understood to mean furnish and install.
- ee) Project Geotechnical Engineer – Geotechnical report was prepared by Crawford & Associates and is dated December 14, 2017.
- ff) Resident Project Representative - Authorized representative of the Engineer who is assigned to the Project or any part thereof.
- gg) Service of Notice - Any notice from one party to the other under the Contract shall be in writing and shall be dated and signed by the party giving such notice or by a duly authorized representative thereof. Any such notice shall not be effective for any purpose whatsoever unless service in the following manner:
 - (i) If the notice is given to the DISTRICT by personal delivery thereof, the DISTRICT'S Project Representative or by depositing the notice in the U.S. mail, enclosed in a sealed envelope addressed to HUMBOLDT BAY MUNICIPAL WATER DISTRICT, P.O. Box 95, Eureka, CA 95502, postage prepaid, by certified mail return receipt requested.
 - (ii) If the notice is given to the Contractor, by personal delivery to the Contractor or its duly authorized representative at the project site or by depositing in the U.S. mail, enclosed in a sealed envelope address to the Contractor on the Contract Form, postage prepaid, by certified mail, return receipt request.
 - (iii) If the notice is given to the Surety or any other person, by personal delivery to such Surety or other person by personal delivery to such Surety or other person by depositing in the U.S. mail, enclosed in a sealed envelope, addressed to the surety or other person at the address of such Surety or other person last communicated to the party giving the notice, postage prepaid, by certified mail return receipt requested.
- hh) Shall or Will - "Shall," or "Will," whenever used to stipulate anything, means shall or will be done or be performed by either the Contractor or the DISTRICT and means that the Contractor or the DISTRICT has thereby entered into a covenant with the other party to do or perform the same.
- ii) Shop Drawing - All drawings, diagrams, illustrations, brochures, schedules and other data which

are prepared by the Contractor, a Subcontractor, manufacturer, supplier or distributor, which illustrate how specific portions of the Work shall be fabricated or installed.

- jj) Shown - "Shown," "indicated," "detailed," and words of like import, wherever and in whatever manner used, with or without reference to the drawings, means shown, indicated or detailed on the Drawings or Plans.
- kk) Specifications - A part of the Contract Documents consisting of written descriptions of a technical nature of materials, equipment, construction systems, standards and workmanship, including the General Conditions and Supplemental General Conditions.
- ll) Specified - "Specified," "described," or "noted," wherever and in whatever manner used, means as specified, described or noted in the Contract Documents.
- mm) Subcontractors - The term "Subcontractor", as employed herein, includes only those having a direct contract with the Contractor and it includes one who furnishes material worked to a special design according to the Plans or Specifications of this Work, but does not include one who merely furnishes material not so worked and would be considered a supplier only.
- nn) Substantial Completion - That date as certified by the Engineer when the construction of the Project or a specified part thereof is sufficiently completed, in accordance with the Contract Documents, so that the Project or specified part can be utilized for the purposes for which it is intended.

The Engineer may, at its sole discretion, issue a written notice of substantial completion for the purpose of establishing the starting date for specific equipment guarantees, and to establish the date that the DISTRICT will assume the responsibility for the cost of operating such equipment. Said notice shall not be considered as final acceptance of any portion of the Work or relieve the Contractor from completing the remaining work within the specified time and in full compliance with the Contract Documents.

- oo) Sufficient - "Sufficient," "necessary," or "proper," "acceptable," "satisfactory," "desirable," and words of like import, wherever and in whatever manner used, with or without reference to the Engineer, means sufficient, necessary, proper, acceptable, satisfactory and desirable in the judgment of the Engineer.
- pp) Supplementary Conditions (not included for this project) - Modifications to General Conditions required by a Federal Agency for participation in the PROJECT and approved by the Agency in writing prior to inclusion in the Contract Documents, or such requirements that may be imposed by applicable State laws.

References to "Supplemental General Conditions" in the General Conditions and elsewhere in the Contract Documents shall be construed to read "Supplementary Conditions."

- qq) Supplier - Any person or organization who supplies materials or equipment for the Work, including that fabricated to a special design, but who does not perform labor at the site.
- rr) Time Limits - All time limits stated in the Contract Documents are of the essence of the Contract.
- ss) Work - All the work specified, indicated, shown or contemplated in the Contract to construct the improvements, including all alterations, amendments or extensions thereto made by Contract Change Order or other written orders of the Engineer.
- tt) Written Notice - "Written Notice" shall be deemed to have been duly served when delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended or if delivered at or sent by registered mail to the last business address known to it who

gives the notice, or sent by email.

- uu) Whenever in the Specifications or upon the Drawings the words DIRECTED, REQUIRED, PERMITTED, ORDERED, DESIGNATED, PRESCRIBED, or words of like import are used, it shall be understood that the direction, requirement, permission, order, designation or prescription of the Engineer is intended, and similarly the words APPROVED, ACCEPTABLE, SATISFACTORY, or words of like import, shall mean approved or acceptable to, or satisfactory to the Engineer, unless otherwise expressly stated.

SECTION B GENERAL CONDITIONS

ARTICLE I. SCOPE OF WORK

B-1 Intent of Contract Documents

The intent of the Contract Documents is to prescribe the details for the construction and completion of the Work which the Contractor undertakes to perform in accordance with the terms of the Contract. Where the Specifications and Plans describe portions of the Work in general terms, but not in complete detail, it is understood that only the best general practice is to prevail and that only materials and workmanship of the first quality are to be used. Unless otherwise specified, the Contractor shall furnish all labor, materials, tools, equipment and incidentals and do all the work involved in performing the Contract in a satisfactory and workmanlike manner, ready for use occupancy or operation by the DISTRICT.

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

The Contract Documents are complementary, and what is called for in any one shall be as binding as if called for in all.

Anything shown on the Drawings and not mentioned in the Specifications or mentioned in the Specifications and not shown on the Drawings shall have the same effect as if shown or mentioned respectively in both. Any work shown on one drawing shall be construed to be shown in all drawings and the Contractor will coordinate the Work and the Drawings. If any portion of the Contract Documents shall be in conflict with any other portion, the various documents comprising the Contract Documents shall govern in the following order of precedence: The DISTRICT-Contractor Contract; the Bid; any Supplementary or Special Conditions; Instructions to Bidders; the General Conditions; the Specifications; the Drawings. Technical Specifications take priority over general Specifications and detail Drawings take precedence over general Drawings. As between schedules and information given on Drawings, the Schedules shall govern. As between figures given on Drawings and the scales measurements, the figures shall govern. As between large-scale Drawings and small-scale Drawings, the larger scale shall govern. Any conflict or inconsistency between or in the Drawings shall be submitted to the Engineer through the DISTRICT'S Project Representative or Resident Project Representative in writing. Work done by the Contractor after his discovery of such discrepancies, inconsistencies or ambiguities shall be done at the Contractor's own risk.

B-2 Contractor's Understanding

It is understood and agreed that the Contractor has, by careful examination, satisfied itself as to the nature and location of the Work, the conformation of the ground, the character, quality and quantity of the materials to be encountered, the character of equipment and facilities needed preliminary to and during the prosecution of the Work, the general and local conditions, and all other matters which can in any way affect the Work under this Contract. No verbal agreement or conversation with any officer, agent or employee of the DISTRICT, either before or after the execution of this Contract, shall affect or modify any of the terms or obligations herein contained.

Contractor shall comply with all Federal, State, and Local laws and regulations applicable to this scope of work and said project, as well as all permits and environmental conditions established for this project (see section B-13). Contractor is responsible for obtaining all necessary permits for construction except for those permits already obtained by the DISTRICT prior to construction. If a Contractor materially fails to comply with any term of this award, whether stated in a Federal statute or regulation, an assurance, in a State plan or application, a notice of award, or elsewhere, FEMA and/or the DISTRICT may take one or more of the actions outlined in 2 CFR Section 200.338, including termination of the project. Project awards may be terminated for convenience through the procedures outlined in 2 CFR Section 200.339.

B-3 Changes in the Work

The DISTRICT may, at any time, by written order make changes in the Work including but not limited to: (a) changes in the Specifications or Drawings; (b) changes in the sequence, method or manner of performance of the Work; (c) changes in the owner-furnished facilities, equipment, materials, services or site; or (d) changes directing acceleration of the Work. If such changes cause an increase or decrease in the Contractor's cost of, or time required for, performance of the Contract an equitable adjustment will be made and the Contract modified in writing accordingly.

Such modification will be in the form of a Contract Change Order which will set forth the work to be done or the method by which the change and cost adjustment, if any, will be determined, and the time of completion of the Work.

To comply with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA), material additions or amendments to this scope of work (SOW) may have to be reviewed by all State and Federal agencies participating in the NEPA/CEQA process. NEPA/CEQA compliance for all SOW additions or amendments is essential before the revised SOW can be approved by FEMA or implemented by the DISTRICT. Any construction activities associated with a SOW change, prior to FEMA approval, may be ineligible for reimbursement or match. The Contractor shall obtain approval in writing from the DISTRICT prior to proceeding with any changes of work.

The compensation to be paid for any extra work or change shall be determined in one or more of the following ways or at DISTRICT's sole election:

- a) By unit prices previously approved (unit prices previously approved shall be used in all cases for similar units unless mutually agreed that for some reason they are not applicable);
- b) By estimate and acceptance of an agreed upon lump sum; or
- c) On a time and materials basis involving the actual necessary expenses and other services necessary to complete the Work. In addition, there shall be added an amount to be agreed upon but not to exceed fifteen (15) percent of the actual necessary expense to cover the cost of general overhead, general superintendence, other expenses and profit. In the events that items (a) and (b) above are not applicable, then this latter method (c) shall be used. Markup by Subcontractors on their work shall not exceed fifteen percent. Contractor's markup on Subcontractor's work shall not exceed five (5) percent.

The Contractor shall keep full and complete records of the actual cost of such work in the form and manner prescribed by the Engineer and shall permit the Engineer to have access to such records as may be necessary to assist in the determination of the compensation payable for such work.

The Engineer also may at any time by issuing a Field Order make changes in the details of the Work. The Contractor shall proceed with the performance of any change in the Work so ordered by the Engineer unless the Contractor believes that such Field Order entitles it to a change in the Contract Price or Time, or both in which event the Contractor shall give the Engineer written notice thereof within seven (7) calendar days after the receipt of the ordered change. The Contractor shall not execute such changes pending the receipt of an executed change order or further instruction from the DISTRICT.

If the Contractor is delayed in completing by reason of any change made pursuant to this section, the time for completion of the Work shall be extended by change order for a period agreed to, commensurate with such delay. The Contractor shall not be subjected to any claim for liquidated damages for this period of time, but the Contractor shall have no claim for any other compensation for any such delay.

B-4 Procedures and Allowable Costs on Changes

- a) No indirect costs of a Contractor are separately eligible for reimbursement, in compliance with 2 CFR Section 200.410. Such costs are covered by the Subgrantee Administrative Cost allowance formula provided by 44 CFR Section 206.439(b)(1)(ii).
- b) Contractors are referred to the State HMGP administrative plan for project cost overrun regulations. If project costs exceed the approved federal share, the DISTRICT must contact the Governor's Authorized Representative (GAR). The GAR will evaluate requests for cost overruns. Written determination of cost overrun eligibility in accordance with 2 CFR 328 shall be submitted by the GAR to the FEMA Regional Director. Contractor is hereby notified that such notifications and approvals may necessitate project delays, which will be reviewed and approved with the Contractor via a contract Change Order.
- c) All changes which affect the cost or time of the construction of the project must be authorized by means of a Change Order. The Change Order will include extra work, work for which quantities have been altered from those shown in the bidding schedule, as well as decreases or increases in the quantities of installed units which are different than those shown in the bidding schedule because of final measurements. All changes should be recorded on a Change Order as they occur. Each Change Order must contain complete and detailed justification for all items addressed by the Change Order.
- d) If the change in or addition to the Work will result in an increase in the contract sum, the DISTRICT shall have the right to require the performance thereof in any of the following ways, at DISTRICT's sole election:
 - (i) By unit prices previously approved (unit prices previously approved shall be used in all cases for similar units unless mutually agreed that for some reason they are not applicable);
 - (ii) By estimate and acceptance of an agreed upon lump sum; or
 - (iii) On a time and materials basis involving the actual necessary expenses and other services necessary to complete the work. In addition, there shall be added an amount to be agreed upon but not to exceed fifteen (15) percent of the actual necessary expense to cover the cost of general overhead, general superintendence, other expenses and profit. In the events that items (a) and (b) above are not applicable, then this latter method (c) shall be used. Markup by Subcontractors on their work shall not exceed fifteen percent. Contractor's markup on Subcontractor's work shall not exceed five percent (5%).
- e) If the DISTRICT elects to have the Change in the Work performed on a lump sum basis, such election shall be based on a lump sum proposal which shall be submitted by the Contractor within ten (10) calendar days of the DISTRICT's request therefor. Request for a lump sum proposal shall not be deemed an election to have the Work performed on a lump sum basis. The Contractor's proposal shall be itemized and segregated by labor and materials for the various components of the change (no aggregate labor total will be acceptable) and shall be accompanied by signed proposals of any Subcontractors which will perform any portion of the change, and of any persons who will furnish materials or equipment for incorporation therein. The proposal shall also include the Contractor's estimate of the time required to perform said changes or additional work.

The portion of the proposal relating to labor, whether by the Contractor's forces or the forces of any of its Subcontractors, may include reasonably anticipated gross wages of Job Site labor, including foremen, who will be directly involved in the Change in the Work (for such time as they

will be so involved), plus payroll costs (including premium costs of overtime labor, if overtime is anticipated, social security, Federal or State unemployment insurance taxes and fringe benefits required by collective bargaining agreements entered into by the Contractor or any such Subcontractor in connection with such labor) and up to fifteen percent (15%) of such anticipated gross wages, but not payroll costs, as overhead and profit for the Contractor or any such Subcontractor, as applicable (such overhead and profit to include all supervision except foremen.)

The portion of the proposal relating to materials may include the reasonably anticipated direct costs to the Contractor or to any of its Subcontractors of materials to be purchased for incorporation in the Change in the Work, plus transportation and applicable sales or use taxes and up to fifteen percent (15%) of said direct material costs as overhead and profit for the Contractor or any such Subcontractor (such overhead and profit to include all small tools), and may further include the Contractor's and any of its Subcontractors' reasonably anticipated rental costs in connection with the Change in the Work (either actual rates or discounted local published rates), plus up to five percent (5%) thereof as overhead and profit for the Contractor or any such Subcontractors, as applicable. If any of the items included in the lump sum proposal are covered by unit prices contained in the Contract Document, the DISTRICT may, if it requires the Change in the Work to be performed on a lump sum basis, elect to use these unit prices in lieu of the similar items included in the lump sum proposal in which event and appropriate deduction will be made in lump sum amount prior to the application of any allowed overhead and profit percentages. No overhead and profit shall be applied to any unit prices.

The lump sum proposal may include up to five percent (5%) of the amount which the Contractor will pay to any of its Subcontractors for the Change in the Work as a commission to the Contractor.

- f) In the event that the Contractor fails to submit its proposal within the designated period, the Engineer may direct the Contractor to proceed with the Change or Addition to the Work and the Contractor shall so proceed. The Engineer shall determine the reasonable costs and time to perform the Work in question, which determination when approved by DISTRICT shall be final and binding upon the Contractor.
- g) In the event that the parties are unable to agree as to the reasonable costs and time to perform the change in or addition to the Work based upon the Contractor's proposal and the Engineer and DISTRICT do not elect to have the change in the Work performed on a time and material basis, the Engineer and DISTRICT shall make a determination of the reasonable cost and time to perform the Change in the Work, based upon their own estimates, the Contractor's submission or combination thereof. A Change Order shall be issued for the amount of costs and time determined by the Engineer and the DISTRICT and shall become binding upon the Contractor unless the Contractor submits its protest in writing to the DISTRICT within thirty (30) calendar days of the issuance of the Change Order. The DISTRICT has the right to direct the Contractor in writing to perform the Change in the Work which is the subject of the Change Order. Failure of the parties to reach agreement regarding the costs and time of the performing the Change in the Work and/or any pending protest shall not relieve the Contractor from performing the Change in the Work promptly and expeditiously.
- h) If the DISTRICT elects to have the Change in the Work performed on a time and material basis, the same shall be performed, whether by the Contractor's forces or the forces of any of its Subcontractors or Sub-subcontractors, at actual costs to the entity or entities performing the Change in the Work (without any charge for administration, clerical expense, supervision or superintendence of any nature whatsoever, including foremen, or the costs, use or rental of tools or plant), plus fifteen percent (15%) thereof as the total overhead and profit to the entity or entities actually performing the change (except that this fifteen percent (15%) shall not be applied against any payroll costs, defined herein with respect to lump sum proposals). If the entity or entities

actually performing the work are Subcontractors or Sub-subcontractors, the Contractor shall be allowed five percent (5%) of the total charge of the performing entity or entities (including mark-up) as Contractor's mark-up. No other mark-ups shall be allowed hereunder. The Contractor shall submit to the DISTRICT daily work and material tickets, to include the identification number assigned to the Change in the Work, the location and description of the Change in the Work, the classification of labor employed (and names and social security numbers), the material used, the equipment rented (not tools) and such other evidence of cost as the DISTRICT may require. The DISTRICT may require authentication of all time and material tickets and invoices by persons designated by the DISTRICT for such purpose. The failure of the Contractor to secure any required authentication shall, if the DISTRICT elects to treat it as such, constitute a waiver by the Contractor of any claim for the cost of that portion of the Change in the Work covered by a non-authenticated ticket or invoice; provided, however, that the authentication of any such ticket or invoice by the DISTRICT shall not constitute an acknowledgment by the DISTRICT that the items thereon were reasonably required for the Change in the Work.

- i) No overhead and profit will be paid by the DISTRICT on account of a Change in the Work except as specifically provided in this Section B-4. Overhead and Profit, as allowed under this paragraph, shall be deemed to include all costs and expenses which the Contractor or any of its Subcontractors may incur in the performance of the Change in the Work and which are not otherwise specifically recoverable by them pursuant to this paragraph.
- j) The Contractor shall not be entitled to any amount for indirect costs, damages or expenses of any nature, including, but not limited to, so-called "impact" costs, labor inefficiency, wage, material or other escalations beyond the prices upon which the proposal is based and to which the parties have agreed pursuant to the provisions of this section, and which the Contractor, its Subcontractors and Sub-subcontractors or any other person may incur as a result of delays, interferences, suspensions, changes in sequence or the like, for whatever cause, whether reasonable or unreasonable, foreseeable or unforeseeable, or avoidable or unavoidable, arising from the performance of any and all Changes in the Work performed pursuant to this section. It is understood and agreed that the Contractor's sole and exclusive remedy in such event shall be recovery of its direct costs as compensable hereunder and an extension of the time of the Contract, but only in accordance with the provisions of the Contract Documents.

The Contractor agrees that it shall not be entitled to claim damages for anticipated profits on any portion of work that may be deleted. The amount of any adjustment for work deleted shall be estimated at the time deletion of work is ordered and the estimated adjustment will be deducted for the subsequent monthly pay estimates.

The DISTRICT reserves the right to contract with any person or firm other than the Contractor for any or all extra work.

B-5 Unilateral Change in or Addition to the Work

Notwithstanding the above, the DISTRICT, directly or through the Engineer, may direct the Contractor in writing to perform changes in or additions to the scope of the Contract. The Contractor shall perform such work and the parties shall proceed pursuant to the provisions of Section B-4.

B-6 Differing Site Conditions

The Contractor shall promptly, and before the following conditions are disturbed, notify the DISTRICT in writing of any:

- a) Material that the Contractor believes may be material that is hazardous waste, as defined in Section 25118 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; or

- b) Subsurface or latent physical conditions at the site differing from those indicated in the Contract Documents; or
- c) Unknown 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.

The Engineer shall thereupon promptly investigate the conditions. If the Engineer finds that they do involve hazardous waste, or do materially differ and cause any decrease or increase in the Contractor's cost or time of performance, it will issue a Change Order as appropriate. Any increase or decrease in the cost of the Work or the time for performance shall be adjusted in the manner provided herein for adjustments as to extra and/or additional work and changes. The procedures applicable to claims per extra costs shall then apply.

In accordance with 36 CFR Part 800, in the event a potential historic property or cultural resource is discovered during construction activities, the Contractor must cease work in the vicinity of the discovery and take all reasonable measures to avoid or minimize harm to the discovered property/resource. Construction activities in the area of the discovery shall not resume until the DISTRICT concludes consultation with the State Historic Preservation Officer (SHPO) for treatment of the discovery.

B-7 Claims for Extra Costs

- a) The Plans for Work show the conditions as they are supposed or believed by the Engineer to exist, but it is neither intended nor to be inferred that the conditions as shown thereon constitute a representation by the DISTRICT or its officers that such conditions are universally existent nor shall the DISTRICT or any of its officers or representatives be liable for any loss sustained by the Contractor as a result of any variance between conditions as shown on the Plans and alternate conditions revealed during the progress of the Work, or otherwise.
- b) The DISTRICT assumes no responsibility for any representations made by any of its officers or agents during or prior to the execution of this Contract, unless (1) such representations are expressly stated in the Contract, and (2) the Contract expressly provides that the responsibility therefor is assumed by the DISTRICT.
- c) It is hereby mutually agreed that the Contractor shall not be entitled to the payment of any additional compensation for any cause, including any act, or failure to act, by the Engineer or the DISTRICT, or the happening of any event, thing or occurrence, unless the Contractor shall have given the Engineer due written notice of potential claims as hereinafter specified.
- d) The written notice of potential claims shall set forth the reasons for which the Contractor believes additional compensation will or may be due, the nature of the costs involved, and, insofar as possible, the amount of the potential claim. Except as provided in Section B-6, the notice as above required shall be given to the Engineer at least 48 hours prior to the time that the Contractor commences performance of the work giving rise to the potential claim for additional compensation. If such notice is not given, the Contractor shall be barred from making any such claim for extra compensation.
- e) The Contractor may submit a claim to the Engineer concerning any matter for which a protest under Section B-3 or a notice of potential claim is filed within sixty (60) calendar days following the submission of said protest or notice, unless, due to the nature of the claim or the uncompleted state of the work, it is impracticable to determine the amount or the extent of the claim within such period, in which case a claim may be submitted at the earliest time thereafter that such determination can be made, but in no event later than the final release by the Contractor provided for in Section B-71. The claims shall set forth clearly and in detail, for each item of additional compensation claimed, the reasons for the claim, reference to applicable provisions of the

Specifications, the nature and the amount of the cost involved, the computations used in determining such costs, and all pertinent factual data. The Contractor shall maintain complete and accurate records of the cost or any portion of the Work for which additional compensation is claimed, and shall provide the Engineer with copies thereof, as required.

- f) The Engineer will, within a reasonable time after submission of the Contractor's claim, make decisions in writing on all claims of the Contractor. All such decisions of the Engineer shall be final unless the Contractor shall within ten (10) calendar days after receipt of the Engineer's decision, file with the Engineer a written protest, stating clearly and in detail the basis thereof. Such protest will be forwarded promptly by the Engineer to the DISTRICT, which will issue a decision upon each such protest, and the DISTRICT's decision will be final. Pending such decision, the Contractor shall proceed with its work in accordance with the determination or instructions of the Engineer. It is hereby agreed that the Contractor's failure to protest the Engineer's determination or instructions, within ten (10) calendar days from and after the Engineer's determinations or instructions, shall constitute a waiver by the Contractor of all its rights to further protest, judicial or otherwise.
- g) It is the intention of this Section that the differences between the parties, arising under and by virtue of the Contract, be brought to the attention of the Engineer at the earliest possible time in order that such matters may be settled, if possible or other appropriate action promptly taken. The Contractor hereby agrees that it shall have no right to additional compensation for any claim that may be based on any act, failure to act, event, thing or occurrence for which no written notice of potential claim as herein required was timely filed.
- h) In the event of an emergency endangering life or property, the Contractor shall act as stated in Section B-62 herein, and after execution of the emergency work shall present an accounting of labor, materials and equipment in connection therewith. The procedure for any payment that may be due for emergency work will be as specified in Section B-3 herein.

B-8 Disputes

Except as otherwise specifically provided in the Contract Documents, the Engineer will initially decide all claims of the Contractor and all disputes arising under and by virtue of the Contract. Such claim or dispute will be processed and decided by the Engineer as soon as practicable after its submission and the submission or availability of any additional information necessary to its decision. If the Contractor is dissatisfied with the Engineer's decision, the Contractor may, within 15 calendar days from the date of the Engineer's decision, follow the procedures set forth in Section B-55. If the Contractor fails to follow the procedures set forth in Section B-55 within the 15 calendar day period, then the Engineer's decision shall be final, conclusive, and binding on the Contractor.

B-9 Guarantee

- a) In addition to warranties, representations and guarantees stated elsewhere in the Contract Documents, the Contractor unconditionally guarantees all materials and workmanship furnished hereunder, and agrees to replace at its sole cost and expense, and to the satisfaction of the Engineer and the DISTRICT, any and all materials which may be defective or improperly installed.
- b) The Contractor shall repair or replace to the satisfaction of the Engineer any or all such work that may prove defective in workmanship or materials, ordinary wear and tear excepted, together with any other work which may be damaged or displaced in so doing.
- c) In the event of failure to comply with the above stated conditions within a reasonable time, the DISTRICT is authorized to have the defect repaired and made good at the expense of the Contractor who will pay the costs and charges therefor immediately upon demand, including any reasonable management and administrative costs, and engineering, legal and other consultant fees incurred to enforce this section.

- d) The signing of the Contract by the Contractor shall constitute execution of the above guarantees. Except as otherwise provided in this Contract, the guarantees and warranties shall remain in effect through the one-year maintenance warranty period specified in the Performance Bond.

ARTICLE II. CONTROL OF WORK

B-10 Authority of the Engineer

- a) The Engineer is the representative of the DISTRICT and has full authority to interpret the Contract Documents, to conduct the construction review and inspection of the Contractor's performance, and to decide questions which arise during the course of the work and its decisions on these matters shall be final and conclusive. The Engineer has the authority to reject all work and materials which do not conform to the Contract Documents, and has the authority to stop the work whenever such stoppage may be necessary to ensure the proper execution of the Contract.

If at any time the Contractor's work force, tools, plant or equipment appear to the Engineer to be insufficient or inappropriate to secure the required quality of work or the proper rate of progress, the Engineer may order the Contractor to increase their efficiency, improve their character, to augment their number or to substitute other personnel, new tools, plant or equipment, as the case may be, and the Contractor shall comply with such order.
- b) Neither the failure of the Engineer to demand such increase of efficiency, number, or improvement, nor the compliance by the Contractor with the demand, shall relieve the Contractor of its obligation to provide quality work at the rate of progress necessary to complete the Work within the specified time.
- c) The Engineer shall have the authority to make minor changes in the Work, not involving extra costs, and not inconsistent with the purposes of the Work.
- d) Any order given by the Engineer, not otherwise required by the Contract Documents to be in writing shall, on request of the Contractor, be given or confirmed by the Engineer in writing.
- e) Whenever work, methods of procedure, or any other matters are made subject to direction or approval, such direction or approval will be given by the Engineer.
- f) The Engineer shall not be responsible for the construction means, controls techniques, sequences procedures or construction safety.
- g) It is expressly agreed and understood that GHD Inc. will have no liability whatsoever resulting from the obligations entered into under the Contract except as provided in any scope of work agreement between GHD Inc. and the DISTRICT; that the DISTRICT must look solely to the Contractor for the furnishing of the Work; that the Contractor must look solely to the DISTRICT for payment; and that the DISTRICT and the Contractor must look solely to each other for the enforcement of any claims or liabilities arising under or by reason of the Contract.

B-11 Drawings

- a) Drawings furnished herewith are for bidding purposes. The Engineer will furnish the Contractor additional copies of the Contract Documents and full-size plans. Additional copies may be obtained by paying the actual cost of reproduction. The Contractor shall have no claim for excusable delay on account of the failure of the Engineer to deliver such drawings unless the Engineer shall have failed to deliver the same within fourteen (14) calendar days after receipt of written demand therefor from the Contractor. The Contractor shall keep one copy of said drawings, in good order, available to the Engineer and its representatives, and convenient to the working site. The Contractor shall maintain on the job site and make available to the Engineer on request, one current full-sized marked-up set of design drawings which accurately indicate all variations in the completed work that differ from the design information shown on the Plans. If the Contractor, in the course of the Work, finds any discrepancy between the Drawings and the physical condition of the locality, or any errors or omissions in the Drawings, or in the layout as given by points and instructions, it shall be the Contractor's duty to inform the Engineer in writing, and the Engineer will

promptly verify the same. Any work done after such discovery, until authorized, will be done at the Contractor's risk. All Drawings, Specifications, and copies thereof furnished by the Engineer are the property of the Engineer and shall not be reused on other work and, with the exception of the signed Contract sets, are to be returned to the Engineer, on request, at the completion of the Work. All models are the property of the DISTRICT. The Contractor may be furnished additional instructions and detail drawings by the Engineer as necessary to carry out the work required by the Contract Documents.

The additional drawings and instructions thus supplied, will become part of the Contract Documents. The Contractor shall carry out the Work in accordance with the additional detail drawings and instructions.

- b) The Drawings shall be supplemented by such shop drawings prepared by the Contractor as are necessary to adequately control the Work. No changes shall be made by the Contractor in any shop drawings after they have been reviewed by the Engineer.
- c) Shop Drawings for any structure shall include, but not be limited to: stress sheets, anchor bolt layouts, shop details, and erection plans, which shall be reviewed and accepted by the Engineer before any such work is performed.
- d) Contractor agrees that shop drawings processed by the Engineer are not Contract Change Orders; that the purpose of shop drawings submitted by the Contractor is to demonstrate to the Engineer that the Contractor understands the design concept, that it demonstrates its understanding by indicating which equipment and material it intends to furnish and by detailing the fabrication methods it intends to use.
- e) It is expressly understood, however, that favorable review of the Contractor's shop drawings shall not relieve the Contractor of any responsibility for accuracy of dimensions and details, or for mutual agreements of dimensions and details. It is mutually agreed that the Contractor shall be responsible for agreement and conformity of its shop drawings with the Specifications. Contractor further agrees that if deviations, discrepancies or conflicts between shop drawings and Specifications are discovered either prior to or after shop drawings are processed by the Engineer, the Specifications shall control and shall be followed.
- f) Unless otherwise stated, the Engineer shall have thirty (30) calendar days from the date of receipt of shop drawings for review.
- g) Full compensation for furnishing all shop drawings shall be considered as included in the prices paid for the Contract items of Work to which such drawings relate and no additional compensation will be allowed therefor. Any cost related to the Engineer's review of any particular set of shop drawings more than twice, due to incompleteness or unacceptability, shall be borne by the Contractor, and the DISTRICT reserves the right to withhold such costs from payments due the Contractor.
- h) When submitted for the Engineer's review, Shop Drawings shall bear the Contractor's certification that he has reviewed, checked and approved the Shop Drawings and that they are in conformance with the requirements of the Contract Documents.
- i) That portion of the Work requiring a shop drawing or sample submission shall not begin until the shop drawing or submission has been approved by the Engineer. A copy of each approved shop drawing and each approved sample shall be kept in good order by the Contractor at the site and shall be available to the Engineer.
- j) Acceptance by the Engineer of any drawing, method of work, or any information regarding materials and equipment the Contractor proposes to furnish shall not relieve the Contractor of his responsibility for any errors therein and shall not be regarded as an assumption of risks or liability

by the Engineer or DISTRICT, or any officer or employee thereof, and the Contractor shall have no claim under the Contract on account of the failure or partial failure or inefficiency or insufficiency of any plan or method or work or material and equipment so accepted. Such acceptance shall be considered to mean merely that the Engineer has no objection to the Contractor using, upon his own full responsibility, the plan or method of work proposed, or furnishing the materials and equipment proposed.

B-12 Construction Staking and Surveys

The Contractor shall furnish land surveys deemed necessary for locating the principal component parts of the Work.

B-13 Permits and Regulations

Permits, licenses, and easements of a temporary or permanent nature, necessary for the prosecution of the Work shall be secured and paid for by the Contractor, except as noted in Section B-32, and herein.

The Contractor shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the Work as shown on the Plans and described in the Specifications. The Contractor shall promptly notify the Engineer in writing of any specification at variance therewith and any necessary changes shall be adjusted as provided in the Contract for Changes in the Work. If the Contractor performs any work knowing it to be contrary to such laws, ordinances, rules, and regulations and without such notice to the Engineer, it shall bear all costs arising therefrom.

B-14 Conformity with Contract Documents and Allowable Deviations

Work and materials shall conform to the lines, grades, cross sections, dimensions and material requirements, including tolerances, shown on Contract Documents. Although measurement, sampling, and testing may be considered evidence as to such conformity, the Engineer shall be the sole judge as to whether the work or materials deviate from the Specifications and Plans, and its decision as to any allowable deviations therefrom shall be final and conclusive.

Whenever a material, article or piece of equipment is identified on the Drawings or Specifications by reference to brand name or catalogue number, it shall be understood that this is referenced for the purpose of defining the performance or other salient requirements and that other products of equal capacities, quality and function shall be considered as described in Section B-28. The Contractor may recommend the substitution of a material, article, or piece of equipment of equal substance and function for those referred to in the Contract Documents by reference to brand name or catalogue number, and if, in the opinion of the Engineer, such material, article, or piece of equipment is of equal substance and function to that specified, the Engineer may approve its substitution and use by the Contractor. Any cost differential shall be deductible from the Contract Price and the Contract Documents shall be appropriately modified by Change Order. The Contractor warrants that if substitutions are approved, no major changes in the function or general design of the Project will result. Incidental changes or extra component parts required to accommodate the substitution will be made by the Contractor without a change in the Contract Price or Contract Time.

B-15 Coordination and Interpretation of Contract Documents

- a) The Contract Documents are complementary and a requirement occurring in one is as binding as though occurring in all.
- b) In the event of conflict between the Plans and the Technical Specifications, the Technical Specifications shall govern, except that, where items are shown on the Plans and are not specifically included in the Technical Specifications, the Plans shall govern.
- c) Should it appear that the work to be done or any of the matters relative thereto are not sufficiently

detailed or explained in the Specifications or Plans, the Contractor shall apply to the Engineer for such further explanations as may be necessary and shall conform to them as part of the Contract. In the event of any doubt or question arising respecting the true meaning of the Specifications and Plans, reference shall be made to the Engineer, whose decision thereon shall be final and conclusive.

- d) In the event of any discrepancy between any plans and the figures written thereon, the figures shall be taken as correct. Detailed drawings shall prevail over general drawings.
- e) Any reference made in these Specifications or on the plans to any Specification, standard, method, or publication of any scientific or technical society or other organization shall, in the absence of a specific designation to the contrary, be understood to refer to the Specification, standard, method, or publication in effect as of the date that the Work is advertised for Bids.

B-16 Subcontracts

- a) In accordance with 2 CFR Section 200.213, the Contractors must not make any award or permit any award (subgrant or contract) at any tier to any party which is debarred or suspended or is otherwise excluded from or ineligible for participation in Federal assistance programs under Executive Order 12549, "Debarment and Suspension."
- b) The attention of the Contractor is directed to the provisions of Public Contract Code sections 4100-4113, regarding subcontracting and said provisions are by this reference incorporated herein and made a part hereof.
- c) Each Subcontract shall contain a suitable provision for the suspension or termination thereof should the Work be suspended or terminated or should the Subcontractor neglect or fail to conform to every provision of the Contract Documents insofar as such provisions are relevant. No Subcontractor or supplier will be recognized as such, and all persons engaged in work will be considered as employees of the Contractor, and the Contractor will be held responsible for their work, which shall be subject to the provisions of the Contract Documents. The Contractor shall be fully responsible to the DISTRICT for the acts or omissions of its Subcontractors and of the persons either directly or indirectly employed by him. Nothing contained in the Contract Documents shall create any contractual relationship between any Subcontractor and the DISTRICT. If a legal action, including arbitration and litigation, against the DISTRICT is initiated by a Subcontractor or Supplier, the Contractor shall reimburse the DISTRICT for the amount of legal, engineering and all other expenses incurred by the DISTRICT in defending itself in said action.
- d) The DISTRICT and the Engineer reserve the right to approve all Subcontractors. Such approval shall be a consideration to the awarding of the Contract and unless notification to the contrary is given to the Contractor prior to the signing of the Contract, the list of Subcontractors which is submitted with its proposal will be deemed to be acceptable.

B-17 Cooperation of Contractors

- a) Should construction be under way by other forces or by other contractors within or adjacent to the limits of the work specified or should work of any other nature be under way by other forces within or adjacent to said limits, the Contractor shall cooperate with all such other contractors or other forces to the end that any delay or hindrance to their work will be avoided. The right is reserved to perform other or additional work at or near the site (including material sources) at any time, by the use of other forces.
- b) When two or more contractors are employed on related or adjacent work, each shall conduct its operation in such a manner as not to cause any unnecessary delay or hindrance to the other. Each contractor shall be responsible to the other for all damage to work, to persons or property caused to the other by its operations, and for loss caused the other due to its unnecessary delays

or failure to finish the Work within the time specified for completion.

B-18 Superintendence

- a) The Contractor shall designate in writing before starting work an individual as authorized representative who shall have the authority to represent and act for the Contractor. This authorized representative shall be present at the site of the work at all times while work is actually in progress on the Contract. When work is not in progress and during periods when work is suspended, arrangements acceptable to the Engineer shall be made for any emergency work which may be required.
- b) The Contractor is solely responsible, at all times, for the superintendence of the Work and for its safety and progress.
- c) Whenever the Contractor or its authorized representative is not present on any particular part of the Work where it may be desired to give direction, orders will be given by the Engineer, which shall be received and obeyed by the superintendent or foreman who may have charge of the particular work in reference to which the orders are given.
- d) Any order given by the Engineer, not otherwise required by the Specifications to be in writing, will on request of the Contractor, be given or confirmed by the Engineer in writing.

B-19 Inspection of Work

- a) Unless otherwise provided, all equipment, materials, and work shall be subject to inspection and testing by the Engineer. The Engineer will observe the progress and quality of the Work and determine, in general, if the Work is proceeding in accordance with the intent of the Contract Documents. The Engineer shall not be required to make comprehensive or continuous inspections to check the quality of the Work, and it shall not be responsible for construction means, methods, techniques, sequences, or procedures, or for safety precautions and programs in connection with the Work. Visits and observations made by the Engineer shall not relieve the Contractor of its obligation to conduct comprehensive inspections of the Work and to furnish proper materials, labor, equipment and tools, and perform acceptable work, and to provide adequate safety precautions, in conformance with the intent of the Contract.
- b) Whenever the Contractor varies the period during which work is carried on each day, it shall give due notice to the Engineer so that proper inspection may be provided. Any work done in the absence of the Engineer shall be subject to rejection. Proper facilities for safe access for inspection to all parts of the Work shall at all times be maintained for the necessary use of the Engineer and other agents of the DISTRICT, and agents of the Federal, State, or Local governments at all reasonable hours for inspection by such agencies to ascertain compliance with laws and regulations.
- c) One or more inspectors may be assigned to observe the Work and to act in matters of construction under this Contract. It is understood that inspectors shall have the power to issue instructions and make decisions within the limitations of the authority of the Engineer. Such inspection shall not relieve the Contractor of its obligation to conduct comprehensive inspections of the work, to furnish proper materials, labor, equipment and tools, and perform acceptable work, and to provide adequate safety precautions in conformance with the intent of the Contract.
- d) The Engineer and its representatives and the DISTRICT and its representatives shall at all times have access to the Work wherever it is in preparation or progress, and the Contractor shall provide safe and convenient facilities for such access and for inspection. If the Specifications, the Engineer's instructions, laws, ordinances, or any public authority require any material, equipment or work to be specifically tested or approved, the Contractor shall give the Engineer timely notice of its readiness for inspection, and if the inspection is by an authority other than the DISTRICT, of

the time fixed for inspection. Inspections by the Engineer will be made promptly and, where practicable, at the source of supply.

- e) Work performed without inspection may be required to be removed and replaced under proper inspection and the entire cost of removal and replacing, including the cost of DISTRICT-furnished materials used in the Work, shall be borne by the Contractor, regardless of whether or not the Work exposed is found to be defective. Examination of questioned work, other than that installed without inspection, may be ordered by the Engineer and, if so ordered, the work must be uncovered by Contractor. If such work is found to be in accordance with the Contract Documents, the DISTRICT will pay the cost of re-examination and replacement. If such work is found to be not in accordance with the Contract Documents, the Contractor shall pay such cost unless it can show that the defect in the work was caused by another Contractor, and in that event the DISTRICT will pay such costs.
- f) The inspection of the Work shall not relieve the Contractor of its obligation to fulfill the Contract as herein prescribed, or in any way alter the standard of performance provided by the Contractor, and defective work shall be made good and unusable materials may be rejected, notwithstanding that such work and materials have been previously overlooked by the Engineer and accepted or estimated for payment. If the Work or any part thereof shall be found defective, Contractor shall, within ten (10) calendar days, make good such defect in a manner satisfactory to the Engineer. If the Contractor shall fail or neglect to make ordered repairs of defective work or to remove the condemned materials from the Work within ten (10) calendar days after direction by the Engineer in writing, the DISTRICT may make the ordered repairs, or remove the condemned materials, and deduct the cost thereof from any monies due the Contractor.
- g) The Contractor shall furnish promptly without additional charge all facilities, labor and materials reasonably needed by the Engineer for performing all inspection and tests. Contractor shall be charged with any additional cost of inspection when material and workmanship are not ready at the time specified by the Contractor for its inspection.
- h) Where any part of the Work is being done under an encroachment permit or building permit, or is subject to Federal, State, County or City codes, laws, ordinances, rules or regulations, representatives of the government agency shall have full access to the Work and shall be allowed to make any inspection or tests in accordance with such permits, codes, laws, ordinances, rules, or regulations. If advance notice of the readiness of the Work for inspection by the governing agency is required, the Contractor shall furnish such notice to the appropriate agency.
- i) The Engineer may inspect production of the material, or the manufacture of products at the source of supply. Plant inspection, however, will not be undertaken until the Engineer is assured of the cooperation and assistance of both the Contractor and the material producer. The Engineer or its authorized representative shall have free entry at all times to such parts of the plant as concerns the manufacture or production of the materials. Adequate facilities shall be furnished free of charge to make the necessary inspection. The DISTRICT assumes no obligation to inspect materials at the source of supply.
- j) Forty-eight (48) hours prior to work being accomplished, the Contractor will notify the Engineer of the proposed working hours to accomplish the work for that day. Overtime and shift work may be established as a regular procedure by the Contract and with the written permission of the Engineer. Such permission may be revoked at any time. No work other than overtime and shift work established as a regular procedure shall be done between the hours of 7 p.m. and 7 a.m., nor on Sundays or legal holidays, except as identified below for tunneling activities, or for such work as is necessary for the proper care and protection of the work already performed, or in case of an emergency.

Continuous pullback may be required during the final segment of the horizontal directional drilling

(HDD) process when the high-density polyethylene pipeline is installed. During this phase of the HDD process, construction could require some nighttime work periods for installation of the water main. If required, nighttime work periods shall be coordinated with the Engineer in advance, and approval shall be given by the Engineer prior to any work occurring outside the hours described above.

All costs for the overtime inspection, including those occurring as a result of overtime and shift work established as a regular procedure, shall be paid for by the Contractor. Overtime inspection shall include inspection required during holidays, Saturdays, Sundays, and any weekday between the hours of 6 p.m and 7 a.m. Such costs will include, but will not necessarily be limited to, engineering, inspection, general supervision and other expenses which are directly chargeable to the overtime work. All such charges shall be deducted by the DISTRICT from payment due the Contractor.

- k) A prefinal inspection of the Work will be made by the DISTRICT and the Engineer. This inspection shall be made as soon as practical after Contractor has notified the DISTRICT in writing that the Work is ready for this inspection. The prefinal inspection shall be made prior to acceptance of any portion of the Work as being substantially complete and prior to filing the Notice of Completion.

A final inspection of all the Work will be made by the DISTRICT, Engineer, and Contractor.

B-20 Tests

The DISTRICT shall perform or witness all tests specified or required by the Technical Specifications. The responsibility for payment for these tests is also outlined in the Technical Specifications. In general, and unless explicitly stated otherwise, the Contractor is responsible for the performance of all test required, and the payment for such tests is to be included in the Bid Item to which it relates. No additional payment will be made for the required testing. The Engineer will direct the Contractor to perform such tests as it deems necessary to determine the quality of work or compliance with Contract Documents. The Contractor shall furnish promptly without additional charge all facilities, labor, and material reasonably required for performing safe and convenient tests as may be required by the Engineer. The Contractor shall not be required to reimburse the DISTRICT for tests performed by the DISTRICT or Engineer above and beyond those outlined in the plans or specifications. If samples of materials are submitted which fail to pass the specified tests, the Contractor shall pay for all subsequent tests.

B-21 Removal of Rejected and Unauthorized Work and Materials

- a) All work or materials which have been rejected shall be remedied, or removed and replaced by the Contractor in an acceptable manner and no compensation will be allowed it for such removal, replacement, or remedial work.
- b) Any work done beyond the lines and grades shown on the plans or established by the Engineer or any extra work done without written authority will be considered as unauthorized work and will not be paid for. Upon order of the Engineer, unauthorized work shall be remedied, removed, or replaced at the Contractor's expense.
- c) Upon failure of the Contractor to comply with any order of the Engineer made under this Section, the DISTRICT may cause rejected or unauthorized work to be remedied, removed or replaced, and may deduct the costs therefor from any monies due or to become due the Contractor.
- d) If following the installation of any equipment furnished hereunder, defects requiring correction by the Contractor are found, the DISTRICT shall have the right to operate such unsatisfactory equipment and make reasonable use thereof until the equipment can be shut down for correction of defects without injury to the DISTRICT.

B-22 Deductions for Uncorrected Work

If the Engineer deems it inexpedient to correct work damaged or not done in accordance with the Contract, an equitable deduction from the Contract price shall be made therefor, and such sum may be withheld by DISTRICT from Contractor's payment.

B-23 Equipment and Plants

- a) If equipment is acquired by the contractor under this project and paid for by the DISTRICT, the use and disposition of the equipment shall be in compliance with 2 CFR Section 200.313.
- b) Only equipment and plants suitable to produce the quality of work and materials required will be permitted to operate on the project.
- c) Plants will be designed and constructed in accordance with general practice for such equipment and shall be of sufficient capacity to insure the production of sufficient material to carry the Work to completion within the time limit.
- d) The Contractor shall provide adequate and suitable equipment and plants to meet the above requirements, and when ordered by the Engineer, shall remove unsuitable equipment from the Work and discontinue the operation of unsatisfactory plants.
- e) The Contractor shall identify each piece of its equipment, other than hand tools, by means of an identifying number plainly stenciled or stamped on the equipment at a conspicuous location, and shall furnish to the Engineer a list giving the description of each piece of equipment and its identifying number. In addition, the make, model number and empty gross weight of each unit of compacting equipment shall be plainly stamped or stenciled in a conspicuous place on the unit. The gross weight shall be either the manufacturer's rated weight or the scale weight.
- f) In the case of termination of this Contract before completion from any cause whatever, the Contractor, if notified to do so by the DISTRICT, shall promptly remove any part or all of its equipment and supplies from the property of the DISTRICT. If the Contractor fails to do so, the DISTRICT shall have the right to remove such equipment and supplies at the expense of the Contractor.

B-24 Character of Worker

The Contractor shall employ only competent Subcontractors or skillful workers to do the work. If any Subcontractor, or person employed by the Contractor or any Subcontractor shall fail or refuse to carry out the directions of the DISTRICT or its agents or shall appear to the DISTRICT or its agents to be incompetent or to act in a disorderly or improper manner, it shall be removed from the project Work immediately on the requisition of the DISTRICT or its agents, and such person shall not again be employed on the Work. Such discharge shall not be the basis for any claim for compensation or damages against the DISTRICT, or any of its officers or agents.

B-25 Separate Contracts

The DISTRICT reserves the right to let other contracts in connection with this work. The Contractor shall afford other contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work, and shall properly connect and coordinate its work with the other contractor's work.

If any part of the Contractor's work depends for proper execution or results upon the work of any other contractor, the Contractor shall inspect and promptly report to the Engineer any defects in such work that render it unsuitable for such proper execution and results. The Contractor's failure to inspect and report shall constitute an acceptance of the other contractor's work as fit and proper for the reception of its work,

except as to defects which may develop in the other contractor's work after the execution of its work.

To ensure the proper execution of its subsequent work, the Contractor shall measure work already in place and shall at once report to the Engineer any discrepancy between the executed work and the Drawings.

The DISTRICT may perform additional Work related to the Project itself, or it may let other contracts containing provisions similar to these. The Contractor will afford the other contractors who are parties to such contracts (or the DISTRICT, if the DISTRICT is performing the additional Work itself), reasonable opportunity for the introduction and storage of materials and equipment and the execution of Work and shall properly connect and coordinate his Work with theirs.

If the performance of additional Work by other contractors or the DISTRICT is not noted in the Contract Documents prior to the execution of the Contract, written notice thereof shall be given to the Contractor prior to starting any such additional Work. If the Contractor believes that the performance of such additional Work by the DISTRICT or others involves him in additional expense or entitles him to an extension of the Contract Time, he may make a claim therefore as provided in Section B-7 of this Contract.

B-26 Materials, Services and Facilities

- a) Unless otherwise specifically stated in the Contract Documents, the Contractor shall furnish all materials, labor, tools, equipment, water, light, power, transportation, supervision, temporary construction of any nature on all of the facilities necessary for the execution and completion of the Work. Unless otherwise specified, all materials shall be new and shall be manufactured, handled, and installed in a workmanlike manner to ensure completion of the Work in accordance with the Contract Documents. The Contractor shall, upon request of the Engineer, furnish satisfactory evidence as to the kind and quality of materials.
- b) Where materials are to be furnished by the DISTRICT, the type, size, quantity and location at which they are available will be stated in the Contract Documents.
- c) Manufacturers' warranties, guarantees, instruction sheets and parts listed, which are furnished with certain articles or materials incorporated in the Work, shall be delivered to the Engineer before acceptance of the Contract.
- d) Manufactured articles, materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned as directed by the manufacturer.
- e) Materials, supplies and equipment shall be in accordance with samples submitted by the Contractor and approved by the Engineer.
- f) Materials, supplies or equipment to be incorporated into the Work shall not be purchased by the Contractor or the Subcontractor subject to a chattel mortgage or under a conditional sale contract or other agreement by which an interest is retained by the seller.
- g) The completed Work shall include all necessary permanent safety devices, such as machinery guards and similar ordinary safety items required by the State and Federal (OSHA) industrial safety authorities and applicable local and national codes. Further, any features of the Work subject to such safety regulations shall be fabricated, furnished, and installed in compliance with these requirements. Prior to performing Work specified herein, the Contractor shall request an inspection by a State Industrial Safety representative for the purpose of determining that the facilities provided are in compliance with the State and Federal safety requirements. Any facilities which are deemed necessary by official response following the above safety inspection shall be added or corrected as required as a part of the Contract Work. However, no payment will be made to the Contractor for such changes or additions to equipment furnished under this Contract since it

is a requirement of these Specifications that such equipment be manufactured or fabricated in such a manner as to be in conformance with all Federal, State, and local safety requirements. The Contractor shall notify all manufacturers, equipment suppliers, and Subcontractors of the provisions of this article.

- h) In approving equipment for installation in the project, the DISTRICT and Engineer assume no responsibility for injury or claims resulting from failure of the equipment to comply with applicable National, State, and local safety codes or requirements, or the safety requirements of a recognized agency, or failure due to faulty design concepts, or defective workmanship and materials.
- i) All materials incorporated into the job shall be new, especially purchased for the project unless otherwise specified or agreed in writing. Unless otherwise noted, any equipment offered shall be current modifications which have been in successful regular operation under comparable conditions for a period sufficient to determine the reliability of the product. This time requirement, however, does not apply to minor details nor to thoroughly demonstrated improvements in design or in materials of construction.
- j) Whenever the Contractor shall furnish materials or manufactured articles or shall do work for which no detailed specifications are set forth, the materials or manufactured articles shall be of the best grade in quality and workmanship obtainable in the market from firms of established good reputation, or, if not ordinarily carried in stock, shall conform to the usual standards of first-class materials or articles of the kind required with due consideration of the use to which they are to be put. In general, the work performed shall be in full conformity and harmony with the intent to secure the best standard of construction and equipment of the work as a whole or in part.
- k) If there is a residual inventory of unused supplies exceeding \$5,000 in total fair market value upon completion of the Project, and if the supplies are not needed for any other federally sponsored programs or projects, the Contractor shall notify the DISTRICT and provide unused supplies to the location and at the time arranged, for unloading and storage. The DISTRICT shall compensate the grant awarding agency for its share (2 CFR Section 200.314).

B-27 Storage of Materials

Materials shall be so stored as to ensure the preservation of their quality and fitness for the Work. When considered necessary, they shall be placed on wooden platforms or other hard, clean surfaces, and not on the ground, and they shall be placed under cover. Stored materials shall be located so as to facilitate prompt inspection. Private property shall not be used for storage purposes without the written permission of the owner or lessee.

Electrical equipment, devices, and motors shall be placed in dry and warm storage as approved by the Engineer.

All equipment and materials which are not to be painted (such as aluminum and stainless steel) and all factory finished or coated equipment and materials which are not to be painted, that are installed prior to completion of adjacent work, shall be completely covered and protected.

Articles or materials to be incorporated in the Work shall be stored in such a manner as to ensure the preservation of their quality and fitness for the Work, and to facilitate inspection.

B-28 Trade Names and Alternatives

For convenience in designation in the Specifications and Plans, certain articles or materials to be incorporated in the Work may be designated under a trade name or the name of a manufacturer and its catalog information. The use of an alternative article or material which is of equal quality and of the required characteristics for the purpose intended will be permitted, subject to the following requirements:

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- a) The burden of proof as to the quality and suitability of alternatives shall be upon the Contractor and it shall furnish all information necessary as required by the Engineer. The Engineer shall be the sole judge as to the quality and suitability of alternative articles or materials and its decision shall be final.
- b) Whenever the Specifications and Plans permit the substitution of a similar or equivalent material or article, no tests or action relating to the approval of such substitute material or article will be made until the request for substitution is made in writing by the Contractor accompanied by complete data as to the equality of the material or article proposed. Such request by the Contractor must be made within thirty-five (35) calendar days after award of Contract.

B-29 Certificate of Compliance

- a) A Certificate of Compliance shall be furnished prior to the use of any materials for which the Technical Specifications require that such a certificate be furnished. In addition, when so authorized in the Specifications, the Engineer may permit the use of certain materials or assemblies prior to sampling and testing if accompanied by a Certificate of Compliance. The Certificate shall be signed by the manufacturer of the material or the manufacturer of assembled materials and shall state that the materials involved comply in all respects with the requirements of the Contract. A Certificate of Compliance shall be furnished with each lot of material delivered to the Work and the lot so certified shall be clearly identified in the Certificate.
- b) All materials used on the basis of a Certificate of Compliance may be sampled and tested at any time. The fact that material is used on the basis of a Certificate of Compliance shall not relieve the Contractor of responsibility for incorporating material in the Work which conforms to the requirements of the Contract Documents and any such material not conforming to such requirements will be subject to rejection whether in place or not.
- c) The DISTRICT reserves the right to refuse to permit the use of material on the basis of a Certificate of Compliance.
- d) The form of the Certificate of Compliance and its disposition shall be as directed by the Engineer.

B-30 Assignment

The Contractor shall not assign the Contract or sublet it as a whole or in part without the prior written consent of the DISTRICT, nor shall the Contractor assign any monies due, or to become due to it hereafter, without the prior written consent of the DISTRICT.

B-31 Use of Completed Portions, Right to Operate Unsatisfactory Equipment or Facilities

- a) The DISTRICT may, at any time, and from time to time, during the performance of the Work, enter the work site for the purpose of installing any necessary work by the DISTRICT labor or other contracts, and for any other purpose in connection with the installation of facilities. In doing so, the DISTRICT shall endeavor not to interfere with the Contractor and the Contractor shall not interfere with other work being done by or on behalf of the DISTRICT.
- b) If, prior to completion and final acceptance of all the Work, the DISTRICT takes possession of any structure or facility (whether completed or otherwise) comprising a portion of the Work with the intent to retain possession thereof (as distinguished from temporary possession contemplating the return to the Contractor), then, while the DISTRICT is in possession of the same, the Contractor shall be relieved of liability for loss or damage to such structure other than that resulting from the Contractor's fault or negligence. Such taking of possession by the DISTRICT shall not relieve the Contractor from any provisions of this Contract respecting such structure, other than to the extent specified in the preceding sentence, nor constitute a final acceptance of such structure or facility.

- c) If, following installation of any equipment or facilities furnished by the Contractor, defects requiring correction by the Contractor are found, the DISTRICT shall have the right to operate such unsatisfactory equipment or facilities and make reasonable use thereof until the equipment or facilities can be shut down for correction of defects without injury to the DISTRICT.

B-32 Lands for Work, Right-of-Way Construction Roads

- a) The DISTRICT will provide the lands, easements, and/or rights-of-way necessary or other rights to enter and work on lands necessary for the performance of the Work. The Contractor is solely responsible for obtaining an encroachment from Humboldt County for the work occurring within and along Warren Creek Road and Glendale Drive. Other permits and licenses are addressed by sections B-13 and B-49. Should the Contractor find it advantageous to use any additional land for any purpose whatsoever, the Contractor shall provide for the use of such land at its expense. The Engineer shall be furnished with a copy of written agreements or otherwise be notified in writing of additional working space which is acquired. Nothing herein contained and nothing marked on the Plans shall be interpreted as giving the Contractor exclusive occupancy of the territory provided by the DISTRICT. When two or more contracts are being executed at one time on the same or adjacent land in such a manner that work on one contract may interfere with that on another, the Engineer shall decide which contractor shall cease work, and which shall continue, or whether the work on both contracts shall progress at the same time and in what manner, and the decision of the Engineer shall be final and binding. When the territory of one contract is the necessary or convenient means of access for the performance of another contract, such privilege of access or any other reasonable privilege may be granted by the Engineer to the contractor so desiring, to the extent, amount, in the manner, and at the time permitted. No such decision as to the method or time of conducting the work or the use of territory shall be the basis of any claim for delay or damage.
- b) Lands, easements or rights-of-way to be furnished by the DISTRICT for construction operations will be specifically shown on the Plans in the form of a clearly defined limits of work.
- c) The Contractor shall construct and maintain all roads necessary to reach the various parts of the Work and for the transportation thereto of construction material and personnel. The cost of constructing and maintaining such roads shall be borne by the Contractor.

B-33 District's Right to Audit and Preservation of Records

- a) The DISTRICT is responsible for obtaining audits in accordance with the Single Audit Act of 1996, in compliance with 2 CFR Section 200 Subpart F. The Contractor shall facilitate the completion of such an audit as it relates to the Contractor's work on this project.
- b) The Contractor shall maintain books, records and accounts of all costs in accordance with generally accepted accounting principles and practices. The DISTRICT, the Comptroller General of the United States, State of California, and its authorized representatives shall have the right to audit the books, records and accounts of the Contractor under any of the following conditions:
- (i) The Contract is terminated for any reason in accordance with the provisions of the Contract Documents in order to arrive at equitable termination costs;
 - (ii) In the event of a disagreement between the Contractor and the DISTRICT over the amount due the Contractor under the terms of the Contract;
 - (iii) To check or substantiate any amounts invoiced or paid which are required to reflect the costs of the Contractor, or the Contractor's efficiency or effectiveness under this Contract or in connection with extras, changes, claims, additions, backcharges, or others, as may be provided for in this Contract; and/or
 - (iv) If it becomes necessary to determine the DISTRICT's rights and the Contractor's obligations under the Contract or to ascertain facts relative to any claim against the Contractor

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- which may result in a charge against the DISTRICT;
- (v) To determine any difference in cost occasioned by a permissible substitution;
 - (vi) To make audits, examinations, excerpts, and transcriptions pertinent to the loan financing on this project.
 - (vii) For any other reason in the DISTRICT's sole judgment.
- c) If any of the conditions stated in paragraph B-33(a) are satisfied, Contractor shall provide the DISTRICT (or its representatives), unlimited, reasonable access during working hours to the Contractor's books and records under the conditions stated above. The DISTRICT's audit rights shall be liberally construed in the DISTRICT's favor.
 - d) The Contractor, from the effective date of final payment or termination hereunder, shall preserve and make available to the DISTRICT for a period of three (3) years thereafter, at all reasonable times at the office of the Contractor (but without any charge to the DISTRICT), all its books, records, documents, photographs, micro-photographs, and other evidence bearing on the costs and expenses of the Contractor under this Contract and relating to the Work hereunder.
 - e) In accordance with 2 CFR Section 200.512, financial and programmatic records related to expenditure of funds on grant-supported projects shall be maintained at least 3 years following the date the grantee submits its final expenditure report on the project.
 - f) The DISTRICT will make all payments required of it under this Contract subject to audit, under circumstances stated above, which audit may be performed at the DISTRICT's option, either during the Contract time period or during the record retention time period. Regardless of authorization, approval or acceptance, signatures or letters which are given by the DISTRICT and are part of the DISTRICT's control systems or are requested by the Contractor, the payments made under this Contract shall not constitute a waiver or agreement by the DISTRICT that it accepts as correct the billings, invoices or other charges on which the payments are based. If the DISTRICT's audit produces a claim against the Contractor, the DISTRICT may pursue all its legal remedies even though it has made all or part of the payments required by this Contract.
 - g) If any audit by the DISTRICT or its representative discloses an underpayment by the DISTRICT pursuant to the terms of the Contract Documents, the DISTRICT shall have the duty to pay any amount found by the audit to be owed to the Contractor. If such audit discloses an overpayment, the Contractor shall have the obligation to reimburse the DISTRICT for the amount of the overpayment. The DISTRICT's right to claim reimbursement from the Contractor of any overpayment shall not be terminated or waived until three years after the completion of the DISTRICT's audit or upon the termination of audit rights under subparagraph B-33(d), whichever date is later. The obligation of the Contractor to make reimbursements hereunder shall not terminate except as provided by law.

The DISTRICT's right to audit and the preservation of records shall terminate at the end of three (3) years after the date final payment is made or termination of the Contract. The Contractor shall include this "Right to Audit and Preservation of Records" clause in all subcontracts issued by it shall require the same to be inserted by all lower tier Subcontractors in their subcontracts, for any portion of the Work. Should Contractor fail to include this clause in any such contract or lower tier contract, or otherwise fail to ensure the DISTRICT's rights hereunder, Contractor shall be liable to the DISTRICT for all costs, expenses and attorney's fees which the DISTRICT may have to incur obtaining or attempting to obtain an audit or inspection of or the restoration of records which otherwise have been available to the DISTRICT from said persons under this clause. Such audit may be conducted by the DISTRICT or its authorized representative.

ARTICLE III. PROGRESS AND COMPLETION OF WORK

B-34 Progress Schedule

The Contractor shall submit to the DISTRICT such schedules of quantities and costs, progress schedules, payrolls, reports, estimates, records and other data, where applicable, as are required by the Contract Documents for the Work to be performed.

Prior to the first partial payment estimate, the Contractor shall submit construction progress schedules showing the order in which it proposes to carry on the Work, including dates at which it will start the various parts of the Work, estimated date of completion of each part and as applicable:

- a) The dates at which special detail drawings will be required; and
- b) Respective dates for submission of shop drawings, the beginning of manufacture, the testing and the installation of materials, supplies, and equipment.
- c) The Contractor shall also submit a schedule of payments that it anticipates it will earn during the course of the Work.

The progress schedules shall be submitted regularly and shall cover a time period satisfactory to the Engineer. The Contractor shall also forward to the Engineer, with the request for progress payment each month, a summary report of the progress of the various parts of the Work under the Contract in the shops and in the field, stating the existing status, rate of progress, estimated time of completion, and cause of delay, if any. If the Work is behind the submitted schedule, the Contractor shall submit in writing a plan acceptable to the DISTRICT and Engineer for bringing the Work up to schedule.

B-35 Commencement and Progress of the Work and Time of Completion

Prior to the start of construction, the DISTRICT will conduct a preconstruction conference. At the conference, the DISTRICT will review the planned development with the Engineer, Contractor, and other interested parties. Items to be reviewed include materials, equipment, rights-of-way, schedules and all arrangements for prosecuting the Work.

The Contractor shall begin work within twenty-one (21) calendar days after receiving a Notice to Proceed and shall diligently prosecute the work to completion within one hundred eighty (180) calendar days. Engineer shall have the right to specify the locations where Contractor shall start and proceed with the Work. The intent is to complete construction by October 15, 2018.

B-36 Suspension of Work

- a) The Engineer may at any time, by notice in writing to the Contractor, suspend any part of the Work for such period of time as may be necessary to prevent improper execution of the Work on the project by the Contractor, its Subcontractors or agents, and the Contractor shall have no claim for damages or additional compensation on account of any such suspension.
- b) The DISTRICT may at any time suspend any part or all of the Work upon ten (10) calendar days written notice to the Contractor, who shall thereupon discontinue all Work suspended except for all operations to prevent loss or damage to Work already executed as may be directed by the Engineer. In the event a part of the Work is suspended, the Contractor, if the suspension is not through its fault or the fault of its Subcontractors or agents, shall be paid on the same basis as Extra Work for costs of work performed in accordance with such orders of the Engineer during such suspension, provided that this shall not include any cost pertaining to Work not suspended by said notice. Work shall be resumed by the Contractor after such suspension on written notice from the DISTRICT. In the event of suspension of the entire Work by the DISTRICT, the Contractor, if the suspension is not through fault of the Contractor or the fault of its Subcontractors

or agents, shall be paid the sum of \$500.00 for each calendar day during which the entire Work shall have been suspended. Said sum is hereby mutually agreed upon as fixed and liquidated damages in full settlement of all costs and expenses, losses and damages resulting to the Contractor from such suspension. Work shall be resumed by the Contractor after such suspension on written notice from the DISTRICT.

- c) In the event of any suspension of the Work in whole or in part under subsection (b) above, the Contractor shall be entitled to an extension of time wherein to complete the Work to the extent of the delay caused the Contractor thereby.
- d) In the event the entire Work shall be suspended by order of the DISTRICT, as hereinabove provided, and shall remain so suspended for a period of sixty (60) consecutive calendar days, through no fault of the Contractor, and notice to resume the Work shall not have been served on the Contractor as hereinabove provided, Contractor may, at its option, by written notice to the DISTRICT, terminate the Contract in the same manner as if the termination had been initiated by the DISTRICT, and the DISTRICT shall have no claim for damages because of such termination of the Contract.
- e) If, through no act or fault of the Contractor, the Work is suspended for a period of more than ninety (90) calendar days by the DISTRICT or under an order of Court or other public authority, or the Engineer fails to act on any request for payment within thirty (30) calendar days after it is submitted, or the DISTRICT fails to pay the Contractor substantially the sum approved by the Engineer or any final award by arbitration or litigation within sixty (60) calendar days of its approval and presentation, then the Contractor may, after ten (10) calendar days from delivery of a written notice to the DISTRICT and the Engineer, terminate the Contract and recover from the DISTRICT payment for all Work executed and all expenses sustained.

In addition and in lieu of terminating the Contract, if the Engineer has failed to act on a request for payment or if the DISTRICT has failed to make any payment as aforesaid, the Contractor may upon ten (10) calendar days written notice to the DISTRICT and the Engineer stop the Work until he has been paid all amounts then due, in which event and upon resumption of the Work, Change Orders shall be issued for adjusting the Contract Price or extending the Contract Time or both to compensate for the costs and delays attributable to the stoppage of the Work.

If the performance of all or any portion of the Work is suspended, delayed, or interrupted as a result of a failure of the DISTRICT or Engineer to act within the time specified in the Contract Documents, or if no time is specified, within a reasonable time, an adjustment in the Contract Price or an extension of the Contract Time, or both, shall be made by Change Order to compensate the Contractor for the costs and delays necessarily caused by the failure of the DISTRICT or Engineer.

If the Contractor intends to file a claim for additional compensation for a delay caused by the DISTRICT or Engineer at a particular time, the Contractor shall file a Notice of Claim with the DISTRICT within seven (7) calendar days of the beginning of the occurrence. The Notice of Claim shall be in duplicate, in writing, and shall state the circumstances and the reasons for the Claim, but need not state the amount. No Claim for additional compensation will be considered unless a Notice of Claim has been filed with the DISTRICT within the time and in the manner stated above. Contractor's failure to file a claim shall constitute a waiver.

B-37 Termination For Default - Damages For Delay - Timely Extension

- a) The Contractor shall at all times employ such force, plant, materials, and tools as will be sufficient, in the opinion of the Engineer, to prosecute the Work at not less than the rates fixed under the terms of the Contract and to complete the Work or any part thereof within the time limits fixed therein. If the Contractor refuses or fails to prosecute the Work, or any separable part

thereof, with such diligence as will ensure the completion within the time specified in the Contract, or any extension thereof, or fails to complete said Work within such time, the DISTRICT may, after giving ten (10) calendar days written notice to the Contractor, terminate its right to proceed with the Work or such part of the Work as to which there has been delay.

- b) The Contractor's right to proceed shall not be so terminated nor the Contractor charged with resulting damage if:
 - (i) The delay in the completion of the Work arises from unforeseeable causes beyond the control and without the fault or negligence of the Contractor, including but not restricted to Acts of God, acts of the public enemy, acts of the DISTRICT, acts of another contractor in the performance of a Contract with the DISTRICT, fires, floods, excluding site flooding due to groundwater, epidemics, quarantine restrictions, unusually severe weather, as determined by the Engineer; and
 - (ii) The Contractor shall, within 48 hours of the start of the occurrence, give notice to the DISTRICT of the cause of the potential delay and an estimate of the possible time extension involved. The Contractor, within seven (7) calendar days from the beginning of any such delay (unless the Engineer grants further period of time before the date of final payment under the Contract), notifies the Engineer in writing of the causes of delay and requests an extension of time.
 - (iii) The Engineer shall ascertain the facts and the extent of the delay and extend the time for completing the Work when, in its judgment, the findings of fact justify such an extension, and its findings of fact shall be final and conclusive on the parties.
- c) A request for an extension of time, or the granting of an extension of time, shall not constitute a basis for any claim against the DISTRICT for additional compensation or damages unless caused by the DISTRICT or another contractor employed by the DISTRICT.
- d) If the Contractor should be adjudged bankrupt, or if it should make a general assignment for the benefit of its creditors, or if a receiver should be appointed for the Contractor on account of its insolvency and not be discharged within ten (10) calendar days after its appointment, or if the Contractor should fail to make prompt payments to Subcontractors or suppliers, or should it persistently disregard laws, ordinances, or the instructions of the Engineer, or otherwise commit a substantial violation of any provisions of the Contract, the DISTRICT may, after giving ten (10) calendar days written notice to the Contractor, terminate the Contract and the Contractor's right to proceed with the Work.
- e) No extension of time will be considered for time lost due to weather conditions normal to the area. Unusual weather conditions, if determined by the Engineer to be of a severity that could not be predicted, may be considered as cause for an extension of Contract completion time.
- f) Delays in delivery of equipment or material purchased by the Contractor or his Subcontractors shall not be considered as a just cause for delay. The Contractor shall be fully responsible for the timely ordering, scheduling, expediting delivery, and installation of all equipment and materials.
- g) The rights and remedies of the DISTRICT provided in this section are in addition to any of the rights and remedies provided by law or under this Contract.
- h) In addition to the DISTRICT's rights under this section, if at any time before completion of the work under the Contract, it shall be determined by the DISTRICT that reasons beyond the control of the parties hereto render it impossible or against the interests of the DISTRICT to complete the Work, or if the Work shall be stopped by an injunction of a court of competent jurisdiction or by order of any competent authority, the DISTRICT may, upon ten (10) calendar days written notice to the Contractor, discontinue the Work and terminate the Contract. Upon service of such notice of termination, the Contractor shall discontinue the Work in such manner, sequence, and at such

times as the Engineer may direct. The Contractor shall have no claim for damages for such discontinuance or termination, nor any claim for anticipated profits on the Work thus dispensed with, nor any other claim except for the Work actually performed up to the time of discontinuance, including any extra work ordered by the Engineer to be done, nor for any claim for liquidated damages in accordance with the provisions of Section B-39.

B-38 Rights of DISTRICT Upon Termination

- a) In the event the right of the Contractor to proceed with the Work, or any portion thereof, has been terminated because of the fault of the Contractor and the Contractor has been given ten (10) calendar days' notice to cure such fault and has not done so, the DISTRICT may take over the Work and prosecute the same to completion by contract or any other method the DISTRICT deems expedient, and may take possession of and utilize in completing the Work such materials, appliances, equipment and plant as may be on the site of the Work and necessary therefor. Whether or not the Contractor's right to proceed with the Work is terminated, it and its sureties shall be liable for all damages including costs of managerial and administrative services, engineering, legal and other consultant fees, sustained or incurred by the DISTRICT in enforcing the provisions of Section B-37 and in completing or causing to complete the Contract Work.
- b) Upon termination the Contractor shall not be entitled to receive any further payment until the Work is finished. If upon completion of the Work the total cost to the DISTRICT, including engineering, legal and other consultant fees, costs of managerial and administrative services, construction costs, and liquidated damages shall be less than the amount which would have been paid if the Work had been completed by the Contractor in accordance with the terms of the Contract, then the difference shall be paid to the Contractor in the same manner as the final payment under the Contract. If the total cost incurred by the DISTRICT on account of termination of the Contract and subsequent completion of the Work by the DISTRICT by whatever method the DISTRICT may deem expedient shall exceed said amount which the Contractor would otherwise have been paid, the Contractor and its sureties shall be liable to the DISTRICT for the full amount of such excess expense.
- c) The rights and remedies of the DISTRICT provided in this section are in addition to any of the rights and remedies provided by the law or under this Contract.

B-39 Failure to Complete the Work in the Time Agreed Upon - Liquidated Damages

- a) Liquidated Damages - It is agreed by the parties to the Contract that time is of the essence; and that in case all the Work is not completed before or upon the expiration of the time limit as set in the Bid, Contract and Progress Schedule, or within any time extensions that may have been granted, damage will be sustained by the DISTRICT; and that it may be impracticable to determine the actual amount of damage by reason of such delay; and it is, therefore, agreed that the Contractor shall pay to the DISTRICT as damages the amount of \$750.00 per day for each and every day's delay in finishing the Work in excess of the number of days specified. The parties expressly agree that this liquidated damage clause is reasonable under the circumstances existing at the time the Contract was made. The DISTRICT shall have the right to deduct the amount of liquidated damages from any money due or to become due the Contractor.
- b) In addition, the DISTRICT shall have the right to charge to the Contractor and to deduct from the final or progress payments for the Work the actual cost to the DISTRICT of legal, engineering, inspection, superintendence, and other expenses, which are directly chargeable to the Contract and which accrue during the period of such delay, except that the cost of final inspection and preparation of the final estimate shall not be included in the charges.
- c) Exclusions - Notwithstanding the provisions of subsection (a), the Contractor shall not be liable for liquidated damages or delays caused by the removal or relocation of utilities when such

removal or relocation is the responsibility of the DISTRICT or the owner of the utility under Government Code Section 4215.

B-40 Clean-up

During the progress of the Work, the Contractor shall maintain the site and related structures and equipment in a clean, orderly condition and free from unsightly accumulation of rubbish. Upon completion of Work and before the final estimate is submitted, the Contractor shall at its own cost and expense remove from the vicinity of the Work all plants, buildings, rubbish, unused work materials, concrete forms, and temporary bridging and other like materials, belonging to it or used under its direction during the construction, and in the event of its failure to do so, the same may be removed by the DISTRICT after ten (10) calendar days' notice to the Contractor, such removal to be at the expense of the Contractor. Where the construction has crossed yards or driveways, they shall be restored by the Contractor to the complete satisfaction of the Engineer, at the Contractor's expense.

ARTICLE IV. LEGAL RELATIONS AND RESPONSIBILITY

B-41 Compliance with Laws - Permits, Regulations, Taxes

Contractor is an independent contractor and shall at its sole cost and expense comply with all laws, rules, ordinances and regulations of all governing bodies having jurisdiction over the Work, obtain all necessary permits and licenses therefor, pay all manufacturers' taxes, sales taxes, use taxes, processing taxes, and all Federal and State taxes, insurance and contributions for social security and unemployment which are measured by wages, salaries or any remuneration paid to Contractor's employees, whether levied under existing or subsequently enacted laws, rules, or regulations. Contractor shall also pay all property tax assessments on materials or equipment used until acceptance by the DISTRICT. If any discrepancy or inconsistency is discovered in the Plans or Specifications, or in this Contract in relation to any such law, rule, ordinance, regulation, order or decree, the Contractor shall forthwith report the same to the Engineer in writing. It shall also protect and indemnify the DISTRICT, the Engineer, and all of the DISTRICT's officers, agents, and servants against any claim or liability arising from or based upon the violation of any such law, rule, ordinance, regulation, order or decree, whether by the Contractor itself or by its employees. Particular attention is called to the following:

- a) Without limitation, materials furnished and performance by Contractor hereunder shall comply with Safety Orders of the Division of Industrial Safety, State of California, Federal Safety regulations of the Bureau of Labor, Department of Labor; and any other applicable Federal regulations.

The Contractor, upon request, shall furnish evidence satisfactory to the DISTRICT and Engineer that any or all of the foregoing obligations have been or are being fulfilled. The Contractor warrants to the DISTRICT that it is licensed by all applicable governmental bodies to perform this Contract and will remain so licensed throughout the progress of the Work, and that it has, and will have, throughout the progress of the Work, the necessary experience, skill and financial resources to enable it to perform this Contract.

Government code section references shall be interpreted to be the most recent applicable version.

B-42 Prevailing Wage

- a) The Contractor shall forfeit as penalty to the DISTRICT the sum of Two Hundred Dollars (\$200) for each calendar day or portion thereof for each worker (whether employed by the Contractor or Subcontractor) paid less than the stipulated prevailing rates for any Work done under the Contract in violation of the provisions of the Labor Code and in particular, Section 1775.
- b) The DISTRICT will not recognize any claims for additional compensation because of the payment of the wages set forth in the Contract Documents. The possibility of wage increases is one of the elements to be considered by the Contractor in determining its proposal, and will not under any circumstances be considered as the basis of a claim against the DISTRICT or the Engineer.
- c) The Contractor shall at all times keep posted at the jobsite current wage rates in effect for this Work.
- d) This is a Public Works Project funded with Federal (FEMA) and State of California Proposition 84 grant money. Therefore both CA State prevailing wage rates and Federal wage rates will be required on this project, whichever wages are higher. The DISTRICT requires that all contractors and subcontractors working on this project keep certified payroll records in accordance with California Labor Code 1776 and submit copies to the DISTRICT.
 - (i) In accordance with the provisions of section 1720 et seq. of the Labor Code, the Division of Labor Standards and Research has determined the general prevailing rates or wages and employer payments for health and welfare, pension, vacation, travel time, and subsistence pay

as provided for in section 1773.8.

- (ii) It shall be mandatory upon the Contractor herein and upon any Subcontractor to pay not less than the said specified rates to all laborers, workers and mechanics employed by them in the execution of the Agreement pursuant to CA Labor Code 1774.
- (iii) Attention is directed to the provisions in section 1777.5 and sections 1777.6 of the Labor Code concerning the requirement to employ apprentices by the Contractor or any Subcontractor under it. The Contractor shall submit documentation to the DISTRICT confirming compliance with these requirements.
- (iv) The Contractor shall comply with and shall cause his subcontractors to comply with all laws and regulations governing the contractor's and subcontractor's performance on this project including, but not limited to: anti-discrimination laws, workers' compensation laws, and prevailing wage laws as set forth in CA Labor Code, Sections 1720-1861 et seq. and licensing laws, as well as Federal Labor Standards set forth in the Davis-Bacon Act (40 USC 276(a-a5), the Copeland "Anti-Kickback" Act (40 USC 276(c); and the Contract Work Hours and Safety Standards Act (CWHSSA) (40 USC 327-333). The contractor is required to include the prevailing wage language in all subcontracts pursuant to CA Labor Code 1775(E)(b)(1). The Contractor shall post, at appropriate conspicuous points on the site of the Project, a schedule showing all the determined general prevailing wage rates.
- (v) The Contractor agrees to comply with Labor Code Section 1775 (Payment of the Prevailing Wage Rates) and Labor Code 1776 (keeping accurate records) and Labor Code 1777.5, placing responsibility for compliance with the statutory requirements for all apprenticeable occupations on the prime contractor. The Contractor shall comply with the requirements imposed by the California Labor Code Sections 1720 through 1861 regarding public works projects and prevailing wage laws and sections 16000-16800 of the CA Code of Regulations.
- (vi) Each worker needed to execute the work must be paid travel and subsistence payments as defined in the applicable collective bargaining agreements filed in accordance with Labor Code Section 1773.8.
- (vii) Holiday and overtime work when permitted by law shall be paid for at a rate of at least one and one-half times the above specified rate of per diem wages, unless otherwise specified.
- (viii) Contractors and any Subcontractors shall be assessed penalties for violating the following labor codes; CA Labor Code 1813 for overtime, 1775 for underpayment of the prevailing wage, and 1776 for inaccurate or incomplete payroll records.

B-43 Labor Compliance and Discrimination

Pursuant to Labor Code section 1771.4, the Contract for this Project is subject to compliance monitoring and enforcement by the California Department of Industrial Relations.

- a) On each job site that is subject to compliance monitoring and enforcement by the Department of Industrial Relations under this subchapter, the prime contractor shall post a Notice containing the following language:

"This public works project is subject to monitoring and investigative activities by the Division of Labor Standards Enforcement (DLSE), Department of Industrial Relations, State of California. This Notice is intended to provide information to all workers employed in the execution of the contract for public work and to all contractors and other persons having access to the job site to enable the DLSE to ensure compliance with and enforcement of prevailing wage laws on public works projects."

"The prevailing wage laws require that all workers be paid at least the minimum hourly wage as determined by the Director of Industrial Relations for the specific classification (or type of work) performed by workers on the project. These rates are listed on a separate job site posting of minimum prevailing rates required to be maintained by the public entity which awarded the public works contract. Complaints concerning nonpayment of the required minimum wage rates to workers on this project may be filed with the DLSE."

Humboldt Bay Municipal Water District
Mad River Pipeline Crossing Project

Local Office Contact Information:

Telephone Number: 844-522-6734
Address: BOFE – Public Works
Attn: Complaints Unit
2031 2031 Howe Ave, Suite 100
Sacramento, CA 95825

“Complaints should be filed in writing immediately upon discovery of any violations of the prevailing wage laws due to the short period of time following the completion of the project that the DLSE may take legal action against those responsible.”

“Complaints should contain details about the violations alleged (for example, wrong rate paid, not all hours paid, overtime rate not paid for hours worked in excess of 8 per day or 40 per week, etc) as well as the name of the employer, the public entity which awarded the public works contract, and the location and name of the project.”

“For general information concerning the prevailing wage laws and how to file a complaint concerning any violation of these prevailing wage laws, you may contact any DLSE office. Complaint forms are also available at the Department of Industrial Relations website found at www.dir.ca.gov/dlse/PublicWorks.html.”

Attention is directed to Section 1735 of the Labor Code, which reads as follows:

- a) No discrimination shall be made in the employment of persons upon public works because of the race, religious creed, color, national origin, ancestry, physical disability, mental disability, medical condition, genetic information, marital status, sex, gender, gender identity, gender expression, age, sexual orientation, or military and veteran status of such persons, except as provided in Section 12940 of the Government Code, and every Contractor for public works violating this section is subject to all the penalties imposed for a violation of this chapter.

Federal Equal Opportunity Clauses from 41 CFR 60 1.4(b) also apply. See Part 4 for detailed outline of Federal requirements. See Part 5 for required Non-discrimination Form.

B-44 Eight-Hour Day Limitation

- a) In accordance with the provisions of the Labor Code, and in particular, Sections 1810 to 1815 thereof, inclusive, eight hours labor shall constitute a day's work, and no worker, in the employ of said Contractor, or any Subcontractor, doing or contracting to do any part of the Work contemplated by this Contract, shall be required or permitted to work more than eight (8) hours in any one calendar day and forty (40) hours in any one calendar week in violation of those provisions; provided that subject to Labor Code Section 1815, a worker may perform work in excess of either eight (8) hours per day or forty (40) hours during any one week upon compensation for all hours worked in excess of eight (8) hours per day or forty (40) hours during any one week at not less than one and one-half times the basic rate of pay.
- b) The Contractor and each Subcontractor shall also keep an accurate record showing the names, addresses, social security numbers, work classifications, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by the Contractor and by the Subcontractor in connection with the work specified herein, which record shall be open at all reasonable hours to the inspection of the DISTRICT, State and Federal officers and agents; and it is hereby further agreed that, except as provided in (a) above, the Contractor shall forfeit as a penalty to the DISTRICT the sum of one hundred dollars (\$100) for each worker employed in the performance of this Contract by it or by any Subcontractor under it for each calendar day during which such worker is required or

permitted to labor more than eight (8) hours in any one calendar day and forty (40) hours in any one calendar week in violation of Sections 1810 through 1815.

B-45 Compliance with State Requirements for Employment of Apprentices

The Contractor's attention is directed to Section 1777.2 through 1777.5 of the Labor Code; provisions of those Sections pertaining to employment of registered apprentices are hereby incorporated by reference into these Specifications. As applicable, the Contractor or any Subcontractor employed by it in the performance of the Contract work shall take such actions as necessary to comply with the provisions of Section 1777.5. Contractor shall provide the DISTRICT copies of applicable forms or equivalent: DAS 140 – Public Works Contract Award Information; CAC2 – Training Fund Contributions; and any other communications relating to apprentices on public works projects. Contractor shall be solely liable for any and all fines assessed by the DIR or other agency or entity for non-compliance with any prevailing wage requirements.

B-46 Underground Utilities

In accordance with Government Code Section 4215, the Contractor shall be compensated for the costs of locating, repairing damage not due to the failure of the Contractor to exercise reasonable care, and removing or relocating existing main or trunkline utility facilities not indicated in the Contract Plans and Specifications with reasonable accuracy, and for the equipment on the project necessarily idled during such work; provided that the Contractor shall first notify the Engineer before commencing work on locating, repairing damage to, removing or relocating such utilities.

B-47 Water Pollution

The Contractor shall exercise every reasonable precaution to protect streams, lakes, reservoirs, and other waters of the state and/or United States from pollution with fuels, oils, bitumens, calcium chloride, and other harmful materials and shall conduct and schedule its operations so as to avoid or minimize muddying and silting of said streams, lakes, reservoirs, and water bodies. Care shall be exercised to preserve vegetation beyond the limits of construction. The Contractor shall comply with Section 5650 of the California Fish and Wildlife Code, the National Pollution Discharge Elimination System (NPDES), State of California Construction General Permit, and all other applicable statutes and regulations relating to the prevention and abatement of water pollution.

B-48 Payment of Taxes

The Contract prices paid for the Work shall include full compensation for all taxes which the Contractor is required to pay, whether imposed by Federal, State, or local governments.

B-49 Permits and Licenses

Except as otherwise provided in this Contract, the Contractor shall procure all permits and licenses, pay all charges and fees, and give all notices necessary and incident to the lawful prosecution of the Work.

Procurement procedures shall be in conformance with 2 CFR Section 200.320.

B-50 Patents

The Contractor shall pay all applicable royalties and license fees and assume all costs arising from the use of patented materials, equipment and devices. The Contractor shall defend all suits or claims for infringement of any patent rights and save the DISTRICT and Engineer and their duly authorized representatives harmless from loss on account thereof, except that the DISTRICT shall be responsible for any such loss when a particular process, design, or the product of a particular manufacturer or manufacturers is specified; however if the Contractor has reason to believe that the design, process or product specified is an infringement of a patent, he shall be responsible for such loss unless he promptly

gives such information to the Engineer.

This project is funded by a Federal Emergency Management Agency (FEMA) Grant. As such, in accordance with 2 CFR Section 200.315, FEMA reserves a royalty-free, nonexclusive, and irrevocable license to reproduce, publish or otherwise use, and to authorize others to use, for Federal Government purposes:

- a) The copyright in any work developed under a grant, subgrant, or contract under a grant or subgrant; and
- b) Any rights of copyright to which a grantee, subgrantee or a contractor purchases ownership with grant support.

B-51 Public Convenience

- a) This section defines the Contractor's responsibility with regard to convenience of the public and public traffic in connection with its operations.
- b) The Contractor shall so conduct its operations as to offer the least possible obstruction and inconvenience to the public and it shall have under construction no greater length or amount of work than it can prosecute properly with due regard to the rights of the public.
- c) Unless otherwise provided in the Contract Documents, all public traffic shall be permitted to pass through the Work with as little inconvenience and delay as possible.
- d) Spillage resulting from hauling operations along or across any publicly traveled way shall be removed immediately by the Contractor at the Contractor's expense.
- e) Construction operations shall be conducted in such a manner as to cause as little inconvenience as possible to abutting property owners.
- f) Convenient access to driveways, houses and buildings along the line of the Work shall be maintained and temporary approaches to crossings or intersecting highways shall be provided and kept in good condition. When the abutting property owner's access across the right-of-way line is to be eliminated, or to be replaced under the Contract by other access facilities, the existing access shall not be closed until the replacement access facilities are usable.
- g) Water shall be supplied if ordered by the Engineer for the alleviation or prevention of dust nuisance as provided in the Contract Documents.
- h) In order to expedite the passage of public traffic through or around the Work and where ordered by the Engineer, the Contractor shall install signs, lights, flares, barricades, and other facilities for the sole convenience and direction of public traffic. Also, where directed by the Engineer, the Contractor shall provide and station competent flagpersons whose sole duties shall consist of directing the movement of public traffic through or around the Work. The cost of furnishing and installing such signs, lights, flares, barricades, and other facilities, and the cost of providing and stationing such flagpersons, all for the convenience and direction of public traffic, will be considered as included in the Contract price and no additional compensation will be allowed.
- i) Flagpersons and guards, while assigned to traffic control, shall perform their duties and shall be provided with the necessary equipment in accordance with the current "Instructions to Flagmen" of the California Department of Transportation. The equipment shall be furnished and kept clean and in good repair by the Contractor at its expense.

B-52 Safety

- a) General - The Contractor shall be solely and completely responsible for the conditions of the job site, including safety of all persons and property during performance of the Work. This requirement shall apply continuously and not be limited to normal working hours. Safety provisions shall conform to all applicable Federal, State, and local laws, ordinances, and codes, and to the rules and regulations established by the California Division of Industrial Safety, and to other rules of law applicable to the Work.
- b) The services of the Engineer in conducting construction review of the Contractor's performance is not intended to include review of the adequacy of the Contractor's work methods, equipment, bracing or scaffolding or safety measures, in, on, or near the construction site, and shall not be construed as supervision of the actual construction nor make the Engineer or the DISTRICT responsible for providing a safe place for the performance of work by the Contractor, Subcontractors, or suppliers; or for access, visits, use work, travel or occupancy by any person.
- c) The Contractor shall carefully instruct all personnel working in potentially hazardous work areas as to the potential dangers and shall provide such necessary safety equipment and instruction as is necessary to prevent injury and damage to property. The Contractor shall appoint for the duration of this Contract, a qualified supervisor employee to develop and/or supervise the Contractor's job safety program that will effectively implement the safety provisions of the above agencies.
- d) The Contractor, as a part of its safety program, shall maintain at its office or other well-known place at the job site, safety equipment applicable to the Work as prescribed by the aforementioned authorities, all articles necessary for giving first aid to the injured, and shall establish the procedure for the immediate removal to a hospital or a doctor's care of persons (including employees) who may be injured on the job site.
- e) If death or serious injuries or serious damages are caused, the accident shall be reported immediately by telephone or messenger to both the Engineer and the DISTRICT. In addition, the Contractor must promptly report in writing to the Engineer all accidents whatsoever arising out of, or in connection with, the performance of the Work whether on, or adjacent to, the site, giving full details and statements of witnesses.
- f) If any claim is made by anyone against the Contractor or any subcontractor on account of any accident, the Contractor shall promptly report the facts in writing to the Engineer, giving full details of the claim.
- g) All work and materials shall be in strict accordance with all applicable State, Federal, and local laws, rules, regulations, and codes.
- h) Nothing in this Contract is to be construed to permit work not conforming to governing law. When Contract Documents differ from governing law, the Contractor shall furnish and install the higher standards called for without extra charge. All equipment furnished shall be grounded and provided with guards and protection as required by safety codes. Where vapor-tight or explosion-proof electrical installation is required by law, this shall be provided.
- i) Shoring and Trench Safety Plan - Attention is directed to Section 832 of the Civil Code of the State of California relating to lateral and subjacent support, and the Contractor shall comply with this law.
- j) Trenching and Worker Protection - In accordance with Section 6705 of the State Labor Code, the Contractor shall submit to the DISTRICT specific plans to show details of provisions for worker protection from caving ground. Not less than thirty (30) calendar days before beginning excavation for any trench or trenches five (5) feet or more in depth required under this Contract, the

Contractor shall furnish to the Engineer working drawings of its trench safety plan. The trench safety plan working drawings shall be detailed plans showing the design of shoring, bracing, sloping or other provisions to be made for worker protection from the hazard of caving ground. If such plan varies from the shoring system standards established by the Construction Safety Orders of the California Department of Industrial Relations or the Federal Safety and Health Regulations for Construction of the Occupational Safety and Health Administration, Department of Labor, the plan shall be prepared by a registered civil or structural engineer. In no event shall the Contractor use a shoring, sloping, or protective system less effective than that required by said Construction Safety Orders, or less effective than that required by said Federal Safety and Health Regulations for Construction. Submission of this plan in no way relieves the Contractor from the requirement to maintain safety in all operations performed by it or its Subcontractors.

- k) Hazardous Wastes and Unforeseen Conditions - In accordance with Section 7104 of the State Public Contract Code, if the Work contemplated hereunder involves digging trenches or other earthwork activities, the Contractor shall promptly, and before the following conditions are disturbed, notify the DISTRICT, in writing, of any: (i) 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; (ii) Subsurface or latent physical conditions at the site differing from those indicated; or (iii) 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. The DISTRICT shall promptly investigate the conditions, and if it finds that the conditions do materially so differ, or do involve hazardous waste, and cause a decrease or increase in the Contractor's cost of, or the time required for, performance of any part of the Work shall issue a change order under the procedures described herein. In the event that a dispute arises between the DISTRICT and the Contractor whether the conditions materially differ, or involve hazardous waste, or cause a decrease or increase in the Contractor's cost of, or time required for, performance of any part of the Work, the Contractor shall not be excused from any scheduled completion date provided for herein, but shall proceed with all Work to be performed hereunder. 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 DISTRICT and Contractor.
- l) The Contractor shall perform all Work in a fire-safe manner. The Contractor shall supply and maintain onsite adequate firefighting equipment capable of extinguishing incipient fires. The Contractor shall comply with applicable Federal, State, and local fire prevention regulations and where the regulations do not cover, with applicable parts of the National Fire Prevention Standard for "Safeguarding Building Construction Operations," (NFPA No. 241).

B-53 Protection of Person and Property

- a) The Contractor shall take whatever precautions are necessary to prevent damage to all existing improvements, including above ground and underground utilities, trees, shrubbery that is not specifically shown to be removed, fences, signs, mailboxes, survey markers and monuments, buildings, structures, the DISTRICT's property, adjacent property, and any other improvements or facilities within or adjacent to the Work. If such improvements or property are injured or damaged by reason of the Contractor's operations, they shall be replaced or restored, at the Contractor's expense, to a condition at least as good as the condition they were in prior to the start of the Contractor's operations.
- b) The Contractor shall adopt all practical means to minimize interference to traffic and public inconvenience, discomfort or damage. The Contractor shall protect against injury any pipes, conduits or other structures, crossing the trenching or encountered in the Work and shall be responsible for any injury done to such pipes or structures, or damage to property resulting therefrom. The Contractor shall support or replace any such structures without delay and without

any additional compensation to the entire satisfaction of the Engineer. All obstructions to traffic shall be guarded by barriers illuminated at night. The Contractor shall be responsible for all damage to persons and property directly or indirectly caused by its operations and, under all circumstances, the Contractor must comply with the laws and regulations of the County and the State of California relative to safety of persons and property and the interruption of traffic and the convenience of the public within the respective jurisdictions.

- c) The Contractor is cautioned that it must replace all improvements in rights-of-way and within the public streets to a condition equal to what existed prior to the Contractor's entry onto the job.
- d) Type and time of construction required at any road subject to interference by Contract work will be determined by those authorities responsible for maintenance of said road. It shall be the responsibility of the Contractor to determine the nature and extent of all such requirements, including provision of temporary detours as required; however, the construction right-of-way obtained by the DISTRICT at affected roadways will be adequate for provision of all required detours. As required at any road crossing, the Contractor shall provide all necessary flagpersons, guardrails, barricades, signals, warning signs and lighting to provide for the safety of existing roads and detours. Immediately after the need for temporary detours ceases, or when directed, the Contractor shall remove such detours and perform all necessary cleanup work, including replacement of fences, and removal of pavement. Included shall be all necessary replacement of existing roadway appurtenances, grading work, soil stabilization and dust control measures, as required and directed. The cost of all work specified under this Section shall be borne by the Contractor.
- e) The Contractor shall examine all bridges, culverts, and other structures over which it will move its materials and equipment, and before using them, it shall properly strengthen such structures where necessary. The Contractor shall be responsible for any and all injury or damage to such structures caused by reason of its operations.

B-54 Responsibility for Repair of Facilities

All public or private facilities, including but not limited structures, telephone cables, roadways, parking lots, private drives, levees and embankments disturbed during construction of the Work shall be repaired and/or replaced by the Contractor to match facilities existing prior to construction. In addition, the Contractor shall be responsible for any settlement damage to such facilities or adjoining areas for a period of one year after acceptance of such required facilities.

B-55 Resolution of Construction Claims

- a) For any claim arising under this Contract, the following procedures will apply:
 - (i) The claim must be in writing and include the documents necessary to substantiate the claim. Claims must be filed on or before the day of final payment. Nothing in this subsection is intended to extend the time limit or supersede notice requirements for the filing of claims as set forth elsewhere in this Contract.
- b) The Contractor shall proceed with the Work in accordance with the Plans and Specifications and determinations and instructions of the Engineer during the resolution of any claims disputes.

B-56 DISTRICT's Repair

In the event the Contractor refuses or neglects to make good any loss or damage for which the Contractor is responsible under this Contract, the DISTRICT may itself, or by the employment of others, make good any such loss or damage, and the cost and expense of doing so, including any reasonable engineering, legal and other consultant fees, and any costs of administrative and managerial services, shall be charged to the Contractor. Such costs and expenses may be deducted by the DISTRICT from

claims for payment made by the Contractor for Work completed or remaining to be completed.

B-57 Antitrust Claim Assignment

In entering into a public works contract or a subcontract to supply goods, services, or materials pursuant to this Contract, the Contractor and all subcontractors shall offer and agree to assign to the DISTRICT all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Sec. 15) or under the Cartwright Act (Chapter 2 (commencing with Section 16700) of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, services or materials pursuant to the public works contract or subcontract. This assignment shall be made and become effective at the time the DISTRICT tenders final payment to the Contractor, without further acknowledgement by the parties.

B-58 Waiver of Right to Rescind For Material Breach

The Contractor agrees that it can be adequately compensated by money damages for any breach of this Contract which may be committed by the DISTRICT and hereby agrees that no default, act, or omission of the DISTRICT or the Engineer, except for failure to make progress payments as required by Section B-67, shall constitute a material breach of the Contract entitling the Contractor to cancel or rescind the provisions of this Contract or (unless the DISTRICT shall so consent or direct in writing) to suspend or abandon performance of all or any part of the Work. The Contractor hereby waives any and all rights and remedies to which it might otherwise be or become entitled, save only its right to money damages.

B-59 Contractor's License Notice

Contractors are required by law to be licensed and regulated by the Contractors' State License Board which has jurisdiction to investigate complaints against contractors of a complaint if filed within three (3) years of the date of the alleged violation. Any questions concerning a contractor may be referred to the Registrar, Contractors' State License Board, 9835 Goethe Road, Sacramento, California. Mailing address: P.O. Box 26000, Sacramento, California 95826.

ARTICLE V. INSURANCE AND LIABILITY

B-60 Insurance

- a) Neither the Contractor nor any Subcontractors shall commence any work until all required insurance has been obtained at their own expense. Such insurance must have the approval of the DISTRICT as to limit, form, and amount, and shall be placed with insurers with a current A.M. Best's rating of no less than A-:VII.
- b) Any insurance bearing on adequacy of performance shall be maintained after completion of the project for the full guarantee period.
- c) Prior to execution of the Contract, the Contractor shall furnish the DISTRICT with original endorsements effecting coverage for all policies required by the Contract. The Contractor shall not permit any Subcontractor identified in the Designation of Subcontractors form to commence work on this project until such Subcontractor has furnished the DISTRICT with original endorsements effecting coverage for all insurance policies required by the Contract. The endorsements shall be signed by a person authorized by the insurer to bind coverage on its behalf. The Contractor's insurer shall provide complete, certified copies of all required insurance policies, including endorsements affecting the coverage required by this paragraph. The Contractor agrees to furnish one copy of each policy to the DISTRICT, and additional copies as requested in writing, certified by an authorized representative of the insurer.
- d) All of the Contractor's policies shall contain an endorsement providing that written notice shall be given to the DISTRICT at least sixty (60) calendar days prior to termination, cancellation, or reduction of coverage in the policy.
- e) Any policy or policies of insurance that the Contractor elects to carry as insurance against loss or damage to its construction equipment and tools shall include a provision therein providing a waiver of the insurer's right to subrogation against the DISTRICT and the Engineer.
- f) The requirements as to the types, limits, and the DISTRICT's approval of insurance coverage to be maintained by the Contractor are not intended to and shall not in any manner limit or qualify the liabilities and obligations assumed by the Contractor under the Contract.
- g) In addition to any other remedy the DISTRICT may have, if the Contractor or any of the Subcontractors fails to maintain the insurance coverage as required in this Section, the DISTRICT may obtain such insurance coverage as is not being maintained, in form and amount substantially the same as required herein, and the DISTRICT may deduct the cost of such insurance from any amounts due or which may become due the Contractor under this Contract.
- h) The Contractor and all Subcontractors shall, at their expense, maintain in effect at all times during the performance of work under the Contract not less than the following coverage and limits of insurance, which shall be maintained with insurers and under forms of policy satisfactory to the DISTRICT. The maintenance by the Contractor and all Subcontractors of the following coverage and limits of insurance is a material element of this Contract. The failure of the Contractor or any Subcontractor to maintain or renew coverage or to provide evidence of renewal may be treated by the DISTRICT as a material breach of this Contract.
 - (i) Worker's Compensation and Employer's Liability Insurance.
 - a. Worker's Compensation – The Contractor shall Provide, during the life of this Contract, workers' compensation insurance for all of the employees engaged in Work under this Contract, on or at the Project site, and, in case any of sublet Work, the Contractor shall require each subcontractor similarly to provide workers' compensation insurance for all the latter's employees as prescribed by State law. Any class of employee or employees not covered by a subcontractor's insurance shall be covered by the Contractor's insurance. In

case any class of employees engaged in work under this Contract, on or at the Project site, is not protected under the Workers' Compensation Statutes, the Contractor shall provide or shall cause a subcontractor to provide, adequate insurance coverage for the protection of such employees not otherwise protected. The Contractor is required to secure payment of compensation to his employees in accordance with the provisions of Section 3700 of the Labor Code. The Contractor shall file with the DISTRICT certificates of its insurance protecting workers and shall provide certificates at any time upon request. Company or companies providing insurance coverage shall be acceptable to the DISTRICT, if in the form and coverage as set forth in the Contract Documents.

- b. Contractor shall assume the immediate defense of and indemnify and save harmless the DISTRICT and its officers and employees, agents, and consultants from all claims, loss, damage, injury, and liability of every kind, nature, and description brought by any person employed or used by Contractor, or any subcontractor, to perform the Work under this contract regardless of responsibility or negligence. Contractor hereby agrees to waive rights of subrogation which any insurer of Contractor may acquire from Contractor by virtue of the payment of any loss. Contractor agrees to obtain any endorsement that may be necessary to effect this waiver of subrogation. The Workers' Compensation Policy shall be endorsed with a waiver of subrogation in the favor of the DISTRICT for all work performed by the Contractor, its employees, agents and subcontractors.
 - c. The Contractor and all Subcontractors shall maintain insurance to protect the Contractor or Subcontractor from all claims under Worker's Compensation and Employer's Liability Acts, including Longshoremens and Harbor Worker's Act. Such coverage shall be maintained, in type and amount, in strict compliance with all applicable State and Federal statutes and regulations. The Contractor shall execute a certificate in compliance with Labor Code Section 1861.
- (ii) Claims Against DISTRICT - If an injury occurs to any employee of the Contractor or any of the Subcontractors for which the employee or its dependents, in the event of its death, may be entitled to compensation from the DISTRICT under the provisions of the said Acts, or for which compensation is claimed from the DISTRICT, there will be retained out of the sums due the Contractor under this Contract, an amount sufficient to cover such compensation as fixed by said Acts, until such compensation is paid or it is determined that no compensation is due. If the DISTRICT is required to pay such compensation, the amount so paid will be deducted and retained from such sums due, or to become due the Contractor.
- (iii) Commercial General Liability and Automobile Liability Insurance - the Contractor shall provide and maintain the following commercial general liability and automobile liability insurance:
- a. Coverage – coverage for commercial general liability and automobile liability insurance shall be at least as broad as the following:
 - i. Insurance Services Office (ISO) Commercial General Liability Coverage (Occurrence Form CG 0001)
 - ii. Insurance Services Office (ISO) Business Auto Coverage (Form CA 0001), covering Symbol 1 (any auto)
 - b. Limits – the Contractor shall maintain limits no less than the following:
 - i. General Liability - Five million dollars (\$5,000,000) per occurrence or the full per occurrence limits of the policies available, whichever is greater for bodily injury, personal injury and property damage. If Commercial General Liability Insurance or other form with a general aggregate limit or products-completed operations aggregate limit is used, either the general aggregate limit shall apply separately to the project/location (with the ISO CG 2503, or ISO CG 2504, or insurer's equivalent endorsement provided to DISTRICT) or the general aggregate limit and products-completed operations aggregate limit shall be twice the required occurrence limit.
 - ii. Automobile Liability - One million dollars (\$1,000,000) for bodily injury and property damage each accident limit.
 - c. Required Provisions - the general liability, auto liability and excess liability policies are to

contain, or be endorsed to contain, the following provisions:

- i. The DISTRICT, its directors, officers, employees, and authorized volunteers are to be given insured status at least as broad as ISO endorsement CG 2010 11 85; or both CG 20 10 10 01 and CG 20 37 04 13 (or the CG 20 10 04 13 (or earlier edition date) specifically naming all of the DISTRICT parties required in this agreement, or using language that states "as required by contract"). All Subcontractors hired by Contractor must also have the same forms or coverage at least as broad; as respects (via CG 20 38 04 13): liability arising out of activities performed by or on behalf of the Contractor; products and completed operations of the Contractor; premises owned, occupied or used by the Contractor; and automobiles owned, leased, hired or borrowed by the Contractor. The coverage shall contain no special limitations on the scope of protection afforded to the DISTRICT, its directors, officers, employees, or authorized volunteers.
 - ii. It is understood and agreed to by the parties hereto and the insurance company(s), that the Certificate(s) of Insurance and policies shall so covenant and shall be construed as primary, and the DISTRICT insurance and/or deductibles and/or self-insured retentions or self-insured programs shall not be construed as contributory using the ISO endorsement CG 20 01 04 13 or coverage at least as broad.
 - iii. Any failure to comply with reporting or other provisions of the policies including breaches of warranties shall not affect coverage provided to the DISTRICT, its directors, officers, employees, or authorized volunteers.
 - iv. The Contractor's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.
 - v. Each insurance policy required above shall provide that coverage shall not be canceled, except with notice to the DISTRICT.
- d. Such liability insurance shall indemnify the Contractor and his/her sub-contractors against loss from liability imposed by law upon, or assumed under contract by, the Contractor or his/her sub-contractors for damages on account of such bodily injury (including death), property damage, personal injury, completed operations, and products liability.
 - e. The general liability policy shall cover bodily injury and property damage liability, owned and non-owned equipment, blanket contractual liability, completed operations liability, explosion, collapse, underground excavation, and removal of lateral support.
 - f. The automobile liability policy shall cover all owned, non-owned, and hired automobiles.
 - g. All of the insurance shall be provided on policy forms and through companies satisfactory to the DISTRICT.
 - h. The comprehensive general and automobile liability insurance coverage shall also include the following:
 - i. Provision or endorsement naming the DISTRICT, the Engineer and its consultants, and each of their officers, employees, and agents, each as additional insureds in regards to liability arising out of the performance of any work under the Contract and providing that such insurance is primary insurance as respects the interest of the DISTRICT and Engineer and that any other insurance maintained by the DISTRICT and Engineer is excess and not contributing insurance with the insurance required hereunder.
 - ii. "Cross Liability" or "Severability of Interest" clause.
 - iii. Provision or endorsement stating that such insurance, subject to all of its other terms and conditions, applies to the liability assumed by the Contractor under the Contract, including, without limitation, that set forth in Section B-61, Indemnity and Litigation Costs.
 - iv. Provision or endorsement stating that any failure to comply with reporting or other provisions of the policies including breaches of warranties shall not affect

coverage provided to the DISTRICT, its officers, officials, employees, or volunteers.

- i) Deductibles and Self-Insured Retentions - Insurance deductibles or self-insured retentions must be declared by the Contractor, and such deductibles and retentions shall have the prior written consent from the DISTRICT. At the election of the DISTRICT the Contractor shall either 1) reduce or eliminate such deductibles or self-insured retentions, or 2) procure a bond which guarantees payment of losses and related investigations, claims administration, and defense costs and expenses. Policies containing any self-insured retention (SIR) provision shall provide or be endorsed to provide that the SIR may be satisfied by either the named or additional insureds, co-insurers, and/or insureds other than the First Named Insured.
- j) Acceptability of Insurers - Any insurance carrier providing insurance coverage required by the Contract Documents shall be admitted to and authorized to do business in the State of California unless waived, in writing, by the DISTRICT Risk Manager. Carrier(s) shall have an A.M. Best rating of not less than an A-: VII or better.
- k) Responsibility for Work - Until the completion and final acceptance by the DISTRICT of all the work under and implied by this agreement, the work shall be under the Contractor's responsible care and charge. The Contractor shall rebuild, repair, restore and make good all injuries, damages, re-erections, and repairs occasioned or rendered necessary by causes of any nature whatsoever.
 - a. The Contractor shall provide and maintain builder's risk insurance (or installation floater) covering all risks of direct physical loss, damage or destruction to the work in the amount specified in the General Conditions, to insure against such losses until final acceptance of the work by the DISTRICT. Such insurance shall insure at least against the perils of fire and extended coverage, theft, vandalism and malicious mischief, and collapse. The DISTRICT, its directors, officers, employees, and authorized volunteers shall be named insureds on any such policy. The making of progress payments to the Contractor shall not be construed as creating an insurable interest by or for the DISTRICT or be construed as relieving the Contractor or his/her subcontractors of responsibility for loss from any direct physical loss, damage or destruction occurring prior to final acceptance of the work by the DISTRICT.
 - b. The Contractor shall waive all rights of subrogation against the DISTRICT, its directors, officers, employees, or authorized volunteers.
- l) Evidences of Insurance - Prior to execution of the agreement, the Contractor shall file with the DISTRICT a certificate of insurance (Acord Form 25 or equivalent) signed by the insurer's representative evidencing the coverage required by this agreement. Such evidence shall include an additional insured endorsement signed by the insurer's representative and evidence of waiver of rights of subrogation against the DISTRICT (if builder's risk insurance is applicable). Such evidence shall also include (1) attached additional insured endorsements with primary & non-contributory wording, (2) Workers' Compensation waiver of subrogation, and (3) a copy of the CGL declarations or endorsement page listing all policy endorsements, and confirmation that coverage includes or has been modified to include Required Provisions 1-5 above. The DISTRICT reserves the right to obtain complete, certified copies of all required insurance policies, at any time. Failure to continually satisfy the Insurance requirements is a material breach of contract.
- m) Continuation of Coverage - The Contractor shall, upon demand of the DISTRICT deliver evidence of coverage showing continuation of coverage for at least (10) years after completion of the project. Contractor further waives all rights of subrogation under this agreement. When any of the required coverages expire during the term of this agreement, the Contractor shall deliver the renewal certificate(s) including the general liability additional insured endorsement and evidence of waiver of rights of subrogation against the DISTRICT (if builder's risk insurance is applicable) to the DISTRICT at least ten (10) days prior to the expiration date.

- n) Subcontractors - In the event that the Contractor employs other contractors (Subcontractors) as part of the work covered by this agreement, it shall be the Contractor's responsibility to require and confirm that each sub-contractor meets the minimum insurance requirements specified above. The Contractor shall, upon demand of the DISTRICT, deliver to the DISTRICT copies such policy or policies of insurance and the receipts for payment of premiums thereon.
- o) The Contractor's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.
- p) The DISTRICT reserves the right to modify these insurance requirements, including limits, based on the nature of the risk, prior experience, insurer, coverage or other circumstances.

B-61 Indemnity and Litigation Cost

- a) Promptly upon execution of the Contract, the Contractor specifically obligates itself and hereby agrees to protect, hold free and harmless, defend and indemnify the DISTRICT, the Engineer and its consultants, and each of their officers, officials, employees and agents, from and against any and all liability, penalties, costs, losses, damages, expenses, causes of action, claims or judgments, including without limitation attorneys' fees and other costs of litigation, which arise out of or are in any way connected with the Contractor's, or its Subcontractors' or suppliers', performance of Work under this Contract or failure to comply with any of the obligations contained in the Contract. This indemnity shall not extend, however, to attorney fees and costs incurred by the DISTRICT in prosecuting or defending against the Contractor in any proceeding under Section B-8, and shall imply no reciprocal right of the Contractor in any action on the contract pursuant to California Civil Code section 1717 or section 1717.5. To the extent legally permissible, this indemnity and hold harmless agreement by the Contractor shall apply to any acts or omissions, whether active or passive, on the part of the Contractor or its agents, employees, representatives, or Subcontractor's agents, employees and representatives, resulting in liability, irrespective of whether or not any acts or omissions of the parties to be indemnified hereunder may also have been a contributing factor to the liability, except such loss or damage which was caused by the active negligence, sole negligence or willful misconduct of the DISTRICT.
- b) In any and all claims against the DISTRICT or the Engineer and its consultants, and each of their officers, employees and agents by any employee of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, the indemnification obligation under this Section shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any Subcontractor under Worker's Compensation statutes, disability benefit statutes or other employee benefit statutes.
- c) Each party to this Contract has been represented by counsel in the negotiation and execution of this Contract.

B-62 Protection of Work

- a) The Contractor shall be responsible for the care of all work until completion and final acceptance; and the Contractor shall, at its own expense replace damaged or lost material and repair damaged parts of the Work or the same may be done at the Contractor's expense by the DISTRICT and the Contractor and its sureties shall be liable therefore. The Contractor shall make its own provisions for properly storing and protecting all material and equipment against theft, injury, or damage from any and all causes. Damaged material and equipment shall not be used in the Work. The Contractor shall take all risks from floods and casualties except as provided by law, and shall make no charge for the restoration of such portions of the Work as may be destroyed or damaged by flood or other casualties or because of danger from flood or other casualties or for delays from such causes. The Contractor may, however, be allowed a reasonable extension of time on

account of such delays, subject to the conditions hereinbefore specified. The Contractor shall not be responsible for the cost, in excess of five percent (5%) of the contracted amount, of repairing or restoring damage to the Work, if the damage was proximately caused by an earthquake in excess of a magnitude of 3.5 on the Richter Scale or by tidal waves; provided that the Work damaged was built in accordance with accepted and applicable building standards, and the Plans and Specifications of the DISTRICT.

- b) The Contractor shall effectively secure and protect adjacent property and structures, livestock, crops, and other vegetation. If applicable, the Contractor shall open fences on or crossing the right-of-way and install temporary gates of sound construction thereon so as to prevent the escape of livestock. Adjacent fence posts shall be adequately braced to prevent the sagging or slackening of the wire. Before such fences are opened, the Contractor shall notify the owner or tenant of the property and, where practicable, the opening of the fence shall be in accordance with the wishes of said owner or tenant. The Contractor shall be responsible that no loss or inconvenience shall accrue to the owner or tenant by virtue of its fences having been opened or the gate not having been either shut or attended at all times. Where special types of fences are encountered, the Contractor shall install temporary gates made of similar materials and of suitable quality to serve the purposes of the original fences. In all cases where the Contractor removes fences to obtain work room, it shall provide and install temporary fencing as required, and on completion of construction shall restore the original fence to the satisfaction of the Engineer. All costs of providing, maintaining and restoring gates and fencing shall be borne by the Contractor. The Contractor shall provide and maintain all passageways, guard fences, lights and other facilities for protection required by public authority or local conditions.
- c) The Contractor shall use extreme care during construction to prevent damage from dust to crops and adjacent property. The Contractor, at its own expense, shall provide adequate dust control for the right-of-way and take other preventive measures as directed by the Engineer.
- d) The Contractor shall be responsible for all damage to any property resulting from trespass by the Contractor or its employees in the course of their employment, whether such trespass was committed with or without the consent or knowledge of the Contractor.
- e) The Contractor shall see that the work site is kept drained and free of all ground water and any other water which may impede the progress or execution of the Contract work.
- f) The Contractor shall be responsible for any damage caused by drainage or water runoff from construction areas and from construction plant areas. In an emergency affecting the safety of life, or of the Work, or of adjoining property, the Contractor, without special instruction or authorization from the Engineer, is hereby permitted to act at the Contractor's discretion to prevent such threatened loss or injury, and it shall so act without appeal if so instructed or authorized. Any compensation claimed by the Contractor on account of emergency work shall be determined as specified under Section B-3. Should the Engineer deem an emergency condition to exist, the Contractor shall immediately do those things and take those steps ordered by the Engineer. The decision of the Engineer in this respect shall be final and conclusive. Any claims for compensation made by the Contractor on account of emergency work shall be determined as specified under Section B-3.
- g) Except as provided by Government Code Section 4215, the Contractor shall be responsible for the removal, relocation and protection of all public and private utilities, including irrigation facilities in the nature of utilities, located on the site of the construction project if and to the extent that the same are identified in the Contract Documents, and the Contractor shall not be entitled to any extension of time or claim for damages for extra compensation in connection therewith. If and to the extent that such utilities or facilities are not identified in the Contract Documents, as between the Contractor and the DISTRICT, the DISTRICT will be responsible for the cost of their removal, relocation or protection, as the case may be, but the Contractor shall perform any such work in

conformance with applicable provisions of Sections B-3 and B-4, if so directed by the Engineer and in such situation the Contractor shall not be responsible for delay in completion of the project caused by the failure of the DISTRICT or the owner of the utility to provide for such removal or relocation. If the Contractor, while performing the Contract, discovers utility or irrigation facilities not identified by the DISTRICT in the Contract Documents, it shall immediately notify the Engineer in writing.

- h) Subject to the provisions of this Section, where the Work to be performed under the Contract crosses or otherwise interferes with existing streams, watercourses, canals, farm ditches, pipelines, drainage channels, or water supplies, the Contractor shall provide for such watercourse or pipelines and shall perform such construction during the progress of the Work so that no damage will result to either public or private interests, and the Contractor shall be liable for all damage that may result from failure to so provide during the progress of the Work.

B-63 No Personal Liability

Neither the DISTRICT, the Engineer, nor any of their other officers, agents, or employees nor any other public office shall be personally responsible for any liability arising under the Contract, except such obligations as are specifically set forth herein.

ARTICLE VI. MEASUREMENT AND PAYMENT

B-64 Measurement of Quantities

- a) Where the Contract provides for payment on a lump sum price basis, the Contractor shall submit a price breakdown to the Engineer immediately after award of the Contract. The price breakdown as agreed upon between the Contractor and the Engineer shall be used for preparing future estimates for partial payments to the Contractor and shall list the major items of Work and a price for each item. Overhead and other general costs and profit shall be prorated to each item so that the total of all items equals the lump sum price. The price breakdown shall be subject to the approval of the Engineer and Contractor may be required to verify the prices for any or all items.

Where the Contract provides for payment on a unit price basis, the quantities of work performed will be computed by the Engineer on the basis of measurements taken by the Engineer.

- b) Whenever the estimated quantities of Work to be done and materials to be furnished under this Contract are shown in any of the documents including the Proposal, they are given for use in comparing bids and the right is especially reserved, except as herein or otherwise specifically limited, to increase or diminish them as may be deemed reasonably necessary or desirable by the DISTRICT to complete the Work contemplated by this Contract and such increase or diminution shall in no way violate this Contract, nor shall any such increase or diminution give cause for claims, liability for damage or adjustment to the Contract time bid price.

B-65 Scope of Payment

- a) The Contractor shall accept the compensation provided in the Contract as full payment for furnishing all labor, materials, tools, equipment, and incidentals necessary to the completed Work and for performing all Work contemplated and embraced under the Contract; also for loss or damage arising from the nature of the Work, or from the action of the elements, or from any unforeseen difficulties which may be encountered during the prosecution of the Work until the acceptance by the DISTRICT and for all risks of every description connected with the prosecution of the Work, also for all expenses incurred in consequence of the suspension or discontinuance of the Work as provided in the Contract; and for completing the Work according to the Specifications and Plans. Neither the payment of any estimate nor of any retained percentage shall relieve the Contractor of any obligation to make good any defective work or material.
- b) No compensation will be made in any case for loss of anticipated profits. Increased or decreased work involving supplemental agreements will be paid for as provided in such agreements.

B-66 Progress Estimate

At the end of each month where work was performed, the Contractor will submit to the Engineer a partial payment estimate filled out and signed by the Contractor covering the Work performed during the period covered by the partial pay estimate and supported by such data as the Engineer may reasonably require. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at or near the site, the partial payment estimate shall also be accompanied by such supporting data, satisfactory to the DISTRICT, as will establish the DISTRICT'S title to the material, and equipment and protect its interest therein, including, applicable insurance. The Engineer will within seven (7) calendar days after receipt of each partial payment estimate either recommend payment to the DISTRICT or return the estimate to the Contractor indicating in writing its reasons for refusing to approve payment. In the latter case, the Contractor may make the necessary corrections and resubmit the partial pay estimate.

Payroll certification forms provided by the Contractor and fully executed shall be filed with the Engineer at the time of submission of each partial payment estimate and also when the claim for final payment is submitted. Wage Report forms shall be completed and submitted as set forth in Parts 4 and 5.

B-67 Progress Payments

- a) The Contractor is made aware that the DISTRICT will approve all partial payments.
- b) Upon receipt of an undisputed, properly submitted progress estimate from the Contractor, recommended by the Engineer, the DISTRICT shall act in accordance with the following:
 - (i) Each payment request shall be reviewed by the DISTRICT as soon as practicable after receipt for the purpose of determining that the progress estimate is a proper payment request.
 - (ii) Any payment request determined not to be a proper payment request suitable for payment shall be returned to the Contractor as soon as practicable but not later than seven (7) calendar days after receipt. A request returned pursuant to this paragraph shall be accompanied by a document setting forth in writing the reasons why the payment request is not proper.
- c) The number of days available to the DISTRICT to make a payment without incurring interest pursuant to this section shall be reduced by the number of days by which the DISTRICT exceeds the ten-day return requirement set forth herein.
- d) The DISTRICT will pay the Contractor ninety-five percent (95%) of the amount of each progress estimate within sixty (60) calendar days after receipt of an undisputed, properly submitted progress estimate from the Contractor, recommended by the Engineer. If the DISTRICT fails to pay an undisputed progress estimate within the allotted sixty (60) calendar days, the DISTRICT shall pay interest to the Contractor equivalent to the legal rate set forth in subdivision (s) of Section 685.010 of the Code of Civil Procedures. Five percent (5%) of amount of each estimate shall be retained by the DISTRICT until final completion and acceptance of all Work under Contract.
- e) When, in the judgment of the Engineer, the work is not proceeding in accordance with the provisions of the Contract, or when in the Engineer's judgment the total amount of the work done since the last estimate amounts to less than \$1,000, no pay estimate will be prepared and no progress payment will be made.
- f) No progress estimate or payment shall be considered to be an approval or acceptance of any work, materials, or equipment. Estimated amounts and values of work done and materials and equipment furnished will be confirmed with actual amounts and values as they become available in subsequent progress estimates, progress payments and the final estimate and payment. All estimates and payments will be subject to correction in subsequent progress estimates and payments and the final estimate and payment.
- g) The DISTRICT requires that any payments due to Subcontractors for a portion of the Work satisfactory completed shall be made by Contractor to Subcontractors within thirty (30) calendar days of DISTRICT's payment to Contractor. Failure to make such payments in a timely fashion may result in the DISTRICT issuing future progress payments by joint check to the Contractor and Subcontractors.
- h) It is mutually agreed between the parties to the Contract that no payments made under the Contract, including progress payments and the final payment, shall be evidence of the performance of the Contract, either wholly or in part, and no payment shall be construed to be an acceptance of any defective or incomplete work or improper materials.

B-68 Liens and Stop Notices

The Contractor agrees to keep the Work, the site of the Work and all monies held by the DISTRICT free and clear of all liens and stop notices related to labor and materials furnished in connection with the Work, if permitted by law. Furthermore, the Contractor waives any right it may have to file any type of lien or stop notice in connection with the Work. Notwithstanding anything to the contrary contained in the

Contract documents, if any such lien or stop notice is filed or there is evidence to believe that lien or stop notice may be filed at any time during the progress of the Work or within the duration of this Contract, the DISTRICT may refuse to make any payment otherwise due the Contractor or may withhold any payment due the Contractor a sum sufficient in the opinion of the DISTRICT to pay all obligations and expenses necessary to satisfy such lien or stop notice. The DISTRICT may withhold such payment unless or until the Contractor, within ten (10) calendar days after demand therefor by the DISTRICT, shall furnish satisfactory evidence that the indebtedness and any lien or stop notice in respect thereof has been satisfied, discharged and released of record, or that the Contractor has legally caused such lien or stop notice to be released of record pending the resolution of any dispute between the Contractor and any person or persons filing such lien or stop notice. If the Contractor shall fail to furnish such satisfactory evidence within ten days of the demand therefor, the DISTRICT may discharge such indebtedness and deduct the amount thereof, together with any and all losses, costs, damages and attorney's fees suffered or incurred by the DISTRICT from any sum payable to the Contractor under the Contract documents, including but not limited to final payment and retained percentage. This Section shall be specifically included in all Subcontracts and purchase orders entered into by the Contractor.

B-69 Final Acceptance and Date of Completion

Whenever the Contractor shall deem all Work under this Contract to have been completed in accordance therewith, it shall so notify the Engineer in writing, and the Engineer shall promptly ascertain whether the Work has been satisfactorily completed and, if not, shall advise the Contractor in detail and in writing of any additional work required. When all the provisions of the Contract have been fully complied with to the satisfaction of the Engineer, the Engineer shall proceed with all reasonable diligence to determine accurately the total value of all Work performed by the Contractor at the prices set forth in the Contract or fixed by Change Orders, and the total value of all extra work, all in accordance with the Contract. The Engineer will then certify to said final estimate and to the completion of the Work, and will file copies thereof with the DISTRICT and the Contractor. The date of completion shall be the date upon which the DISTRICT makes its formal written acceptance of the Work.

B-70 Final Payment

Within ten (10) calendar days after the date of completion, the DISTRICT will file in the Office of the County Recorder, a Notice of Completion of the Work herein agreed to be done by the Contractor. On the expiration of thirty-five (35) calendar days after the recordation of such Notice of Completion the difference between said final estimate and all payments theretofore made to the Contractor shall be due and payable to the Contractor, subject to any requirements concerning the furnishings of a maintenance bond, and excepting only such sum or sums as may be withheld or deducted in accordance with the provisions of this Contract. All prior certifications upon which partial payments may have been made, being merely estimates, shall be subject to correction in the final certificate.

B-71 Final Release

Final payment to the Contractor in accordance with the final estimate is contingent upon the Contractor furnishing the DISTRICT with a signed written release of all claims against the DISTRICT arising by virtue of the Contract. Disputed Contract claims in stated amounts may be specifically excluded by the Contractor from the operation of the release. The release shall be in substantially the following form:

WAIVER AND RELEASE UPON FINAL PAYMENT

The undersigned has been paid in full by the Humboldt Bay Municipal Water District (District) for all labor, services, equipment and material furnished to the District for the Mad River Pipeline Crossing Project located in Humboldt County, California, and does hereby waive and release the District, its officers, agents, and employees, from all claims and liability to the Contractor arising out of, or in any way connected with, the Contract, except for the disputed contract claims specified below:

Notice of Disputed Claim

Amount of Claim

\$ _____

Dated: _____

(Name of Contractor)

By: _____
(Title)

Any payment, however, final or otherwise shall not release the Contractor or its sureties from obligations under the Contract Documents or Performance and Payment Bonds.

B-72 Right to Withhold Payments

- a) In addition to all other rights and remedies of the DISTRICT hereunder and by virtue of the law, the DISTRICT may withhold or nullify the whole or any part of any partial or final payment to such extent as may reasonably be necessary to protect the DISTRICT from loss on account of:
- (i) Defective work not remedied, irrespective of when any such work be found to be defective;
 - (ii) Claims or liens filed or reasonable evidence indicating probable filing of claims or liens including, but not limited to claims under Sections 1775, 1776, or 1777.7 of the Labor Code;
 - (iii) Failure of the Contractor to make payments properly for labor, materials, equipment, or other facilities, or to Subcontractors and/or suppliers;
 - (iv) A reasonable doubt that the Work can be completed for the balance then unearned;
 - (v) A reasonable doubt that the Contractor will complete the Work within the agreed time limits;
 - (vi) Costs to the DISTRICT resulting from failure of the Contractor to complete the Work within the proper time; or
 - (vii) Damage to Work or property.
 - (viii) Damage to another Contractor.
 - (ix) Performance of Work in violation of the Terms of the Contract Documents.
 - (x) Where work on unit items is substantially complete, but lacks cleanup and/or other corrections ordered by the Engineer, amounts shall be deducted from the unit prices in partial payment estimates to amply cover such cleanup and correction.
 - (xi) Failure to file required Equal Opportunity and Affirmative Action forms.
- b) Whenever the DISTRICT shall, in accordance herewith, withhold any monies otherwise due the Contractor, written notice of the amount withheld and the reasons therefore will be given the Contractor. After the Contractor has corrected the enumerated deficiencies, the DISTRICT will promptly pay to the Contractor the amount so withheld. When monies are withheld to protect the DISTRICT against claims or liens of mechanics, material men, Subcontractors, etc., the DISTRICT

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may at its discretion permit the Contractor to deliver a surety bond in terms and amount satisfactory to the DISTRICT, indemnifying the DISTRICT against any loss or expense, and upon acceptance thereof by the DISTRICT, the DISTRICT shall release to the Contractor monies so withheld.

B-73 Waiver of Interest

The DISTRICT shall have no obligation to pay and the Contractor hereby waives the right to recover interest with regard to monies which the DISTRICT is required to withhold by reason of judgment, order, statute or judicial process.

B-74 Satisfaction of Claims and Liens

Neither the final payment nor any part of the retained percentage shall become due until the Contractor, if required, shall deliver to the DISTRICT, a complete release of all liens and claims arising out of this Contract, or receipts in full in lieu thereof and, if required in either case, an affidavit that so far as it has knowledge or information the releases and receipts include all the labor and material for which a lien or claim could be filed; but the Contractor may, if any Subcontractor refuses to furnish a release or receipt in full, furnish a bond satisfactory to the Engineer, to indemnify the DISTRICT against any lien or claim. If any lien or claim remains unsatisfied after all payments are made, the Contractor shall refund to the DISTRICT all monies that the latter may be compelled to pay in discharging such a lien, or claim, including all costs and reasonable attorney's fees.

PART 4
SPECIFICATIONS

SECTION 01 11 00

SUMMARY OF WORK

PART 1 GENERAL

1.01. WORK COVERED BY CONTRACT DOCUMENTS

A. General:

1. The Contract Documents describe the Work to be performed under this Contract which includes, but is not limited to, furnishing all plants, tools, equipment, materials, supplies, and manufactured articles for the Project. It shall also include the furnishing of all transportation and services, including fuel, power, water, and essential communications necessary for the performance of all labor, work, or other operations required for the performance of the Contract in accordance with the Contract Documents.
2. The Contractor shall carefully review all sections of the Specifications in order to completely understand the Work and all constraints including schedule, environmental, permit, and material requirements.
3. Contractor is encouraged to proceed in an orderly and expeditious manner based on the constraints shown on the Drawings and described in the Specifications. All Work is to be constructed in strict accordance with the Contract Drawings and Specifications and subject to the terms and conditions of the Contract.

B. An encroachment permit for work performed in the Humboldt County right-of-way on Warren Creek Road and along Glendale Drive shall be secured by the Contractor. The Contractor shall abide by all provisions and requirements of said permit, and said permit requirements shall become part of the Contract Documents.

C. The District either has existing rights-of-way/easements or has obtained easements for access and disturbance on the properties required for execution of the work (with the exception of the above-referenced encroachment permit from Humboldt County). The Contractor shall abide by all provisions and requirements of said easements, and said easement requirements shall become part of the contract documents. Easement requirements affecting the Contractor's work have been incorporated into the Drawings and these Specifications.

D. The Mitigated Negative Declaration (MND) entitled "Initial Study and Mitigated Negative Declaration, City of Blue Lake & Fieldbrook-Glendale Community Services District, Water Transmission Pipeline Replacement Project, Adopted September 14, 2017" has been prepared for the Project. The Contractor shall abide by all applicable provisions of said document, and said requirements shall become part of the Contract Documents. Requirements affecting the Contractor's work have been incorporated into these specifications.

E. The District's California Statewide NPDES General Permit for Drinking Water System Discharges has been included as Appendix A to these specifications. The Contractor shall comply with all requirements given in this document, and said requirements shall become part of the Contract Documents.

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- F. The District has contacted and obtained confirmation from the California Department of Fish & Wildlife, the California State Lands Commission, the California State Water Quality Control Board, and the U.S. Army Corps of Engineers that permits from these agencies are not required for this project.
- G. Contractor shall obtain all other necessary permits and comply with them and all other applicable Local, State, and Federal laws and regulations.
- H. Reports completed for this project include the following:
 - 1. "Final Geotechnical Report: Water Transmission Pipeline Replacement Under Mad River. Humboldt Bay Municipal Water District, Humboldt County, California." December 2017. Prepared by Crawford & Associates, Inc. This report has been included as Appendix B to these Specifications.
 - 2. "Horizontal Directional Drilling (HDD) Surface Spill and Hydrofracture Contingency Plan. Humboldt Bay Municipal Water District, Mad River HDD Crossing." December 2017. Prepared by Bennet Trenchless Engineers. The contractor shall comply with all requirements given in this document, and said requirements shall become part of the Contract Documents. This report has been included as Appendix C to these Specifications.
 - 3. "Initial Study and Mitigated Negative Declaration, City of Blue Lake & Fieldbrook-Glendale Community Services District, Water Transmission Pipeline Replacement Project, Adopted September 14, 2017"
- I. Location of the Work:
 - 1. Humboldt County, California, near the Cities of Arcata and Blue Lake. See the Cover Sheet on the Drawings for more information.
- J. Contractor's duties:
 - 1. Except as specifically noted, provide and pay for:
 - a. Labor, materials and equipment.
 - b. Tools, construction equipment and machinery.
 - c. Water, heat, and utilities required for construction.
 - d. All other facilities and services necessary for proper execution and completion of Work.
 - 2. Pay legally required sales, consumer, and use taxes.
 - 3. Conform to the requirements in all permits, easement agreements, and the Mitigated Negative Declaration (MND) mitigation provisions.
 - 4. Secure and pay for, as necessary for proper execution and completion of the Work, all other applicable permits and licenses.
 - 5. Give required notices.

6. Comply with codes, ordinances, rules, regulations, orders and other legal requirements of public authorities that bear on performance of the Work.
 7. Promptly submit written notice to Engineer of observed variance of Contract Documents from legal requirements.
 8. If any Subcontractor or person employed by the Contractor shall appear to the Engineer to be incompetent or to act in a disorderly or improper manner, that person shall be discharged immediately on the requisition of the Engineer, and such person shall not again be employed on the Work.
 9. Laydown and storage areas have been provided to the Contractor as shown on the Drawings. It is believed that these areas will be sufficient for the execution of the work. However, if required, the Contractor shall obtain all additional laydown and storage areas necessary for the execution of the Work. Contractor shall obtain all necessary permissions and approvals for use of laydown and storage areas and shall submit a signed statement from the property owner granting permission and holding the District harmless from any and all damages that may result from the Contractor's use of the site.
 10. The Contractor shall obtain its own disposal site for replaced soils and other debris. Prior to the use of disposal sites the Contractor must submit a signed statement from the property owner granting permission to spoil materials and holding the District harmless from any and all damages that may result from the spoiling of materials. The Contractor shall contact Humboldt County Department of Environmental Health prior to disposal of any soils off-site.
 11. The Contractor is responsible for providing construction staking and surveying as required for the job. The District will provide control point information as needed for the purpose of locating the project components. The Contractor shall mark the location of all new waterlines and appurtenances 48 hours in advance of construction for approval by the Engineer.
- K. All equipment shall be maintained in proper working order, including proper muffling.
- 1.02. CONTRACT DESCRIPTION
- A. Description:
1. The Contractor is advised to carefully review all sections of the Drawings and Specifications in order to completely understand the Work and all constraints including the schedule, permitting, and material requirements. The Work generally includes but is not limited to miscellaneous demolition; installation of water pipelines via both horizontal directional drilling and standard open cut trenching; installation of related valves and appurtenances; connections to existing asbestos cement waterlines; installing sheet pile walls; a new water service connection; construction staking; minor grading; patching asphalt concrete; traffic control; cleanup; and all other Work required to complete the modifications as shown in the Contract Drawings and described in the Specifications.
 2. All Work is contained in this Contract. The limits of Work are shown in the Contract Drawings. It will be the Contractor's responsibility to coordinate their activities to resolve conflicts.

3. All risk of loss, damage or diminution to the Work shall rest with Contractor until final acceptance of the Work by the District.

1.03. WORK SEQUENCE AND CONSTRAINTS

A. General:

1. Work under this contract includes furnishing all labor, materials, equipment, and supervision required for installing a new water main, connecting the new water main to the existing asbestos cement water main on each side of the river, and performing other miscellaneous work items associated with the installation of the new water main. Construction of the new water main will include horizontal directional drilling (HDD) approximately 1,180 linear feet (LF) of 18-inch outside diameter high-density polyethylene (primarily through fresh, hard meta-argillite bedrock) and trenching in approximately 150 LF of 14-inch polyvinyl chloride (PVC). The new pipeline will be installed to replace the existing 14-inch ductile iron main attached to an old railroad bridge across the Mad River that is no longer maintained. Appurtenances include, but are not limited to, combination air valves, blowoffs, butterfly valves, concrete manholes and vaults, and fittings.
2. The Contractor shall note that only certain constraints are addressed in this section. All Work, whether or not addressed here, shall be governed by applicable parts of this section, and schedules and procedures further submitted for approval.
3. Changes to existing utilities or any new connection thereto must be coordinated to provide the least possible interference with site and utility operation. Prior to any planned Work, all materials, fittings, supports, equipment, and tools shall be on the site and all necessary labor scheduled prior to starting any connection Work.
4. The Contractor will be required to coordinate their schedule with District personnel to ensure minimal interruption to the operation of the water system.
5. No service connection shall be disconnected without prior written approval from the District and at the agreed upon time and date and for the agreed upon duration negotiated with the District and the service customer. When it is necessary to disconnect a service connection, the Contractor shall give at least fourteen (14) calendar days' notice to the District for approval of the proposed schedule.

B. Specific Sequence and Constraints:

1. The first order of business is submission of submittals. Complete submittals for all items to be incorporated into the Work shall be made no later than fifteen (15) calendar days following receipt of Notice to Proceed.
2. The Contractor shall include all Work described in this section in the construction schedule. The sequence and constraints identified in this section shall be followed in the construction of the Work. However, alternatives to these sequences and constraints may be submitted by the Contractor for review by the District.
3. Specific Sequencing constraints include:
 - a. The pre-construction conference described in this Section shall be coordinated to accommodate attendance by representatives of the District.

- b. Contractor shall anticipate weekly construction progress meetings with District staff to review work progress and issues (see Section 01 30 00).
- c. Stockpiling of excavated soils that are potentially contaminated is not allowed. Contractor to remove contaminated material from the site and dispose of it at an approved disposal site.
- d. All new utilities must be disinfected and tested by the Contractor and accepted by the District before they can be put into service, before connections between new and existing facilities can be made, and before old facilities can be abandoned.
- e. Existing District water transmission system will remain in operation during the duration of the Work. The existing pipe will be used to serve the District's connections with the City of Blue Lake and the Fieldbrook-Glendale Community Services District until the new pipeline is installed. It is the responsibility of the Contractor to repair any damage to the existing pipeline that may result from construction activities.
- f. Contractor shall maintain vehicular and pedestrian access at all times throughout the project duration at all points in the project.
- g. Contractor shall provide as much notice as possible, but a minimum of fourteen (14) calendar days' written notice prior to connecting the new pipeline to the existing pipeline. Contractor shall not make these connections until written approval is obtained from the District. It is anticipated that some of these connections may need to be made during non-regular work hours to minimize customer service interruptions.

1.04. CONTRACT METHOD

- A. The Work of this Contract is based on the Bid Schedule provided in Part 1 and Section 01 22 00 – Measurement and Payment.
- B. The Contractor shall include the requirements of the General Conditions of the Contract as a part of all of its subcontract agreements.

1.05. UNDERGROUND FACILITIES

- A. The Contractor shall exercise care in all excavations to avoid damage to existing underground facilities. This shall include potholing and hand digging in those areas where underground facilities are known to exist until they have been sufficiently located to avoid damage to the facilities.
- B. Prior to fabrication of any materials, the Contractor shall verify the locations and elevations of existing underground facilities which the Contractor is connecting to.
- C. The Contractor shall exercise care in maintaining those pipes and valves to be abandoned and/or removed which are required for the continuing operation of the existing facilities until such time as they can be abandoned. The Contractor shall exercise extreme caution in working in any area adjacent to existing underground pipes. It is essential that the existing utilities be maintained in service until the new Work is ready for full-time operation and is placed in service.

- D. No additional compensation shall be provided the Contractor for compliance with the provisions of this section for the damage and repair of such facilities due to the lack of care.

1.06. PROJECT MEETINGS

- A. See Section 01 30 00 - Administrative Requirements

1.07. CONTRACTOR USE OF PREMISES

- A. Construction is limited to the Public Right of Way and limits shown on the Drawings.
 - 1. Laydown and storage areas have been provided to the Contractor as shown on the Drawings. Contractor is responsible for all security and safekeeping of material and equipment stored in these areas. It is believed that these areas will be sufficient for the execution of the work. However, if required, the Contractor shall obtain all additional laydown and storage areas necessary for the execution of the Work. Contractor shall obtain all necessary permissions and approvals for use of laydown and storage areas and shall submit a signed statement from the property owner granting permission and holding the District harmless from any and all damages that may result from the Contractor's use of the site.
 - 2. Prior to commencement of any development, a final plan detailing the locations and sizes of all construction staging areas, storage areas, stockpiling areas, concrete washout areas, Contractor employee parking areas, and other construction areas appurtenant to the authorized development shall be submitted to the Engineer. The plan shall demonstrate and include the following, at a minimum:
 - a. No construction staging, storage, stockpiling, concrete washout, parking, or other areas associated with construction of the authorized development shall be located within wetlands, riparian areas, or other environmentally sensitive habitat areas (ESHA).
 - b. Designated areas for construction vehicle or equipment cleaning, fueling, and/or maintenance shall be located at least 100 feet from drainage courses and shall be designed to fully contain any spills of fuel, oil, or other contaminants.
 - c. Concrete washout areas shall be located at least 100 feet from drainage courses and shall be implemented in a manner that controls runoff and prevents leaching to underlying soils.
 - d. The limits of such areas shall be depicted on plans and maps provided to the Engineer at least two weeks prior to commencement of construction.
 - e. If necessary, areas shall be flagged or otherwise delineated to ensure that construction activities are contained within designated areas.
 - f. No changes to the approved final plans shall occur without approval from the Engineer.
- B. Confine operations at site to areas permitted by the Contract Documents.
- C. Do not encumber site with materials or equipment beyond those required to complete the Work.

- D. Do not load structure or roadway with weight that will endanger or render unusable any structures or roadways.
- E. Assume full responsibility for protection and safekeeping of products stored on premises.
- F. Obtain and pay for use of additional storage or work area needed for operations.
- G. Return all surface areas to their original condition upon completion of the Work.
- H. Repair all damaged utilities, roadways, sidewalks, property, and appurtenances damaged during the course of construction to pre-existing condition or better.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION 01 11 00

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SECTION 01 22 00

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.01. GENERAL

- A. Unless otherwise specified in other individual sections of these Specifications, quantities of Work shall be determined from measurements or dimensions in horizontal planes.
- B. Units of measurement shall be in accordance with U.S. Standard Measures.
- C. See Section B-67 of the General Conditions for special provisions related to progress payments and payment schedule to the Contractor.

1.02. MATERIALS

- A. The measurement and payment items are listed below:
 - 1. The payments to the Contractor are based on the following items. It is the intent that the scope of the description of the following items encompasses the entire scope of the Work as shown on the Plans and described in the Specifications. The bid amounts shall be for complete in place installations.

BASE BID SCHEDULE

Item 1 – Mobilization/ Demobilization

Payment for this item shall be on a lump sum basis per the amount listed for that item in the Bid Schedule. Measurement shall correspond to percent complete as confirmed by the Engineer. This Work covers all Contractor costs and effort associated with mobilizing equipment, materials, and labor to the project site as well as demobilization of the same. Items covered by this include, but are not limited to, bonds, insurance, attendance of Contractor's staff at meetings, contracting and administrative costs, preparation and administrative costs for processing cost proposals, preparation of project schedules, updates to project schedules, costs associated with temporary facilities and utilities, punch list items, repairs of damaged property, site cleanup, and project maintenance and warranty.

When 10 percent of the total original Contract amount is earned from bid items, excluding amounts paid for materials on hand, 90 percent of the amount of the bid price for mobilization, or 10 percent of the total Contract amount, whichever is less, will be paid for mobilization. Upon completion of all Work on the project, payment of the balance of the bid amount for mobilization will be paid.

Item 2 – Construction Staking

Payment for this item shall be on a lump sum basis per the amount listed for that item in the Bid Schedule. Measurement shall correspond to percent complete as confirmed by the Engineer. This Work covers all Contractor costs and effort associated with providing construction staking and project layout as described in these Specifications. Items covered by this item include, but are not limited to, labor, materials, equipment, and other expenses required to stake the pipeline alignment, air vacuum/release valve and blowoff locations, and access routes.

Item 3 – Traffic Control

Payment for this item shall be on a lump sum basis per the amount listed for that item in the Bid Schedule. Measurement shall correspond to percent complete as confirmed by the Engineer. This

Work covers all Contractor costs and effort associated with providing traffic control as described in these Specifications. Items covered by this include, but are not limited to, labor, materials, equipment, and other expenses for complete traffic control throughout the length of the project, including times when the Contractor is not working on site. Included are notifications, flaggers, temporary pavement delineation, barricades, K-Rail, and all other materials and equipment needed to temporarily control traffic throughout the project.

Item 4 – Grading, Access Improvements, and Sediment & Erosion Control

Payment for this item shall be on a lump sum basis per the amount listed for that item in the Bid Schedule. Measurement shall correspond to percent complete as confirmed by the Engineer. Payment shall include full compensation for all materials, labor, equipment, and supervision necessary to accomplish the following: improve the site access route on the west side of the river, including any grading or material that may need to be imported; improve construction and staging areas, including any grading or material that may need to be imported; and construct and maintain erosion and sediment control Best Management Practices. This Work covers all Contractor costs and effort associated with providing silt fences, fiber rolls, diversion dikes, and other Best Management Practices, complying with NPDES and general construction permits. This Bid Item also includes all necessary revegetation and straw mulching around vegetated areas that are disturbed during construction of this project. Contractor shall not be responsible for the removal of any improvements to the access road or staging areas put in place as part of this work.

Item 5 – Horizontal Directional Drill (HDD) HDPE Water Main

Payment for this item shall be on a lump sum basis per the amount listed for that item in the Bid Schedule. Measurement shall correspond to percent complete as confirmed by the Engineer. Payment shall include full compensation for all materials, labor, equipment, and supervision necessary to furnish and install the 18-inch IPS DR 9 HDPE pipe by horizontal directional drilling under the Mad River as shown on the Drawings. This includes, but is not limited to, all labor, equipment and materials necessary to protect against hydrofracture, monitoring for hydrofracture, bracing, controls, surface guidance system, conductor casings (if required), HDPE pipe, HDPE fittings and connections at both ends with restraints for pressure piping, welding, drilling fluid system, tree removal (if required), HDD pits, drilling pad, using temporary fill, timber mats or steel plates, removal and disposal of excess materials, sheeting, shoring and bracing, pressure testing, disinfection, flushing pipeline, water control and all other related work per the Contract Documents.

Item 6 – Install Water Main from HDD Exit Point and Connect to Existing Water Main at Warren Creek Road

Payment for this item shall be on a lump sum basis per the amount listed for that item in the Bid Schedule. Measurement shall correspond to percent complete as confirmed by the Engineer. Payment shall include full compensation for all materials, labor, equipment, and supervision necessary to furnish and install the C905 DR25 14-inch PVC pipe, associated ductile iron fittings, and all associated appurtenances complete and in place by the method of trenching and backfilling from the HDD exit point to the connection with the existing 14-inch asbestos cement pipe (ACP) water main at Warren Creek Road, and connecting to the existing ACP. This work includes, but is not limited to, asphalt concrete saw-cutting, trenching and excavation, shoring (except the shoring provided by installing the sheet pile walls, as described under Item 12 – Sheet Pile Walls and French Drain), bedding, installation of pipe, fittings, thrust blocks (if required), restrained joints, appurtenances, tracer wire, warning tape, control of grade, backfilling, temporary paving, pressure testing, disinfection, compaction testing, and cleanup.

Payment for this item shall also include effort associated with dewatering and water management. Payment shall include full compensation for all materials, labor, equipment, and supervision necessary to construct, execute, and maintain an effective dewatering system including control of water, flushing, dechlorination, and proper disposal of water from flushing and draining the active line as required for making the connection, as well as any other dewatering activities required for this portion of the work. Items covered by this include, but are not limited to, dewatering pumps,

hoses and tanks, dewatering bags, and a dechlorination basin for dewatering disposal.

Item 7 – Install Water Main from HDD Entry Point and Connect to Existing Water Main

Payment for this item shall be on a lump sum basis per the amount listed for that item in the Bid Schedule. Measurement shall correspond to percent complete as confirmed by the Engineer. Payment shall include full compensation for all materials, labor, equipment, and supervision necessary to furnish and install the C905 DR25 14-inch PVC pipe, associated ductile iron fittings, and all associated appurtenances complete and in place by the method of trenching and backfilling from the HDD entry point to the connection with the existing 14-inch asbestos cement pipe (ACP) water main, and connecting to the existing ACP. This work includes, but is not limited to, trenching and excavation, bedding, installation of pipe, fittings, thrust blocks, restrained joints, appurtenances, tracer wire, warning tape, control of grade, backfilling, pressure testing, disinfection, compaction testing, and cleanup.

Payment for this item shall also include effort associated with dewatering and water management. Payment shall include full compensation for all materials, labor, equipment, and supervision necessary to construct, execute, and maintain an effective dewatering system including control of water, flushing, dechlorination, and proper disposal of water from flushing and draining the active line as required for making the connection, as well as any other dewatering activities required for this portion of the work. Items covered by this include, but are not limited to, dewatering pumps, hoses and tanks, dewatering bags, and a dechlorination basin for dewatering disposal.

Item 8 – New Lateral Connection and Meter for Ford Property

Payment for this item shall be on a lump sum basis per the amount listed for that item in the Bid Schedule. Measurement shall correspond to percent complete as confirmed by the Engineer. Payment shall include full compensation for all materials, labor, equipment, and supervision necessary to furnish and install the new Ford water connection including but not limited to the service saddle, corporation stop, meter, backflow preventer, enclosures, 1-inch polyethylene service line, removing the existing meter, and connecting to the existing water service as shown on the Contract Drawings and described in these Specifications. Items covered by this include, but are not limited to, excavation, trenching, bedding and cover material, tracer wire, warning tape, installation of service water lateral, appurtenances, control of grade, flushing, control of water, temporary water service if required, backfilling, pressure testing, disinfection, compaction testing, and cleanup.

Item 9 – New Lateral Connection and Meter for Sundberg Property

Payment for this item shall be on a lump sum basis per the amount listed for that item in the Bid Schedule. Measurement shall correspond to percent complete as confirmed by the Engineer. Payment shall include full compensation for all materials, labor, equipment, and supervision necessary to furnish and install the new Sundberg water connection including but not limited to connecting to the existing water main, the service saddle, corporation stop, meter, backflow preventer, enclosures, and the 2-inch service line shown on the Contract Drawings and described in these Specifications. Items covered by this include, but are not limited to, excavation, trenching, bedding and cover material, tracer wire, warning tape, installation of service water lateral, appurtenances, control of grade, flushing, control of water, temporary water service if required, backfilling, pressure testing, disinfection, compaction testing, and cleanup.

Item 10 – 14-inch Butterfly Valve and Box

Measurement and payment for this item shall be on a unit basis for each valve installed. Payment shall include full compensation for all labor, equipment, materials and supervision necessary to install the 14-inch butterfly valves as shown on the Plans complete and in place, including but not limited to the valve, pipe riser, valve box and cover, concrete collar, restrained joints, thrust blocks (if required), resurfacing, and cleanup.

Item 11 – Abandon Existing Pipes

Measurement and payment for this item shall be on a unit basis for each location of pipe

abandonment. Payment shall include full compensation for all materials, labor, equipment, and supervision necessary to cap and abandoning the existing 14-inch ACP water main including, but not limited to, excavation, shoring, control of water, cutting, removing, and properly disposing of the required section of ACP, installing sandbags, pouring a concrete plug, backfilling, compaction testing, and cleanup.

Item 12 – Sheet Pile Walls and French Drain

Payment for this item shall be on a lump sum basis per the amount listed for that item in the Bid Schedule. Measurement shall correspond to percent complete as confirmed by the Engineer. Payment for the sheet pile walls shall include full compensation for all materials, labor, equipment, and supervision necessary to complete the installation of the sheet pile wall as shown on the Drawings and as required by the Specifications, including but not limited to, maintaining required clearances from the existing overhead telecommunication line, maintaining communication in the existing overhead telecommunication line, driving in the sheet pile sections, and cutting the sheet pile sections if required.

Payment for the French drain shall include full compensation for all materials, labor, equipment, and supervision necessary to complete the installation of the French drain as shown on the Drawings and as required by the Specifications, including but not limited to, excavation, shoring, pea gravel and geotextile fabric installation, all perforated pipe and fittings required to install and daylight the French drain as shown on the Drawings, backfill, and compaction.

Item 13 – Combination Air Vacuum/Release Valve Assemblies with Enclosures

Measurement and payment for this item shall be on a unit basis for each combination air valve installed. Payment shall include full compensation for all labor, equipment, materials and supervision to install the combination air valves and appurtenances as shown on the Drawings complete and in place, including but not limited to, service saddle (or blind flange, per the Drawings), tap, stainless piping and fittings, corporation stop, globe valve, combination air valve, traffic rated precast enclosure and extensions, vertical and lateral support for air valve assembly, and resurfacing.

Item 14 – Blowoff Assemblies

Measurement and payment for this item shall be on a unit basis for each blowoff assembly installed. Payment shall include full compensation for all labor, equipment, materials and supervision to install the blowoff assemblies and appurtenances as shown on the Drawings complete and in place, including but not limited to, service saddle (if required, per the Drawings) tap, stainless piping and fittings, plug, corporation stop, globe valve, thrust block, lateral supports for blowoff assembly, Christy box and pipe riser (if required, per the Drawings), and resurfacing.

Item 15 – 4-inch Paving Section

Measurement and payment for the 4-inch-thick paving section around the connection point at Warren Creek Road shall be on a per square foot basis installed as measured in the field by the Engineer. The full width of the road (approximately 16 feet at the connection location) shall be repaved, and it is estimated that 25 feet of existing paving along the length of the road will need to be replaced, giving an estimated quantity of 400 square feet total. Payment shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the Work involved in asphalt surfacing, complete in place, as shown on the Contract Drawings and as specified in these Specifications and as directed by the Engineer. No additional compensation will be allowed therefor. No payment will be made for the correction of deficiencies in construction. No payment will be made for over-run quantities unless pre-approved by the Engineer. No additional payment will be made for resurfacing areas outside of the estimated 25-foot-long stretch of road encompassing the connection location unless approved by the Engineer. The Contractor shall repair any pavement damage that occurs as a result of the Contractor's operations outside of this 25-foot-long stretch at the Contractor's expense. The collection and signing of weight tickets shall neither constitute nor construe acceptance or approval of over-run quantities.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION 01 22 00

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SECTION 01 30 00

ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01. SECTION INCLUDES

- A. Coordination and project conditions
- B. Field engineering
- C. Pre-bid meeting
- D. Preconstruction meeting
- E. Progress meetings
- F. Pre-Connection meetings

1.02. MEASUREMENT AND PAYMENT

- A. Measurement and payment for the items addressed in this Section shall be included in the Mobilization/Demobilization Bid Item. No additional measurement or payment will be included for the requirements of this section.

1.03. COORDINATION AND PROJECT CONDITIONS

- A. Coordinate scheduling, submittals, and Work of various sections of Project to ensure efficient and orderly sequence of installation of construction elements.

1.04. FIELD ENGINEERING

- A. The Contractor will provide construction staking services, given as a separate bid item as called out in Section 01 22 00 – Measurement and Payment, Part 1.02.A.
- B. Protect survey control points prior to starting site Work; preserve permanent reference points during construction.
- C. Promptly report to Engineer loss or destruction of reference point or relocation required because of changes in grades or other reasons.
- D. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Engineer. The surveyor shall comply with the California Professional Land Surveyors' Act in replacement of all permanent survey monuments.

1.05. PRE-BID MEETING

- A. Prior to awarding the Contract, a non-mandatory pre-bid meeting will occur as established in the Advertisement for Bids. The pre-bid meeting shall be attended by District representatives and the Engineer. While non-mandatory, it is highly recommended that the Contractor's construction superintendent and/or project manager attend the meeting.

1.06. PRECONSTRUCTION MEETING

- A. Contractor will schedule meeting after Notice of Award.
- B. Prior to the commencement of Work at the site, a preconstruction meeting will be held at a mutually agreed upon time and place. The preconstruction meeting shall be attended by District representatives, Engineer, construction foreman, contractor's construction superintendent, key subcontractors, and any other parties requested by the Contractor or the Engineer.
- C. Unless previously submitted to the Engineer, the Contractor shall bring to the conference three (3) copies of each of the following:
 - 1. Draft Construction Schedule.
 - 2. Procurement schedule of major equipment and materials and items requiring long lead time.
 - 3. Shop Drawing/Sample/submittal schedule.
 - 4. Substitution requests.
 - 5. Contact sheet designating contact information for the construction foreman, construction Superintendent, and Project Manager for the Contractor including cell phone numbers or contact information to allow for emergency contact after business hours.
- D. At the preconstruction meeting the District will provide the Contractor with three (3) sets of the Contract Documents. It shall be the Contractor's responsibility to arrange to pay all costs of additional reproduction required by the Contractor.
- E. The purpose of the meeting is to designate responsible personnel and establish a working relationship. Matters requiring coordination will be discussed and procedures for handling such matters established.
- F. The Engineer will preside at the preconstruction conference and will arrange for keeping the minutes and distributing the minutes to all persons in attendance.
- G. Agenda:
 - 1. Notice to Proceed date.
 - 2. Distribution of Contract Documents.
 - 3. Contractor's tentative schedules.
 - 4. Submission of list of Subcontractors, list of products, schedule of values, and progress schedule.
 - 5. Critical work sequencing.
 - 6. Designation of personnel representing parties in Contract, and Engineer.

7. Procedures and processing of field decisions, submittals, substitutions, requests for information, applications for payments, proposal request, change orders, and contract closeout procedures.
8. Scheduling.
9. Major equipment deliveries and priorities.
10. Use of premises by Owner and Contractor.
11. Owner's requirements and occupancy.
12. Site Safety: Contractor's assignments for safety and first aid.
13. Construction facilities and controls provided by Owner.
14. Temporary utilities provided by Owner.
15. Pipeline installation procedures.
16. Hydrofracture Contingency Plan.
17. Application for payment procedures.
18. Procedures for testing.
19. Procedures for maintaining record documents.
20. Requirements for system shut down and connection coordination.

1.07. PROGRESS MEETINGS

- A. The Engineer shall schedule, arrange and conduct progress meetings. These meetings shall be conducted once per week, or as mutually agreed by Contractor and Owner, and shall be attended by the Contractor's superintendent and representatives of key Subcontractors, utilities, and others, who are active in the execution of the Work. The purpose of these meetings shall be to review the Contractor's schedule provided in accordance with this Section, resolve conflicts, and in general, coordinate and expedite the execution of the Work.
- B. Engineer will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings and record the meeting minutes.
- C. Attendance Required: construction superintendent, key subcontractors, Owner and Engineer, as appropriate to agenda topics for each meeting.
- D. Agenda:
 1. Review and acceptance of minutes of previous meeting.
 2. Review of Work progress.
 3. Field observations, problems, and decisions.
 4. Site Safety.

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5. Identification of problems impeding planned progress.
 6. Review of submittals schedule and status of submittals.
 7. Review of delivery schedules.
 8. Maintenance of progress schedule.
 9. Corrective measures to regain projected schedules.
 10. Planned progress during succeeding work period.
 11. Coordination of projected progress.
 12. Maintenance of quality and work standards.
 13. Effect of proposed changes on progress schedule and coordination.
 - a. Progress Payment.
 - b. Change Orders.
 - c. Claims.
 - d. Field Work Directives
 - e. Requests for Information
 14. Other business relating to Work.
- E. The Engineer shall record minutes and distribute copies within two days after meeting to participants and those affected by decisions made.

1.08. PRE-CONNECTION MEETINGS

- A. Coordination meetings may also be required prior to system shut downs for connections to users. These meetings may also be incorporated into weekly progress meetings. It is anticipated that coordination will be required with the Humboldt Bay Municipal Water District, City of Blue Lake, Fieldbrook-Glendale Community Services District, Blue Lake Fire Department, Fieldbrook Volunteer Fire Department, and Arcata Fire District.
- B. Require attendance of parties directly affecting, or affected by, Work of specific connection.
- C. Notify Engineer a minimum of fourteen (14) calendar days in advance of planned connection date.
- D. Engineer shall prepare agenda and preside at meeting:
 1. Review conditions of connection, preparation and connection procedures.
 2. Review schedule.
 3. Discussion of contingency plan if work does not proceed according to schedule.

- E. Engineer shall record minutes and distribute copies within two days after meeting to participants and those affected by decisions made.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION 01 30 00

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SECTION 01 33 00
SUBMITTAL PROCEDURES

PART 1 GENERAL

1.01. SECTION INCLUDES

- A. Submittal procedures.
- B. Construction progress schedules.
- C. Product data & shop drawings.
- D. Test reports.
- E. Certificates.

1.02. MEASUREMENT AND PAYMENT

- A. Measurement and payment for the items addressed in this Section shall be included in the Bid Item to which they relate. No additional measurement or payment will be included for the requirements of this section.

1.03. SUBMITTAL PROCEDURES

- A. Submit on Submittal Form (attached at the end of this section). Contractor shall submit one electronic version in Word format.
- B. Sequentially number transmittal forms. The first iteration of a particular submittal shall be Revision Number 0.
- C. Identify Project, Contractor, Subcontractor and supplier; pertinent drawing and detail number, and specification section number, appropriate to submittal.
- D. Apply Contractor's stamp and/or signature certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information is in accordance with requirements of the Work and Contract Documents.
- E. Schedule submittals to expedite Project and coordinate submission of related items.
- F. Allow fourteen (14) calendar days for review of each submittal.
- G. Identify variations from Contract Documents and product or system limitations which may be detrimental to successful performance of completed Work.
- H. When revised for resubmission, clearly identify changes made since previous submission.
- I. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report inability to comply with requirements.

1.04. CONSTRUCTION PROGRESS SCHEDULES

- A. Submit an initial schedule electronically within ten (10) calendar days after date of Notice to Proceed. After review, resubmit required revised data within ten (10) calendar days.
- B. Submit revised Progress Schedules with each Application for Payment.
- C. Distribute copies of reviewed schedules to Project site file, Subcontractors, suppliers, and other concerned parties.
- D. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.
- E. Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities.
- F. Indicate estimated percentage of completion for each item of Work at each submission.
- G. Revisions to Schedules:
 - 1. Indicate progress of each activity to date of submittal, and projected completion date of each activity.
 - 2. Identify activities modified since previous submittal, major changes in scope, and other identifiable changes.

1.05. PRODUCT DATA AND SHOP DRAWINGS

- A. Product Data and Shop Drawings: Submit to Engineer for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.
- B. Submit a single reproducible copy or email an electronic version of the submittal to the Engineer.
- C. Mark submittal to clearly identify applicable products, models, options, and other data to be used on this project. Supplement manufacturers' standard data to provide information specific to this Project.

1.06. TEST REPORTS

- A. Submit for Engineer's knowledge as contract administrator.
- B. Submit test reports for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

1.07. CERTIFICATES

- A. When specified in individual specification sections, submit certification by manufacturer, installation/application subcontractor, or Contractor to Engineer, in quantities specified for Product Data.
- B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

- C. Certificates may be recent or previous test results on material or Product, but must be acceptable to Engineer.

1.08. REQUESTS FOR SUBMITTALS

- A. Contractor is directed to each Specification section for required submittals, however, the anticipated Submittals shall consist of, but is not necessarily limited to the following:

Section	Submittal Description
01 11 00	Signed Statement Granting Laydown/Storage Area Permission
01 11 00	Signed Statement Granting Disposal Site Permission
01 11 00	Plan Detailing Staging Areas, Storage Areas, Stockpiling Areas, Concrete Washout Areas, and Parking Areas
01 30 00	Draft Construction Schedule (3 copies).
01 30 00	Procurement Schedule (3 copies).
01 30 00	Shop Drawings/Sample/Submittal Schedule (3 copies).
01 30 00	Substitution Requests (3 copies)
01 30 00	Contact Information for Site Superintendent, Foreman, Project Manager (3 copies)
01 40 00	Independent Testing Agency or Laboratory Information and Most Recent Inspection
01 40 00	Observer Qualifications
01 50 00	Proposed Hot Tap Assembly
01 55 26	Work Zone Traffic Control Plan
01 55 26	Letter of Responsibility
01 57 13	Mill Certificate or Affidavit for Silt Fence Fabric and Factory Seams

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Section	Submittal Description
01 57 13	Erosion Control Plan
01 57 13	Proposed Seed Mix
01 57 19	General Construction Permit Application
01 57 19	Flushed Water Disposal Plan
01 57 19	Dewatering Plan
01 57 19	Fire Safety Plan
01 70 00	Notice of Completion and Request for Final Inspection
01 70 00	Operation and Maintenance Manuals
01 70 00	Project Record Document
01 70 00	Spare Parts
02 00 10	Site Security Plan
03 48 00	Product Data
03 48 00	Manufacturer's Certificates
03 48 00	Manufacturer's Installation Instructions
03 48 00	Manufacturer's Warranty
03 60 00	Certificates of Compliance

Section	Submittal Description
31 00 00	Shoring and Bracing Drawings
31 00 00	Certificates of Compliance
31 00 00	Construction Drainage Plan
31 00 00	Material Disposal Plan
31 23 19	Dewatering Plan
31 23 19	Dewatering Pump Data
31 23 19	Pumping Equipment Data
31 23 19	Percolation Basin Data
31 41 00	State Division of Industrial Safety Excavation Permit
31 41 00	Trench Safety Plan
31 41 00	Stamped and Sealed Copy of Trench Safety Calculations
31 62 16	Responsible Person Qualifications for Sheet Pile Installation
31 62 16	Sheet Piling Material Certifications
31 62 16	Sheet Pile Hammer Manufacturer Verification
33 01 10	Responsible Persons for Disinfection Testing and Bacteriological Sampling
33 01 10	Product Data

Humboldt Bay Municipal Water District
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Section	Submittal Description
33 01 10	Test Reports
33 01 10	Certified Results for Bacterial Sampling
33 01 10	Locations for Taps to be Installed and Used for Chlorination
33 01 10	Disinfection Plan and Schedule
33 01 10	Disinfection Report
33 01 10	Bacteriological Report
33 05 07	HDD Contractor Qualifications and Experience
33 05 07	HDD Qualifications and Experience of Contractor Personnel
33 05 07	CalOSHA Certification
33 05 07	HDD Equipment and Materials Product Data
33 05 07	Rig Capacity
33 05 07	Pump Capacity
33 05 07	Calculations for Pullback and Pipe Stresses
33 05 07	Calculations of Maximum Allowable and Minimum Required Drilling Fluid Pressures
33 05 07	HDD Work Plan
33 05 07	Locating, Monitoring, and Protection of Adjacent Structures and Facilities

Section	Submittal Description
33 05 07	HDD Schedule
33 05 07	Soil Separation Plant and Plans for Disposal
33 05 07	Daily Logs and Records of HDD Operations
33 05 07	Surveying Equipment and Procedures
33 05 07	Pilot Bore As-Built Profile
33 05 07	Contingency Plans for Potential Problems
33 05 07	HDD Surface Spill and Hydrofracture Contingency (SSHC) Plan Agreement
33 05 07	Safety Plan
33 05 08	Product, Materials, and Procedures Details
33 05 08	Work Plan
33 05 08	Grout Mix Details
33 05 08	Daily Logs of Grout Operations
33 05 33	Shop Drawings
33 05 33	Fusion Technician Qualifications
33 05 33	Layout Drawings
33 05 33	Pipe Manufacturer Allowable Load Limits

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Section	Submittal Description
33 05 33	Pipe Delivery Certification
33 05 33	Delivery Test Reports
33 05 33	As-Builts of each Fusion Joint
33 05 33	Pre-Installation Testing
33 05 33	Post-Installation Hydrostatic Tests
33 05 33	Post-Installation Mandrel Test
33 12 00	Responsible Person/Lab for Compaction Testing
33 12 00	Material Samples, Testing Reports, and Formulas
33 12 00	HMA Mix Design
33 12 00	Load Slips for Asphalt Concrete
33 14 00	Shop Drawings
33 14 00	Product Data
33 14 00	Manufacturer's Certificate
33 14 00	Manufacturer's Recommendation (4 copies)
33 14 00	Installation Procedures
33 14 00	Pressure Testing Plan

Section	Submittal Description
33 14 00	Connection Transfer Plan and Schedule
33 14 00	Project Record Documents
33 14 19	Shop Drawings
33 14 19	Material List
33 14 19	Valve Data
33 14 19	Operations and Maintenance Manuals
33 14 19	Manufacturer's Recommendations
33 14 19	Coating Data

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION 01 33 00

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**Humboldt Bay Municipal Water District
SHOP DRAWING & SUBMITTAL REVIEW FORM**

Date:	Contract Title: Mad River Pipeline Crossing Project GHD Job #: 8411162
To: GHD, Inc. 718 Third Street Eureka, CA 95501 Attention: Patrick Kaspari, PE Email: Pat.Kaspari@ghd.com Phone: (707) 443-8326 Fax: (707) 444-8330	From: Contractor Name Contractor Address Line 1 Contractor Address Line 2 Submitted By: Signature: Phone:

Spec Section or Dwg	Submittal No.	Rev. No.	Qty.	Subject of Shop Drawing or Submittal	Review Action

Engineer's Review Comments:

Signature: _____ **Date:** _____

Review Action Explanation:

1. No Exceptions Taken	4. Rejected – Resubmit
2. Make Corrections Noted – No Resubmittal Required	5. Answer provided
3. Amend and Resubmit	6. Not Reviewed – Filed Only

Shaded areas  for Engineer use only.

This review is only for general conformance with the design concept and the information given in the Construction Documents. Notations made on the submittals during this review do not relieve the Contractor from compliance with the requirements of the construction documents, including without limitation, the plans and specifications, and all applicable laws and codes. Review of that specific item shall not include review of an assembly of which the item is a component. The Contractor is responsible for: dimensions to be confirmed and correlated at the jobsite; information that pertains solely to the fabrication processes or to the means, methods techniques, sequences and procedures of construction; and coordination of the Work with all other trades and performing all Work in a safe and satisfactory manner. This review is not for constructability or Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto. This review is subject to all provisions of the Contract Documents.

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SECTION 01 40 00
QUALITY REQUIREMENTS

PART 1 GENERAL

1.01. SECTION INCLUDES

- A. Quality control and control of installation
- B. Tolerances
- C. References
- D. Labeling
- E. Testing and Inspection Services
- F. Manufacturers' field services
- G. Examination
- H. Preparation

1.02. MEASUREMENT AND PAYMENT

- A. Measurement and payment for the items addressed in this Section shall be included in the Bid Item to which they relate. No additional measurement or payment shall be made for the requirements of this section.

1.03. QUALITY CONTROL AND CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. When manufacturers' instructions conflict with Contract Documents, request written clarification from Engineer before proceeding.
- D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Perform Work by persons qualified to produce required and specified quality.
- F. Verify field measurements as indicated on Shop Drawings or as instructed by manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1.04. TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. When manufacturers' tolerances conflict with Contract Documents, request clarification from Engineer before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

1.05. REFERENCES

- A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Conform to reference standard by date of issue current on notice to proceed date of Contract Documents, except where specific date is established by code.
- C. Obtain copies of standards where required by product specification sections.
- D. When specified reference standards conflict with Contract Documents, request written clarification from Engineer before proceeding.
- E. Neither contractual relationships, duties, nor responsibilities of parties in Contract nor those of Engineer shall be altered from Contract Documents by mention or inference otherwise in reference documents.

1.06. LABELING

- A. Label Information: Include manufacturer's or fabricator's identification, approved agency identification, and the following information, as applicable, on each label:
 - 1. Model number.
 - 2. Serial number.
 - 3. Performance characteristics.
- B. Manufacturer's Nameplates, Trademarks, Logos, and Other Identifying Marks on Products: Not allowed on surfaces exposed to view in public areas, interior or exterior without the Owner's prior approval.

1.07. TESTING AND INSPECTION SERVICES

- A. Employ and pay for services of an independent testing agency or laboratory acceptable to Owner to perform specified testing.
 - 1. Before starting Work, submit testing laboratory name, address, and telephone number, and names of full-time appropriately licensed or certified Professional Engineer and responsible officer.

2. Submit copy of report of laboratory facilities' inspection made by Materials Reference Laboratory of National Bureau of Standards during most recent inspection, with memorandum of remedies of deficiencies reported by inspection.
- B. Independent firm will perform tests, inspections, and other services specified in individual Specification Sections and as required by the Engineer.
1. Laboratory: Authorized to operate in State of California.
 2. Laboratory Staff: Maintain full-time appropriately licensed or certified Professional Engineer on staff to review services.
 3. Testing Equipment: Calibrated at reasonable intervals with devices of an accuracy traceable to National Bureau of Standards or accepted values of natural physical constants.
- C. Testing, inspections, and source quality control may occur on or off Project Site. Perform off-Site testing as required by the Engineer or Owner.
- D. Reports shall be submitted by independent firm to the Engineer, Contractor, and authorities having jurisdiction, in duplicate, indicating observations and results of tests and compliance or noncompliance with Contract Documents.
1. Submit final report indicating correction of Work previously reported as noncompliant.
- E. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.
1. Notify Engineer and independent firm forty-eight (48) hours before expected time for operations requiring services.
 2. Make arrangements with independent firm and pay for additional Samples and tests required for Contractor's use.
- F. Employment of testing agency or laboratory shall not relieve Contractor of obligation to perform Work according to requirements of Contract Documents.
- G. Retesting or re-inspection required because of nonconformance with specified or indicated requirements shall be performed by same independent firm on instructions from Engineer. Payment for retesting or re-inspection will be charged to Contractor.
- H. Testing Agency Responsibilities:
1. Test Samples of mixes submitted by Contractor.
 2. Provide qualified personnel at Site. Cooperate with Engineer and Contractor in performance of services.
 3. Perform indicated sampling and testing of products according to specified standards.
 4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
 5. Promptly notify Engineer and Contractor of observed irregularities or nonconformance of Work or products.

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6. Perform additional tests required by Engineer.
7. Attend preconstruction meetings and progress meetings, as requested.
- I. Agency Reports: After each test, promptly submit two (2) copies of report to Engineer, Contractor, and authorities having jurisdiction. When requested by Engineer, provide interpretation of test results. Include the following:
 1. Date issued.
 2. Project title and number.
 3. Name of inspector.
 4. Date and time of sampling or inspection.
 5. Identification of product and Specification Section.
 6. Location in Project.
 7. Type of inspection or test.
 8. Date of test.
 9. Results of tests.
 10. Conformance with Contract Documents.
- J. Limits on Testing Authority:
 1. Agency or laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 2. Agency or laboratory may not approve or accept any portion of the Work.
 3. Agency or laboratory may not assume duties of Contractor.
 4. Agency or laboratory has no authority to stop the Work.

1.08. MANUFACTURERS' FIELD SERVICES

- A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment as applicable, and to initiate instructions when necessary.
- B. Submit qualifications of observer to Engineer thirty (30) calendar days in advance of required observations. Observer subject to approval of Engineer.
- C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01. EXAMINATION

- A. Verify existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means Contractor acceptance of existing conditions.
- B. Verify existing substrate is capable of structural support or attachment of new Work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Verify utility services are available, of correct characteristics, and in correct locations.

PART 4 PREPARATION

4.01. PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying new material or substance in contact or bond.

END OF SECTION 01 40 00

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SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01. SECTION INCLUDES

- A. Public Utilities
 - 1. Agencies Affected
 - 2. Notification Requirements
 - 3. Contractor Responsibility
- B. Temporary Utilities
 - 1. Temporary water
 - 2. Temporary electricity
 - 3. Temporary ventilation
 - 4. Temporary sanitary facilities
- C. Existing Utilities and Improvements
 - 1. General
 - 2. District Right of Access
 - 3. Underground Utilities Indicated
 - 4. Underground Utilities not Indicated
 - 5. Approval of Repairs
 - 6. Maintain in Service
- D. Temporary Field Office and Storage Facility
- E. Vehicular Access
- F. Parking
- G. Progress Cleaning and Waste Removal
- H. Barriers
- I. Security
- J. Water Control

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- K. Dust Control
- L. Erosion and Sediment Control
- M. Pollution Control
- N. Removal of utilities, facilities, and controls
- O. Related Sections
 - 1. Section 01 33 00 – Submittal Procedures
 - 2. Section 01 57 13 – Erosion Control
 - 3. Section 01 57 19 – Environmental Requirements

1.02. MEASUREMENT AND PAYMENT

- A. Measurement and payment for this item shall be included in the Mobilization/Demobilization Bid Item, or other appropriate Bid Item. No additional measurement or payment will be included for the requirements of this section.

1.03. SUBMITTAL REQUIREMENTS

- A. Section 01 33 00 - Submittal Procedures.

1.04. PUBLIC UTILITIES

- A. Agencies Affected
 - 1. Electrical: Pacific Gas & Electric. Where a structure that is known to receive service does not have overhead service, underground service shall be assumed to exist.
 - 2. Gas: Pacific Gas & Electric Company has jurisdiction over gas lines.
 - 3. Telephone Service: AT&T. Where a structure that is known to receive service does not have overhead service, underground service shall be assumed to exist.
 - 4. Water Service: HBMWD has jurisdiction over water usage.
 - 5. Drainage: Humboldt County Department of Public Works has jurisdiction over drainage in the area.
 - 6. Streets/Pavement: Humboldt County Department of Public Works has jurisdiction over streets and pavement in the area.
 - 7. Sewer Service: Individual owner provided sewer service.
- B. Notification Requirements
 - 1. Prior to any excavation in the vicinity of any existing underground facilities, including all water, sewer, storm drain, gas, or other pipelines; all buried electric power, communications, or television cables; all traffic signal and street lighting facilities; and all roadways; the Contractor shall notify the respective authorities representing the

owners or agencies responsible for such facilities not less than two (2) work days nor more than seven (7) work days prior to excavation.

2. Notify USA North at 811 or online at USANorth811.org at least two (2) work days, but no more than fourteen (14) work days, prior to such excavation.

C. Contractor Responsibility

1. The Contractor shall anticipate water, sewer, electrical, gas, communication, fiber optic, drainage and telephone services. It may be expected that there will be variation in location from that as shown on the Plans to the actual location. Contractor responsible for verifying actual location in the field after pre-marking by the various utilities affected.
2. No extra payment will be allowed for the removal, replacement, repair, or possible increased cost caused by inadvertent or planned interception and breaking of underground obstructions which may exist.
3. It should be understood that the various utilities are indicated on the Plans to show only the approximate location and must be verified in the field by the Contractor. The various utility agencies will cooperate with the Contractor to endeavor to familiarize the Contractor with all known underground utilities obstructions, but this will not relieve the Contractor from full responsibility in anticipating and locating their actual location.
4. The Contractor, in conjunction with the affected utility company(s), shall pothole and establish the horizontal and vertical locations of all pertinent utilities shown on the Plans and marked in the field. This may be done on an area-by-area basis, but shall be accomplished at least five working days in advance of the date of construction within such area. Any discrepancies (horizontal and/or vertical) between the locations of utilities found by the potholing operation than that shown on the Plans shall be brought to the Engineer's attention immediately. Potholing shall be required at the connection to existing facilities prior to the shop drawing submittals.

1.05. TEMPORARY UTILITIES

A. Temporary Water

1. Contractor has the option of hot tapping into the District's existing 14-inch asbestos cement water main to provide water necessary for construction operations. If used, the hot tap shall require a backflow preventer assembly. Contractor shall submit the proposed hot tap assembly for review and approval by the District and Engineer prior to installation.

B. Temporary Electricity

1. Owner supplied temporary electricity is not available.
2. Contractor will pay cost of energy used and is responsible for all necessary permits, permissions, code and regulatory compliance associated with such use.

C. Temporary Ventilation

1. Ventilate enclosed areas, such as air relief enclosures and valve vaults to achieve curing of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

2. Contractor shall comply with all applicable OSHA requirements for working in confined spaces.

D. Temporary Sanitary Facilities

1. Provide and maintain required facilities and enclosures sufficient to accommodate Contractor and Subcontractor personnel at locations easily accessible from work. Existing facility use is not permitted. Provide facilities at time of project mobilization.
2. Contractor is responsible for cleaning, maintenance, security, placement and removal of facilities.

1.06. EXISTING UTILITIES AND IMPROVEMENTS

A. General

1. The Contractor shall protect all underground utilities and other improvements that may be impaired during construction operations. It shall be the Contractor's responsibility to ascertain the actual location of all existing utilities and other improvements that will be encountered in its construction operations, and to see that such utilities or other improvements are adequately protected from damage due to such operations. The Contractor shall take all possible precautions for the protection of unforeseen utility lines to provide for uninterrupted service and to provide such special protection as may be necessary.
2. In case it shall be necessary to move the property of any public utility or franchise holder, such utility company or franchise holder will be notified by the Contractor to move such property. Time of relocation of the utility by the utility company is not a responsibility of the District. When utility lines that are to be removed are encountered within the area of operations, the Contractor shall notify the Engineer a sufficient time in advance for the necessary measures to be taken to prevent interruption of service.
3. Where the proper completion of the Work requires the temporary or permanent removal and/or relocation of an existing utility or other improvement that is indicated, the Contractor shall remove and, without unnecessary delay, temporarily replace or relocate such utility or improvement in a manner satisfactory to the Engineer and the District. In all cases of such temporary removal or relocation, restoration to former location shall be accomplished by the Contractor in a manner that will restore or replace the utility or improvement as nearly as possible to its former location and to equal or better condition as found prior to removal.

B. District Right of Access

1. The right is reserved by the District and the owners of public utilities and franchises to enter at any time upon any public street, alley, right-of-way, or easement for the purpose of making changes in their property when necessary during the performance of the Work of this Contract.

C. Underground Utilities Indicated

1. Existing utility lines that are indicated or the locations of which are made known to the Contractor prior to excavation and that are to be retained, and all utility lines that are constructed during excavation operations shall be protected from damage during excavation and backfilling, and if damaged, shall be immediately repaired or replaced by the Contractor.

D. Underground Utilities not indicated

1. In the event that the Contractor damages any existing utility lines that are not indicated or the locations of which are not made known to the Contractor prior to excavation, a written report thereof shall be made by the Contractor to the District.
2. All costs of locating, repairing damage not due to failure of the Contractor to exercise reasonable care, and removing or relocating such utility facilities not shown in the Contract documents with reasonable accuracy, and for equipment on the project which was actually working on that portion of the Work which was interrupted or idled during such Work will be paid for as extra Work.

E. Approval of Repairs

1. All repairs to a damaged utility or improvement are subject to inspection and approval by an authorized representative of the utility or improvement Owner before being concealed by backfill or other Work. Contractor to schedule with Owner for the inspection and shall notify the Engineer of the schedule and place of the inspection a minimum of three (3) calendar days prior to inspection.

F. Maintain In Service

1. All power and telephone or the communication cable ducts, gas and water mains, sewer lines, storm drain lines, poles, and overhead power and communication wires and cables encountered along the line of Work shall remain continuously in service during all the operations under the Contract, unless other arrangements satisfactory to the Engineer are made with the owner of said utilities. The Contractor shall be responsible for and shall repair all damage due to its operations, and the provisions of this section shall not be abated even in the event such damage occurs after backfilling or is not discovered until after completion of the backfilling.
2. The District's existing 14-inch water main is constructed of asbestos cement. The Contractor shall become familiar with the asbestos cement pipeline location prior to executing the Work. Should any damage occur to this pipeline, the Contractor shall be responsible for and shall repair the pipeline. Contractor shall review repair procedures with District and have repair materials on hand prior to commencement of the Work.

1.07. TEMPORARY FIELD OFFICE AND STORAGE FACILITY

A. Contractor and Subcontractors:

1. The Contractor and their Subcontractors shall make arrangements for and maintain temporary field offices and storage facilities as may be necessary for the proper execution of the Work. These shall be located so as to cause no interference with any Work to be performed on the site. Coordination and location of offices or storage facilities shall be the responsibility of the Contractor.

1.08. VEHICULAR ACCESS

- A. Provide unimpeded access for Owner's vehicles.
- B. Provide means of removing mud from vehicle wheels before entering streets.
- C. Use existing on-site roads and railroad alignment for construction traffic.

1.09. PARKING

- A. Arrange for temporary surface parking areas to accommodate construction personnel.
- B. When site space is not adequate, provide additional off-site parking.
- C. Use of designated existing on-site streets and driveways used for construction traffic is permitted.
- D. Tracked vehicles not allowed on paved areas.
- E. Maintenance
 - 1. Maintain traffic and parking areas in sound condition free of excavated material, construction equipment, products, and mud.
 - 2. Maintain existing areas used for construction; promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain surface course and drainage in original, or specified, condition.
- F. Removal, Repair
 - 1. Remove temporary materials and construction at Substantial Completion.
 - 2. Repair existing facilities damaged by use to original condition.
- G. Mud From Site Vehicles
 - 1. Provide means of removing mud from vehicle wheels before entering streets.

1.10. PROGRESS CLEANING AND WASTE REMOVAL

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, vaults and other closed or remote spaces, prior to enclosing spaces.
- C. Collect and remove waste materials, debris, and rubbish from site weekly and dispose off-site.

1.11. BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations.
- B. Protect vehicular traffic, stored materials, site, and structures from damage.

1.12. SECURITY

- A. Security Program
 - 1. Protect Work, existing premises and Owner's operations from theft, vandalism, and unauthorized entry.

2. Initiate security program in coordination with Owner's existing security system at project mobilization.
 3. Maintain program throughout construction period until Owner acceptance precludes need for Contractor security.
- B. Entry Control
1. Restrict entrance of persons and vehicles into Work site.
 2. Owner will control entrance of persons and vehicles related to Owner's operations.
- 1.13. WATER CONTROL
- A. Grade Site to Drain
1. Maintain excavations free of water.
 2. Provide, operate, and maintain pumping equipment.
- 1.14. DUST CONTROL
- A. See Section 01 57 00 Environmental Requirements of these Specifications.
- 1.15. EROSION AND SEDIMENT CONTROL
- A. See Section 01 57 13 – Erosion Control
- B. See Section 01 57 19 – Environmental Requirements
- 1.16. POLLUTION CONTROL
- A. See Section 01 57 19 – Environmental Requirements
- 1.17. REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS
- A. Remove temporary utilities, equipment, facilities, materials, prior to Substantial Completion inspection.
 - B. Clean and repair damage caused by installation or use of temporary work.
 - C. Restore existing facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION 01 50 00

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SECTION 01 55 26

TEMPORARY TRAFFIC CONTROL SYSTEMS

PART 1 GENERAL

1.01. THE REQUIREMENT

- A. The Contractor shall provide all materials, equipment, and labor necessary to furnish, place, and maintain all temporary traffic control systems, including construction and maintenance area traffic control devices and flaggers as required to perform the Work in accordance with this Section, and all other appurtenant Work, complete in place, as shown on the Contract Drawings and as specified herein.
- B. Work Specified in this Section
 - 1. Review of proposed Work areas to determine temporary traffic control requirements.
 - 2. Verification of temporary traffic controls with the Humboldt County Public Works and Engineer prior to implementation.
 - 3. Maintenance of traffic control during the Work.
 - 4. Monitoring traffic control during the Work to determine necessary changes required to maintain adequacy.
 - 5. Maintenance of traffic control during non-work hours to maintain adequacy.
 - 6. Removal of temporary traffic control systems after completion of the Work.

1.02. MEASUREMENT AND PAYMENT

- A. Measurement and payment for traffic control shall be included in the Traffic Control Bid Item. No additional measurement or payment will be included for the requirements of this section.

1.03. REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. General Conditions, Section B-51 – Public Convenience.
- B. Humboldt County Public Works Encroachment Permit (to be completed by Contractor)
- C. State of California, Department of Transportation (Caltrans) Specifications and Standards
 - 1. Standard Specifications
 - a. Section 7 Legal Relations and Responsibility
 - b. Section 12 Construction Area Traffic Control Devices
 - 2. California Manual on Uniform Traffic Control Devices, Current Edition (California MUTCD)
- D. Commercial Standards

1. State of California, Division of Industrial Safety, Department of Industrial Relations.
2. Safety Orders of the Division of Industrial Safety, Department of Industrial Relations of the State of California, current edition.

1.04. CONTRACTOR SUBMITTALS

- A. Contractor shall obtain an Encroachment Permit from Humboldt County Public Works prior to beginning the work. As part of the Encroachment Permit process, the Contractor shall prepare traffic control plans for planned work within the public right-of-way for review and acceptance by the County and Engineer. The development and implementation of the traffic control plans shall include, but not necessarily be limited to, traffic controls, signs, and flaggers conforming to the current California MUTCD. The Contractor will be required to submit for review by the County and Engineer a Work Zone Traffic Control Plan that contains only information specifically related to work zone traffic control, including pedestrian traffic control. The items that the Contractor will be required to submit as a part of the Work Zone Traffic Control Plan are anticipated to include, but not necessarily be limited to:
 - a. Specific details for construction staging, including the location and limits of the work zone.
 - b. Identification of changeable message board locations.
 - c. Locations of all excavations.
 - d. MUTCD compliant pedestrian routing plans and details showing how pedestrians will be routed through the work area.
 - e. Plans for protection of the public from construction-related hazards.
 - f. Lane closures and traffic routing including consideration of construction-related trucking routes.
 - g. A trucking route. The route must minimize traffic on residential streets that are not part of the project.
 - h. Lane closure markings, barricade locations, and sign locations showing the necessary signing, methods of delineation, and channelization, and reference to the appropriate Caltrans standards and California MUTCD details for all affected roads.
 - i. Dimensions of lanes affected by traffic control that will be open to traffic.
 - j. Dimensions and locations of signs and cone tapers.
 - k. Identification of side streets and driveways affected by construction and how they will be handled.
 - l. Detail of how public transit will be handled through the construction area.
 - m. Time periods of lane closures.
2. The Work Zone Traffic Control Plan shall contain a title block which contains the Contractor's name, address, phone number, project superintendent's name, contract

name, dates and hours traffic control will be in effect, and a space for review acknowledgment.

3. The Work Zone Traffic Control Plan shall be prepared by a licensed California Civil or Traffic Engineer. The Work Zone Traffic Control Plan and other Encroachment Permit application materials shall be submitted to the Engineer and other affected agencies in conjunction with the County for review.
4. No work will be allowed to commence prior to approval of the Encroachment Permit and Work Zone Traffic Control Plan.
5. A "Letter of Responsibility" shall be submitted on company letterhead, indicating the names and telephone numbers of at least three different persons who shall be available to be contacted in case of emergency at any time during the life of the contract. Said persons must have decision-making authority within the company.

PART 2 PRODUCTS

2.01. GENERAL

- A. All construction area stationary and portable sign panels, lights, barricades, and traffic control devices shall be the product of a commercial sign or safety device manufacturer conforming to the requirements of Section 12, "Construction Area Traffic Control Devices," of the Caltrans Standard Specifications, unless otherwise specified in this Section, shown on the Drawings, and/or as directed by the Engineer.

PART 3 EXECUTION

3.01. GENERAL

- A. No work in or affecting the public right-of-way shall commence until traffic control signing has been approved by Humboldt County and the Engineer.
- B. The Contractor shall provide all appropriate traffic control measures in accordance with this Section prior to start of construction in the public right-of-way or in any area adjacent to the street right-of-way where public safety is affected.
- C. The Contractor shall take all necessary precautions for the protection of the Work and the safety of its employees and the public. Traffic shall be maintained through the construction or maintenance zone in accordance with Sections 7-1.08, 7-1.09 and 12 of the Caltrans Standard Specifications and Sections 01 11 00 – Summary of Work.
- D. The Contractor shall be responsible for developing a plan that is in conformance with the Humboldt County encroachment permit and the County's requirements.
- E. Field changes to traffic control plans shall be approved by the Engineer prior to installation.
- F. When traffic cones or delineators are used to delineate a temporary edge of a traffic lane, the line of cones or delineators shall be considered to be the edge of the traffic lane, however, the Contractor shall not reduce the width of an existing lane to less than 10 feet without written approval from the Engineer.

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- G. All construction area signs, lights, barricades, and traffic control devices shall be furnished, installed, maintained, and removed in conformance with the latest edition of the California MUTCD. Additional or alternate signs may only be used when specifically authorized by the Engineer.
- H. The Contractor shall monitor traffic and safety conditions and maintain adequate traffic control measures during both work and non-work hours in order to maintain compliance with the requirements of this Section.
- I. The Contractor shall conform to all requirements of the current "Safety Orders of the Division of Industrial Safety, Department of Industrial Relations of the State of California."
- J. If a hazardous condition is observed and the Engineer notifies the Contractor either directly or by telephone, the Contractor shall correct the condition immediately. If the Contractor fails to correct the hazardous condition immediately, the District reserves the right to call in a local contractor to perform the necessary work needed to improve public safety. The cost incurred shall be billed to the Contractor. Should the Engineer point out any inadequacy of warning and protective measures, such action on the part of the Engineer shall not relieve the Contractor from responsibility for public safety nor abrogate the Contractor's obligation to furnish and pay for these devices.
- K. All construction area signs, lights, barricades, and temporary traffic control devices shall be completely removed from the roadway when not in use. Locations and methods of storing traffic control equipment adjacent to the roadway between interrupted use shall require prior approval of the Engineer.
- L. The Contractor shall completely remove all temporary signs, striping and/or delineators and restore the pavement, as necessary, upon removal or relocation of any temporary traffic controls or constructed as part of the Work.
- M. Temporary traffic control measures shall be in effect only during work hours. Normal traffic routing shall be reestablished at the end of each workday whenever possible.
- N. Contractor shall conduct operations as to offer the least possible obstruction and inconvenience to the public and shall have under construction no greater amount of work than can be prosecuted properly with due respect to the rights of the public. Contractor shall provide personal advance notice to each affected resident or business informing them of impending work and provide ample time to remove vehicles and estimated time of driveway closure. This shall be accomplished by delivering a notice to all houses or businesses to be affected by the impending work. The notice shall be typed and signed by the Contractor or the Contractor's designated superintendent. The format and contents of the notice shall be approved by the Engineer prior to commencement of the Work.
- O. Construction operations shall be conducted in such a manner as to cause as little inconvenience as possible to abutting property owners. Convenient access to driveways, houses, and buildings along the line of the work shall be maintained, and temporary approaches to crossings or intersecting roads shall be provided and kept in good condition.
- P. Whenever the Contractor's operations create a condition hazardous to the public, furnish, erect, and maintain such fences, barricades, lights, signs and other devices as are necessary to prevent accidents or damage or injury to the public.
- Q. Should the Contractor appear to be neglectful or negligent in furnishing warning and protective measures as above specified, the Engineer may direct attention to the existence of hazard, and the necessary warning and protective measures shall be furnished and installed by the Contractor at his expense, without cost to the Owner. Should the Engineer point out any

inadequacy of warning and protective measures, such action on the part of the Engineer shall not relieve the Contractor from responsibility for public safety nor abrogate his obligation to furnish and pay for these devices.

- R. Under no circumstances shall access to businesses or residences be held up more than fifteen (15) minutes at any one time. The Contractor may coordinate with property and business owners to schedule work so that delays longer than 15 minutes do not adversely affect residents or business owners to their satisfaction. In addition, Contractor shall give personal notice to all affected property owners as specified in paragraph N, hereinbefore. No streets shall be closed to through traffic at any time. Contractor shall at all times provide access to public facilities such as schools, etc. and make provisions for passage of emergency vehicles.

3.02. PEDESTRIAN TRAFFIC

- A. The Contractor is directed to Chapter 6D, Pedestrian and Worker Safety, in the California MUTCD, the Drawings, and these Specifications.
- B. Pedestrians shall be provided with a safe, convenient and accessible path that, at a minimum, replicates the most desirable characteristics of the existing path.
- C. The Contractor shall construct and maintain temporary pedestrian pathways through the work zone, where required, that shall be in compliance with the requirements of California MUTCD.
- D. Pedestrian routes shall not be impacted for the purposes of any non-construction activities such as parking of vehicles or equipment, or stock piling of materials.
- E. Pedestrians shall not be led into conflicts with work site vehicles, equipment or operations.

END OF SECTION 01 55 26

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SECTION 01 57 13

EROSION CONTROL

PART 1 GENERAL

1.01. GENERAL

- A. Minimize the extent of all ground-disturbing activities and avoid Work in any drainage channels if at all feasible.
- B. Heavy equipment shall be placed outside of drainage channels except when absolutely necessary to perform the Work.
- C. Upon completion of construction activities, natural drainage shall be restored and re-contoured as nearly as practicable to pre-project conditions and shall match adjacent natural channel contours.
- D. In addition to ongoing erosion control measures, all disturbed areas resulting in bare earth shall be treated with seed and straw upon completion of the project. Seed shall be per Caltrans standards for roadside seeding in the project region. Seed shall be applied at a minimum rate of 100 pounds per acre. All disturbed areas shall be covered with straw by hand broadcasting at an application rate so that no earth can be seen through the straw.

1.02. RELATED SECTIONS

Related work specified in other sections:

- A. Section 01 57 19 – Environmental Requirements
- B. Section 31 00 00 – Earthwork

1.03. MEASUREMENT AND PAYMENT

- A. Measurement and payment for erosion control shall be included in the Grading, Access Improvements, and Sediment & Erosion Control Bid Item. No additional measurement or payment will be included for the requirements of this section.

1.04. SUBMITTALS

- A. Mill Certificate or Affidavit. A mill certificate or affidavit shall be provided attesting that the fabric and factory seams meet chemical, physical, and manufacturing requirements specified below.
- B. Erosion Control Plan.
- C. Proposed Seed Mix

1.05. REFERENCES

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.
- B. American Society for Testing and Materials (ASTM)

1. ASTM D4439 - Standard Terminology for Geosynthetics.
 2. ASTM D4491 - Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
 3. ASTM D4533 - Standard Test Method for Trapezoid Tearing Strength of Geotextiles.
 4. ASTM D4632 - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.
 5. ASTM D4751 - Standard Test Method for Determining Apparent Opening Size of a Geotextile.
 6. ASTM D4873 - Standard Guide for Identification, Storage, and Handling of Geosynthetic Rolls and Samples.
- C. California State Water Resources Control Board:
1. National Pollutant Discharge Elimination System (NPDES) General Permit Discharge from Construction Activities.
 2. HBMWD Statewide NPDES General Permit for Drinking Water System Discharges (see Appendix A of these Specifications).

1.06. EROSION AND SEDIMENT CONTROLS

- A. The controls and measures required of the Contractor are described but not limited to the below.
1. Structural Practices: Structural practices shall be implemented to divert flows from exposed soils, temporarily store flows, or otherwise limit runoff and the discharge of pollutants from exposed areas of the site. Structural practices shall be implemented in a timely manner during the construction process to minimize erosion and sediment runoff. Structural practices shall include the following devices.
 - a. Silt Fences. The Contractor shall provide silt fences as a temporary structural practice to minimize erosion and sediment runoff. Silt fences shall be properly placed and installed to effectively retain sediment immediately after completing each phase of work where erosion would occur in the form of sheet and rill erosion (e.g. clearing and grubbing, trench excavation, backfilling, and grading). Silt fences shall be installed in the locations as directed by the Engineer. Final removal of silt fence barriers by the Contractor shall be upon approval of the Engineer.
 - b. Fiber Rolls (sediment logs or wattles): Contractor shall provide fiber rolls as temporary structural practice to minimize erosion and sediment runoff. Fiber rolls shall be properly placed and installed to effectively retain sediment immediately after completing each phase of work (e.g., clearing and grubbing, trench excavation, backfill, and grading) in each independent runoff area (e.g., after clearing and grubbing in an area between a ridge and drain, fiber rolls shall be placed as work progresses; fiber rolls shall be removed/replaced/relocated as needed for work to progress in the drainage area). Final removal of fiber roll barriers by the Contractor shall be upon approval by the Engineer. Fiber Rolls shall be provided as follows, or as required to conform to the intent of this section:

- 1) Along the downhill perimeter edge of all areas disturbed.
 - 2) Along the top of the slope or top bank of drainage ditches, channels, swales, etc. that traverse disturbed areas.
 - 3) Along the toe of all cut slopes and fill slopes of the construction areas.
 - 4) Perpendicular to the flow in the bottom of existing drainage ditches, channels, swales, etc. that traverse disturbed areas or carry runoff from disturbed areas. Rows shall be spaced a maximum of 100 feet apart.
 - 5) Perpendicular to the flow in the bottom of new drainage ditches, channels, and swales. Rows shall be spaced a maximum of 100 feet apart.
 - 6) At the entrance to culverts that receive runoff from disturbed areas.
- c. To minimize wildlife entanglement and plastic debris pollution, the use of plastic netting (such as polypropylene, nylon, polyethylene, polyester, or other synthetic fibers used in fiber rolls, erosion control blankets, and mulch control netting) in temporary rolled erosion and sediment control products is prohibited. Any erosion control associated netting shall be made of natural fibers and constructed in a loose-weave design with movable joints between the horizontal and vertical twines.

PART 2 PRODUCTS

2.01. SILT FENCES

- A. Ultraviolet stabilized woven polypropylene face. The filter fabric shall meet the following requirements:

Physical Property	Test Procedure	Required Value
Grab Tensile	ASTM D 4632	160 lbs. min.
Elongation (%)	ASTM D 1682	25 % max.
Mullen Burst Strength, psi, min.	ASTM D 3876	350
Equivalent Opening Size, max.	US Standard Sieve	30-70
Ultraviolet Radiation Resistance, % Strength Retention	ASTM D 4355	70
Weight oz./sq. yd.	ASTM D 3776	4

- B. Mill Certificate or Affidavit. A mill certificate or affidavit shall be provided attesting that the fabric and factory seams meet chemical, physical, and manufacturing requirements specified above.

- C. The Contractor may use either wooden stakes or steel posts for silt fence construction. Wooden stakes utilized for silt fence construction, shall have a minimum cross section of 2 inches by 2 inches when oak is used and 4 inches by 4 inches when pine is used. Steel posts (standard "U" or "T" section) utilized for silt fence construction, shall have a minimum weight of 1.33 pounds per linear foot.

2.02. FIBER ROLLS (SEDIMENT LOGS OR WATTLES)

- A. Composed of certified weed free rice straw or coconut fiber in 8.5 to 9-inch diameter rolls with and approximate weight of 2lbs/lineal foot, contained in a core, jute, or burlap netting.
- B. Manufacturers:
 - 1. Earth Savers 9"-Coir Log
 - 2. Erosion Control Blanket, 9-inch Stenlog
 - 3. Substitutions: Section 01 60 00 - Product Requirements.
- C. The Contractor shall use wooden stakes for fiber roll installation. Wooden stakes used for fiber roll installation shall have a minimum cross section of 1 inch by 2 inches, or as suggested by the fiber roll manufacturer.

PART 3 EXECUTION

3.01. INSTALLATION OF SILT FENCES

- A. Silt fences shall extend a minimum of 16 inches above the ground surface and shall not exceed 34 inches above the ground surface. Filter fabric shall be from a continuous roll cut to the length of the barrier to avoid the use of joints. When joints are unavoidable, filter fabric shall be spliced together at a support post, with a minimum 6 inch overlap, and securely sealed. A trench shall be excavated approximately 4 inches wide and 4 inches deep on the upslope side of the location of the silt fence. The 4-inch by 4-inch trench shall be backfilled and the soil compacted over the filter fabric. Silt fences shall be removed upon approval by the Engineer.
- B. Maximum spacing for post supports shall be 6 feet on center. Posts shall be buried 12 inches minimum and shall not exceed 36 inches above the ground surface.

3.02. INSTALLATION OF FIBER ROLLS (SEDIMENT LOGS OR WATTLES)

- A. Fine grade the subgrade by hand, dressing where necessary to remove local deviations and to remove larger stones or debris that will inhibit intimate contact of the fiber roll with the subgrade. Prior to roll installation, contour a concave key trench 2 to 4 inches deep along the proposed installation route. Soil excavated in trenching should be placed on the uphill or flow side of the roll to prevent water from undercutting the roll.
- B. Place fiber rolls into the key trench and stake on both sides of the roll within 6 feet of each end. Spacing for stakes shall be 3 to 5 feet. Stakes are typically driven in on alternating sides of the roll. Stakes shall be buried 12 inches minimum.
- C. When more than one fiber roll is placed in a row, the rows shall be abutted securely to one another to provide a tight joint, not overlapped. Fiber rolls shall be placed in a single row, lengthwise on the contour, with ends of adjacent rolls tightly abutting one another.

3.03. MAINTENANCE

- A. The Contractor shall maintain the temporary and permanent vegetation, erosion and sediment control measures, and other protective measures in good and effective operating condition by performing routine inspections to determine condition and effectiveness, by restoration of destroyed vegetative cover, and by repair of erosion and sediment control measures and other protective measures. The following procedures shall be followed to maintain the protective measures.
1. Silt Fence Maintenance. Silt fences shall be inspected in accordance with PART 4. Any required repairs shall be made promptly. Close attention shall be given to the repair of damaged silt fence resulting from end runs and undercutting. Should the fabric on a silt fence decompose or become ineffective, and the barrier is still necessary, the fabric shall be replaced promptly. Sediment deposits shall be removed when deposits reach one-third of the height of the barrier. When a silt fence is no longer required, it shall be removed. The immediate area occupied by the fence and any sediment deposits shall be shaped to an acceptable grade. The areas disturbed by this shaping shall be re-vegetated.
 2. Fiber Roll Maintenance. Fiber roll barriers shall be inspected in accordance with PART 4. Close attention shall be given to the repair of damaged rolls, end runs and undercutting beneath rolls. Necessary repairs to barriers or replacement of rolls shall be accomplished promptly. Sediment deposits shall be removed when deposits reach one-half of the height of the barrier. Roll rows used to retain sediment shall be turned uphill at each end of each row. When a fiber roll barrier is no longer required, it shall be removed. The immediate area occupied by the roll and any sediment deposits shall be shaped to an acceptable grade. The areas disturbed by this shaping shall be re-vegetated.

PART 4 INSPECTION

4.01. SITE INSPECTIONS

- A. Person(s) Responsible for Inspecting Site
1. The person inspecting the site may be on the Contractor's staff or a third party hired by the Contractor to conduct such inspection. The Contractor is responsible for ensuring that the person who conducts inspections is a "qualified person."
 2. A "qualified person" is a person knowledgeable in the principles and practice of erosion and sediment controls and pollution prevention, who possesses the skill to access conditions at the construction site that could impact stormwater quality, and the skills to assess the effectiveness of any stormwater controls selected and installed to meet the requirements of this Specification section.
- B. Frequency of Inspections:
1. At a minimum, conduct a site inspection in accordance with one of the two schedules listed below:
 - a. At least once every seven (7) calendar days; or
 - b. Once every 14 calendar days and within 24 hours of the occurrence of a storm event of 0.25 inches or greater. To determine if a storm event of 0.25

inches or greater has occurred on the project site, the Contractor must either keep a properly maintained rain gauge on the site, or obtain the storm event information from a weather station that is representative of the project location. For any day of rainfall during normal business hours that measures 0.25 inches or greater, you must record the total rainfall measured for that day.

c. Inspections are only required during the project's normal working hours.

C. Reduction in Inspection Frequency:

1. Inspection frequency may be reduced as follows:

a. For Stabilized Areas. Contractor may reduce frequency of inspection to once per month in any area of the site where the site has been stabilized as approved by the Engineer. If construction activity resumes in this portion of the site at a later date, the inspection frequency immediately increases to that required in Part 4.01.B. Contractor must document the beginning and ending dates of this period in their records.

D. Areas that need to be inspected. During site inspection, the Contractor must at a minimum inspect the following areas of the site:

1. All areas that have been cleared, graded, or excavated and that have not yet completed stabilization.
2. All stormwater controls (including pollution prevention measures) installed at the site.
3. Materials, waste, borrow, or equipment storage and maintenance areas.
4. All areas where stormwater typically flows within the site, including drainageways designed to divert, convey and/or treat stormwater;
5. All points of discharge from the site; and
6. All locations where stabilization measures have been implemented.

E. Requirements for Inspections. During site inspection, the Contractor's inspector must at a minimum:

1. Check whether all erosion and sediment controls and pollution prevention controls installed, appear to be operational, and are working as intended to minimize pollutant discharges. Determine if any controls need to be replaced, repaired, or maintained.
2. Check for presence of conditions that could lead to spills, leaks, or other accumulations of pollutants on the site;
3. Identify any locations where new or modified stormwater controls are necessary to meet the requirements of these Specifications or the applicable permit conditions;
4. At points of discharge and, if applicable, the banks of any surface waters flowing within site boundaries or immediately adjacent to the site, check for signs of visible erosion and sedimentation that have occurred and are attributable to your discharge; and

5. Identify all incidents of noncompliance observed.
 6. If a discharge is occurring during inspection, the Contractor's inspector is required to:
 - a. Identify all points of the property from which there is a discharge
 - b. Observe and document the visual quality of the discharge, and take note of the characteristics of the stormwater discharge, including color, odor, floating, settled, or suspended solids, foam, oil sheen, and other obvious indicators or stormwater pollutants; and
 - c. Document whether the stormwater controls are operating effectively, and describe any such controls that are clearly not operating as intended or are in need of maintenance.
 7. Based on the results of the inspection, initiate corrective action under Part 5.
- F. Inspection Report
1. Requirements to Complete Inspection Report: the Contractor or Contractor's representative must complete an inspection report within 24 hours of completing any site inspection. Each inspection report must include the following:
 - a. The inspection date;
 - b. Names and titles of the personnel making the inspections;
 - c. A summary of inspection findings, covering at a minimum the observations made in accordance with Part 4.01.E;
 - d. If the site is being inspected at the frequency specified in Part 4.01.B.1. and an inspection was conducted because of rainfall measuring 0.25 inch or greater, you must include the applicable rain gauge or weather station readings that triggered the inspection; and
 - e. If it has been determined that it is unsafe to inspect a portion of the site, the reasons it was found to be unsafe must be described, and the locations that this condition applied to must be specified.
 2. Record Keeping Requirements: Contractor is required to keep a current copy of all inspection reports at the site or at an easily accessible location, so that it can be made available at the time of an onsite inspection or upon request by the Owner, Engineer, County or CA Regional Water Quality Control Board. The inspection reports may be kept electronically if the records are:
 - a. In a format that can be read in a similar manner as a paper record;
 - b. Legally dependable with no less evidentiary value than their paper equivalent; and
 - c. Accessible to the inspector during an inspection to the same extent as a paper copy stored at a site would be, if the records were stored in paper form. All inspection reports completed for this part must be retained for at least 3 years from the date that the Notice of Completion for this project is filed.

4.02. INSPECTIONS BY REGULATORY AGENCIES

- A. Allow Regional Water Quality Control Board, or any authorized representative of this or other applicable agencies, to conduct the following activities at reasonable times:
 - 1. Enter onto areas of the site, including any construction support activity areas, and onto locations where records are kept.
 - 2. Access and copy any records that must be kept under the conditions of this Specification section;
 - 3. Inspect the construction site, including any construction support activity areas covered by this Contract and any stormwater controls installed and maintained at the site; and
 - 4. Sample or monitor for the purpose of ensuring compliance.

PART 5 CORRECTIVE ACTION

5.01. "CORRECTIVE ACTIVE" DEFINED

- A. Corrective actions are actions taken in compliance with this Specification section, which include:
 - 1. Repair, modify, or replace any stormwater control used at the site;
 - 2. Clean up and properly dispose of spills, releases, or other deposits; or
 - 3. Remedy a permit violation

5.02. REQUIREMENTS FOR TAKING CORRECTIVE ACTION

- A. Contractor must complete the following corrective action in accordance with the deadlines specified in this Part. In all circumstances, Contractor must immediately take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events.
- B. For any of the following conditions on the site, Contractor must install a new or modified erosion control measure and make it operational, or complete the repair, but no later than seven (7) calendar days from the time of discovery. If it is infeasible to complete the installation or repair within seven (7) calendar days, Contractor must document in their records why it is infeasible to complete the installation or repair within seven (7) calendar days and document the schedule for installing the stormwater control(s) and making it operational as soon as practicable after the seven (7) day timeframe.
 - 1. A required storm water control was never installed, was installed incorrectly, or not in accordance with the requirements of Section 01 57 13.
 - 2. If the Contactor determines that erosion control measures installed are not effective enough for the discharge to meet applicable water quality standards.
 - 3. Any of the prohibited discharges listed below are occurring or has occurred:

- a. Wastewater from washout of concrete or slurry, unless managed by an appropriate control.
- b. Wastewater from washout and cleanout of any other construction materials, unless managed by an appropriate control.
- c. Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance.
- d. Soaps, solvents, or detergents used in vehicle and equipment washing.
- e. Drilling muds, or toxic or hazardous substances from a spill or other release.

5.03. CORRECTIVE ACTION REQUIRED BY REGULATORY AGENCY

- A. Contractor must comply with any corrective actions required by the State as a result of an inspection carried out under Part 4.02.

5.04. CORRECTIVE ACTION REPORT

- A. For each corrective action taken in accordance with this Part, Contractor must complete a corrective action report, which includes the applicable information listed below. Note that these reports must be maintained in Contractor's records but do not need to be provided to any regulatory agency except upon request.
 1. Within 24 hours of discovering the occurrence of one of the triggering conditions in Part 5.02.B at the site, Contractor must complete a report of the following:
 - a. Which condition was violated
 - b. The nature of the condition identified; and
 - c. The date and time of the condition identified and how it was identified.
 2. Within seven (7) calendar days of discovering the occurrence of one of the triggering conditions in Part 5.02.B at the site, Contractor must complete a report of the following:
 - a. Any follow-up actions taken to review the design, installation, and maintenance of stormwater controls, including the dates such actions occurred;
 - b. A summary of stormwater control modifications taken or to be taken, including a schedule of activities necessary to implement changes, and the date the modifications are completed or expected to be completed.
 3. Record Keeping Requirements: Contractor is required to keep a current copy of all inspection reports at the site or at an easily accessible location, so that it can be made available at the time of an onsite inspection or upon request by the Owner, Engineer, County or CA Regional Water Quality Control Board. The inspection reports may be kept electronically if the records are:
 - a. In a format that can be read in a similar manner as a paper record;

- b. Legally dependable with no less evidentiary value than their paper equivalent; and
- c. Accessible to the inspector during an inspection to the same extent as a paper copy stored at a site would be, if the records were stored in paper form. All corrective action reports completed for this part must be retained for at least 3 years from the date that the Notice of Completion for the project has been filed.

PART 6 STAFF TRAINING REQUIREMENTS

6.01. STAFF TRAINING REQUIREMENTS

- A. Prior to commencement of earth-disturbing activities or pollutant-generating activities, whichever occurs first, Contractor must ensure that the following personnel understand the requirements of the applicable permits, this Specification section, and their specific responsibilities with respect to those requirements:
 - 1. Personnel who are responsible for the design, installation, maintenance, and/ or repair of stormwater controls (including pollution prevention measures);
 - 2. Personnel responsible for the application and storage of chemicals, petroleum products, or other hazardous or toxic materials;
 - 3. Personnel who are responsible for conducting inspections as required in Part 4.01; and
 - 4. Personnel who are responsible for taking corrective actions as required in Part 5.02.
- B. Contractor is responsible for ensuring that all activities on the site comply with the requirements of this Specification. Contractor is not required to provide or document formal training for subcontractors or other outside service providers, but must ensure that such personnel understand any requirements of the applicable permits or these specifications that may be affected by the Work they are subcontracted to perform.
- C. At a minimum the personnel listed in Part 6.01 A must be trained to understand the following if related to the scope of their job duties (e.g., only personnel responsible for conducting inspections need to understand how to conduct inspections):
 - 1. The location of all stormwater controls on the site required by this permit, and how they are to be maintained;
 - 2. The proper procedures to follow with respect to the project's pollution prevention requirements; and
 - 3. When and how to conduct inspections, record applicable findings, and take corrective actions.

END OF SECTION 01 57 13

SECTION 01 57 19

ENVIRONMENTAL REQUIREMENTS

PART 1 GENERAL

1.01. SUMMARY

- A. Section includes mitigation and project measures to reduce or avoid adverse effects, resulting from construction of the project.
- B. Related Sections
 - 1. Section 01 50 00 Temporary Facilities and Controls
 - 2. Section 01 55 26 Temporary Traffic Control Systems
 - 3. Section 01 57 13 Erosion Control
 - 4. Section 01 74 00 Site and Area Cleanup
 - 5. Section 31 23 19 Dewatering
 - 6. Section 33 01 10 Disinfection of Water Utility Distribution
 - 7. HBMWD Statewide NPDES General Permit for Drinking Water System Discharges (see Appendix A of these Specifications)
 - 8. Final Geotechnical Report, Water Transmission Pipeline Replacement under Mad River, Crawford & Associates, Inc., December 2017 (see Appendix B of these Specifications)
 - 9. Horizontal Directional Drilling (HDD) Surface Spill and Hydrofracture Contingency Plan, Bennett Trenchless Engineers, December 2017 (see Appendix C of these Specifications)
- C. The Mitigated Negative Declaration (MND) entitled "Initial Study and Mitigated Negative Declaration, City of Blue Lake & Fieldbrook-Glendale Community Services District, Water Transmission Pipeline Replacement Project, Adopted September 14, 2017" has been prepared for the Project. The Contractor shall abide by all applicable provisions of said document, and said requirements shall become part of the Contract Documents. Requirements affecting the Contractor's work have been incorporated into this and other sections of these specifications.
- D. The Owner has contacted and obtained confirmation from the California Department of Fish & Wildlife, the California State Lands Commission, the California State Water Quality Control Board, and the U.S. Army Corps of Engineers that permits from these agencies are not required for this project. Any permit requirements mandated by these agencies upon implementation of the Work that vary significantly or impact the Work detailed in these specifications or other Contract Documents shall be paid for as extra work.

1.02. MEASUREMENT AND PAYMENT

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- A. Measurement and payment for the items addressed in this Section shall be included in the Bid Item to which they relate. No additional measurement or payment will be included for the requirements of this section.

1.03. DEFINITIONS

- A. Project Measures: Measures and practices are included as part of the Project to reduce or avoid adverse effects that could result from construction or operation of the pipeline.
- B. Mitigation Measures: Measures and practices are included as part of the Project to reduce or avoid adverse effects that could result from construction or operation of the pipeline and require monitoring and checking for compliance prior, during, and following construction.

1.04. SUBMITTALS

- A. Erosion Control Plan – Submit under Specification 01 57 13 – Erosion Control
- B. General Construction Permit Application
- C. Flushed Water Disposal Plan
- D. Dewatering Plan
- E. Fire Safety Plan
- F. Work Zone Traffic Control Plan

PART 2 PRODUCTS

2.01. PRODUCTS

- A. The use of rodenticides containing any anticoagulant compounds including, but not limited to Warfarin, Bromadiolone, Brodifacoum, or Diphacinone is prohibited.
- B. The use of herbicides is prohibited.

PART 3 EXECUTION

3.01. PROJECT-WIDE MEASURES:

- A. **Implement Air Quality Emission Control Measures during Construction.** The principal concern about the effect of construction projects on air quality relates to the potential for earthwork and other activities to generate dust, including inhalable particulate matter (PM₁₀) that poses a human health hazard. To address the potential for dust generation, the Contractor will be required to implement the following BMPs. These measures will also apply to ground disturbing maintenance activities and equipment exhaust:
 - 1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered twice per day, and additionally as necessary during dusty conditions or as directed by the Engineer.
 - 2. Erosion control measures must be employed to prevent water runoff containing silt and debris from entering the Mad River;

3. All haul trucks transporting soil, sand, or other loose material on- or off-site shall be covered;
 4. Sweep paved access roads and parking areas daily. The use of dry power sweeping shall be prohibited;
 5. All visible mud or dirt tracked out onto adjacent public roads shall be removed using wet power vacuum street sweepers as needed. The use of dry power sweeping shall be prohibited;
 6. All vehicle speeds on unpaved areas shall be limited to 15 miles per hour;
 7. All paving shall be completed as soon as possible after trenching work is finished;
 8. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to five minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations);
 9. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.
 10. Refer to Section 01 50 00, "Temporary Facilities and Controls," for additional BMPs and requirements.
- B. **Erosion Control.** The following erosion control measures shall be implemented by the construction Contractor to prevent soil erosion and sedimentation during construction. Erosion and sediment control measures will be in effect and maintained by the Contractor on a continuous basis until all disturbed areas are stabilized.
1. Stockpiled material will be covered or watered to eliminate excessive dust, as necessary.
 2. Fiber rolls, silt fences, or similar products will be utilized in appropriate locations to reduce sediment runoff from disturbed soils, as necessary.
 3. A stabilized construction entrance will be maintained to minimize tracking of mud and dirt from construction vehicles onto public roads.
 4. Storm drain inlets receiving storm water runoff will be equipped with inlet protection, as necessary.
 5. A concrete washout area will be designated to clean concrete trucks and tools, if necessary. The washout area shall be located at least 100 feet from all waters, drainage courses, and storm drain inlets and shall be implemented in a manner that controls runoff and prevents leaching to underlying soils.
 6. Refer to Section 01 57 13 – Erosion Control for additional BMPs and requirements.
- C. **Hydrofracture Analysis.** The Contractor shall have equipment and tools on-site for rapid containment and cleanup of any inadvertent fluid returns. The Contractor shall also comply with all of the additional requirements given in the *Horizontal Directional Drilling Surface Spill and Hydrofracture Contingency Plan, Humboldt Bay Municipal Water District BLFGCSD*

Water Transmission Pipeline Replacement, Mad River HDD Crossing, prepared by Bennett Trenchless Engineers, dated December, 2017 (see Appendix C).

- D. **Draining, Disinfection, and Flushing.** A portion of the existing 14-inch asbestos cement line will need to be drained, disinfected, and flushed at each new connection location for the connection work to be completed.
1. On the west side, it is anticipated that approximately 3,500 linear feet of the 14-inch line will need to be drained (approximately 28,000 gallons of water). On the east side, it is anticipated that approximately 500 linear feet of the 14-inch line will need to be drained (approximately 400 gallons of water). These numbers are estimates and are provided for informational purposes only. There is a possibility that the existing valves will not fully seat in the closed position.
 2. At no time shall the Contractor operate any existing system valves. All opening and closing of valves shall be coordinated with District personnel.
 3. The Contractor shall be responsible for dealing with all of the drained water as described herein. The drained water shall be directed to a percolation area that consists of a hay bale perimeter and facilitates percolation of the water back into the ground, or the Contractor may propose another method for properly disposing of this water.
 4. After the new pipe is installed, it will need to be disinfected with highly chlorinated water and subsequently flushed. A percolation basin consisting of a hay bale perimeter and a plastic liner (or another method proposed by the Contractor) shall be used for the de-chlorination (by Vita-D-Chlor or similar product) of disinfection water that is flushed out of the water line. Standard construction Best Management Practices (BMPs) shall be used for the above work, and all of the water handling and disposal requirements as set forth in the District's existing General NPDES Permit for Drinking Water Discharges (see Appendix A) shall be followed. Highly chlorinated or sediment-laden water shall not be allowed to reach the Mad River or other drainage courses in the vicinity. The Contractor shall submit a plan for approval by the Engineer that details how drained water will be disposed of, and how the highly chlorinated flushing water will be de-chlorinated and disposed of.
 5. The cutting and capping of the existing 14-inch asbestos cement water main cannot be completed until the new pipe is installed, tested and approved by the Engineer.
- E. **Construction Schedule.** Daytime work hours shall be limited to the hours of 7:00 a.m. to 7:00 p.m., Monday through Saturday, except as identified below for tunneling activities. Construction outside of these hours, on Sunday, or legal or County holidays shall not be allowed without prior approval from the Engineer.
- Continuous pullback may be required during the final segment of the HDD process when the HDPE pipeline is installed. During this phase of the HDD process, construction could require some nighttime work periods for installation of the water main. If required, nighttime work periods shall be coordinated with the Engineer in advance, and approval shall be given by the Engineer prior to any work occurring outside the hours described above.
- F. **Site Restoration and Demobilization.** Following construction, the contractor shall demobilize and remove all equipment, supplies, and construction wastes. Disturbed areas shall be revegetated, and final erosion and sediment controls shall be installed. All disturbed areas of the project site shall be restored to original pre-construction conditions.

- G. **Groundwater Dewatering.** If required, temporary groundwater dewatering shall be conducted to provide a dry work area. Groundwater shall be pumped to a percolation area consisting of a hay bale perimeter to allow it to infiltrate back into the soil (or other method proposed by the Contractor). The Contractor shall submit a dewatering plan for review and approval by the Engineer. The Contractor may also:

1. Reuse the water on-site for dust control, compaction, or irrigation, as appropriate.
2. Retain the water on-site in a grassy or porous area to allow infiltration/evaporation.

Refer to Section 31 23 19 – Dewatering for additional BMPs and requirements.

3.02. SITE SPECIFIC MITIGATION MEASURES:

A. Biological Resources

1. **Avoidance or Replacement of Sensitive Wildlife Species and Habitats.**

- a. No work activities shall occur within the channel of the Mad River or within the adjacent riparian zone habitat up to top of bank. If work were to occur within the channel, it would require consultation with the California Department of Fish and Wildlife and the National Marine Fisheries Service regarding potential impacts to aquatic habitat and special-status fish species.
- b. Silt fences shall be installed along the entire downslope edge of the disturbed area of project sites on the east and west side of the Mad River as necessary.
- c. Within 24 hours prior to the start of ground-disturbing work, a qualified biologist working on behalf of the Owner shall survey the project area for Northern Red-legged frogs and Foothill Yellow-legged Frogs. If any frogs are located, they shall be relocated to the nearest suitable habitat outside of the project area. The Engineer shall be given a minimum two weeks' notice prior to ground-disturbing work occurring.
- d. If any trees with loose bark or cavities, snags, or rock crevices will be disturbed during the May 1 through August 15 bat maternity period, a qualified biologist working on behalf of the Owner shall survey the area for any presence of special status bats such as the Long-eared Myotis (*Myotis evotis*). The Engineer shall be given a minimum two weeks' notice prior to any such trees being disturbed.

2. **Bird Surveys for Nesting Birds**

- a. Pre-construction bird surveys shall be conducted by a qualified biologist working on behalf of the Owner within seven days prior to the start of any construction within the nesting season (March 15 – August 15). The Engineer shall be given a minimum two weeks' notice prior to any construction activities beginning.
- b. If active nests are detected within 500 feet of construction activities, the Owner shall flag locations that are supporting breeding, and no ground-disturbing work or vegetation removal shall commence within the buffers until the nests have fledged. Construction activities shall avoid nest sites until the biologist determines that the young have fledged or nesting activity has

ceased. If nests are documented outside of the construction (disturbance) footprint, but within 500 feet of the construction area, buffers will be implemented if deemed appropriate in coordination with CDFW. In general, the buffer for common species would be 30 to 50 feet and may be modified on a case-by-case basis with consultation with CDFW, the buffer for sensitive species (CESA and ESA) would be 300 feet, and the buffer for raptors would be 500 feet.

B. Cultural Resources

1. **Identify and Avoid or Minimize Impacts to Unknown Historic and/or Archaeological Resources.** The Contractor shall ensure that if concentrations of prehistoric or historic-period materials are encountered as a result of ground-disturbing activity attributable to the Project, all work in the immediate vicinity shall halt until a qualified archaeologist can evaluate the finds and make recommendations. The recommendations of the archaeologist shall be implemented.

Prehistoric materials could include:

- obsidian and chert flaked-stone tools (e.g. projectile points, knives, scraping implements) or tool-making debris
- culturally darkened soil (“midden”) containing heat-affected rocks
- shellfish remains
- stone milling equipment (e.g. mortars, pestles, handstones, milling slabs)

Historic materials could include:

- Stone or concrete footings and walls,
- Building materials or other remains with cut nails,
- Artifact-filled wells or privies,
- Other deposits of metal, glass, and/or ceramic artifacts.

If such materials are encountered during construction, the Contractor shall immediately halt all Work in the vicinity and notify the Engineer. The District shall retain a qualified archaeologist who shall be present during subsequent surface and subsurface activities in the vicinity of the sensitive materials as determined necessary by the archaeologist. With respect to these areas of sensitive materials:

- Ground disturbance shall be monitored by a qualified archaeologist with the authority to temporarily halt work and redirect equipment if cultural materials are discovered.
- If cultural materials are discovered, the archaeologist shall assess the discovery to determine if it constitutes either a unique archaeologist resource or a historical resource for purposes of CEQA (CCR Title 14 §15064.5[a]).
- If the archaeologist determines that the materials do not constitute either a unique archaeological resource or a historical resource, their presence shall be noted but need not be considered further (CCR Title 14 §15064.5[c][3]).
- If the archaeologist determines: (a) that the materials do constitute a unique archaeological resource or historical resource; and, (b) they are

subject to substantial adverse change as defined in CCR Title 14 §15064.5[b], the archaeologist shall provide recommendations to the District for appropriate treatment which, among other options, may include preservation in place or archaeological data recovery. Preservation in place is preferred, if it is feasible.

Any additional Work requirements due to changes in alignment, re-excavation, and standby time will be paid for under a negotiated change order.

2. **Evaluation and Treatment of Paleontological Resources.** If paleontological resources (e.g. vertebrate bones, teeth, or abundant and well-preserved invertebrates or plants), are encountered during construction, the Contractor shall ensure work in the immediate vicinity shall be diverted away from the find until a professional paleontologist assesses and salvages the find, as appropriate.

If such materials are encountered during construction, the Contractor shall immediately halt all Work within 50 feet of the find and notify the Engineer. The District shall retain a qualified paleontologist to assess and salvage the find. Based on the scientific value or uniqueness of the find, the paleontologist may record the find and allow work to continue, or recommend salvage and recovery of the material, if it is determined that the find cannot be avoided. The paleontologist shall make recommendations for any necessary treatment that is consistent with currently accepted scientific practices. Any fossils collected from the area shall then be deposited in an accredited and permanent scientific institution where they will be properly curated and preserved.

Work shall not proceed until the Contractor receives written clearance to proceed from the District. The Contractor shall continue Work in other areas of the Project during the Stop Work Order, and it is not anticipated that additional payment shall be required; however, if Work in other areas is impossible, standby time shall be paid for under a negotiated change order and per the General Conditions.

3. **Procedures regarding Encountering Human Remains.** Human remains may be encountered, given the reported presence of prehistoric sites in the vicinity. If human remains, associated grave goods, or items of cultural patrimony are encountered during construction, the following procedures shall be followed as required by Public Resources Code § 5097.9 and Health and Safety Code § 7050.5:
- a. The Contractor will halt the work in the vicinity
 - b. The Humboldt County Coroner will be notified. At the same time, a qualified archaeologist will be contacted to evaluate the situation.
 - c. The Engineer will be notified.
 - d. If human remains are of Native American origin, the Coroner will notify the Native American Heritage Commission within 24 hours of identification, which would appoint a Most Likely Descendant (MLD).
 - e. A qualified archaeologist, the Contractor, Owner, and the MLD shall make all reasonable efforts to develop an agreement for the treatment, with appropriate dignity, of any human remains and associated or unassociated funerary objects. The agreement would take into consideration the appropriate excavation, removal, recordation, analysis, custodianship, and

final disposition of the human remains and associated or unassociated funerary objects.

4. **Protect Tribal Cultural Resources during Construction Activities.** In the event that any tribal cultural resources are discovered during construction-related earth-moving activities:
 - a. The Contractor shall halt all ground-disturbing activity in the vicinity of the resources
 - b. An appropriate tribal representative(s)/archaeologist shall be notified
 - c. If the find is determined to constitute a tribal cultural resource per Public Resources Code Section 21074, the appropriate tribal representative(s)/archaeologist shall develop appropriate mitigation to protect the integrity of the resource and ensure that no additional resources are affected.
 - d. Mitigation could include but would not necessarily be limited to avoidance, preservation in place, archival research, subsurface testing, or excavation and data recovery.

C. Hazards and Hazardous Materials

1. **Contaminated Materials Handling and Disposal.** The HBMWD shall retain a qualified consultant to recommend actions in accordance with the Comprehensive Environmental Response, Compensation and Liability Act to reduce the risk of handling contaminated soil or groundwater during construction. If potentially contaminated soils or groundwater are encountered during construction (based on visual discoloration or odors observed) then recommended actions may include, but are not limited to:
 - a. Soil excavated shall be stockpiled and characterized to determine suitability for re-use at the site or to determine appropriate methods of disposal off-site;
 - b. Groundwater generated from dewatering of excavations shall be containerized for chemical analysis, and depending on analytical results, shall be discharged to an approved offsite facility for treatment.
2. **Fire Safety Plan.** The Contractor shall develop and implement a Fire Safety Plan for use during Project construction. The Fire Safety Plan shall be submitted to the District and the Arcata Fire District for review and approval prior to commencement of construction. The Fire Safety Plan shall contain the following requirements:
 - a. Fires shall be immediately reported to 911, Arcata Fire Protection District, the Fieldbrook Volunteer Fire Department, Blue Lake Volunteer Fire Department, the Engineer and the Owner.
 - b. The construction Contractor shall maintain fire toolbox pursuant to California Code – Section 4428.
 - c. Fire safety measures shall be posted for the duration of construction on the project bulletin board at the Contractor’s field office or other central location and areas visible to employees.

- d. All internal combustion engines used at the project site shall be equipped with spark arresters in working order, as applicable.
- e. Mufflers on motor vehicles shall be maintained in good working order and motor vehicles shall only be used off-road if the area has been cleared of vegetation.
- f. Equipment parking areas and small stationary engine sites shall be cleared of all flammable materials.
- g. Personnel shall be trained in the practices of the Fire Safety Plan relevant to their duties.
- h. Smoking shall be limited to approved areas cleared of all combustible vegetation.

D. Hydrology and Water Quality

1. BMPs to be Implemented During Construction.

- a. At all times during construction activities, the Contractor shall minimize the area disturbed by excavation, grading, or earth moving to prevent the release of excessive fugitive dust. During periods of high winds (i.e. wind speed sufficient that fugitive dust leaves the site) the Contractor shall cover or treat areas of exposed soil and active portions of the construction site to prevent fugitive dust.
- b. No construction materials, equipment, debris, or waste shall be placed or stored where it may be subject to wind or rain erosion and dispersion. Material handling on and offsite shall be required to comply with California Vehicle Code Sec. 23114 with regard to covering loads to prevent materials spills onto public roads.
- c. All construction equipment shall be equipped and maintained to meet applicable EPA and CARB emission requirements for the duration of the construction activities.
- d. Throughout construction, the Contractor shall maintain adjacent paved areas free of visible soil, sand or other debris.
- e. If stockpiled on or offsite, soil and aggregate materials shall be covered with secured plastic sheeting and runoff shall be diverted around them. Stockpiled materials shall be stored a minimum of 100 feet from waterways, concentrated stormwater flows or drainage courses, and storm drain inlets.
- f. Drainage courses, creeks, or catch basins shall be protected with straw bales, silt fences, and/or straw wattles.
- g. Storm drain inlets shall be protected from sediment-laden runoff with sandbag barriers, filter fabric fences, straw wattles, block and gravel filters, and excavated drop inlet sediment traps.
- h. Vehicle and equipment parking and vehicle maintenance shall be conducted in designated areas that are located at least 100 feet from waterways, drainage courses, creeks, and storm drain inlets.

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- i. Construction vehicle and equipment fueling areas shall be designed to fully contain any spills of fuel, oil, or other contaminants. Equipment that cannot be feasibly relocated to a designated fueling area may be fueled and maintained in other areas of the site provided that procedures are implemented to fully contain any potential spills.
 - j. Major maintenance, repair, and washing of vehicles and other equipment shall be conducted off-site or in a designated and controlled area.
 - k. Construction debris, plant and organic material, trash and hazardous materials shall be collected and properly disposed.
- E. Transportation/Traffic
- 1. **Traffic Control Plan.** The Contractor shall obtain an encroachment permit from Humboldt County prior to beginning the work on Warren Creek Road and along Glendale Drive. As part of the encroachment permit process, the Contractor shall prepare traffic control plans for review and acceptance of planned work within the public right-of-way. The plan shall include, but not limited to:
 - a. Adherence to County and Caltrans traffic management standards.
 - b. Location(s) of designated Project construction staging areas for equipment/materials storage and construction worker parking.
 - c. Use of flagging and signage during construction, materials delivery, and/or movement of construction equipment in any private or public roadway.
 - d. Provisions to maintain unobstructed access for law enforcement, fire department, or other official or emergency personnel and vehicles.

END OF SECTION 01 57 19

SECTION 01 60 00
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01. SECTION INCLUDES

- A. Products.
- B. Product delivery requirements.
- C. Product storage and handling requirements.
- D. Product options.

1.02. PRODUCTS

- A. Furnish products of qualified manufacturers suitable for intended use. Furnish products of each type by single manufacturer unless specified otherwise.
- B. Do not use materials or equipment removed from existing premises, except as specifically permitted by the Contract Documents.
- C. Furnish interchangeable components from same manufacturer for components being replaced.

1.03. MEASUREMENT AND PAYMENT

- A. Measurement and payment for this item shall be included in the Bid Item to which it relates. No additional measurement or payment will be included for the requirements of this section.

1.04. PRODUCT DELIVERY REQUIREMENTS

- A. Schedule delivery of products or equipment as required to allow timely installation and to avoid prolonged storage.
- B. Transport and handle products in accordance with manufacturer's instructions.
- C. Deliver products or equipment in manufacturer's original unbroken cartons or other containers designed and constructed to protect the contents from physical or environmental damage.
- D. Promptly inspect shipments to ensure products comply with requirements, quantities are correct, and products are undamaged.
- E. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.
- F. Clearly and fully mark and identify as to manufacturer, item, and installation location.

1.05. PRODUCT STORAGE AND HANDLING REQUIREMENTS

- A. Store and protect products in accordance with manufacturer's instructions. Ensure potable water piping, valves, and other product surfaces that will contact potable water are protected

- from contamination by deleterious materials. Provide manufacturer's instructions for storage and handling.
- B. Store with seals and labels intact and legible.
 - C. Store sensitive products in weather tight, climate controlled enclosures in an environment favorable to product.
 - D. For exterior storage of fabricated products, place on sloped supports above ground.
 - E. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.
 - F. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
 - G. Store loose granular materials on solid flat surfaces in well-drained area. Prevent mixing with foreign matter.
 - H. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
 - I. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

1.06. STORAGE FACILITIES

- A. Laydown and storage areas have been provided to the Contractor as shown on the Drawings. It is believed that these areas will be sufficient for the execution of the work. However, if required, the Contractor shall obtain all additional laydown and storage areas necessary for the execution of the Work. Contractor shall obtain all necessary permissions and approvals for use of laydown and storage areas and shall submit a signed statement from the property owner granting permission and holding the District harmless from any and all damages that may result from the Contractor's use of the site. Contractor is responsible for all security and safekeeping of materials in laydown and storage areas and additional payment shall not be made for materials stolen or damaged while stored in these areas.

1.07. PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Products of one of manufacturers named and meeting specifications, no options or substitutions allowed, except as provided for in the General Conditions.
- C. Products Specified by Naming One or More Manufacturers with Provision for Substitutions: Submit request for substitution for any manufacturer not named in accordance with the following article.

1.08. PRODUCT SUBSTITUTION PROCEDURES

- A. General Conditions, Section B-14 – Conformity with Contract Documents and Allowable Deviations.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION 01 60 00

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SECTION 01 70 00

EXECUTION REQUIREMENTS

PART 1 GENERAL

1.01. SECTION INCLUDES:

- A. Closeout procedures.
- B. Final cleaning.
- C. Protecting installed construction.
- D. Project record documents.
- E. Operation and maintenance data.
- F. Spare parts and maintenance products.

1.02. MEASUREMENT AND PAYMENT

- A. Measurement and payment for the items addressed in this Section shall be included in the Bid Item to which they relate. No additional measurement or payment will be included for the requirements of this section.

1.03. CLOSEOUT PROCEDURES

- A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Engineer's review.
- B. Provide submittals to Engineer required by authorities having jurisdiction.
- C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

1.04. FINAL CLEANING

- A. Execute final cleaning prior to final project assessment.
- B. Clean equipment and fixtures to sanitary condition with cleaning materials appropriate to surface and material being cleaned.
- C. Clean site; sweep paved areas, rake clean landscaped surfaces.
- D. Remove waste and surplus materials, rubbish, and construction facilities from site.

1.05. PROTECTING INSTALLED CONSTRUCTION

- A. Protect installed Work and provide special protection where specified in individual specification sections.

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- B. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- C. Provide protective coverings at pipe and conduit openings.

1.06. PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other modifications to the Contract.
 - 5. Reviewed Shop Drawings, Product Data, and Samples.
 - 6. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress, not less than weekly.
- E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
 - 1. Manufacturer's name and product model and number.
 - 2. Product substitutions or alternates utilized.
 - 3. Changes made by Addenda and modifications.
- F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
 - 1. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - 2. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
 - 3. Field changes of dimension and detail.
 - 4. Details not on original Contract drawings.
- G. Submit Record Documents to Engineer with claim for final Application for Payment.

1.07. OPERATION AND MAINTENANCE DATA

- A. Submit data bound and organized in 8-1/2 x 11 inch (A4) text pages, three D side ring binders with durable cloth covers.
- B. Prepare binder cover with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", title of project, date of submittal.
- C. Internally subdivide binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.
- D. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- E. Contents: Prepare Table of Contents for each volume, with each product or system description identified, typed on white paper, in three parts as follows:
 - 1. Part 1: Directory, listing names, addresses, and telephone numbers of Engineer, Contractor, Subcontractors, and major equipment suppliers.
 - 2. Part 2: Operation and maintenance instructions, arranged by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
 - a. Significant design criteria.
 - b. List of equipment.
 - c. Parts list for each component.
 - d. Operating instructions.
 - e. Maintenance instructions for equipment and systems.
 - 3. Part 3: Project documents and certificates, including the following:
 - a. Shop drawings and product data.
 - b. Certificates.
 - c. Photocopies of warranties and bonds.

1.08. SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Furnish spare parts, maintenance, and extra products in quantities specified in individual specification sections.
- B. Deliver to Project site and place in location as directed by Owner; obtain receipt prior to final payment.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION 01 70 00

SECTION 01 74 00

SITE AND AREA CLEANUP

PART 1 GENERAL

1.01. DESCRIPTION

- A. Maintain work areas free from accumulations of waste, debris, dust and mud caused by Contractor's operations.
- B. At completion of Work, remove all waste materials, tools, equipment, machinery, surplus materials; leave property clean; leave all right-of-ways in a condition equal to pre-project conditions.
- C. Related Sections
 - 1. Section 01 50 00 – Temporary Facilities and Controls
 - 2. Section 01 57 19 – Environmental Requirements

1.02. MEASUREMENT AND PAYMENT

- A. Measurement and payment for this item shall be included in the Mobilization/ Demobilization Bid Item. No additional measurement or payment will be included for the requirements of this section.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01. PROTECTION

- A. The Contractor shall contact Northern California Underground Service Alert (USA) 811 in accordance with the requirements of Section 01 50 00 – Temporary Facilities and Controls.
- B. The Contractor shall be solely responsible for the protection of adjacent properties, structures, streets, and utilities. Any damaged items shall be repaired to original condition or better, as determined by the Engineer, at the Contractor's expense.
- C. The Contractor shall protect benchmarks, survey control points, and existing structures not identified for removal from damage or displacement.

3.02. CLEARED MATERIAL

- A. Clearing and grubbing shall consist of removal of all objectionable material within the limits of work shown on the Plans and as directed by the Engineer. Objectionable materials shall include but are not limited to all abandoned or removed pipes or other appurtenances, conduits, waste concrete, waste drilling mud, trash, unused construction materials, unused sand or aggregate, extra asphalt paving, packing materials, silt fences and other erosion control materials as approved by Engineer and any other objectionable material identified by

the Engineer . All objectionable cleared material shall become the property of the Contractor and shall be removed from the project site and disposed of or recycled properly.

3.03. REMOVAL

- A. Remove objectionable materials, trash, debris, rock, and extracted plant life from site.
- B. Remove paving as indicated on Drawings. Neatly saw cut edges at right angle to surface. Dispose of at approved disposal or recycling facility.
- C. Do not burn or bury materials on site. Leave site in clean condition.

3.04. TOP SOIL EXCAVATION

- A. Excavate topsoil from areas to be further excavated, re-landscaped, or re-graded without mixing with foreign materials for use in finish grading.
- B. Stockpile and protect from erosion. Stockpile material on impervious material and cover over with same material until reuse.
- C. Remove excess topsoil not intended for reuse from site.

3.05. DURING CONSTRUCTION

- A. Execute cleaning to ensure that any private property, grounds and especially access roads and public properties are maintained free from accumulation of waste materials, dust, mud and debris.
- B. The Contractor shall keep all access roads clean and free of dust, mud and debris resulting from Contractor's operations.
- C. All waste materials, debris and rubbish shall be disposed of at sites to be chosen by Contractor. Prior to dumping soils on any private property, a letter allowing such dumping shall be obtained from the property Owner and presented to the Engineer and the Humboldt County Department of Environmental Health for approval.

Senior REHS, Solid Waste Program
DHHS, Department of Environmental Health
100 H Street, Suite 100
Eureka, CA 95501

- D. If, in the opinion of the Engineer, the Contractor has not sufficiently cleaned the project area, the Engineer shall issue a written notice to the Contractor stating that the Contractor shall clean the project area to the satisfaction of the Engineer within forty-eight (48) hours. If the Contractor does not properly clean up (in the opinion of the Engineer or the Owner), then either the Engineer or the Owner shall have the option of using outside equipment to perform the Work and such cost will be withheld from the Contract.

3.06. AFTER CONSTRUCTION

- A. If, in the opinion of the Engineer, the Contractor has not sufficiently cleaned the project area, the Engineer shall issue a written notice to the Contractor stating that the Contractor shall clean the project area to the satisfaction of the Engineer within forty-eight (48) hours. If the Contractor does not properly clean up (in the opinion of the Engineer or the Owner), then either the Engineer or the Owner shall have the option of using outside equipment to perform

the Work and such cost will be withheld from the Contract. Site shall be left in a condition equal to or better than existed prior to construction.

END OF SECTION 01 74 00

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SECTION 02 00 10

SITE CONDITIONS

PART 1 GENERAL

1.01. INFORMATION ON SITE CONDITIONS

- A. All information obtained by the Owner regarding site conditions, surface topography, subsurface information, groundwater elevations, existing construction of site facilities, existing underground utilities, and similar data will be available to prospective Bidders upon request and at the office of the Engineer prior to bid opening.
- B. Investigations conducted by a Geotechnical Engineer of subsurface conditions were made for the purpose of study and design, and neither the Engineer nor the Owner assume any responsibility in respect to the sufficiency or accuracy of the test pits, or of other investigations that have been made, or of the interpretations made thereof, and there is no warranty or guarantee, either expressed or implied, that the conditions indicated by such investigations are representative of those existing throughout such area, or any part thereof, or that unforeseen for developments may not occur. The Geotechnical Report has been included as Appendix B to these Specifications.
- C. Any logs of test borings, pits, geotechnical reports, or topographic maps showing a record of the data obtained by the investigations of surface and subsurface conditions that are made available, shown on the Drawings, or bound herewith shall not be considered a part of the Contract Documents, said logs representing only the opinion of the Geotechnical Engineer as to the character of the materials encountered in their investigations and are provided only for the convenience of the Bidders.
- D. Information derived from inspection of logs of test borings, pits, topographic maps, geotechnical reports, or from Drawings showing locations of utilities and structures will not in any way relieve the Contractor from any risk, or from properly examining the site and making such additional investigations as the Contractor may elect, or from properly fulfilling all the terms of the Contract Documents.

1.02. CONTRACTOR'S RESPONSIBILITIES

- A. The Contractor shall satisfy themselves as to the nature and location of the Work and the general and local conditions, particularly those bearing upon horizontal directional drilling tooling and methods, availability of transportation, disposal, limited access to site, handling and storage of materials, availability of labor, water, electric power, roads, and uncertainties of weather, river stages, or similar physical conditions at the site, the conformation and conditions of the ground, the character of equipment facilities needed prior to and during the prosecution of the Work, and all other matters which can in any way affect the Work or the cost thereof under this Contract.
- B. The Contractor shall further satisfy themselves as to the character, quality, and quantity of surface and subsurface materials to be encountered during the course of execution of the work by inspecting the site, as well as any exploratory work performed by the Engineer, and information presented in the Drawings and Specifications made a part of this Contract. Any failure by the Contractor to become acquainted with all available information will not relieve the Contractor from responsibility for properly estimating the difficulty or cost of successfully performing the Work. Refer to the reports included in the Appendices of the Contract Documents.
- C. The Contractor shall anticipate underground obstructions such as utility lines, concrete, water table, soil conditions, and debris. No extra payment will be allowed for the removal,

replacement, repair or possible increased cost caused by underground obstructions. Any such lines or obstructions indicated on the map show only the approximate location and must be verified in the field by the Contractor. The Engineer will endeavor to familiarize the Contractor with all known underground obstructions, but this will not relieve the Contractor from full responsibility in anticipating and locating all underground obstructions.

- D. The Contractor shall note that some of the roadways experience minimal traffic flow, and heavy truck and equipment operations may cause roadway damage in excess of normal usage. Damage caused to roadways by the Contractor's operations shall be repaired to a condition equal or better than the original condition at the Contractor's expense.
- E. Contractor shall submit a Site Security Plan, which shall include staging areas, fencing, and description of how to secure the project materials from damages and unauthorized access.

1.03. ADDITIONAL INFORMATION

- A. Prior to bidding, Bidders may make their own subsurface investigations subject to time schedules and arrangements approved in advance by the Owner. Before any subsurface test holes are excavated, Bidder must submit insurance documents and receive written approval from the Owner.

1.04. SURFACE FACILITIES

- A. The Contractor is advised that the Plans were prepared based on available information; therefore, all existing surface facilities may not be shown on the Drawings. It is the Contractor's responsibility to become acquainted with existing site conditions per this Section and anticipate those surface facilities which are typically encountered (fences, signs, mailboxes, sidewalks, driveways, ditches, AC pavement, AC dikes, curbing, power poles, overhead lines, landscaping, irrigation, etc.) and will affect the work. The Contractor shall provide adequate security to protect the public and Work. No extra payment will be made to the Contractor for the repair, removal and replacement of such facilities. Full payment for this work shall be as included in the various bid items.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION 02 00 10

SECTION 03 48 00

PRECAST CONCRETE UTILITY BOXES

PART 1 GENERAL

1.01. SUMMARY OF SECTION

- A. Principal items specified herein are:
 - 1. Precast concrete valve boxes.
 - 2. Precast concrete meter enclosures.
 - 3. Precast concrete backflow preventer boxes.
 - 4. Precast concrete combination air vacuum/relief valve and blowoff enclosures.

1.02. MEASUREMENT AND PAYMENT

- A. Measurement and payment for precast concrete utility boxes shall be included in the Bid Item to which they relate. No additional measurement or payment will be included for the requirements of this section.

1.03. RELATED SECTIONS

Related work specified in other sections:

- A. Section 31 00 00 – Earthwork
- B. Section 33 14 00 – Piping Systems
- C. Section 33 14 19 – Valves and Appurtenances

1.04. REFERENCED CODES AND SPECIFICATIONS

The following standards apply:

- A. American Society for Testing and Materials:
 - 1. ASTM A48 - Standard Specification for Gray Iron Castings.
 - 2. ASTM A185 - Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
 - 3. ASTM A536 - Standard Specification for Ductile Iron Castings.
 - 4. ASTM A615/A615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
 - 5. ASTM C33 - Standard Specification for Concrete Aggregates.
 - 6. ASTM C150 - Standard Specification for Portland Cement.

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7. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
8. ASTM C890 - Standard Practice for Minimum Structural Design Loading for Monolithic or Sectional Precast Concrete Water and Wastewater Structures.
9. ASTM C913 - Standard Specification for Precast Concrete Water and Wastewater Structures.
10. ASTM C990 - Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joints Sealants.
11. ASTM C857 - Minimum Structural Design Loading for Underground Precast Concrete Utility Structures.
12. ASTM C858 - Underground Precast Concrete Utility Structures.
13. ASTM C891 - Standard Practice for Installation of Underground Precast Concrete Utility Structures.
14. ASTM C1037 – Standard Practice for the Inspection of Underground Precast Concrete Utility Structures.

1.05. SUBMITTALS

Submit the following in accordance with Section 01 33 00 – Submittal Procedures:

- A. Product Data: Submit product data for all precast concrete utility boxes.
- B. Manufacturer's Certificates: Submit Statement of Compliance, supporting data, from materials suppliers attesting that precast concrete boxes and boxes provided meet or exceed ASTM Standards and specification requirements.
- C. Manufacturer's Installation Instructions: Submit special procedures for precast concrete boxes and box installations.
- D. Manufacturer's Warranty: Submit manufacturer's standard warranty.

1.06. DESIGN CRITERIA

- A. Precast reinforced air-entrained concrete structures designed to ASTM C890 live loading and installation conditions, and manufactured to conform to ASTM C913.
- B. Minimum 28-day Compressive Strength: 5,000 psi.
- C. Honeycombed or retempered concrete is not permitted.

1.07. QUALITY ASSURANCE

- A. Perform Work in accordance with applicable encroachment permits.
- B. Delivery, Storage and Handling:
 1. Transport and handle precast concrete units with equipment designed to protect units from damage.

2. Do not place concrete units in position to cause overstress, warp, or twist.

1.08. MAINTAINING INTEGRITY OF PRODUCTS AND ADJACENT ITEMS

- A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.
- B. Conduct operations not to interfere with, interrupt, damage, destroy, or endanger integrity of surface or subsurface structures or utilities, or landscape in immediate or adjacent areas.

1.09. COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordinate work with the District and users.

PART 2 PRODUCTS

2.01. GENERAL

- A. Manufacturers:
 1. Christy
 - a. Model G05 or approved equal for butterfly valve boxes
 - b. Model B2436 or approved equal for blowoff and combination air/vacuum valve in the same enclosure.
 - c. Model G12 or approved equal for blowoff assembly
 - d. Model B1017 or approved equal for water meter and ball valve.
 - e. Model B1324 or approved equal for backflow preventer
 2. Vaughn Concrete Products, Inc
 3. Substitutions: Section 01 60 00 - Product Requirements.
- B. Materials:
 1. Portland Cement: ASTM C150, Type II.
 2. Coarse Aggregates: ASTM C33; Graded 1 inch to No. 4 Sieve.
 3. Sand: ASTM C33; 2.35 fineness modulus.
 4. Water: Potable; clean and free of injurious amounts of acids, alkalis, salts, organic materials, and substances incompatible with concrete or steel.
 5. Air-Entraining Admixtures: ASTM C260.
 6. Reinforcing Steel:

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- a. Deformed Bars: ASTM A615/A615M, Grade 40.
 - b. Welded Wire Fabric: ASTM A185.
- 7. Joint Sealant:
 - a. ASTM C990.
- C. Mixes: Design concrete mix to produce required concrete strength, air-entrainment, watertight properties, and loading requirements.
- D. Frames and Covers:
 - 1. Cast Iron Castings: ASTM A48, Class 30 or better; free of bubbles, sand and air holes, and other imperfections.
 - 2. Ductile Iron Castings: ASTM A536.
 - 3. Covers suitable for H20 traffic loads.
 - 4. Contact surfaces machined and matched.
 - 5. Cast cover inscription with water pipeline service.
- E. Fabrication and Manufacture: Fabricate precast reinforced concrete boxes in accordance with ASTM C913, to dimensions indicated on Drawings, and to specified design criteria.

2.02. BEDDING MATERIALS

- A. Where indicated in the drawings, bedding material below precast concrete boxes shall conform to the Caltrans Standard Specification Section 68-1.025, "Permeable Material". Use Class 2 Permeable Material
- B. Bedding material below precast concrete box frames shall conform to the Caltrans Standard Specification Section 26-1.02A, "Class 2 Aggregate Base". Use $\frac{3}{4}$ " Class 2 aggregate base below precast concrete box frames as shown on the Contract Drawings.

2.03. TRAFFIC RATED COMPONENTS

- A. All precast concrete enclosures, extensions, and lids shall be traffic rated, suitable for H20 traffic loads.

PART 3 EXECUTION

3.01. EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify piping connection, size, location and invert are as indicated on Drawings.
- C. Verify built-in items are in proper location, and ready for roughing into Work.

- D. Verify correct size of precast manhole excavation.

3.02. PREPARATION

- A. Excavate to the required depth and install four inches of drain rock below structure as shown on the Contract Drawings.
- B. Level the resting surface and verify top of drain rock elevation so that top of box and pipe elevations will be as indicated on the Contract Drawings.
- C. Inspect precast concrete structures immediately prior to placement in excavation to verify structures are internally clean and free from damage. Remove and replace damaged units.

3.03. INSTALLATION

- A. Install all precast concrete products in accordance with manufacturer's instructions and as shown on the Contract Drawings.
- B. Excavate for precast vaults in location and to depth shown. Provide clearance around sidewalls of structure for construction operations.
- C. When groundwater is encountered, prevent accumulation of water in excavations. Place manholes (and structures) in dry excavation.
- D. Assemble multi-section manholes and boxes by lowering each section into excavation. Lower, set level, and firmly position base section before placing additional sections.
- E. Lift precast components at lifting points designated by manufacturer.
- F. Remove foreign materials from joint surfaces and verify sealing materials are placed properly. Maintain alignment between sections by using guide services affixed to lower section.
- G. Verify manholes and boxes installed satisfy required alignment and grade.
- H. Remove knockouts or cut structure to receive piping without creating openings larger than required to receive pipe. Fill annular space with mortar.
- I. Set precast concrete sections plumb and aligned with the underlying sections with no more than quarter ($\frac{1}{4}$) inch maximum overlap.
- J. Ensure that the top of the box is flush and level with existing grade or to the elevation shown on the plans.

END OF SECTION 03 48 00

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SECTION 03 60 00

GROUT

PART 1 GENERAL

1.01. SUMMARY OF SECTION

- A. The principal items specified herein are:
 - 1. Non-Shrink Grout: Non-Shrink grout is to be used unless another type is specifically referenced or shown on the Drawings.
- B. The Contractor shall provide all materials, equipment, and labor necessary to furnish and place grout and shall form, mix, place, cure, repair, finish, and do all other work as necessary to produce finished grout as shown on the Drawings and as specified herein.

1.02. MEASUREMENT AND PAYMENT

- A. Measurement and payment for the placement of grout shall be included in the Bid Item to which it relates. No additional measurement or payment shall be made for the requirements of this section.

1.03. RELATED SECTIONS

Related work specified in other sections:

- A. Section 03 48 00 Precast Concrete Utility Boxes

1.04. REFERENCED CODES AND SPECIFICATIONS

The following standards apply:

- A. Commercial Standards:
 - 1. ASTM C109 Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-In. or 50-mm Cube Specimens).
 - 2. ASTM C531 Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Grouts, and Monolithic Surfacing.
 - 3. ASTM C579 Test Methods for Compressive Strength of Chemical-Resistant Mortars, Grouts, and Monolithic Surfacing.
 - 4. ASTM C827 Test Method for Change in Height of Early Ages of Cylindrical Specimens from Cementitious Mixtures.
 - 5. ASTM D696 Test Method for Coefficient of Linear Thermal Expansion of Plastics.
 - 6. CRD-C-621 Corps of Engineers Specification for Non-shrink Grout.

1.05. SUBMITTALS

Submit the following in accordance with Section 01 33 00 – Submittal Procedures:

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- A. Certificates of Compliance: Certificates of Compliance shall be provided for all products and materials proposed to be used under this Section.

PART 2 PRODUCTS

2.01. PREPACKAGED GROUTS

- A. Non-Shrink Grout:
 - 1. Non-shrink grout shall be a prepackaged, inorganic, non-gas-liberating, non-metallic, cement-based grout requiring only the addition of water. Manufacturer's instructions shall be printed on each bag or other container in which the materials are packaged. The specific formulation for each class of non-shrink grout specified herein shall be that recommended by the manufacturer for the particular application.
 - 2. Non-shrink grouts shall have a minimum 28-day compressive strength of 7000 psi; shall have no shrinkage (zero percent) and a maximum 4.0 percent expansion in the plastic state when tested in accordance with ASTM C 827; and shall have no shrinkage (zero percent) and a maximum of 0.2-percent expansion in the hardened state when tested in accordance with CRD C 621.
 - 3. Application: Non-shrink grout shall be used for the repair of all holes and defects in concrete members, grouting under all equipment base plates, and at all locations where non-shrink grout is specified.

2.02. CONSISTENCY

- A. The consistency of grouts shall be that necessary to completely fill the space to be grouted for the particular application. Dry pack consistency is such that the grout is plastic and moldable but will not flow. Where "dry pack" is specified, it shall mean a grout of that consistency; the type of grout to be used shall be as specified herein for the particular application.

2.03. MEASUREMENT OF INGREDIENTS

- A. Measurements for cement grout shall be made accurately by volume using appropriate containers. Shovel measurement will not be allowed.
- B. Prepackaged grouts shall have ingredients measured by means recommended by the manufacturer.

PART 3 EXECUTION

3.01. GENERAL

- A. All mixing, surface preparation, handling, placing, consolidation and other means of execution for prepackaged grouts shall be done according to the printed instructions and recommendations of the manufacturer.

3.02. CONSOLIDATION

- A. Grout shall be placed in such a manner, for the consistency necessary for each application, so as to assure that the space to be grouted is completely filled.

END OF SECTION 03 60 00

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SECTION 31 00 00

EARTHWORK

PART 1 GENERAL

1.01. THE REQUIREMENT

- A. The Contractor shall provide all materials, equipment, and labor necessary to perform and complete all earthwork as shown on the Drawings and as specified herein.
- B. The work of this Section includes all earthwork required for construction of the project. Such earthwork shall include, but may not necessarily be limited to, site preparation, rough grading, the loosening, removing, loading, transporting, depositing, and compacting in its final location of all materials wet and dry, as required for the purposes of completing the work; the supporting of structures above and below the ground; all backfilling around structures and all backfilling of trenches and pits; the disposal of excess excavated materials; borrow of materials to make up deficiencies for fills; and all other incidental earthwork.

1.02. RELATED WORK SPECIFIED ELSEWHERE

- A. Section 02 00 10 – Site Conditions

1.03. REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. State Codes:
 - 1. California Labor Code.
 - 2. Construction Safety Orders of the State of California.
- B. State of California (Caltrans) Standards, latest edition:
 - 1. Standard Specifications:
 - 2. Section 25 – Aggregate Subbases.
 - 3. Section 26 – Aggregate Bases.
 - 4. Section 68 – Subsurface Drains.
 - 5. Section 88 – Engineering Fabrics
 - 6. CMM "Materials Manual"
- C. Commercial Standards:
 - 1. ASTM C 117 Test Method for Materials Finer than 75 microns (No. 200) Sieve in Mineral Aggregates by Washing.
 - 2. ASTM C136 Method for Sieve Analysis of Fine and Coarse Aggregates
 - 3. ASTM D 422 Test Method for Particle-Size Analysis of Soils.

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4. ASTM D 698 Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 lb Rammer and 12 inch Drop.
5. ASTM D 1556 Test Method for Density of Soil in Place by the Sand-Cone Method.
6. ASTM D 1557 Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-lb (4.54-kg) Rammer and 18-in. (457-mm) Drop.
7. ASTM D 1633 Test Method for Compressive Strength of Molded Soil-Cement Cylinders.
8. ASTM D 2419 Method for Sand Equivalent Value of Soils and Fine Aggregate.
9. ASTM D 2487 Test Method for Classification of Soils for Engineering Purposes.
10. ASTM D 2844 Test Method for Resistance R-Value and Expansion Pressure of Compacted Soils.
11. ASTM D 2922 Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
12. ASTM D2991 Test Method for Density of Soil in Place by Nuclear Methods
13. ASTM D 3017 Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).
14. ASTM D 3776 Test Methods for Mass per Unit Area (Weight) of Woven Fabric.
15. ASTM D 3786 Method of Hydraulic Bursting Strength of Knitted Goods and Nonwoven Fabrics: Diaphragm Bursting Strength Tester Method.
16. ASTM D 4253 Test Methods for Maximum Index Density of Soils Using a Vibratory Table.
17. ASTM D 4254 Test Methods for Minimum Index Density of Soils and Calculation of Relative Density.
18. ASTM D 4318 Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
19. ASTM D 4491 Test Methods for Water Permeability of Geotextiles by Permittivity.
20. ASTM D 4632 Test Method for Grab Breaking Load and Elongation of Geotextiles.
21. ASTM D 4751 Test Method for Determining the Apparent Opening Size of a Geotextile.
22. OSHA Occupational Safety and Health Administration.

1.04. CONTRACTOR SUBMITTALS

- A. Submit under provisions of Section 01 33 00 – Submittal Procedures
 - B. The Contractor's attention is directed to the provisions for "Shoring and Bracing Drawings" in Section 6705 of the California Labor Code. The Contractor, prior to beginning any trench or structure excavation 5 feet deep or over, shall submit to the Engineer for review for compliance with Section 6705 the Contractor's detailed plan showing design of all shoring, bracing, sloping of the sides of excavation, or other provisions for worker protection against the hazard of caving ground during the excavation of such trenches or structure excavation. If such plan varies from the shoring system standards established in the Construction Safety Orders of the State of California, such alternative system plans shall be prepared, stamped and signed by a civil or structural engineer licensed in the State of California at the Contractor's expense.
 - C. Certificates of Compliance: Certificates of Compliance shall be provided for all products and materials proposed to be used under this Section.
 - D. For all materials that are not pre-approved by the Owner or Owner's Representative, the Contractor shall designate the source and/or submit samples of all materials in advance of their use for required testing and Engineer's approval. All testing costs shall be at the Contractor's expense.
 - E. Submit a construction drainage plan showing the collection and disposal of surface and subsurface water that may be encountered in the course of construction.
 - F. Prior to commencing any excavation, the subcontractor shall submit a shoring plan in accordance with the requirements in Section 31 41 00 - Shoring and Trench Safety.
 - G. Prior to commencing any excavation, Contractor shall submit a trenching plan for approval by the Engineer.
 - H. Contractor shall submit material disposal plan including haul routes.
- 1.05. QUALITY ASSURANCE
- A. General: All soils testing will be done by a certified testing laboratory at the Contractor's expense.
 - B. Where soil material is required to be compacted to a percentage of maximum density, the maximum density at optimum moisture content will be determined in accordance with ASTM D 1557. Where cohesionless, free draining soil material is required to be densified to a percentage of relative density the calculation of relative density will be determined in accordance with ASTM D 4253 and D 4254. Field density in-place tests will be performed in accordance with ASTM D 2922, or by such other means acceptable to the Engineer.
 - C. In the case that the first test of the fill or backfill shows non-compliance with the requirements, the Contractor shall accomplish such remedy as may be required to ensure compliance. Subsequent re-testing to show compliance shall be at the Contractor's expense.
 - D. The Contractor shall notify the Engineer at least 48 hours prior to performing any excavation.
 - E. Delineate area to be excavated and contact the Regional Notification Center, Underground Service Alert (USA North) at 811, a minimum of 2 working days prior to any excavation in accordance with Section 4216 of the California Government Code.

- F. Field Measurements: Verify that survey benchmark and intended elevations for the work are as indicated.

PART 2 PRODUCTS

2.01. SUITABLE BACKFILL AND FILL MATERIALS

- A. Suitable backfill shall be a selected or processed clean, fine earth, rock, or sand, free from objectionable material, vegetation, or other deleterious substances.
- B. The following types of backfill materials are designated and defined as follows:
 - 1. TYPE 1. Sand shall be material with 100 percent passing a 3/8-inch sieve, at least 90 percent passing a No. 4 sieve, and a sand equivalent value not less than 30.
 - 2. TYPE 2. Class 2 Aggregate Base shall be crushed rock aggregate base material meeting the requirements of Section 26, "Aggregate Bases," for 3/4-inch maximum grading, of the Caltrans Standard Specifications.
 - 3. TYPE 3. Class 1, Type A or B, Permeable Material shall be crushed stone, or gravel, durable and free from slaking or decomposition under action or alternate wetting or drying, uniformly graded, and shall meet the requirements of Section 68-2.02F(2) for Class 1, "Permeable Material," of the Caltrans Standard Specifications.
 - 4. TYPE 4. Class 2 Permeable Material shall be crushed rock or gravel, durable and free from slaking or decomposition under the action of alternate wetting or drying, uniformly graded, and shall meet the requirements of Section 68-2.02F(3) for Class 2 "Permeable Material," of the Caltrans Standard Specifications.
 - 5. TYPE 5. Manufactured Backfill shall be manufactured, angular, granular, crushed stone, rock, or slag with 100 percent passing a one-inch sieve and less than one percent passing a No. 4 sieve.
 - 6. TYPE 6. Controlled Low Strength Materials (CLSM) – Not Used
 - 7. TYPE 7. Native material shall be material obtained from on-site excavations, provided the materials are not classified as unsuitable by the Engineer. Native material shall be free of stones, lumps, broken concrete, bituminous surfacing over 2 inches in diameter, objectionable material, vegetation, and deleterious substances. Additionally, all native material used as compacted fill shall meet the same property requirements as for Engineered Fill specified in this specification under Type 10.
 - 8. TYPE 8. Topsoil material may be selected excavated material, graded, free of roots, rocks larger than 4 inches, subsoil, debris, and large weeds.
 - 9. TYPE 9. Class 2 Aggregate Subbase shall conform to the grading and quality requirements of Section 25, "Aggregate Subbases" of the Caltrans Standard Specifications. At the option of the Contractor, the grading for either 1-1/2 maximum or 3/4-inch maximum shall be used. Once a grading has been selected, the grading shall not be changed without the Engineer's approval.
 - 10. TYPE 10. Engineered Fill or import soil used as engineered fill shall consist of a soil or soil-rock mixture that meets the material properties given below:
 - Free of rock in excess of 2 inches in size.
 - Free of organics, debris or other deleterious materials.

Free of recycled materials such as asphalt concrete, concrete, bricks etc.
Granular in nature, well graded, and contains sufficient binder to allow utility trench to stand open.
Plasticity Index of 4 to 12.
Non-expansive with R-value of 30 minimum.
100% passing 3-inch sieve size, 70 – 100% passing the 3/4-inch sieve size, and 0 – 30% passing the No. 200 sieve size.
Liquid limit < 30.

11. TYPE 11. Lightweight Fill shall consist of a soil/soil-rock mixture or cellular concrete that meets the material properties given below:
Free of rock in excess of 2 inches in size.
Free of organics, debris or other deleterious materials.
Free of recycled materials such as asphalt concrete, concrete, bricks etc.
Granular in nature, well graded, and contains sufficient binder to allow utility trench to stand open.
Unit weight of 64 pounds per cubic foot.
Cellular concrete shall have a compressive strength at 28 days between 50 and 150 psi.

2.02. UNSUITABLE BACKFILL AND FILL MATERIALS

- A. Unsuitable soils for backfill material shall include soils which, when classified under ASTM D 2487, fall in the classifications of Pt, OH, or OL. Types CH and MH soils will be permitted in unimproved areas only where required compaction and stability can be demonstrated. In addition, any soil which cannot be compacted sufficiently to achieve the percentage of maximum density specified for the intended use shall be classified as unsuitable material.
- B. Any material determined to be hazardous is defined as unsuitable material.
- C. Washed, smooth rock (pea gravel) is classified as unsuitable material except where specifically called out in the Drawings.

2.03. USE OF SUITABLE BACKFILL AND FILL MATERIAL TYPES

- A. The Contractor shall use the types of materials as designated herein for all required backfill construction.
- B. Backfill material types shall be used in conformance with the following provisions:
1. Over-excavation backfill shall be material with 100 percent passing a 2-inch sieve, 90 to 100 percent passing a 1-1/2-inch sieve, 5 to 30 percent passing a 3/4-inch sieve, 5 to 20 percent passing a 3/8-inch sieve and 0 to 4 percent passing a No. 200 sieve. Over-excavation backfill shall be completely wrapped with geotextile fabric.
 2. Pipe bedding backfill up to the pipe springline shall be sand, meeting the requirements of Product Type 1.
 3. Trench Zone backfill, as defined under PART 3 - EXECUTION of this Section herein, shall be Class 2 Aggregate Base in paved areas and road shoulders, meeting the requirements of Product Type 2. Trench zone backfill in unimproved areas shall be suitable native meeting the requirements of Product Type 7 or Class 2 Aggregate Base.
 4. Final Zone backfill, as defined under PART 3 - EXECUTION of this Section herein, shall consist of the following materials for each condition listed below.

Final Zone backfill at paved areas and road shoulders shall be Class 2 aggregate base, meeting the requirements of Product Type 2.
Final Zone Backfill in unimproved areas shall be topsoil, meeting the requirements of Product Type 8.
Final Zone backfill in landscape areas shall be Native Fill, meeting the requirements of Product Types 7. Topsoil and amendments shall be Product Type 8.
Final Zone backfill under graveled roads shall be Class 2 aggregate base, meeting the requirements of Product Type 2.

5. Structures. Backfill materials around structures shall be Class 2 aggregate base, meeting the requirements of Product Type 2.
6. Fill. Fill materials shall be as called out for that specific area on the Drawings.
7. Pavement Base Course. Backfill materials under pavement base course shall be Class 2 Aggregate Base or Class 2 Aggregate Subbase, meeting the requirements of Product Types 2 or 9.
8. Stabilization Zone backfill, as defined under PART 3 - EXECUTION of this Section herein, shall be Permeable Material, meeting the requirements of Product Types 3 or 4 and always wrapped in geotextile fabric.

2.04. GEOTEXTILE FABRIC

- A. Geotextile fabric shall be non-woven synthetic fabric meeting the requirements of Section 96-1.02B, "Filter Fabric," of the Caltrans Standard Specifications. Filter fabric shall be non-woven synthetic fabric with a minimum Grab Strength of 150 pounds; a minimum Burst Strength of 300 pounds, a minimum Puncture Strength of 310 pounds, a Water Flow Rate of at least 40 gal/min/sf, and an Apparent Opening Size of between 60 and 70.

2.05. STEEL PLATE

- A. When steel plate bridging is provided in lieu of backfill and temporary asphalt, it shall conform to Section 602.1 of the Caltrans Encroachment Permit Manual, with the following minimum thicknesses:

B.	Trench Width	Minimum Plate Thickness
C.	(10") 0.25 m	(1/2") 13 mm
D.	(1' - 11") 0.58 m	3/4") 19 mm
E.	(2' - 7") 0.80 m	(7/8") 22 mm
F.	(3' - 5") 1.04 m	(1") 25 mm
G.	(5' - 3") 1.60 m	(1 1/4") 32 mm
- H. For spans greater than 5 feet-3 inches, a structural design shall be prepared by a California registered civil engineer.

PART 3 EXECUTION

3.01. GENERAL

- A. Where abandoned underground structures are encountered in street areas, remove to sufficient depth to allow underground lines to cross, backfill and compact during rough grading. The Engineer may require further work to be done if visual inspection indicates that this is necessary during construction.
- B. Regulatory Requirements: Conform to applicable codes and all local, state and federal regulations for disposal of debris and use of herbicides. Burning of debris, lumber, or scrap will not be permitted.
- C. Preparation:
1. Sawcut paving, curbs, gutters, and other structures between portion to remain and portion to be removed.
 2. Identify required lines, levels, contours, and datum.
 3. All areas that will receive engineered fill shall be stripped of organics (e.g., shrubs, weeds, grasses, root systems, etc.) and any manmade deleterious materials, down to relatively undisturbed, native materials. Resultant holes created by removal of these objects shall be cleared of loose material and dished to provide access for compaction equipment.
 4. All areas that will receive engineered fill shall be scarified to a minimum depth of 8 inches, moisture conditioned to a soil moisture content between 2 and 6 percent over optimum, and re-compacted to a minimum relative compaction of 90 percent as determined by ASTM D1557. If subsurface shrinkage cracks are present, the depth of scarifying and moisture conditioning shall extend to the maximum depth of cracking.
- D. Protection:
1. Locate, identify, and protect utilities that remain from damage.
 2. Protect trees, plant growth, and features designated to remain as final landscaping.
 3. Protect benchmarks and existing structures that are to remain from damage or displacement.
- E. Clearing:
1. Clear areas required for access to site and execution of work. Owner has removed trees that are anticipated to impact the work. If additional trees require removal, Contractor shall notify Engineer of proposed trees to be removed that are 6-inches or over in diameter, measured at 1-foot above the existing grade, and obtain Engineer's approval prior to removing said trees. Trees to be removed less than 6-inches in diameter do not need prior approval. Contractor shall remove all felled trucks and branches from the site. Stumps do not need removal, unless the Contractor requires the trunks to be removed for the performance of their work. All excavated trunks shall be removed from the site.
 2. Remove paving, curbs and gutters, fences, posts, or structures indicated on the drawings.
 3. Remove trees and shrubs indicated. In areas to be filled and under structures and roads, remove stumps, and main root system to a depth of not less than 24 inches

below the original ground surface. Depressions made by grubbing are to be filled with structural backfill to the original surface in accordance with this Section unless further excavation is required.

4. Clear undergrowth and dead wood without disturbing subsoil.
- F. Removal: Remove debris, rock, and extracted plant life from site.
- G. Top Soil Excavation:
1. Excavate topsoil from areas to be further excavated, re-landscaped, or re-graded.
 2. Stockpile in area designated on site to depth not exceeding 8 feet and protect from erosion. Spread excess topsoil not being reused evenly on site.

3.02. EXCAVATION

A. General

1. Over-Excavation: When ordered by the Engineer, whether or not indicated on the Drawings, excavations shall be over-excavated beyond the depth shown and paid for as extra work. Such over-excavation shall be to the depth ordered. The excavation shall then be backfilled to the grade of the bottom of the excavations shown on the Contract Drawings. Any over-excavation carried below the grade ordered, specified, or shown shall be backfilled to the required grade and densified with the specified material and compaction. Such work shall be performed by the Contractor at its own expense.
2. Disposal of Excess Excavated Material: The Contractor shall remove and dispose of all excess excavated material to a suitable site. The proper and legal disposal shall be the responsibility of the Contractor.
3. Machine slope banks to angle of repose or less, unless shored. In those cases where excavations are shored, soils at the site shall be considered to meet the OSHA definition of "Type C" soil for the purposes of shoring design, unless evaluated to be other than "Type C" by a registered engineer.
4. Excavation cut not to interfere with normal 45 degree bearing splay of foundations.
5. Grade top perimeter of excavation to prevent surface water from draining into excavation.
6. Hand trim excavation as needed. Remove loose matter.
7. Remove lumped subsoil, boulders, organic material and rock.
8. Notify the Engineer promptly in writing of unexpected subsurface conditions before such conditions are disturbed and discontinue affected work in area until notified to resume work.
9. Stockpile excavated material on site and remove excess material not being reused from site. Cover stockpiled material to protect from rain and wind. Take preventive measures to ensure that water containing soil from excavations or stockpiles does not enter storm drains.

10. Steel Plate
- a. General: When backfilling operations of any excavation cannot be properly completed within a work day, steel plate bridging with a non-skid surface and shoring may be required to preserve unobstructed traffic flow and to protect biological resources from entering the open excavation.
 - b. When steel plate bridging is required, the following conditions shall apply:
 - 1) Steel plates used for bridging must extend a minimum of 12 inches beyond the edges of the trench or excavation.
 - 2) Steel plate bridging shall be installed to operate with minimum noise.
 - 3) The trench shall be adequately shored to support the bridging and traffic loads.
 - 4) Temporary paving with cold asphalt concrete shall be used to feather the edges of the plates for plate installation in paved areas.
 - 5) Bridging shall be secured against displacement by using adjustable cleats, shims or other devices.
 - c. Steel plate bridging and shoring in paved areas shall be installed using the following methods:
 - 1) Approaching plate(s) and ending plate (if longitudinal placement) shall be attached to the roadway by a minimum of 2 dowels pre-drilled into the corners of the plate and drilled 2 inches into the pavement. Subsequent plates are butted to each other. Fine graded asphalt concrete shall be compacted to form ramps, maximum slope 8.5 percent with a minimum 12 inch taper to cover all edges of the steel plates. When steel plates are removed, the dowel holes in the pavement shall be backfilled with either graded fines of asphalt concrete mix, concrete slurry or an equivalent slurry.

B. Pipeline and Trench Excavation

- 1. Trench Width: Unless otherwise shown or directed, excavation for pipelines and utilities shall be open-cut trenches. Trench widths shall be kept as narrow as is practical for the method of densification selected by the Contractor, but shall have a minimum width at the bottom of the trench equal to the outside diameter of the pipe plus 12 inches.
- 2. Subgrade: The surface of the subgrade after compaction shall be hard, uniform, smooth, self-draining, and true to grade and cross section.
- 3. Trench Bottom: The pipe bedding shall be given a final trim establishing grade such that each pipe section when first laid will be continually in contact with the bedding along the extreme bottom of the pipe. Rounding out the trench bottom or bedding to form a cradle for the pipe will not be allowed. The Contractor shall excavate for bell holes and fittings.
- 4. Open Trench: The maximum amount of open trench permitted in any one location shall be the length necessary to accommodate the amount of pipe installed and backfilled in a single day. All trenches shall be fully backfilled at the end of each day or, in lieu thereof, shall be covered by heavy steel plates adequately braced and capable of supporting vehicular traffic in those locations where it is impractical to backfill at the end of each day. The above requirements for backfilling or use of steel plate may not be waived.
- 5. Where pipelines are to be installed in embankment or structure fills, the fill shall be constructed to a level a minimum of 2 feet above the top of the pipe, as directed by the Engineer, or as recommended by the pipe manufacturer, whichever is greater, before the trench is excavated.

C. Structure Excavation

1. Except when specifically provided to the contrary, excavation shall include the removal of all materials of whatever nature encountered, including all obstructions of any nature that would interfere with the proper execution and completion of the work. The removal of said materials shall conform to the lines and grades shown on the Drawings or ordered by the Engineer. The Contractor shall furnish, place, and maintain all supports and shoring that may be required for the sides of the excavations, and all pumping, ditching, or other measures required for the removal or exclusion of water, including storm water, groundwater, and wastewater reaching the site of the work from any source so as to prevent damage to the work or adjoining property. Excavations shall be sloped or otherwise supported in a safe manner in accordance with applicable State safety requirements and the requirements of OSHA Safety and Health Standards for Construction (29CFR1926). The limits of structure excavation shall be a minimum of 12 inches beyond the outside edge of the structure, and at a minimum no larger than necessary to facilitate backfill, compaction and testing operations. For structures poured against undisturbed soil the width of the structure wall shall be no more than 2 inches greater than specified or shown on the Drawings.
2. Except where otherwise specified for a particular structure or as directed by the Engineer, excavation shall be carried to the grade of the bottom of the structure. When directed by the Engineer, areas beneath minor structures shall be over-excavated. When such over-excavation is directed, both over-excavation and subsequent backfill to the required grade shall be performed. After over-excavation is performed and before backfill is placed, the exposed surface shall be scarified to a depth of 6 inches, brought to optimum moisture content, and rolled with heavy compaction equipment to obtain 90 percent of maximum density.

D. Pavement Base Course Excavation

1. Roadway excavation shall conform to Section 19-1, "General" and Section 19-2, "Roadway Excavation" of the Caltrans Standard Specifications, except the reference to Section 19-5, "Compaction," is deleted, and except that Section 19-1.03B, "Unsuitable Material," is modified as follows:
When directed by the Engineer, the Contractor shall excavate the unstable or unsuitable underlying material to the depth determined by the Engineer.

E. Paving Removal

1. All edges of asphalt, armor coats or seal coats shall be cut vertically, with a neat, square edge.
2. In all cases existing paving shall be cut out after construction and just prior to final paving to a point at least six (6) inches beyond each side of the trench line. If the trench line is within three (3) feet of any structure the pavement shall be removed and replace to the structure.
3. Asphalt grindings can be reused as backfill for pipeline trenching if the grindings comply with the gradations specified in this Section of these Specifications; however, any pavement removed and not used to backfill the trench shall be removed from the site and disposed of properly.
4. Contractor's attention is directed to Section B-53, Protection of Person and Property of the General Conditions. Pavement removal and replacement operations shall be

performed in such a manner as adjacent pavement and subgrade are not disturbed. In the event that material underlying adjacent pavement is disturbed, Contractor shall cut back pavement and recompact it at the Contractor's expense, to a relative compaction of not less than 95%.

3.03. BACKFILL

A. General

1. Backfill shall not be dropped directly upon any structure or pipe. Backfill shall not be placed around nor upon any structure for a minimum of 72 hours or until the concrete has attained sufficient design strength to withstand the loads imposed, whichever is greater.
2. Except for Product Type 3B material being placed in over-excavated areas or trenches and unless specifically excepted by the Engineer, backfill shall not be placed until after all water is removed from the excavation.
3. Placing and Spreading of Backfill Materials
 - a. Backfill materials shall be placed and spread evenly in horizontal layers. The backfill layers shall be evenly spread so that when compacted, each layer shall not exceed 6 inches in thickness.
 - b. During spreading, each layer shall be thoroughly mixed as necessary to promote uniformity of material in each layer and uniformity of moisture throughout backfill materials. Pipe Zone backfill materials shall be manually spread around the pipe so that when compacted, the Pipe Zone backfill will provide uniform bearing and side support.
 - c. Where the backfill material moisture content is below the optimum moisture content, water shall be added before or during spreading until the proper moisture content is achieved.
 - d. Where the backfill material moisture content is too high to permit the specified degree of compaction, the material shall be dried or replaced until the moisture content is satisfactory.
 - e. Backfill shall be mechanically compacted by means of tamping rollers, sheepsfoot rollers, pneumatic tire rollers, vibrating rollers, or other mechanical tampers. All such equipment shall be of a size and type subject to review by the Engineer. Impact-type pavement breakers (stompers) will not be permitted. Permission to use specific compaction equipment shall not be construed as guaranteeing or implying that the use of such equipment will not result in damage to adjacent ground, existing improvements, or new improvements. The Contractor shall make its own determination in this regard.
 - f. Material for mechanically compacted backfill shall be placed in lifts which, prior to compaction, shall not exceed the thickness specified below for various types of equipment:
 - 1) Vibratory equipment, including vibratory plates, vibratory smooth-wheel rollers, and vibratory pneumatic-tired rollers - maximum lift thickness of 2 feet.
 - 2) Rolling equipment, including sheepsfoot (both vibratory and non-vibratory), grid, smooth-wheel (non-vibratory), pneumatic-tired (non-vibratory), and segmented wheels - maximum lift thickness of 1 foot.
 - 3) Hand-directed mechanical tampers-maximum lift thickness of 4 inches.
 - g. Mechanically compacted landfill shall be placed in horizontal layers of thickness not exceeding those specified above, compatible to the material being placed and the type of equipment being used. Each layer shall be evenly spread, moistened or dried, if necessary, and then tamped or rolled until the specified relative compaction has been attained.

B. Pipe and Utility Trench Zones and Backfill

1. Trench Backfill Requirements: The pipe class has been structurally designed based upon the trench configuration previously specified herein.
 - a. The Contractor shall maintain the previously specified trench width up to a horizontal plane lying 12 inches above the top of the pipe.
 - b. If, at any location under said horizontal plane, the Contractor slopes the trench walls or exceeds the maximum trench widths indicated the Pipe Zone, backfill shall be "improved" or the pipe class improved at no additional cost to the Owner or Owner's Representative. "Improved" backfill shall mean pipe bedding or other equivalent materials acceptable to the Engineer.
 - c. If the allowable deflection specified for the pipe is exceeded, the Contractor shall expose and reround or replace the pipe, repair all damaged lining and coating, and reinstall the Pipe Zone material and Trench Zone backfill as specified.
 - d. All trenches shall have a minimum of 2 inches of temporary asphalt placed daily and maintained unless final paving can be completed in the same day. Temporary asphalt shall be placed flush with adjacent pavement grade.
 - e. Steel plates may be used to cover open trenches in-lieu of backfill and temporary asphalt pavement.
 - f. For any new pipeline installation that crosses under an existing electric, gas, telephone, or cable TV utility pipe(s) or conduit(s) the Contractor shall replace the existing backfill material around the existing utility pipe(s) or conduit(s) with sand. Sand shall be placed from a plane 6 inches below the bottom of the lowest utility pipe or conduit to a plane 12 inches above the top of the highest utility pipe or conduit, and for the full width of the new trench. Sand backfill shall be compacted to 95 percent maximum density in conformance with Paragraph Compaction, as specified below. Prior to any new pipeline installation crossing under existing storm or sanitary sewer, the contractor shall contact the Engineer and obtain direction on alignment, elevation, fill material and other items with regards to crossing design prior to proceeding. Depending the extent of the requested changes, sewer crossings not shown on plans may be paid for as a contract change order.
2. Bedding: The bedding is defined as that portion of the Pipe Zone lying between a plane 6 inches below the bottom surface of the pipe, and the springline of the pipe.
 - a. Sand Bedding shall be provided for all pipelines.
 - b. After compacting the bedding the Contractor shall perform a final trim for establishing grade, such that each pipe section when first laid will be continually in contact with the bedding along the extreme bottom of the pipe.
3. Pipe Zone and Backfill:
 - a. The Pipe Zone is defined as that portion of the vertical trench cross-section lying between the springline of the pipe and a plane 12 inches above the top of the pipe.
 - b. The Pipe Zone shall be backfilled with the specified backfill material. The Contractor shall exercise care to prevent damage to the pipeline coating, cathodic bonds, or the pipe itself during the installation and backfill operations.
4. Trench Zone and Backfill: After the Pipe Zone backfill has been placed as specified above, and after all excess water has completely drained from the trench, backfilling of the Trench Zone may proceed.
5. The Trench Zone is defined as that portion of the vertical trench cross-section lying between a plane 12 inches above the top of the pipe and below the roadway subgrade in paved areas, or 12 inches below the finished surface grade in landscaped or unimproved areas.

6. Final Zone and Backfill: The Final Zone is defined as the last vertical trench cross-section area above the Trench Zone, which is the roadway subgrade (AB base) and asphalt in paved areas, and the last 12 inches of the vertical trench cross-section lying between the top of the Trench Zone and the finish final grade in landscaped or unimproved areas.
 7. Stabilization Zone is defined as that portion of the vertical trench cross-section lying between a plane 6 inches below the bottom surface of the pipe, and a plane at a point 18 inches below the bottom surface of the pipe.
- C. Pavement Base Course Backfill
1. Preparation: Prior to placement of aggregate base course material at paved areas, compact subsoil to 95% of its maximum dry density at optimum water content in accordance with ASTM D698 to the depth as indicated on the drawing, but not less than six (6) inches.
 2. Tolerances:
 - a. Top Surface of Backfilling under Paved Areas: The surface of the finished aggregate base at any point shall not vary more than 1/2-inch above or below the grade shown on the drawing.
 3. Paving of trench cuts shall conform to line and grade of existing roadway.
 4. Damage to underlying native soils caused by the Contractor's operations shall be repaired and re-compacted under the supervision of and to the satisfaction of the Engineer at no additional cost to the Owner.

3.04. COMPACTION

A. General

1. Each layer of backfill or fill material as defined herein, shall be mechanically compacted to the specified percentage of maximum density. Equipment that is consistently capable of achieving the required degree of compaction shall be used and each layer shall be compacted over its entire area while the material is at the required moisture content range.
2. Flooding, ponding, or jetting shall not be used.
3. Removal of shoring shall not damage pipe or structures, cause settlement or heave the ground surface, or product vibrations that could damage adjacent pipe or structures. Compaction requirements must be met after shoring is removed.

B. Compaction of Trench and Structure Backfill Materials

Compaction Requirements: The compaction requirements noted herein and on the Drawings shall be in accordance with ASTM D 1557 for cohesive type materials and in accordance with ASTM D 4253 and D 4254 for "non-plastic" cohesionless free draining granular type materials. Where other agency or utility company requirements govern, the highest compaction standards shall apply.

Maximum density refers to maximum dry density according to ASTM D 1557 laboratory test procedures.

C. Compaction of Pavement Base Course Backfill

Material for roadway fill shall be placed in lifts or horizontal layers not exceeding 8 inches in un-compacted thickness. Unless otherwise specified, material shall be moisture conditioned by wetting or drying as specified herein, and compacted to a density of not less than 95 percent relative compaction in conformance with ASTM D 1557. In addition, in fill areas the upper 2 feet below street subgrade for the width of the traveled way shall be compacted to a density of not less than 95 percent relative compaction in conformance with ASTM D 1557.

D. Compaction of Fill

Place and compact materials in continuous layers not exceeding 8 inches compacted depth, compacted to 95% of maximum density at 2 percent over optimum water content.

END OF SECTION 31 00 00

SECTION 31 10 00

SITE CLEARING

PART 1 GENERAL

1.01. SUMMARY

- A. Work Included:
 - 1. Removal of surface debris.
 - 2. Removal of vegetation.
 - 3. Topsoil excavation.
- B. Related Work Described Elsewhere:
 - 1. Section 01 57 13 – Erosion Control
 - 2. Section 01 57 19 – Environmental Requirements
 - 3. Section 01 74 00 – Site and Area Cleanup

1.02. MEASUREMENT AND PAYMENT

- A. Measurement and Payment for Site Clearing shall be included in the Bid Item to which it relates. No additional measurement or payment shall be made for the requirements of this section.

1.03. QUALITY ASSURANCE

- A. Perform Work in accordance with all applicable State and County requirements.

PART 2 PRODUCTS – (NOT USED)

PART 3 EXECUTION

3.01. DEBRIS REMOVAL

- A. Remove and dispose of all debris and other material within the working area. All material removed shall be disposed of in accordance with State and County requirements.

3.02. VEGETATION REMOVAL

- A. It shall be the Contractor's responsibility to determine the types of grasses and other vegetation to be removed, and to ensure that the replacement vegetation matches that removed in number and in kind. Should replaced vegetation, after it is established, not match the existing vegetation, the Contractor shall take whatever corrective measures are necessary, including

complete reseeding or planting to provide a restored pasture which is acceptable and approved by the District and the property owner.

- B. Refer to Section 01 57 13 – Erosion Control

3.03. TOPSOIL EXCAVATION

- A. Excavate topsoil from areas to be further excavated, re-vegetated, or re-graded, without mixing with foreign materials for use in finish grading. Do not excavate wet topsoil.
- B. Remove excess topsoil not intended for reuse from site.

END OF SECTION 31 10 00

SECTION 31 23 19

DEWATERING

PART 1 GENERAL

1.01. SUMMARY OF WORK

- A. The Contractor shall keep excavations free from water during construction.
- B. Groundwater could be encountered during excavations.
- C. Groundwater shall be pumped to a percolation area consisting of a hay bale perimeter to allow it to infiltrate back into the soil (or other method proposed by the Contractor).
- D. The Contractor shall develop an excavation dewatering plan in accordance with paragraph 1.04 of this Section.

1.02. RELATED WORK SPECIFIED ELSEWHERE

- A. Section 01 33 00 – Submittal Procedures
- B. Section 01 57 19 – Environmental Requirements
- C. Section 31 00 00 – Earthwork
- D. Section 31 41 00 – Shoring and Trench Safety

1.03. DEFINITIONS

- A. Dewatering: Practices that manage the discharge of groundwater and accumulated precipitation from a work location so that construction work may be accomplished.

1.04. SUBMITTALS

- A. Dewatering Plan: Dewatering systems shall be designed and maintained by the Contractor and shall be coordinated with the design of shoring specified in Section 31 41 00. The dewatering plan shall contain at a minimum the sizes of pumps, tanks, filtration devices, and the points of disposal. The plan shall also include alternate (contingent) systems, and the Contractor shall be prepared to alter the initial dewatering or shoring systems to meet the specified requirements.
- B. Submittals shall be in accordance with requirements given in Section 01 33 00.
- C. Product Data: Submit data for each of the following:
 - 1. Dewatering Pumps: Indicate sizes, capacities, priming methods, and engine or motor characteristics.
 - 2. Pumping equipment for control of discharge.
 - 3. Size of percolation basin(s).

1.05. COORDINATION

- A. Coordinate with the Engineer prior to the commencement of any soil excavation and groundwater discharge.

PART 2 PRODUCTS

2.01. DEWATERING EQUIPMENT

- A. Select dewatering equipment to meet specified performance requirements.
- B. Provide, operate, and maintain dewatering systems of sufficient size and capacity to allow for excavation and subsequent construction and to lower and maintain groundwater level below the lowest point of excavation. Continuously maintain excavations free of water, regardless of source, and until backfilled to final grade.

PART 3 EXECUTION

3.01. Dewatering operations

- A. Install dewatering system in accordance with the approved Dewatering Plan.
 - 1. Secure Owner approved areas for siting of groundwater percolation basins. Locate system components to allow continuous dewatering operations without interfering with the excavation Work.
 - 2. Install the dewatering system in accordance with State, local and Unified Building Code standards.
- B. Remove water from the excavation in accordance with the approved Dewatering Plan.
 - 1. Keep excavations free from water during construction.
 - 2. Treat all water from the dewatering operations as required for removal of sediment prior to discharge.
 - 3. Draw down the static water level a minimum of 2 feet below the bottom of excavations to maintain the undisturbed state of natural soils and allow the placement of any fill to the specified density.
 - 4. Operate dewatering systems continuously until backfill has been completed to 1 foot above the normal static groundwater level.
 - 5. Control the release of groundwater to its static level to prevent disturbance of the natural foundation soils or compacted fill and to prevent flotation or movement of structures or pipelines.
 - 6. Control groundwater to prevent softening of the bottom of excavations, or formation of "quick" conditions. Dewatering systems shall not remove natural soils.
 - 7. Control surface runoff to prevent entry or collection of water in excavations.
 - 8. Discharge water as required in a manner that will not cause erosion or flooding, or otherwise damage existing facilities, completed work, or adjacent property.
- C. Notify Engineer and stop excavation work should the dewatering system not adequately control water within the excavation.
 - 1. Supplement or modify dewatering system and provide other remedial measures to control water within excavation.
 - 2. Demonstrate dewatering system operation complies with performance requirements before resuming excavation operations.
- D. Maintain all equipment in an operable state.
 - 1. Inspect equipment daily and repair or replace as needed.
 - 2. Clean accumulated sediment from basins as needed.
- E. Remove dewatering systems after dewatering operations are discontinued.
 - 1. Repair damage caused by dewatering systems or resulting from failure of systems to protect property.

END OF SECTION 31 23 19

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SECTION 31 41 00

SHORING AND TRENCH SAFETY

PART 1 GENERAL

1.01. SUMMARY OF SECTION

- A. Principle items specified herein are:
 - 1. Shoring required for general safety, worker protection, and protection of adjacent property from the hazards of caving ground.
 - 2. Trench excavations
 - 3. Structural excavations

1.02. MEASUREMENT AND PAYMENT

- A. Measurement and payment for Shoring and Trench Safety shall be included in the Bid Item to which it relates. No additional measurement or payment will be included for the requirements of this section.

1.03. RELATED SECTIONS

Related work specified in other sections:

- A. General Conditions, Section B-53 – Protection of Person and Property
- B. Section 03 48 00 – Precast Concrete Utility Boxes
- C. Section 31 00 00 – Earthwork
- D. Section 31 23 19 – Dewatering

1.04. REFERENCED CODES AND SPECIFICATIONS

The following standards apply:

- A. Cal/OSHA, State of California Administrative Code, Title 8; Industrial Relations, Chapter 4, Subchapter 4, Construction Safety Orders.
- B. Occupational Safety and Health Administration (OSHA) Regulations, 29 CFR Part 1926 Subpart P - Excavations.
- C. Where any of these are in conflict, the more stringent requirements shall be adhered to.

1.05. CONTRACTOR'S RESPONSIBILITIES FOR SAFETY

- A. The Contractor shall be solely and completely responsible for conditions of the job site, including safety of all persons (including employees) and property during performance of the Work. This requirement shall apply continuously and not be limited to normal working hours.

- B. The duty of the Owner and Engineer to conduct construction review of the Contractor's performance is not intended to include a review or approval of the adequacy of the Contractor's safety supervisor, the safety program, or any safety measures taken in, on, or near the construction site.
- C. The Owner and Engineer will review the submittal of the Contractor's proposed shoring system to verify the general scope of the Work, to determine that qualified professional engineering services are used and to determine that appropriate construction techniques are proposed for use. This review shall not in any way be construed to relieve the Contractor from sole responsibility for the design and safety of such shoring.
- D. The Contractor shall appoint a supervisory employee who shall be responsible for determining which of the engineered shoring systems (if alternates are provided) shall be used depending on local soil type, water table, etc.

1.06. PERMIT

- A. For trenches or excavations five feet or more in depth, obtain from the State Division of Industrial Safety a permit for such excavation; submit a copy of the permit to the Engineer, prior to initiating any work requiring said permit.

1.07. SAFETY ORDERS

- A. The Contractor shall have copies or suitable extracts of the Construction Safety Orders of Cal-OSHA at the worksite.
- B. All work shall comply with the provisions of these and all other applicable laws, ordinances and regulations.

1.08. SUBMITTALS

Submit the following in accordance with Section 01 33 00 – Submittal Procedures:

- A. Trench Safety Plan:
 - 1. For trenches or excavations five feet or more in depth, the Contractor shall submit to the Engineer a detailed plan design of shoring, bracing, sloping, or other provisions to be made for worker protection from the hazards of caving ground. The design shall be coordinated with the dewatering plan (Section 31 23 19). Such plans shall be submitted at least ten (10) working days before the Contractor intends to begin trenching or excavation work. Submittal shall be for trench work and work at vaults, horizontal directional drilling entry/exit points, and other cuts 5 feet or more in depth. NOTE: Water table and moisture content will vary with rainfall and cause varying soil strength.
 - 2. Groundwater may be present in trench backfill of existing utilities. Contractor shall design shoring and dewatering systems to mitigate against washout of materials from existing utility trenches. Reconstruction of the structural section of the road will be completed at the Contractor's expense.
 - 3. The trench safety plan shall be prepared, stamped, and signed by a civil or structural engineer registered in California. Stamped and sealed copies of calculations necessary to obtain approval of the systems shall be submitted also. These plans shall be available at all times at the job site.

4. Nothing herein shall be deemed to allow the use of a shoring, sloping, or protective system less effective than that required by the Construction Safety Orders of the Division of Industrial Safety.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01. REMOVAL OF SHORING

- A. Removal of shoring shall not damage pipe or structures, cause settlement or heave the ground surface, or produce vibrations that could damage adjacent pipe or structures.
- B. Minimum compaction requirements must be met after shoring is removed.

PART 4 TESTING

No field testing is required.

END OF SECTION 31 41 00

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SECTION 31 62 16

STEEL SHEET PILES

PART 1 GENERAL

1.01. SUMMARY

- A. Section includes:
 - 1. Construction of steel sheet piles.
 - 2. Installation of steel sheet piling and trimming of the sheet piles to the lines and grades shown on the Drawings or as required.

1.02. RELATED SECTIONS

Related work specified in other sections:

- A. Section 31 00 00 - Earthwork
- B. Section 31 23 19 - Dewatering

1.03. REFERENCE CODES AND STANDARDS

The following Standards apply:

- A. American Concrete Institute (ACI): 318/318R, Building Code Requirements for Structural Concrete and Commentary.
- B. American Petroleum Institute (API): Spec 5L, Specification for Line Pipe.
- C. ASTM International:
 - 1. A36 – Standard Specification for Carbon Structural Steel.
 - 2. A53 – Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 - 3. A139 – Standard Specification for Electric-Fusion (ARC)-Welded Steel Pipe (NPS 4 and Over).
 - 4. A252 – Standard Specification for Welded and Seamless Steel Pipe Piles.
 - 5. A328 – Standard Specification for Steel Sheet Piling.
 - 6. A572 – Standard Specification for High-Strength Low-Alloy Columbium- Vanadium Structural Steel.
 - 7. A690 – Standard Specification for High-Strength Low-Alloy Nickel, Copper, Phosphorus Steel H-Piles and Sheet Piling with Atmospheric Corrosion Resistance for Use in Marine Environments.
 - 8. A950/A950M-99 – Standard Sepcification for Fusion Bonded Epoxy-Coated Structural Steel H-Piles and Sheet Piling

Humboldt Bay Municipal Water District
Mad River Pipeline Crossing Project

9. A1011/A1011M – Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low- Alloy with Improved Formability.
- D. American Water Works Association (AWWA):
 1. C200, Steel Water Pipe—6 in. (150 mm) and Larger.
- E. American Welding Society (AWS):
 1. D1.1, Structural Welding Code—Steel.

1.04. SUBMITTALS

Submit the following in accordance with Section 01 33 00 – Submittal Procedures:

- A. Provide qualifications of proposed sheet pile installer.
- B. Contractor shall provide information from the manufacturer that indicates the sheet piling meets or exceeds the following:
 1. Material properties
 2. Sheet pile shapes
- C. Contractor shall submit verification from the manufacturer that the hammer can deliver the required energy to drive the sheet piles to the required depth.
- D. Splice locations, if necessary, shall be reviewed and accepted by the Engineer prior to installation.

1.05. QUALITY ASSURANCE

- A. Installer Qualifications: Sheet piling installer shall have, as a minimum, three (3) successful past installations of sheet piling of comparable overall heights and sections and comparable penetration into soils similar to those found for this project.

PART 2 PRODUCTS

2.01. GENERAL

- A. All steel sheet piling shall be new and unspliced material throughout, unless otherwise reviewed and accepted by the Engineer.
- B. Steel sheet piles and special fabricated shapes shall be of a design that ensures continuous interlock throughout the entire length when in place.

2.02. MATERIALS

- A. Steel sheet piling shall meet the requirements of ASTM A328, (Grade 50).
- B. Steel corners, tees, wyces, and crosses shall meet the requirements of ASTM A328 or ASTM A690.
- C. Steel sheet piles required for the Project shall be the type and weight shown on the Contract Drawings.

1. Additional length beyond those indicated on the Drawings may be required to provide for trimming of tops of sheet piling.
- D. Steel sheet piles and interlocks shall not have excessive kinks, camber, or twist that would prevent the pile from reasonably free sliding to grade.
- E. All fabricated connections shall be made with the use of angles or bent plates, as necessary, and shall be adequately welded or connected with high strength bolts as accepted by the Engineer. Connections shall be as strong or stronger than the steel sheet pile interlock strength.
- F. Handling Holes:
 1. If handling holes are provided, they shall be two (2) standard two and nine-sixteenth (2-9/16) inch diameter handling holes located six (6) inches from one end.
 2. The holes shall be plugged by welding a piece of steel over the hole prior to installing any riprap, backfill or drop structure cap.
 3. The plated hole shall be watertight.

2.03. STORAGE AND HANDLING

- A. Do not subject piles to damage by impact bending stresses in transporting to and storing piles onsite.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Sheet piles shall be installed as shown on the Drawings prior to any excavation taking place.

3.02 INSTALLATION

- A. General:
 1.
 1. All welding or gas cutting shall be in accordance with the current standards of the American Welding Society.
 2. Steel sheet piling shall be driven to the depths shown on the Drawings.
- B. Sheet Piling Driving:
 1. Steel sheet piling shall be assembled before driving and then driven as a continuous wall, progressively in stages to keep the piles aligned correctly and minimize the danger of breaking the interlock between the sheets.
 2. Steel sheet piling shall be driven to form a tight bulkhead.
 3. A driving head shall be used, and any piling which is damaged in driving or which has broken interlocks between sections shall be pulled and replaced at Contractor's expense.
 4. The piling shall be driven within the following tolerances:

- a. Alignment:
 - 1) Sheet pile shall be driven to form a relatively straight line between the termini points shown on the Drawings.
 - 2) Horizontal deviation of any point from a straight line connecting the two ends of the wall section shall be a maximum of six (6) inches.
- b. Plumbness: Each individual sheet pile section shall be driven vertical, within a horizontal tolerance of two percent (2%) of any vertical length measured along the pile.
- c. Elevation:
 - 1) Tops of sheet pile sections shall be within a tolerance of one (1) inch from plan elevations.
 - 2) Contractor shall not be paid for excess sheet pile trimmed off the end of the pile to meet final grade.
- C. Contractor shall brace and/or provide soil grading as necessary during construction operations in order to provide lateral stability for the sheet pile wall.
- D. Care shall be taken during driving to keep from causing deformations of the top of the piles, splitting of section, or breaking of the interlock between sections. Care shall also be taken during driving to prevent and correct any tendency of steel sheet piles to twist or get out of plumb.
- E. Steel Z piling shall be driven with the ball-end leading. Proper care and planning shall be used to allow for this construction procedure in both immediate and possible future walls.
- F. Alternate Z piles shall be reversed end for end for proper interlocking in the "normal" position. Piles shall also be aligned properly to maintain a "normal" driving width.
- G. For sheet piles driven into the native soils, pre-drilled soils, or excavated soils a vibratory driver may be used as long as the required depth is obtained.
- H. Steel sheet pile that is full length as shown on the Drawings and is required to be driven below the specified cutoff elevation shall be spliced with additional steel sheet piling with a full penetration butt weld.

PART 4 TESTING

4.01. CORRECTION OF DEFICIENCIES

- A. All deficiencies in work and/or items not meeting specified testing requirements shall be corrected in order to meet specification requirements at no additional cost to the District.
- B. Testing, as specified in this section, shall be repeated after correction of deficiencies is made until the specified requirements are met. This work shall be performed at no additional cost to the District.

END OF SECTION 31 62 16

SECTION 32 12 00

PAVING SYSTEMS

PART 1 GENERAL

1.01. DESCRIPTION

- A. Work covered in this section consists of performing all operations necessary to base and pave roadways or repair paved areas affected by Contractor's operations. Items covered under this section include subgrade preparation, base, aggregate base, and Hot Mix Asphalt (HMA) paving.
- B. General intent: All roadway surfaces shall be replaced in a manner which will result in a surface equal to or better than that existing prior to construction operations. Asphalt paving shall be replaced with a minimum thickness of 0.33'. See details on the Contract Drawings.

1.02. MEASUREMENT AND PAYMENT

- A. Measurement and payment for paving shall be included in the 4-inch Paving Section Bid Item. No additional measurement or payment will be included for the requirements of this section.
 - 1. Basis of Measurement: Per square foot, as measured in the field by the Engineer. The full width of the road (approximately 16 feet at the connection location) shall be repaved, and it is estimated that 25 feet of existing paving along the length of the road will need to be replaced, giving an estimated quantity of 400 square feet total. No additional payment will be made for resurfacing areas outside of the estimated 25-foot-long stretch of road encompassing the connection location unless approved by the Engineer. The Contractor shall repair any pavement damage that occurs as a result of the Contractor's operations outside of this 25-foot-long stretch at the Contractor's expense.
 - 2. Basis of Payment: Includes asphalt paving in place compacted to match the grade of the adjacent existing asphalt.
- B. Class II aggregate base will be paid for under other pertinent Bid Items. No additional measurement and payment will be included for the installation of Class II aggregate base as it pertains to paving.
- C. Section 31 00 00 – Earthwork

1.03. REFERENCES

- A. State of California, Business and Transportation Agency, Department of Transportation (Caltrans), Standard Specifications, latest edition excluding measurement and payment items.
- B. State of California, Business and Transportation Agency, Department of Transportation (Caltrans), Standard Plans.

1.04. QUALITY ASSURANCE

- A. Qualifications of workers: Provide sufficient skilled workers and supervisors who shall be present at all times during execution of this portion of the Work and who shall be thoroughly familiar with the type of construction involved and the materials and techniques specified.
- B. Codes and standards:
 - 1. Wherever a test method is referenced in this section, it shall be made in accordance with the most current test method in use by the California Department of Transportation (Caltrans) in the State Standard Specifications, latest edition.
 - 2. All pavement testing will be performed by the Contractor.
- C. Prior to beginning Work, the Contractor shall submit the company name, name of the contact person, and phone number of the Caltrans-certified lab that will be performing compaction and materials testing. Additionally, the lab shall be required to submit a copy of their Caltrans certification to the Engineer prior to the Contractor starting Work. The lab shall be required to submit copies of all test results to the Engineer within 24 hours of completing tests. Tests are to be clearly marked with the California test # (or ASTM where applicable).

1.05. SUBMITTALS

- A. Contractor shall submit samples of aggregate base, crushed rock, and aggregate for asphalt concrete prior to actual construction. Periodic tests of the material may also be made during construction. Contractor shall submit in written certifications materials testing reports, job-mix formulas, and other pertinent information demonstrating that materials and methods comply with the Contract requirements.
- B. Hot Mix Asphalt (HMA) Mix Design a minimum of two weeks prior to pavement.

1.06. PRODUCT HANDLING

- A. All products described herein shall be handled in conformance with the applicable provisions of the Caltrans Standard Specifications.
- B. Submit load slips for asphalt concrete to Engineer.

PART 2 PRODUCTS

2.01. AGGREGATE BASE

- A. Aggregate Base shall be per Section 26 of the Caltrans Standard Specifications and per Humboldt County Public Works Encroachment Permit requirements.
- B. Aggregate Base shall be placed on an unyielding excavated and drained subgrade. All aggregate base backfill subgrade shall be compacted to a relative compaction of 95%.
- C. Aggregate base shall be Class 2, 1/2 inch maximum grading conforming to Section 26 of Caltrans Standard Specifications.
 - 1. Add to section 26-1.02 B of the Caltrans Standard Specifications:

- a. The aggregate shall have at least 50% crushed particles with at least one fractured face.

2.02. PAINT BINDER (TACK COAT)

- A. Paint binder shall conform to Section 39-4 of Caltrans Standard Specifications.
- B. Tack coat if utilized shall be emulsified asphalt Grade, SS1, and shall conform to Section 94, "Asphaltic Emulsions", of the State Standard Specifications.

2.03. HOT MIX ASPHALT

- A. Asphalt concrete Type B shall be per Section 39-1.01 of the Caltrans Standard Specifications and per Humboldt County Public Works Encroachment Permit requirements.
- B. Asphalt binder per Section 39-1.02C of the Caltrans Standard Specifications
 1. Liquid anti-stripping agent (LAS) shall be added to the asphalt binder at a rate of 0.5% by weight of asphalt binder. The LAS shall be AD-here LOF 65-00 or equivalent, and shall be stored, measured, and blended with the asphalt binder in accordance with the anti-stripping agent manufacturer's recommended practice. The LAS can be added at the asphalt plant or at the refinery. When added at the asphalt plant, the equipment shall indicate and record the amount of LAS added. If added at the refinery, the shipping ticket from the refinery shall certify the type and amount of LAS added.
 2. Add to section 39-1.02C of the Caltrans Standard Specifications:
 - a. Asphalt Binder used in HMA Type B must be PG 64-16.
- C. Aggregate per Section 39-1.02E of the Caltrans Standard Specifications:
 1. Add to section 39-1.02E of the Caltrans Standard Specifications:
 - a. Aggregate used in HMA Type B must comply with ½-inch HMA Types A and B gradations.
- D. The asphalt concrete mixture, for asphalt concrete surface and asphalt concrete base, shall conform to the following requirements:
 1. Minimum tensile strength ratio (TSR) of 70, and a minimum dry tensile strength of 65 pounds per square inch, based on California Test Method 371.
 2. At any time during the first 12 months from the time of placement of the asphalt concrete, the surface shall be visually inspected by the District and the County. If signs of stripping of binder from aggregate or loss of aggregate is apparent, the District shall core the asphalt concrete surface. The core samples shall be tested for TSR. Asphalt concrete with a TSR less than 70 shall be remediated by the Contractor as required by the Engineer.
 3. An HMA mix design shall be submitted to the Engineer two weeks prior to the commencement of paving operations.

PART 3 EXECUTION

3.01. PROTECTION OF EXISTING STREET SURFACE

- A. During the entire construction period, the Contractor shall take care to protect existing pavement and sealed surfaces. Backhoes and trenchers must have street pads. Metal tipped pads will not be allowed. Surfaces scarred by cleanup or excavation equipment shall be repaired in a manner satisfactory to the Engineer. Any and all damage caused by the Contractor's operations to existing roads and streets shall be repaired by the Contractor to at least the original condition and to the satisfaction of the Engineer, at no additional cost to the Owner.
- B. If pavement is damaged (excessive loading, grouser marking, scarring/scraping of pavement, etc.) in adjacent lanes, a full lane width grinding and overlay will be required as directed by the Owner. If pavement is damaged due to excessive loading near the trench wall causing openings in the pavement, full depth structural section replacement will be required as directed by the Owner. If pavement restoration comes to within 4 feet from the edge of the pavement, pavement shall be replaced to the edge of pavement.

3.02. PAVING REMOVAL

- A. Sawcutting shall be required for all roads. See Section 31 00 00 – Earthwork for paving removal requirements.

3.03. AGGREGATE BASE

- A. Aggregate base shall be spread and compacted according to Caltrans Standard Specification Section 26. Compact to 95 percent relative compaction.

3.04. PAINT BINDER (TACK COAT)

- A. Paint binder application shall conform to the provisions of Section 39 of the Caltrans Standard Specifications. Areas to be primed are all areas to be paved. Paint binder shall be used on existing asphalt and concrete surfaces.
- B. Where temporary paving has been removed, the Contractor shall re-compact. A tack coat shall be applied to all existing or temporary pavement that will be in contact with the final pavement.
- C. Apply paint binder at 0.10 gallons per square yard over existing paved areas.
- D. The cost of applying tack coat will be included in the Contract Price and no additional compensation will be allowed therefor.

3.05. HOT MIX ASPHALT SURFACING

- A. Paving shall be conducted in accordance with the requirements listed in Section 39 of the Caltrans Standard Specification.
- B. Place asphalt within eight (8) hours of applying primer or tack coat.
- C. Paving shall be done under suitable weather conditions for such operations. Temperature shall be as specified in Section 39-3.04 of the Caltrans Standard Specifications. Rain, snow or other inclement weather will be cause for discontinuing paving Work. The Engineer shall

have the authority for determining whether weather conditions are sufficient cause to discontinue paving.

- D. Compact pavement by rolling to specified density. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment.
- E. Perform rolling with consecutive passes to achieve even and smooth finish without roller marks.

3.06. TRENCH PATCHING

- A. All trench patches in County streets shall conform to Contract Drawings, Humboldt County Encroachment Permit Requirements, and Caltrans Standard Specifications.

3.07. STREET MAINTENANCE

- A. Until the permanent pavement is placed, the base rock or temporary asphaltic plant mix at the surface of the trench/excavated area shall be maintained at all times at a grade level with the adjacent street. Continuous inspection and maintenance of the trench area will be required. Lights and barriers shall be maintained on all Work that is not safe for travel until such time as is made safe.

3.08. CONTRACTOR'S RESPONSIBILITY

- A. Settlement of replaced pavement over trenches/excavated areas within the 12-month warranty period shall be considered the result of improper or inadequate compaction of the subbase or base materials. The Contractor shall promptly repair all pavement deficiencies noted during the warranty period.

END OF SECTION 32 12 00

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SECTION 33 01 10

DISINFECTION OF WATER UTILITY DISTRIBUTION

PART 1 GENERAL

1.01. SUMMARY

- A. Section includes disinfection of potable water transmission system, testing, and reporting results.
- B. Related Sections
 - 1. Section 33 14 00 – Piping Systems

1.02. MEASUREMENT AND PAYMENT

- A. Measurement and Payment for the work detailed in this Specification Section shall be included in the Bid Item to which it relates. No additional measurement or payment will be included for the requirements of this section.

1.03. REFERENCES

- A. American Water Works Association:
 - 1. AWWA B300 – Hypochlorites.
 - 2. AWWA B301 - Liquid Chlorine.
 - 3. AWWA B302 - Ammonium Sulfate.
 - 4. AWWA B303 - Sodium Chlorite.
 - 5. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances.
 - 6. AWWA C651 - Disinfecting Water Mains.
- B. California Waterworks Standards
- C. AWWA, Water Pollution Control Federation, and other applicable Standard Methods for the Examination of Water and Wastewater.

1.04. SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures.
- B. Name and experience of competent person(s) responsible for the disinfection process and performing the required bacteriological sampling. Engineer shall approve in advance.
- C. Product Data: Submit procedures, proposed chemicals, and treatment levels for review.
- D. Test Reports: Indicate results comparative to specified requirements.

- E. Certified results for all bacteriological sampling prior to placing the new pipeline into service.
- F. For each section of pipe chlorinated, the Contractor shall inform the Engineer in writing of the locations for taps to be installed and utilized for the procedure.
- G. Contractor shall submit a disinfection plan and schedule for approval by the Engineer a minimum of fourteen (14) calendar days in advance of the planned performance of the Work. The plan shall detail proposed disinfection procedures including injection and sampling points, proposed chemicals and amounts, proposed hold times, proposed sectioning of the system, and proposed water disposal and dechlorination procedures.

1.05. CLOSEOUT SUBMITTALS

A. Disinfection Report:

- 1. Type and form of disinfectant used.
- 2. Date and time of disinfectant injection start and time of completion.
- 3. Test locations.
- 4. Name of person collecting samples.
- 5. Initial and 24 hour disinfectant residuals in treated water in ppm for each outlet tested.
- 6. Date and time of flushing start and completion.
- 7. Disinfectant residual after flushing in ppm for each outlet tested.

B. Bacteriological Report:

- 1. Date issued, project name, and testing laboratory name, address, and telephone number.
- 2. Time and date of water sample collection.
- 3. Name of person collecting samples.
- 4. Test locations.
- 5. Initial and 24 hour disinfectant residuals in ppm for each outlet tested.
- 6. Coliform bacteria test results for each outlet tested.
- 7. Certify water conforms, or fails to conform, to bacterial standards of California Department of Public Health.

1.06. QUALITY ASSURANCE

- A. Perform Work in accordance with AWWA C651.

- B. The competent person(s) responsible for disinfection processes and bacteriological testing shall be familiar with AWWA C651.
- C. The Engineer shall approve of the disinfection plan prior to implementation.
- D. The Engineer shall observe the disinfection and bacteriological sampling procedures.

1.07. QUALIFICATIONS

- A. Testing Laboratory: Laboratory, certified by State of California, for all chemical and biological tests run.
- B. Submit bacteriologist's signature and authority associated with testing.

PART 2 PRODUCTS

2.01. DISINFECTION CHEMICALS

- A. Chemicals: AWWA B300, Hypochlorite, AWWA B301, Liquid Chlorine, AWWA B302, Ammonium Sulfate, and AWWA B303, Sodium Chlorite.
- B. Material Safety Data Sheets (MSDS) of any chemical used shall be available onsite.
- C. Competent person(s) responsible for the disinfection process shall be fully trained in first aid requirements and procedures to address exposure to chemicals.

PART 3 EXECUTION

3.01. EXAMINATION

- A. Section 01 30 00 - Administrative Requirements.
- B. Verification of existing conditions before starting work.
- C. Verify piping system has been cleaned, inspected, and pressure tested.
- D. Perform scheduling and disinfecting activity with start-up, water pressure testing, adjusting and balancing, demonstration procedures, including coordination with related systems.

3.02. DISINFECTION

- A. Before being placed into service, all new water pipelines shall be chlorinated using either the Tablet Method, Continuous-Feed Method, or the Slug Method of chlorination as specified in AWWA C651. The Engineer shall approve the procedure in advance.
 - 1. The Contractor will determine the location of the chlorination and sampling points in the field. The Contractor shall install taps for chlorinating (depending on the method used), sampling and expulsion of air and shall uncover, backfill and plug the taps as required. All taps shall be installed with backflow preventers (backflow preventers to be approved by the Engineer prior to making the tap).

2. All valves and hydrants within the treated section shall be operated to ensure disinfection of the appurtenances.
- B. The interior of all pipe, fittings and valves used in making a repair or tie-in shall be swabbed or sprayed with a one percent (1 %) hypochlorite solution before they are installed.

3.03. FINAL FLUSHING

- A. Following the chlorination period, all highly-chlorinated water shall be flushed from the lines at their extremities and replaced with water from the transmission system.
1. Flushing the main is to be accomplished at as high a velocity as possible consistent with the ability of the Contractor to collect the discharge water for proper disposal.
 2. All treated water flushed from the lines shall be disposed of by approved means provided in AWWA C655.
 3. Flushing shall be done in strict conformance with the "Statewide National Pollution Discharge Elimination System (NPDES) Permit for Drinking Water System Discharges to Waters of the United States, Order WQ 2014-0194-DWQ, General Order No. CAG140001" (Appendix A of these Contract Documents) all applicable local, state and federal regulations. No discharge to any storm sewer or natural watercourse will be allowed.
- B. The discharge of chlorinated water will be harmful to vegetation and wildlife. Measures must be taken to impound the highly chlorinated water and to neutralize the chlorine prior to discharge of the water.
- C. Coordinate disposal of chlorinated water with the Owner and Engineer. Legally dispose of chlorinated water in accordance with regulatory agency requirements including the NPDES General Permit for Drinking Water Discharges, Appendix A.
- D. Neutralize the chlorine residual of the water being disposed with one of the chemicals listed below:
1. Ascorbic Acid
 2. Sodium Thiosulfate
 3. Sodium Bisulfite
 4. Sodium Metabisulfite
 5. Sodium Sulfite
- E. After final flushing and before pipeline is connected to existing system, or placed in service, employ an approved independent testing laboratory to sample, test and certify water quality suitable for human consumption.

3.04. BACTERIOLOGICAL ANALYSES

- A. After the 24-Hour disinfection period and all chlorine solution has been thoroughly flushed, the bacteriological sampling and analysis of the replacement water may then be performed.

1. Bacteriological sampling shall be made by the Contractor's competent person(s) in full accordance with AWWA C651- Section 7, Bacteriological Tests and under the supervision of the Engineer.
2. Analysis shall be performed by an independent commercial laboratory certified by the State Department of Environmental Protection and U.S. Environmental Protection Agency for analyzing public drinking water supplies. All results shall be provided to the Engineer for review.
3. Two consecutive sets of acceptable samples, taken at least 24 hours apart, are required prior to placing the main into service. Failure of any one of the bacteriological test samples shall require re-chlorination and retesting by the Contractor.
4. The line shall not be placed in service until the bacteriological requirements of AWWA C651 are met. If the pipeline does not pass the bacteriological sampling, the Contractor is responsible for re-disinfecting and testing the line at no additional cost to the Owner until the requirements are met.

END OF SECTION 33 01 10

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SECTION 33 05 07

HORIZONTAL DIRECTIONAL DRILLING

PART 1 GENERAL

1.01 SUMMARY

- A. The Contractor shall furnish all labor, equipment, water, and materials necessary to install the 18-inch OD HDPE pipeline by horizontal directional drilling (HDD) at the locations shown on the Drawings.
- B. The work of this Section includes all labor, materials, construction equipment and appliances required to perform all HDPE pipe installations using HDD methods for the HBMWD – Mad River Crossing Project.
- C. The HDD scope shall include, but not be limited to: directional drilling equipment, operator control cabin, drilling fluid mixing, pumping, and separation equipment, entry and exit pits, pumps, hoses, and other equipment, sheeting, miscellaneous appurtenances to complete the entire Work as shown on the Contract Drawings, site grading and restoration work at the exit side work area as necessary to accomplish the work. HDD operations shall be performed within the Limits of Work shown on the Drawings.

1.02 RELATED SECTIONS

- A. Section 33 05 08 – Contact Grouting.
- B. Section 33 05 33 – High-Density Polyethylene (HDPE) Pipe

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. Reference Documents
 - 1. “Horizontal Directional Drilling (HDD) Surface Spill and Hydrofracture Contingency Plan”, Humboldt Bay Municipal Water District, BLFG CSD Water Transmission Pipeline Replacement: Mad River HDD Crossing, December 20, 2017.
 - 2. “Preliminary Geotechnical Report – Humboldt Bay Municipal Water District, Water Transmission Pipeline Replacement Over Mad River, Blue Lake and Fieldbrook-Glendale Community Services District, Humboldt County, California”, Crawford & Associates, Inc., December 9, 2015.
 - 3. “Final Geotechnical Report – Humboldt Bay Municipal Water District, Water Transmission Pipeline Replacement Under Mad River, Blue Lake and Fieldbrook-Glendale Community Services District”, Humboldt County, California, Crawford & Associates, December 14, 2017.
- B. This section contains references to the following documents. They are a part of this section as specified and modified. Where a referenced document contains references to other

standards, those other standards are included as references under this section as if referenced directly. In the event of a conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.

1. Horizontal Directional Drilling (HDD) Good Practices Guidelines, North American Society for Trenchless Technology (NASTT), 4th Ed., 2017.

1.04 DEFINITIONS

- A. Annular Space: The space between the final reamed bore and the final product pipe.
- B. Bent Sub: A section of drill pipe behind the cutting tools that is inclined at an angle of one to three degrees from the axis of the main drill string. The bent sub allows steering while using rotating cutting tools such as a mud motor.
- C. Conductor Casing: A steel casing pipe installed at the entry and/or exit locations of the borehole to stabilize the borehole. The conductor casing reduces the risk of collapse of the borehole during HDD operations, allowing drilling fluid circulation in soils prone to swelling or collapse. The casing also reduces the risk of hydraulic fracturing of the soil and creating a seepage path to the surface, until sufficient ground cover can be obtained to reduce the risk of inadvertent drilling fluid returns.
- D. Drilling Fluid/Mud: A mixture of water, bentonite, and/or polymers continuously pumped to the drilling tools to facilitate the removal of soil cuttings, and stabilization of the bore. These fluids also cool the cutting tools and lubricate the drill pipe and product pipe string.
- E. Drilling Tool/Bit: Any tool or system of tools which excavates at the face of a bore.
- F. Horizontal Directional Drilling (HDD): A surface-launched, guided, steerable drilling method used for the trenchless installation of pipes, conduits, and cables. A pilot bore path is excavated in a shallow arc from a surface-launched drill rig. Excavation takes place with fluid assisted cutting from a drilling tool on the drill string. The pilot bore is directed by the positioning of a bent sub or slanted face cutting bit. Tracking of the drill string is achieved by using a transmitter behind the cutting tool and a downhole wireline survey tool which may be augmented by using an energized wire grid at the surface, or a gyroscope system. The bore is filled with drilling mud/fluid for stabilization, to cool the cutting tools, and to mix the cuttings into a slurry, which is circulated to the entry point where solids are removed before the drilling fluids are returned to the bore. The bore path is enlarged with subsequent reaming passes until the desired diameter is achieved. The product pipe, conduit, or cable is then pulled into the fluid-stabilized bore hole.
- G. Pilot Bore: The action of creating the first guided pass of the HDD process which is then reamed in one or more passes to the size required to allow pullback of the pipe or casing.
- H. Pullback: That part of a horizontal directional drilling process in which the drill pipe, swivel, and product pipe or cable is pulled back through the bore to the entry.
- I. Pullback Loads: The loads (forces) applied to a drill string and product pipe during the pullback process. In addition to the tensile pullback loads, bending, buckling and combination loads must be considered in design.
- J. Obstruction: Any hard object lying completely or partially within the design pathway of the bore and pipeline that prevents further advancement of the drill pipe, pre-reamer, reamer, and/or pipe, after all reasonable Contractor attempts to advance past the object or re-drill around the object have failed.

- K. Settlement Point: A point with elevation and spatial location established by survey prior to construction. The point is re-surveyed periodically to monitor ground movements. The point may be a nail, pin, subsurface settlement rod, borehole extensometer, or other device that can be readily located and surveyed.
- L. Work Plan: Written descriptions, together with sketches, drawings, schedules, and other documents defining Contractor's plans and procedures for horizontal directional drilling.

1.05 DESIGN CRITERIA

- A. Equipment: The Contractor shall provide all equipment, materials, and personnel necessary for completing the installation as shown on the Drawings and specified herein. The equipment and materials shall include but are not limited to:
 - 1. Directional drilling rig with all ancillary equipment, including drill pipe, cutting tools, reaming bits, swivels, expanders, motors, pumps, hoses, mixing equipment, drilling fluid processing equipment (cuttings separation equipment), downhole survey equipment, energized surface grid tracking system, spare parts, pipe handling equipment, crane, backhoe, pipe support rollers, side boom tractors, control cabin, control equipment, and office equipment.
 - 2. Drilling fluids, water, fuel, lubricant, polymers, or other additives.
 - 3. Any other expendable or re-usable materials, supplies, and equipment needed for the installation.
- B. The drilling equipment shall be capable of advancing through the geologic conditions to be encountered at the site, as described in the Geotechnical Reports, and as anticipated by the Contractor.
- C. The drilling fluid shall be designed for the geologic conditions to be encountered at the site, as described in the Geotechnical Report and as anticipated by the Contractor.
- D. The drilling system shall include a fluid pump and separation plant that can achieve the rates of drilling fluid pumping, spoil separation, and slurry cleaning required by the Contractor to achieve planned production rates for the ground conditions described in the Geotechnical Reports, and as anticipated by the Contractor. Shaker screens, hydrocyclones, and a centrifuge may be required for efficient separation of spoils. The Contractor is advised that the separation plant must fit within the Limits of Work shown on the Drawings.
- E. All spoil and slurry must be contained in trucks, tanks, or other containers at all times. Dumping of spoil or drilling fluid on the ground, discharge into sewers, or discharge into the water bodies will not be permitted. All spoils will be transported and disposed of off-site at an approved disposal facility that meets all State of California and local permit requirements.
- F. Perform all work within the Limits of Work shown on the Drawings.
- G. Install the pipeline using the geometry shown on the Drawings, unless deviations are approved in writing by the Engineer.
- H. Pipe rollers, lifters, and lateral force reaction devices shall be required to help the transition of the carrier pipe into the bore. The number of pipe rollers and lifters shall be determined by the Contractor and submitted as part of the Work Plan.

- I. Surface settlement or heave of utilities and other features above the HDD centerlines and within the zone influenced by the HDD construction shall be limited to values that avoid damage. The Contractor shall repair any damage resulting from settlement or heave caused by HDD activities at no additional cost to the Owner. The Contractor shall grout any voids caused by or encountered during drilling as specified in this section and in accordance with Section 33 05 08 – Contact Grouting.
- J. Safety: It shall be the Contractor's sole responsibility that all work is done in conformance with all applicable Federal, State, and local safety requirements. Required safety equipment and procedures shall be employed by the Contractor at all times. All materials and methods of construction shall meet the applicable requirements of the State of California.
- K. Pipe: The pipe will be certified by the Contractor as meeting all requirements of the Specifications. The fabricated pipe will be pressure-tested by the Contractor in accordance with the requirements of Section 33 05 33 – High-Density Polyethylene (HDPE) Pipe.
- L. Two tracer wires shall be attached to the leading end of the pipe pulling head and shall extend the full length of the installed pipe.
- M. Contractor shall comply with all local noise ordinances and permits.

1.06 QUALITY ASSURANCE

- A. Contractor Qualifications and Experience: The Contractor shall have at least five (5) years of demonstrated successful experience installing pipelines using the horizontal directional drilling process on at least five (5) projects with similar diameters, installation lengths, and ground and groundwater conditions. The submitted information must demonstrate successful completion of at least three (3) bores in rock conditions, and at least two (2) individual bore lengths of 1,000 feet or more under similar ground conditions. The Contractor shall furnish evidence of successful experience by including project owner, project name, location, diameter, length, depth, ground conditions, any problems encountered and how resolved, and any claims and how resolved. Owner's representative with address and telephone number shall be provided.
- B. Qualifications and Experience of Contractor Personnel: The Contractor shall employ skilled, experienced superintendent(s), drill rig operators, fusion machine operators, and key personnel. The superintendent(s) and drill rig operators shall have at least three (3) years of successful experience using the HDD process, on at least five (5) projects with similar diameters, pullback length, and ground conditions. The superintendent(s), drill rig operator, and fusion machine operators shall demonstrate successful completion of at least three (3) projects in rock. At least two (2) projects must include individual bore lengths of at least 1,000 feet under similar soil conditions. The Contractor shall furnish resumes of the superintendent(s) and operators. Personnel experience records should include project names, locations, pullback lengths, ground conditions, pipe materials, project description, project owner, engineer, and references with names, addresses, and telephone numbers. The superintendent and operators listed in the submittal shall be on site during all construction related activities required for the HDD installation.
- C. The Contractor's surveyor responsible for line-and-grade control shall be a Licensed Surveyor registered in the State of California who has prior experience on HDD projects.
- D. Daily Logs and Records: Daily logs and records shall be maintained by the Contractor and shall include drilling lengths, location of drill head in plan and profile, drilling fluid pressures and flow rates, drilling fluid losses, inadvertent returns, drilling times required for each pipe joint, any instances of retraction and re-drilling of the pilot bore or segments thereof, and any other relevant observations, including any observed settlement, heave, frac-outs, or surface

spills. The drilling fluid pressures shall be measured and recorded at least once per drill pipe length. The drilling fluid viscosity and density shall be measured and recorded at least two times per shift with at least two hours between readings, using calibrated Marsh funnel and mud balance. These records shall be maintained and provided daily to the Engineer. The position of the drill head shall be continuously tracked and recorded. A plot of actual locations of the bore path shall be maintained and updated daily, or more frequently, as directed by the Engineer.

- E. Conduct drilling operations in compliance with Hydrofracture and Surface Spill Contingency Plan. In the event of a hydrofracture or surface spill, clean up drilling fluid and notify points of contact as described in the Contingency Plan.
- F. Surveying Equipment and Procedures: All surveying equipment used for downhole wireline surveying and tracking of the bore path and drill head and layout of the surface wire grid system or equivalent tracking system shall be inspected and calibrated by the equipment manufacturer prior to use. Proof of this inspection and calibration shall be provided to the Engineer prior to the commencement of drilling operations.
- G. Advance Notice and Inspections: The Contractor shall provide at least 72 hours advance written notice to the Engineer of the planned inception of major drilling activities, including pilot bore launch, pre-reaming, reaming, and pipe pullback. The Contractor shall immediately notify the Engineer, in writing, when any significant problems are encountered or if ground conditions are considered by the Contractor to be materially and significantly different than those represented within the Contract Documents. All work by the Contractor shall be performed in the presence of the Engineer, unless Engineer grants prior written approval to perform such work in Engineer's absence.
- H. The Contractor shall allow access to the Engineer and shall furnish necessary assistance and cooperation to aid the Engineer in observations and data and sample collection, including, but not limited to the following:
 - 1. The Owner and Engineer shall have access to the operator control container prior to, during, and following all HDD operations. This shall include, but not be limited to, providing visual access to real-time operator control screens, gauges, and indicators.
 - 2. The Owner and Engineer shall have access to the drilling fluid mixing, pumping, and separation equipment prior to, during, and following all HDD operations. This shall include, but not be limited to, access to shaker screens, hydrocyclones, conveyor belts, and slurry and spoil holding tanks. The Engineer shall be allowed to collect soil samples from the shaker screens and/or spoil holding tanks on the slurry separation plant a minimum of once per drill pipe section, and whenever changes in conditions are observed or suspected.

1.07 SUBMITTALS

- A. Submittals shall be made in accordance with the requirements of these Specifications, providing sufficient detail to allow the Engineer to judge whether the proposed equipment, materials, and procedures will meet the Contract requirements. The Engineer's review of submitted details and data will be based on consideration of requirements for the completed work, protection of existing utilities, and the possibility of unnecessary delays in the execution of the work to be constructed under this Contract. Review and acceptance of the Contractor's Submittals by the Engineer shall not be construed in any way as relieving the Contractor of its responsibilities under this Contract.

Humboldt Bay Municipal Water District
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- B. Qualifications: Submit written documentation of HDD Contractor, superintendent, key personnel, and surveyor experience in accordance with Sections 1.07 A through C. Submit evidence of CalOSHA certification for the Site Safety Representative.
- C. Description of Equipment and Materials:
1. The Contractor shall submit detailed descriptions of all equipment and materials to be used for the HDD installation. Equipment and material submittals shall include the directional drill rig, drill rig anchoring system, the drilling fluid system, drill bits, mud motors, reamers or hole openers, pipe rollers, hoisting and positioning equipment for pullback, drilling fluid and additives, pipe pull head, and pipe pulling swivel. Descriptions of equipment shall include manufacturers' specifications, calibrations, appropriate drawings, photographs, and descriptions of any modifications since manufacture. Descriptions of drilling fluid additives shall be accompanied by Safety Data Sheets (SDS) and manufacturers' descriptions and warranties.
 2. Rig Capacity: The Contractor shall submit details on the capacity of the drill rig verifying that the torque/pullback capacity is greater than the required pullback force calculated and submitted.
 3. Pump Capacity: The Contractor shall submit details on the capacity of the mud pumping system, and shall verify that the pump capacity is adequate to supply the required flow rate and pressures for the Contractor's anticipated drilling fluid properties and anticipated drilling rates.
- D. Calculations for Pullback and Pipe Stresses: The Contractor shall submit calculations of the estimated pullback loads for the conditions and operating practices planned. The Contractor shall submit calculations for pipe stresses expected to result from the pullback, bending, fluid buckling loads, earth loads, groundwater loads, and any other installation and service loads expected to be exerted on the pipe. All assumptions used in the calculations shall be provided, including the final bore diameter, drill pipe diameter, radius of curvature, entry and exit angles, assumed drilling fluid weight, assumed drilling fluid viscosity, and pipe ballasting during pullback. All calculations shall be conducted by or under the direct supervision of a licensed Professional Engineer registered in the State of California, who shall affix his or her seal and sign the calculations.
- E. Calculations of Maximum Allowable and Minimum Required Drilling Fluid Pressures: The Contractor shall submit calculations identifying the critical downhole pressure that would cause hydrofracture or inadvertent drilling fluid returns. The calculations shall identify the critical points in the alignment where the soil cover above the bore is low. The calculations shall identify all parameters used and state all assumptions made in the calculations. The Contractor shall submit an annular pressure diagram for the length of the alignment based on the drill path depth, return drilling fluid density and viscosity, and the diameter of the borehole. The pressure diagram shall show upper and lower bound pressures, indicating maximum allowable pressure and minimum pressure required to maintain fluid circulation through the borehole. All calculations shall be conducted by or under the direct supervision of a licensed Professional Engineer registered in the State of California, who shall affix his or her seal and sign the calculations.
- F. Horizontal Directional Drilling Work Plan: Submit an HDD Work Plan complete with drawings and written description identifying details of the proposed method of construction and the sequence of operations to be performed during construction. The work plan shall discuss the

protection of existing utilities, solids control plant, pilot hole drilling procedure, facilities for containment and storage of any spills or hydrofracture fluids, the reaming operation, the pullback procedure including pipe support, hoisting and ballasting, and abandonment of excess bore length. The HDD Work Plan shall explicitly address and satisfy all permit requirements. In addition, the Work Plan shall include:

1. A detailed plan and profile drawing of the bore showing any proposed deviations from the Drawings. All drawings shall be legible with dimensions accurately shown and clearly marked in English.
 2. Equipment Layout: The Contractor shall submit sketches depicting the layout and locations of equipment within the rig side work area and pipe layout area, including proposed drilling fluid containment and recirculation tanks. The Contractor shall confirm that all operations shall be completely contained within the Limits of Work shown on the Drawings.
 3. Details and methods related to bending and supporting the pipe through the required tight bend radius through the pipe layout area during pullback. Provide details and calculations as necessary to demonstrate that the pipe can be safely supported and restrained without excessive stresses on the pipe.
 4. Provide descriptions and details regarding the layout and fabrication of carrier pipe within the allowable work area.
 5. Pipe Filling Methods: The Contractor shall submit methods and procedures for filling the pipe with fluid for testing after installation, and during pullback to reduce pipe buoyancy if used.
- G. Locating, Monitoring, and Protection of Adjacent Structures and Facilities
1. Provide details on measures to be taken to locate, monitor, and protect adjacent utilities, structures, and roadways.
- H. Schedule: At least fifteen (15) days prior to project mobilization, the Contractor shall submit a detailed schedule for the HDD installations showing all major construction activities and durations, with beginning and completion dates shown. The schedule shall be updated at least every two weeks or more frequently, as directed by the Engineer, and shall include:
1. "One-Call" Underground Service Alert (USA) utility locate requests and visual confirmation of all crossing utilities and all parallel utilities within ten (10) feet laterally of the bore centerline.
 2. Rig mobilization and setup, including surface coil installation and survey.
 3. Pilot bore drilling.
 4. Pre-reaming and reaming.
 5. Layout and thermal fusing of pipe.

6. Pressure testing of pipe prior to pullback.
 7. Final reaming and pullback of pipe.
 8. Pressure testing of pipe after installation.
 9. Mandrel test to confirm deformations of pipe are within allowable tolerances.
 10. Contact grouting of the annulus.
 11. Cleanup and demobilization.
 12. Tie-ins and surface restoration.
- I. Soil Separation Plant and Plans for Disposal:
1. The Contractor shall submit details on the drilling fluid pumps and cleaning plant. Include dimensions, manufacturer's specifications, pump capacity.
 2. Drilling fluid volumes and maximum drilling and reaming rates for pilot bore and each reaming pass and confirm that pump capacity is adequate for these anticipated drilling rates for the drilling fluid weights and viscosities anticipated.
 3. Measures for Drilling Fluid Containment: The Contractor shall submit plans for containment of drilling fluids at entry and exit locations.
 4. Plans for Disposal of Spoils and Drilling Fluids: The Contractor shall submit plans for disposal of waste materials resulting from the pipeline construction, including drilling fluids, cuttings, waste oil, fuel, discharge water, etc. The Contractor shall identify the disposal site and submit a letter indicating willingness and legal authority to accept the described and anticipated waste products.
- J. Daily Logs and Records: The Contractor shall submit complete, legible, daily logs and records in accordance with Section 1.06 C. Daily logs and records shall be provided to the Engineer by noon on the day following the shift for which the data or records were taken. The following shall be submitted as construction progresses and at the completion of construction.
1. Daily logs as specified in Section 1.06 C.
 2. Drilling Fluid Properties: The Contractor shall submit measured drilling fluid weights and viscosities used during pilot boring and reaming of the bore measured at a minimum of twice per shift or at least once per 100 feet of drilled or reamed length, whichever is more frequent.
 3. Variations in Plan and Profile: The Contractor shall document any variations between the actual plan and profile of the bore path and the location shown on the Drawings. The Contractor shall notify the Engineer immediately upon discovery of any deviations that exceed design tolerances.

- K. Surveying Equipment and Procedures: The Contractor shall submit records of equipment calibrations and certifications for all equipment used for downhole wireline survey and tracking of the drill head. Procedures for operating the downhole wireline survey tools shall be described, including measures to verify the accuracy of the equipment readings. The Contractor shall submit a drawing with the location of the surface wire grid system for the "TruTracker" or equivalent tracking system.
- L. Pilot Bore As-Built Profile: The Contractor shall submit an as-built plan and profile of the pilot bore within 24 hours of completion of the pilot bore, and before reaming and pullback begins.
- M. Contingency Plans for Potential Problems: The Contractor shall submit contingency plans for remediation of potential problems that may be encountered during the drilling operations. The contingency plans shall address the observations that would lead to the discovery of the problem and the methods that would be used to mitigate the problem. Potential problems that shall be addressed include:
1. Loss of returns/loss of circulation of drilling fluid.
 2. Encountering obstructions during the pilot bore or reaming/pullback.
 3. Drill pipe or product pipe cannot be advanced.
 4. Deviations from design line and grade that exceed allowable tolerances.
 5. Drill pipe or product pipe broken off in borehole.
 6. Product pipe collapse or excessive deformation.
 7. Excessive ground settlement or heave of ground surface or existing utilities.
 8. Inadvertent returns/hydrofracture or surface spills resulting in drilling fluids entering river or reaching the surface.
- N. Confirm that Contractor will comply with the HDD Surface Spill and Hydrofracture Contingency (SSHC) Plan. Any deviations to the SSHC Plan must be submitted in writing and are subject to approval by the Engineer. All surface spill and hydrofracture containment and clean-up will be conducted in accordance with applicable permit requirements.
- O. Safety Plan: The Contractor shall submit a Safety Plan, including the name of the Contractor's Site Safety Representative, emergency telephone numbers for medical facilities, and precautions for handling and disposal of any hazardous or flammable materials. The Safety Plan shall include a code of safe practices and an emergency plan in accordance with OSHA and CalOSHA requirements.

PART 2 PRODUCTS

2.01 PIPE

- A. The Contractor shall provide and install HDPE pipe in accordance with Section 33 05 33– High-Density Polyethylene (HDPE) Pipe.

2.02 WATER

Humboldt Bay Municipal Water District
Mad River Pipeline Crossing Project

- A. The Contractor shall work with the District to secure a suitable source of water, and shall be responsible for transporting, storing, and disposing of any water required.

2.03 DRILLING FLUIDS

- A. The Contractor shall select drilling additives and fluid mixture proportions to ensure continuous circulation, bore stability, reduce drag on the pipe, and completely fill the annular space between the bore and the pipe to ensure stability and control settlement. Management and disposal of drilling fluids shall be the Contractor's responsibility. Drilling fluids shall not be disposed of on-site or discharged to sanitary or storm sewers, or the water way. All drilling fluids shall be removed from the site and properly disposed of at a facility licensed to receive the material.

2.04 DRILL PIPE

- A. The Contractor shall provide high quality drill pipes that have been inspected and determined to be adequate for the project requirements. Bent, cracked, or fatigued drill pipes shall not be used. Threads must be in good condition. The length of each drill pipe shall be measured and recorded

2.05 TRACER WIRE

- A. Tracer wires shall be SoloShot Xtreme, manufactured by Copperhead Industries LLC, Monticello, MN, or equal.

PART 3 EXECUTION

3.01 GENERAL

- A. The Contractor shall provide adequate control of surface water and drilling fluids drainage and runoff. Contractor shall provide silt fences, hay bales, and wattles to prevent surface water or drilling fluids from entering any waterway.
- B. The Contractor shall not initiate HDD until all submittals are received, reviewed, and accepted by the Engineer.
- C. The Contractor shall not initiate HDD until all required permits are obtained.

3.02 PROTECTION OF UNDERGROUND UTILITIES

- A. It is the Contractor's responsibility to request locates and confirm locations of all nearby utilities that may be affected by the work.
- B. The Contractor shall notify "One Call" system to request marking of utilities that subscribe to One Call, and shall individually notify all other known or suspected utilities to request marking of their utilities.
- C. The Contractor shall confirm that all requested locates are made prior to commencing drilling operations.
- D. The Contractor shall make diligent efforts to locate any unmarked or abandoned utilities using all available information, maps, and drawings.

- E. The Contractor shall make diligent effort to locate surface evidence of any other potential subsurface obstructions, such as piers and piles.
- F. The Contractor shall visually confirm and stake all existing lines, cables, or other underground facilities including exposing all crossing utilities and utilities within ten (10) feet laterally of the centerline of the designed drilled path.
- G. The Contractor shall control drilling practices to prevent damage to existing utilities.
- H. The Contractor shall be responsible for all losses and repairs caused by damage to underground utilities resulting from drilling operations.

3.03 WORK STAGING AREA

- A. **Work Staging:** The Contractor shall limit staging and work operations to the areas shown on the Drawings, or as otherwise accepted in writing by the Engineer, for storage of equipment and materials, parking, pipe layout, drilling, and other work.
- B. **Construction Impacts:** The Contractor shall proceed with work in a safe, orderly manner, while maintaining the work site free of debris and unnecessary equipment and materials.
- C. **Control of Drilling Fluids:** The Contractor shall follow all requirements of the Hydrofracture and Surface Spill Contingency Plan and shall control operational pressures, drilling mud weights, drilling speeds, and any other operational factors required to avoid hydrofracture, fluid losses to formations, and drilling fluid spillage. This includes any spillages or returns at entry and exit locations or at any intermediate point. All inadvertent returns or spills shall be promptly contained and cleaned up. The Contractor shall maintain on-site mobile spoil removal equipment during all drilling, pre-reaming, reaming, and pullback operations and shall be capable of quickly removing spoils. The Contractor shall immediately notify Engineer of any inadvertent returns or spills and immediately contain and clean up the return or spill.
- D. **Removal of Temporary Facilities:** At the completion of construction, the Contractor shall remove all temporary facilities installed by the Contractor. All disturbed areas shall be restored to original conditions prior to construction.

3.04 MOBILIZATION

- A. The Contractor shall mobilize all equipment, materials, and personnel necessary to construct the HDPE pipeline using the HDD process at the locations shown in the Drawings.
 - 1. **Entry Area:** The Contractor shall set up temporary workspace within the Limits of Work shown on the Drawings. Appropriate precautions and measures shall be employed by the Contractor to prevent erosion, surface drainage, and spillage of drilling fluids or other materials that could adversely impact the environmental quality of the site. Silt fences, hay wattles, and hay bales shall be used to line the work area to minimize erosion and contain any spillages or runoff.
 - 2. **Exit Area:** The exit area shall have a drilling fluid pit for containing drilling fluids and cuttings. Appropriate precautions and measures shall be employed by the Contractor to prevent erosion, surface drainage, and spillage of drilling fluids or other materials that could adversely impact the environmental quality of the site.

3. Pipe Layout Area: Layout area shall be free of stones, debris and obstructions. Pipe rollers shall be provided by the Contractor to facilitate pipe pullback. Provide all supports and restraints necessary to safely transition pipe from the layout area into the exit pit.

3.05 HORIZONTAL DIRECTIONAL DRILLING

- A. Drill Rig Capacity: The capacity of the directional drilling system used by the Contractor shall be adequate to install the specified pipeline.
- B. Pump Capacity: The pump used by the Contractor shall be adequate to supply the required flow rate and pressures at the anticipated drilling fluid viscosity at all times. Drilling speeds shall not exceed pump capacity.
- C. Bore Tracking and Monitoring: At all times during the pilot bore the Contractor shall provide and maintain a bore tracking system that is capable of accurately locating the position of the drill head.
 1. Downhole and Surface Grid Tracking System: Contractor shall monitor and record x, y, and z coordinates, relative to an established surface survey bench mark, from downhole survey data using downhole wireline system, which may be augmented by using an energized wire grid at the surface. The data shall be continuously monitored and recorded at least once per drill pipe length or every thirty (30) feet, whichever is most frequent.
 2. Deviations between the recorded and design bore path shall be calculated and reported on the daily log. If the deviations exceed tolerances specified elsewhere, such occurrences shall be reported immediately to the Engineer. The Contractor shall undertake all necessary measures to correct deviations and return to design line and grade.
 3. Drilling Fluid Pressures and Flow Rates: Drilling fluid pressures and flow rates shall be continuously monitored and recorded by the Contractor. The pressures shall be monitored at the pump.
 4. Drilling Speeds: Maximum allowable drilling speeds shall be calculated by the Contractor for pilot boring and each reaming pass and shall not be exceeded for pilot boring or reaming passes. Drilling rates shall be recorded for every drill pipe.
 5. Drilling Fluid Viscosity and Density (Mud Weight): The Contractor shall measure and record drilling fluid viscosity and density at least two (2) times per shift with at least two (2) hours between readings, using calibrated Marsh funnel and mud balance. These measurements shall be included in daily logs submitted to the Engineer. The Contractor shall document modifications to the drilling fluids, by noting the types and quantities of drilling fluid additives and the dates and times when introduced. The reason for the addition of drilling fluid additives or other modifications shall be documented and reported.

- D. Location of Entry and Exit Points: Entry and exit points shall be as shown on the Drawings, unless otherwise approved in writing by the Engineer. The Contractor shall employ licensed, experienced surveyors to locate the entry and exit points, and to establish horizontal and vertical datum for the bore and the pipe layout and fabrication areas.
- E. Entry and Exit Angles: Drill entry and exit angles shall be as shown on the Contract Drawings, unless otherwise approved in writing by the Engineer.
- F. Pilot Bore: The pilot bore shall follow the design path of the bore shown on the Drawings.
1. Horizontal and Vertical Tolerances: Horizontal and vertical deviations shall be less than plus or minus five (5) feet from the design path centerline. **In addition, the minimum design clearance shall be maintained at the west bank of the river near Station 12+50.** The Contractor shall continuously monitor horizontal and vertical position and record the position at least once per drill pipe length, or at thirty (30) feet intervals, whichever is most frequent.
 2. Radius of Curvature: The radius of curvature shall not be less than 500 feet. The radius of curvature shall be calculated over the distance of three (3) drill pipe sections.
 3. Tie-In Tolerances: The location of the tie-in points shall be as shown on the Drawings. The Contractor shall be solely responsible for all work necessary to correct excessive deviations from line and grade, and entry and exit, including re-drilling, redesigning connections, and acquiring additional easement, at no additional cost to the Owner and without schedule extension.
- G. Pre-reaming and Reaming: The pilot bore shall be pre-reamed and reamed using equipment and methods submitted by the Contractor. The Contractor shall completely ream the bore to the final diameter prior to pullback.
- H. Pre-Installation Test: The Contractor shall perform pre-installation test in accordance with Section 33 05 33 – High-Density Polyethylene (HDPE) Pipe prior to pipe pullback. The Contractor shall repair any defects discovered during this test, and repeat the test until the pipe passes the test.
- I. Pipe Pullback:
1. The pipe shall be installed by pulling it into the reamed bore path in a continuous operation, behind a final reaming tool selected by the Contractor.
 2. Pullback of the carrier pipe shall begin no later than 11 AM and shall then continue, 24 hours a day as necessary, until pullback is complete.
 3. The pipe shall be isolated from excessive torsional and axial stresses by a swivel device.
 4. All measurements shall be made, recorded, and submitted on the daily logs during final reaming and pipe pullback.

5. The Contractor shall take appropriate steps during pullback to ensure that the HDPE pipe will be installed without damage.
6. Pipeline Support
 - a. The pipelines shall be adequately supported during installation so as to prevent overstressing or buckling. The Contractor shall provide adequate support/rollers along the pipe layout area to support the required length and bends of the HDPE pipe.
 - b. Such support/rollers shall have a maximum spacing in accordance with manufacturer's recommendations, but in no case shall be greater than 60 feet. Rollers shall be comprised of a non-abrasive material arranged in a manner to provide support to the bottom and bottom quarter points of the pipeline allowing for free movement of the pipeline during pullback.
 - c. The pipe layout area shall be cleared of all large stones, construction debris, or other foreign objects that could damage the pipe during pullback.
 - d. The Contractor shall at all times handle the HDPE pipe in a manner that does not overstress or otherwise damage the pipe. Vertical and horizontal curves shall be limited so that wall stresses do not exceed 50% of yield stress for flexural bending of the HDPE pipe. If the pipe is buckled or otherwise damaged, the damaged section shall be removed and replaced at the Contractor's expense.
 - e. The Contractor shall monitor and inspect pipe rollers and method for suspending pipe at entry during the pullback operation to avoid damage to the pipe.
7. The leading end of the pipe shall be closed during the pullback operation.
8. Two tracer wires will be attached to the leading end of the pipe pulling head and shall extend the full length of the installed pipe.
9. The Contractor shall cease pullback operations if the pipe is damaged and shall remove the pipe from the bore and repair the pipe using the manufacturer's recommended procedure or replace the damaged pipe before resuming installation.

10. Damage to the pipe resulting from manufacturer defects, installation, poor workmanship, contact grouting is the responsibility of the Contractor, including costs for replacement and labor and materials.
 11. After the carrier pipe is completely pulled through the bore, a sufficient relaxation period, as recommended by the pipe manufacturer, shall be provided before the final pipe tie-in.
- J. Post-Installation Testing: To confirm no damage to the pipe, upon completion of pull back, the Contractor shall hydrostatically test the completed pipeline as described in Section 33 05 33 – High-Density Polyethylene (HDPE) Pipe.
- K. Contact Grouting: Grout annulus in accordance with Section 33 05 08 – Contact Grouting.
- L. Obstructions: The Contractor shall notify the Engineer immediately in the event that any obstruction is encountered that prevents further advancement of the drill pipe, or pullback of the pre-reamer, reamer, and/or pipe. The Contractor shall make all diligent and reasonable efforts to advance past the object by drilling slowly through the object, or pulling back and drilling along a new bore path that avoids the object, or excavating and exposing and removing the object, and all other reasonable attempts to continue the bore. The Contractor shall notify the Engineer of proposed measures to attempt to advance past the object, prior to initiating the attempt. If the Contractor attempts to pullback and re-drill, the Contractor shall adhere to line and grade tolerances established in this Specification Section, unless the Engineer approves variance, in writing, prior to the Contractor's attempt to re-drill. The Contractor and Engineer shall investigate the cause and together determine an appropriate response. Appropriate response may include revisions to equipment or methods, retraction and re-drilling of a portion of the bore, or abandonment of the hole. If abandonment is deemed necessary, the Contractor shall recover, to the extent practicable, any drill pipe, product pipe, and tools in the bore, and properly abandon the bore by contact grouting, unless otherwise directed in writing by the Engineer. If the bore is abandoned, the Contractor shall begin a second attempt to install the pipeline at an alternate location subject to approval, in writing, by the Engineer. The Contractor shall take all reasonable actions to complete the installation with minimal delays.
- M. Site Restoration and Demobilization: The Contractor shall remove all equipment, materials, drilling fluids, spoils, waste, and debris from the site and restore the site to its original condition upon completion of the installation.

END OF SECTION

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SECTION 33 05 08
CONTACT GROUTING

PART 1 GENERAL

1.01 SUMMARY

- A. This section includes requirements for contact grouting of all voids and the annular space between the HDD bore and the HDPE pipe to prevent surface settlements, and for abandonment grouting of boreholes for subsurface monitoring points after completion of HDD.

1.02 RELATED SECTIONS

- A. Section 33 05 07 – Horizontal Directional Drilling
- B. Section 33 05 33 – High-Density Polyethylene (HDPE) Pipe

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. Commercial Standards:
 - 1. ASTM C31, Standard Practice for Making and Curing Concrete Test Specimens in the Field
 - 2. ASTM C39, Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
 - 3. ASTM C94, Standard Specifications for Ready Mixed Concrete.
 - 4. ASTM C109, Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (using 2-inch or 50-mm cube specimens).
 - 5. ASTM C144, Standard Specification for Aggregate for Masonry Mortar.
 - 6. ASTM C150, Standard Specification for Portland Cement.
 - 7. ASTM C937, Standard Specification for Grout Fluidifier for Preplaced-Aggregate Concrete.

1.04 DEFINITIONS – NOT USED

1.05 DESIGN CRITERIA

- A. Contractor shall grout at least 100 feet of the annulus between the HDD bore and HDPE pipe at entry (rig side) end of the HDD pipeline.
- B. Grout Mixes: Develop one or more grout mixes designed to completely fill the voids outside the pipe and to provide acceptable strength. Determine 24-hour and 28-day compressive strength in accordance with ASTM C39 or C109. All grout mix proportions shall be subject to review and acceptance by the Engineer.
- C. Grout Composition: Grout shall consist of Portland cement, bentonite, fluidifier as necessary, and water in the proportions specified herein or as approved by the Engineer.

Sand may be added to the grout mix in instances of very high grout takes as approved by the Engineer. The addition of sand may require additional water or fluidifier to be added to the grout mix.

1. Compressive Strength: Minimum strength of 10 psi in 24 hours, 50 psi in 28 days.

1.06 QUALITY ASSURANCE

- A. Grout Strength Tests: Prepare samples for 24-hour and 28-day compressive strength tests according to ASTM C31 for cylinders or ASTM C109 for cubes. Test samples according to ASTM C39 or C109 as applicable. Grout for the cylinders or cubes shall be taken from the nozzle of the grout injection line. Provide at least one set of four (4) samples for each 100 cubic feet of grout injected but not less than one set for each grouting shift, unless directed otherwise by the Engineer.

1.07 SUBMITTALS

- A. Provide sufficient detail to allow the Engineer to judge whether the proposed equipment, materials, and procedures will meet the Contract requirements. All drawings shall be legible with dimensions accurately shown and clearly marked in English. Drawings and photographs transmitted by a facsimile will not be accepted. The Engineer's review of submitted details and data will be based on consideration of requirements for the completed work, protection of existing utilities and surface features, and the possibility of unnecessary delays in the execution of the work to be constructed under this Contract. Review and acceptance of the Contractor submittals by the Engineer shall not be construed in any way as relieving the Contractor of its responsibility under this Contract.
- B. Work Plan and Methods:
 1. Submit work plan, for each type of contact grouting required, including: contact grouting methods and details of equipment, grouting procedures and sequences, injection pressures, monitoring and recording equipment, pressure gauge calibration data, estimated volume of grout to be pumped at each location, and methods of controlling grout pressure.
 2. Submit details of grout mix proportions: admixtures, including manufacturers' literature, and laboratory test data verifying the strength of the proposed grout mix.
- C. Reports and Records:
 1. Maintain and submit daily logs of grouting operations, including grouting locations, pressures, volumes, and grout mix pumped, and time of pumping. Note any problems or unusual observations on logs.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Cement: Cement shall be Type II or Type V Portland cement conforming to ASTM C 150. Type II cement shall meet Table 4 false set requirements of ASTM C 150.
- B. Bentonite: Bentonite shall be a commercially processed powdered bentonite, Wyoming type, such as Baroid, Imacco-gel, Black Hills, or equal.

- C. Fluidifier: Fluidifiers shall hold the solid constituents of the grout in colloidal suspension, be compatible with the cement and water used in the grouting work, and comply with the requirements of ASTM C 937.
- D. Admixtures: Other admixtures may be used subject to the written approval of the Engineer to improve the pumpability, to control set time, to hold sand in suspension, and to prevent segregation and bleeding.

PART 3 EXECUTION

3.01 GENERAL

- A. The Contractor shall use contact grouting to attempt to fill the annular space outside the HDPE pipe. At least 100 feet of the annulus at the entry end (rig side) of the HDD bore shall be grouted.
- B. Grouting shall be completed within 72 hours of completion of pullback, after the final hydrostatic test. Grouting shall be completed before the mandrel test.
- C. All grouting operations are to be performed in the presence of the Engineer. Notify the Engineer at least 24 hours in advance of starting contact grouting operations.
- D. The Contractor shall take care to prevent the spill or escape of grout to the ground surface, into any water body, or into any sanitary or storm sewer. Any such spill shall be immediately contained and cleaned up by the Contractor at no additional cost to the Owner.
- E. During grouting work, provide for adequate disposal of all waste and wastewater. Remove and properly dispose of all waste grout resulting from grouting operations. The contents of grout lines shall not be discharged into the pipe.

3.02 EQUIPMENT

- A. Equipment for mixing and injecting grout shall be adequate to satisfactorily mix and agitate the grout and force it into the grout holes, in a continuous flow at the desired pressure. Pumps shall be capable of continuously developing a sustained pressure of 15 pounds per square inch at the end of the tremie pipe.
- B. A pressure gauge shall be provided at the grout pump. The accuracy of the gauge shall be periodically checked with an accurately calibrated pressure gauge. A minimum of two spare pressure gauges shall be available on site at all times.
- C. The grouting equipment shall be provided with a meter to determine the volume of grout injected. The meter shall be calibrated in cubic feet to the nearest one-tenth of a cubic foot.
- D. The grouting equipment shall be maintained in satisfactory operating condition throughout the course of the work to ensure continuous and efficient performance during grouting operations.
- E. Grout hoses shall have an inside diameter not less than 1-1/4 inches and capable of withstanding the maximum water and grout pressures to be used.

3.03 MIXING AND INJECTION OF GROUT

- A. All materials shall be free of lumps when put into the mixer and the grout mix shall be constantly agitated. Grout shall flow unimpeded and shall completely fill all voids. Grout not injected after 90 minutes of mixing shall be wasted.
- B. The grouting process shall be operated and controlled so that the grout will be delivered uniformly and steadily. Drilling grout holes through pipe will not be permitted.
- C. Recirculate grout mixes when any new mix is batched or after adding water, fluidifier, or sand to mix. Recirculate mix for at least 2 minutes prior to pumping grout into grout hole.
- D. The maximum sustained grouting pressure shall be 15 pounds per square inch (psi) above the groundwater pressure at the nozzle elevation or one-half (1/2) psi per foot of earth cover, whichever is less, at the grout hole collar connection unless otherwise approved in writing by the Engineer. Additionally, the grouting pressure shall not exceed the pipe manufacturer's recommended maximum pressure to avoid damage to the product pipe.

3.04 ANNULAR SPACE GROUTING OF HDD PIPELINE

- A. Contractor shall grout at least 100 feet of the annulus between the HDD bore and HDPE pipe at entry end (rig side) of the HDD pipeline.
- B. The Contractor shall grout the annular space between the bore and HDPE pipe within 72 hours of completion of pipe pullback and after final hydrostatic pressure testing. Grouting shall occur before the mandrel test.
- C. Grouting procedures shall be in accordance with approved submittals.
- D. Grouting may be accomplished using the method described below, or an alternative submitted by the Contractor, subject to Engineer's approval.
 - 1. Annular Space Grouting with Tremie Pipe
 - a. Tremie pipes shall be inserted at least 100 feet into the bore after pipe pullback is completed to grout annulus at entry side.
 - b. Tremie grout pipes shall be not less than 1 ¼-inch diameter and shall be inserted at two opposite locations around the product pipe.
 - c. Tremie pipes shall be fitted with a plug at the leading end to prevent the grout pipe from becoming plugged with soil or slurry as it is pushed into the bore. The plug shall be duct-taped or temporarily secured in such a manner that it shall be ejected by the grout injection pressure.
 - d. Grout will be injected in sufficient volume to completely fill the annulus as the tremie pipes are withdrawn.
 - e. Grouting pressures shall be carefully controlled and monitored to avoid applying excessive pressure to the pipe and to avoid heave or hydrofracture.
 - f. Grouting shall continue until grout of the same consistency and color as that being injected issues forth from the bore entry/exit, or until less than 1.0 cubic feet can be pumped through any tremie grout pipe in five (5) minutes at the maximum pumping pressure. If grout cannot be injected through a tremie grout pipe, or if it fails during the grouting process,

Contractor shall attempt to install a replacement tremie grout pipe, and repeat the tremie grouting at that location.

- E. Damaged or collapsed pipe, caused by Contractor's excessive grouting pressures, shall be replaced by Contractor at no additional cost to the Owner, and without schedule extension.

END OF SECTION

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SECTION 33 05 33

HIGH-DENSITY POLYETHYLENE (HDPE) PIPE

PART 1 GENERAL

1.01 SUMMARY

- A. The Contractor shall provide all labor, equipment, water, and materials to fabricate, test, and install High Density Polyethylene (HDPE) pipes as Specified and shown on the Drawings. HDPE pipe shall be installed using horizontal directional drilling as specified in Section 33 05 07 –Horizontal Directional Drilling, at the locations shown on the Drawings.

1.02 RELATED SECTIONS

- A. Section 33 05 07 – Horizontal Directional Drilling

1.03 REFERENCE STANDARDS

- A. This section contains references to the following documents. They are a part of this section as specified and modified. Where a referenced document contains references to other standards, those other standards are included as references under this section as if referenced directly. In the event of a conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.
- B. American Water Works Association (AWWA) C906: Large Polyethylene Pressure Pipe
- C. ASTM D2122: Standard Test Method of Determining Dimensions of Thermoplastic Pipe and Fittings.
- D. AASTM D2657: Standard Practice for Heat-Joining Polyolefin Pipe and Fittings.
- E. ASTM D2774: Standard Recommended Practice for Underground Installation of Thermoplastic Pressure Piping.
- F. ASTM D3261: Butt Heat Fusion Polyethylene (PE) Plastic Fittings for PE Plastic Pipe and Tubing.
- G. ASTM D3350: Standard Specifications for Polyethylene Plastic Pipe and Fitting Materials.
- H. ASTM F714: Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter
- I. ASTM F2164: Standard Practice for Field Leak Testing of Polyethylene (PE) Pressure Piping Systems Using Hydrostatic Pressure
- J. The Plastics Pipe Institute Handbook of Polyethylene Pipe, 2nd Edition, 2008. The Plastics Pipe Institute, Irving, TX.

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1.04 DEFINITIONS – (Not Used)

1.05 DESIGN CRITERIA

- A. The pipes shall be installed using horizontal directional drilling (HDD) at the location shown on the Drawings in accordance with Section 33 05 07 – Horizontal Directional Drilling.
- B. HDPE pipe to be installed for water main shall be black with blue stripes embedded the full length of the pipe.
- C. The HDPE pipe shall be designed to withstand all anticipated service and installation loads. The HDPE pipe shall have Dimension Ratio (DR) not greater than 9, or as required for the anticipated service and installation loads, whichever results in the lower DR.
- D. HDPE pipe joints shall be butt-fusion welded following the procedures described in this Section and referenced Standards.
- E. The HDPE interior pipe joints shall be de-beaded prior to installation.
- F. The length of installed pipe shall extend beyond the entry and exit locations for a sufficient distance to allow for expansion and contraction and to allow for inspection of possible damage to the leading joint of the installed pull section.
- G. Each pipe section to be installed by HDD methods shall be fabricated and tested prior to and after installation, using the procedures described in this Section and referenced Sections and standards.

1.06 QUALITY ASSURANCE

- A. The Contractor shall furnish all labor necessary to assist the Engineer in inspecting pipe upon delivery. Contractor shall remove defective and rejected pipe immediately.
- B. The Contractor shall perform the butt-fusion of pipe and ensure that manufacturer's recommended practices are followed. The fusion machine operator(s) shall demonstrate successful completion of at least three (3) projects where HDPE pipe was installed with horizontal directional drilling techniques.
- C. The Contractor shall provide records of butt-fusion of each joint including data recorded by a McElroy Datalogger, or equal, within 48 hours of fusion and prior to pre-installation testing and HDD pullback. Recorded data shall include the following information: date and time, joint number, operator identification, machine type, pipe use (water, sewer, or reclaimed water), pipe size and DR, ambient temperature, interfacial pressure during fusion and cooling, gauge pressure during fusion and cooling, fusion temperature, and heating, fusion and cooling times.
- D. The pipe shall be mandrel tested after installation and after annular space grouting to confirm deflections of installed pipes are less than the maximum allowable deflection of 4% of the internal diameter. If the mandrel with a diameter 4% less than the specific pipe ID can pass through the pipe, the pipe shall pass the deflection test and be considered within the maximum tolerance level.

1.07 SUBMITTALS

- A. Submittals shall be in accordance with the requirements of the Specifications, providing sufficient detail to allow the Engineer to judge whether the proposed equipment, materials, and procedures will meet the Contract requirements. The Engineer's review of submitted details

and data will be based on consideration of requirements for the completed work and protection of existing utilities. Review and acceptance of the Contractor's Submittals by the Engineer shall not be construed in any way as relieving the Contractor of its responsibilities under this Contract.

- B. Submit the following shop drawings and descriptive literature from the pipe supplier and/or fusion provider:
 - 1. Total pipe length
 - 2. Pipe dimensions (including diameter and wall thickness)
 - 3. Pressure class (DR)
 - 4. Color
 - 5. Weight per foot of pipe
 - 6. Recommended minimum bending radius
 - 7. Recommended maximum safe pull force and factor of safety at quoted safe pull load
 - 8. Pipe manufacturers' joint assembly procedure
 - 9. Methods and procedures for pre-installation low pressure pipe test
 - 10. Methods and procedures for post-installation hydrostatic pipe test
 - 11. Pipe and fusion warranty information
- C. Submit qualifications for the fusion technician in accordance with Paragraph 1.06B.
- D. Layout drawings showing: placement of pipe within the layout area. Shop drawings shall show anticipated bend radius at pipe entry, pipe support at pipe entry, and extent of open trench tie-in sections.
- E. Submit information on the pipe manufacturer's allowable load limits and confirm that pipe is adequate to withstand installation loads anticipated by the pullback calculations submitted for Section 33 05 07 – Horizontal Directional Drilling.
- F. Certification with each delivery that pipe meets or exceeds the requirements of this Specification and applicable Standards.
- G. Certified copies of test reports with each delivery, stating compliance with ASTM D3350 as appropriate.
- H. Machine-generated print-outs of each as-built fusion joint as Specified in Paragraph 1.06C of this specification. Fusion report for each fusion joint performed on the project, including joints that were rejected.
- I. Results of pre-installation testing, including test pressures, durations, procedures, and equipment.
- J. Results of post-installation hydrostatic tests, including test pressures, durations, procedures, and equipment.
- K. Results of post-installation mandrel test conducted after annular space grouting to confirm deflections of installed pipes are less than maximum allowable deflection of 4% of the internal diameter.

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PART 2 MATERIALS

2.01 HDPE PIPE

- A. Provide HDPE for the nominal sizes and lengths shown on the Drawings. Nominal sizes shown on the Drawings are based upon external diameter (OD) of the HDPE pipe. HDPE shall have a dimension ratio (DR) not larger than nine (9).
- B. Pipe shall be high molecular weight, high-density polyethylene pipe (HDPE).
- C. The material shall be listed by the Plastic Pipe Institute (PPI) with a designation of PE 4710 and have a minimum cell classification of 445574 C/E as described in ASTM D3350. The color of the pipe shall be black with blue stripes embedded the full length of the pipe for water main.
- D. The pipe shall contain no recycled compound except that generated in the manufacturer's own plant from resin of the same specification from the same raw material pipe.
- E. Pipe shall be of the same material and class and made in conformance with ASTM F714 and joined in accordance with ASTM D3261 as modified for the specified material.
- F. The pipe shall be homogeneous throughout and free of cracks, holes, foreign inclusions or other injurious defects. Pipe shall be uniform in density and other physical properties.
- G. Any pipe not meeting these criteria shall be rejected.

2.02 MANUFACTURERS:

- A. Performance Pipe, Plano, TX.
- B. JM Eagle, Los Angeles, CA.
- C. WL Plastics, Fort Worth, TX.
- D. Or equal.

2.03 JOINTS

A. General:

1. Butt-fusion joints shall be used for all pipe segments which must be joined before being installed by horizontal directional drilling. Friction or pressure couplings are NOT ACCEPTABLE.

B. Butt Fusion Joints:

1. Butt fusion techniques shall meet all requirements of ASTM D2657 and ASTM D3261, and requirements of this Section.
2. Butt-fusion welding equipment shall be as follows, or equal:
 - a. McElroy Hydraulic Fusion Machine, McElroy Manufacturing, Tulsa, Oklahoma.
 - b. Proweld, Asahi/America, Malden, Massachusetts.

PART 3 EXECUTION

3.01 INSPECTION

- A. Examine the pipe layout area for evidence of rocks, debris, or other objects that could damage the pipe during layout, fabrication or installation. Remove all such objects and ensure layout area is compatible with Contractor's operations.
- B. Inspect the fabricated pipe string for any defects prior to installation. Repair any defects prior to installation according to manufacturer's recommendations and in accordance with these Specifications.

3.02 HANDLING AND STORAGE

- A. The Contractor shall provide and use a temporary pipe storage area as needed to protect the pipe prior to installation.
- B. Store all pipe materials in accordance with pipe manufacturer's recommendations until installation.
 - 1. Keep pipe at ambient outdoor temperature.
 - 2. Avoid covering practices that will cause a temperature build-up.
- C. Handle all pipe material in accordance with pipe manufacturer's recommendations. Handle all pipe material carefully to avoid any damage. Gouges, cuts, or scratches that are deeper than 10% of the pipe wall thickness shall be cause for rejection of the damaged pipe section.

3.03 FABRICATION

- A. Pipe fabrication specified herein applies to all pipes installed by horizontal directional drilling.
- B. The Contractor shall provide all necessary labor, equipment, and materials to fabricate and test the pipeline.
- C. The length of installed pipe shall extend beyond the entry and exit locations for a sufficient distance to allow for expansion and contraction and to allow for inspection of possible damage to the leading joint of the installed pull section.
- D. The pipe layout and fabrication area shall be within the Limits of Work specified in the Drawings, unless otherwise approved in writing by the Engineer.
- E. The Contractor shall provide all necessary supports, protective padding materials, skids, and rollers to protect the pipe during storage, fabrication, and installation and to protect the pipe from damage by stones, debris, etc. on the ground.
- F. Each fusion joint shall be recorded and logged by an electronic monitoring device (data logger) affixed to the fusion machine.
- G. Joints: All HDPE pipe joints shall be completed in accordance with manufacturer's recommendations and the following steps:
 - 1. The Contractor shall clean and prepare joint surfaces according to manufacturer's recommendations.
 - 2. Thermal-Butt-Fusion: The Contractor shall join all sections of HDPE pipe together using thermal butt-fusion. The Contractor shall obtain optimum fusion parameters from the pipe manufacturer, with regard to joint facing, fusion temperature, interface

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pressure, and cooling time. The Contractor shall follow the manufacturer's recommendations with regard to the optimum fusion parameters, and shall use proper equipment for the fusion process. The Contractor shall employ only trained, qualified, and experienced personnel to conduct the fusion process.

3. The butt-fusion welding machine shall be outfitted with a measuring and recording unit that documents the conditions existing during the fusion of each individual weld. A printout that includes key data shall be machine-generated and delivered to the Engineer at the end of each work shift during which fusion has been conducted.

3.04 INSTALLATION

- A. Installation of pipe using horizontal directional drilling shall be performed as specified in Section 33 05 07 – Horizontal Directional Drilling.
- B. Prevent soil, debris, and other materials from entering the pipeline during layout, fusion, and storage.

3.05 TESTING

- A. The Contractor shall furnish and install all equipment and labor required to test pipelines.
- B. The Contractor shall conduct pressure tests on the pipe installed by HDD prior to and after pullback. The test pressures and procedures shall be in conformance with These Specifications, manufacturer's recommendations, and ASTM F2164 Section 9. The Contractor shall repair any defects discovered during these tests and repeat until the pipe passes.

1. Pre-Installation Joint Integrity Test of Pipe Installed by HDD

- a. The Contractor shall notify Engineer at least 48 hours prior to testing
- b. Perform hydrostatic or pneumatic pre-testing of the pipe to be installed by HDD in the presence of the Engineer before installation.
- c. Test pressures and air temperatures shall be monitored with appropriate measurement equipment that has been calibrated and inspected prior to the test.
- d. The pre-installation test pressure shall be 3-10 psi.
- e. The Contractor shall repair any defects discovered during this test, and repeat the test until the test pressure can be maintained.

2. Final Acceptance Post-Installation Hydrostatic Test

- a. The Contractor shall conduct a final test of the HDD installed pipeline.
- b. The final test shall be conducted prior to contact grouting of the ends of the bore.
- c. The test shall be performed immediately after pullback, prior to contact grouting.
- d. The post-installation test pressure of 100 psi, as measured at the ground surface, shall be maintained during the one (1) hour test interval.
- e. Pressure and temperature readings shall be taken at not greater than fifteen (15) minute intervals during the test, using approved instruments.
- f. A passing test is indicated by no leakage of test liquid and a steady pressure (within 5% of the test pressure) during the duration of the test phase.

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SECTION 33 14 00

PIPING SYSTEMS

PART 1 GENERAL

1.01. SUMMARY

A. Section Includes:

1. Water Piping
2. Unions and Flanges
3. Joints
4. Dismantling Joints
5. Couplings
6. Restrained Flanged Adaptor
7. Non-Restrained Flange Adaptor
8. Tapping Sleeves and Tapping Valves
9. Service Saddles
10. Dielectric Couplers
11. Bedding and Cover Materials
12. Underground Tracer Wire
13. Detectable Pipe Locating Tape
14. Water Main Line Monument
15. Pipe Supports, Brackets and Stem Guides
16. Flange Insulation Kit
17. Pipe Casing
18. Hydrostatic and Leakage Test
19. Disinfection
20. Bacteriological Testing

1.02. MEASUREMENT AND PAYMENT

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- A. Measurement and payment for the items in this section shall be included in the Bid Item to which they relate. No additional measurement or payment shall be made for the requirements of this section.

- B. Related Sections
 - 1. Section 01 30 00 – Administrative Requirements
 - 2. Section 01 33 00 – Submittal Procedures
 - 3. Section 01 40 00 – Quality Requirements
 - 4. Section 01 60 00 – Product Requirements
 - 5. Section 31 00 00 – Earthwork
 - 6. Section 31 23 19 – Dewatering
 - 7. Section 31 41 00 – Shoring and Trench Safety
 - 8. Section 33 01 10 – Disinfection of Water Utility Distribution
 - 9. Section 33 05 33 – High-Density Polyethylene (HDPE) Pipe
 - 10. Section 33 14 19 – Valves and Appurtenances

1.03. REFERENCES

- A. American Public Works Association (APWA)
 - 1. Uniform Color Code for Marking of Underground Utility Locations.

- B. American Society of Testing and Materials (ASTM)
 - 1. ANSI/ASME B1.20.1 – Pipe Threads, General Purpose.
 - 2. ANSI/ASME B16.1 – Cast-Iron Pipe Flanges and Flanged Fittings.
 - 3. ANSI/ASME B16.5 – Pipe Flanges and Flanged Fittings.
 - 4. ASTM A126 - 04 Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
 - 5. ASTM A536 - Standard Specification for Ductile Iron Castings.
 - 6. ASTM C150 - Standard Specification for Portland Cement.
 - 7. ASTM D1785 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedule 40, 80, and 120.
 - 8. ASTM D2241 - Standard Specification for Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).
 - 9. ASTM D3139 - Standard Specifications for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.

10. ASTM F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
11. ASTM F1674-96 – Thrust Restrained Devices

C. American Water Works Association

1. ANSI/AWWA C104/A21.4 – American National Standard for Cement–Mortar Lining for Ductile-Iron Pipe and Fittings for Water.
2. ANSI/AWWA C105 – Polyethylene Encasement for Ductile – Iron Pipe Systems. ANSI/AWWA C110/A21.10 – American National Standards for Ductile-Iron and Gray-Iron Fittings, 3 In. Through 48 In. for Water and other Liquids.
3. ANSI/AWWA C110 – Fittings.
4. ANSI/AWWA C111/A21.11 – American National Standards for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
5. ANSI/AWWA C115 – Flanged Ductile Iron Pipe With Ductile-Iron or Gray-Iron Threaded Flanges.
6. ANSI/AWWA C116 – Standard for Protective Fusion-Bonded Epoxy Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings.
7. ANSI/AWWA C151/A21.51 – American National Standards for Ductile-Iron Pipe, Centrifugally Cast, for Water.
8. AWWA C153 – Standard for Ductile-Iron Compact Fittings for Water Service.
9. AWWA C220 – Stainless Steel Piping
10. AWWA C226 – Stainless Steel Fittings
11. AWWA C2BB – Stainless Steel Flanges
12. ANSI/AWWA C600 – American National Standards for Installation of Ductile Iron Water Mains and their Appurtenances.
13. AWWA C605 - Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water.
14. ANSI/AWWA C651 – American National Standards for Disinfecting Water Mains.
15. AWWA C900 - AWWA Standard for Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 In. Through 12 In. (100 mm Through 300 mm), for Water Transmission and Distribution.
16. AWWA C905 - Standard for Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 14 In. Through 48 In. (350 mm Through 1,200 mm), for Water Transmission and Distribution.
17. AWWA M9 – Concrete
18. AWWA M23 – PVC Pipe-Design and Installation

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- D. California Waterworks Standards
- E. ANSI/NSF- American National Standards Institute/ National Sanitary Federation
 - 1. Standard 61 – Drinking Water System Components – Health Effects

1.04. SUBMITTALS

- A. Section 01 33 00 – Submittal Procedures
- B. Shop Drawings: Indicate piping layout at connections, if different than shown on plans.
- C. Product Data: Submit data on pipe materials, fittings, and accessories.
- D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.
- E. Manufacturer's Recommendation: Submit four copies of Manufacturer's current recommended method of installation
- F. Submit detailed written procedures outlining the methods, tools, and protective equipment to be used and required training and certifications (if any) for all work associated with asbestos cement pipe.
- G. Pressure Testing Plan.
- H. Disinfection and Chlorinated Water Disposal Plan.
- I. Connection transfer plan and schedule for all connections and final tie-ins.

1.05. CLOSEOUT SUBMITTALS

- A. Section 01 70 00 – Execution Requirements: Requirements for submittals.
- B. Project Record Documents:
 - 1. Record actual horizontal and vertical locations of piping mains, valves, connections, thrust restraints, and invert elevations.
 - 2. Identify and describe on the Record Drawings unexpected variations due to subsoil conditions or discovery of uncharted utilities.

1.06. QUALITY ASSURANCE

- A. Perform Work in accordance with specified standards.

1.07. DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 – Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Use all means necessary to protect the materials of this Section before, during, and after installation and to protect the installed Work and materials of all other trades.
- C. The Contractor shall provide and use proper equipment, tools, and facilities for the safe and proper handling and protection of the pipe. Pipe shall be handled in such a manner as to

avoid damage to the pipe material or any coating and especially to the ends. All equipment and small loose pieces, tools, gaskets, etc. shall be adequately packed to prevent damage or loss during shipment or while in storage.

- D. In the event of damage, immediately make all replacements necessary at no additional cost to the District.
- E. When damaged pipe cannot be repaired to the satisfaction of the Engineer, it shall be removed from the job.
- F. Pipe shall be stored in a safe location, protected from the elements where damage or contamination therefrom could result.
- G. The pipe shall be carefully lowered in the trench to prevent damage. Under no circumstances shall pipe be dropped or dumped into trenches. Remove foreign matter and dirt from the inside of the pipe and keep it clean during and after laying.
- H. The Contractor shall take care to keep from damaging the pipe by heavy loads and unnecessary compactive effort, especially for shallow lifts. All damaged pipe shall be replaced. Repairs will not be acceptable.

PART 2 PRODUCTS

2.01. GENERAL

- A. All materials shall conform to sizes, capacity, quality, and quantities as shown on the drawings or described in these Specifications. Materials shall be from new stock, delivered in good condition. No damaged stock shall be used.
- B. Where no method of tests for materials is specified, the latest applicable test specified by ASTM shall be followed.
- C. After delivery to the site, all materials shall be carefully unloaded, protected against breakage, rusting, accumulation of foreign matter, disintegration, and injury. The Contractor shall be responsible for all lost or damaged material supplied and Work done under this Contract.

2.02. WATER PIPING

- A. Ductile Iron Fittings: AWWA C110 ductile iron, standard thickness.
 - 1. Coating and Lining:
 - a. Bituminous Coating: AWWA C110/ANSI A21.51.
 - b. Cement Mortar Lining: AWWA C104.
 - c. Buried Exterior Pipe Protection: 8-mil Visquin Polyethylene Film: AWWA C105/ANSI A21.5.
 - 2. Joints:
 - a. Mechanical and Push-On Joints: AWWA C111.

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- b. Flanged Joints: AWWA C115, ASME B16.1, ANSI B16.1 250 lb flat faced.
 - c. Restrained Joints: Refer to Part 2.03.
 - d. Gaskets: Conforming to ANSI A21.11. Gaskets for flanged joints shall be 1/8-in thick, cloth inserted rubber, full faced with holes to pass bolts.
 - e. Bolts: Bolts and nuts shall be low alloy steel ASTM A193. The alloy composition shall be such that the bolts are cathodic to the coupling. Washers of the same material shall be supplied.
- B. Polyvinyl Chloride (PVC) Pipe:
- 1. Polyvinyl Chloride (PVC) Pipe 14": Class 165 (DR 25) as per ASTM D1784, manufactured in accordance with AWWA C905, and shall be Cast Iron O.D.
- C. Polyethylene (PE) Pressure Piping and Tubing:
- 1. Polyethylene (PE) pressure piping and tubing 3/4-inch through 3-inch for water service as per ANSI/AWWA C901-17, manufactured per ASTM D2239 and D2737 with fittings per ASTM D3350, or;
 - 2. PE 3408 pressure piping and tubing 3/4-inch through 3-inch for water service per ASTM D-3035.
- D. Ductile Iron Fittings:
- 1. Provide restrained ductile iron fittings as shown on plans.
 - 2. Ductile iron fittings, shall have a minimum rated working pressure of 250 psi. The fittings shall have a bell ends with gaskets specifically designed for a cast iron equivalent outside diameter PVC pipe, or mechanical joint type fittings manufactured specifically for PVC Pipe.
 - 3. Provide Class 250 flanges on ductile iron fittings where mating to Class 250 butterfly valves.
 - 4. Bolts for PVC pipe, where required, shall be 3 lb stainless steel, ASTM A193, Grade B 8M hex head with ASTM A194, Grade B 8M hex nuts. Washers of the same material shall be supplied.
 - 5. Provide ductile iron tapped tees for appurtenance outlets 2-1/2 inches and smaller. Tapped tees shall be constructed of ductile iron, have outlet iron threads, and bell ends designed to fit the type, size and class of pipe.
 - 6. Provide ductile iron tees with a flanged outlet for appurtenance outlets 3 inches and larger.
- E. PVC Joints: ASTM D3139 and ASTM F477 PVC flexible elastomeric seals. Solvent-cement couplings are not permitted except for pipes 2-inches in diameter and smaller.
- 1. All joints shall be integral, bell and spigot gasketed joints, or plain end with rubber ring couplings.

2. When the spigot end of pipe is to be inserted into a mechanical joint fitting, the beveled end of the pipe shall be removed prior to insertion.
 3. Solvent weld joint are not permitted.
- F. Stainless Steel Pipe: AWWA C220 Type 304L Stainless Steel Schedule 40 (0.322" thick) meeting EPA and ANSI/ NSF 61.
1. Flanges: AWWA C2BB
 2. 125lb Flange
 3. Unions:
- G. High-Density Polyethylene (HDPE) Pipe
1. See Section 33 05 33

2.03. RESTRAINED AND MECHANICAL JOINTS

- A. Manufacturer:
1. For PVC Pipe:
 - a. Mechanical Joint Fittings: EBAA Iron, Inc., Series 2000PV or equivalent.
 2. For asbestos cement pipe (ACP):
 - a. JCM 630 fitting restrainer and 631 coupling restrainer
 3. Substitutions: Section 01 60 00 - Product Requirements.
- B. Materials: Ductile Iron, ASTM A536.
- C. Coating: MEGA-BOND, or approved equivalent.
- D. Style: split ring used behind the pipe bell and a serrated ring used to connect the bell ring and the gripping ring.
- E. Pressure rating: 200 psi minimum.

2.04. COUPLINGS

- A. Manufacturer
1. For Restrained Coupling
 - a. EBAA Iron, Inc.: Series 3800 MEGA-COUPPING or equivalent
 2. Substitutions: Section 01 60 00 - Product Requirements.
- B. Materials:
1. Body - Ductile Iron; ASTM A536

- 2. Bolts: Stainless Steel
- C. Pressure rating: meet or exceed adjacent piping system rating.
- D. System compatible with connecting pipe; verify connecting pipe O.D.

2.05. RESTRAINED FLANGE ADAPTOR

- A. Manufacturer: EBAA Iron, Inc., Series 2100 or equivalent.
 - 1. Substitutions: Section 01 60 00 - Product Requirements.
- B. System: restrain plain end of pipe to a flange, conforming to AWWA C110.
- C. Materials:
 - 1. Body: Ductile Iron; ASTM A536
 - 2. Bolts: Stainless Steel
- D. Coating: AWWA C550; interior/exterior.
- E. Pressure rating: meet or exceed adjacent piping system rating.
- F. System compatible with connecting pipe; verify connecting pipe O.D.

2.06. NON-RESTRAINED FLANGE ADAPTOR

- A. Manufacturer: Baker Series 220 Coupling or equivalent
 - 1. Substitutions: Section 01 60 00 - Product Requirements.
- B. Pressure rating: meet or exceed adjacent piping system rating.
- C. System compatible with connecting pipe; verify connecting pipe O.D.
- D. Submit shop drawings for each coupling as indicated on the Contract Drawings.

2.07. TAPPING SLEEVES AND TAPPING VALVES

- A. Tapping Sleeves:
 - 1. Manufacturers:
 - a. JCM Industries or equivalent
 - b. Mueller Co or equivalent.
 - c. Smith-Blair, Inc or equivalent
 - 2. Substitutions: Section 01 60 00 - Product Requirements.
 - 3. Description: Ductile iron or cast-iron dual compression type.
 - 4. Outlet Flange Dimensions and Drilling: ASME B16.1, Class 150 and MSS SP-60.

- B. Tapping Valves:
 - 1. Manufacturers:
 - a. Mueller Company or equivalent
 - b. U.S. Pipe or equivalent
 - 2. Substitutions: Section 01 60 00 - Product Requirements.
 - 3. Refer to Section 15 10 00 – Valves and Appurtenances

2.08. SERVICE SADDLES

- A. Manufacturers:
 - 1. Smith-Blair Series 317, 357, or 397 or equivalent
 - 2. Romac Style 101N, 202NS, 101 BS or equivalent
 - 3. Mueller DR2A series or equivalent
 - 4. Substitutions: Section 01 60 00 - Product Requirements.
- B. Materials:
 - 1. Double strap type, with bodies cast of either stainless steel, epoxy-coated ductile iron, or bronze, designed to hold pressures in excess pipe working pressure.
 - 2. Taps shall have Iron Pipe threads.
 - 3. Service saddles shall be equipped with nylon bushings where connecting to copper pipe.

2.09. DIELECTRIC COUPLERS

- A. Manufacturers:
 - 1. Smith-Blair Series 317, 357, or 397 or equivalent
 - 2. Romac Style 101N, 202N, 101 BS or equivalent
 - 3. Mueller DR2A series or equivalent
 - 4. Substitutions: Section 01 60 00 - Product Requirements.
- B. Materials:
 - 1. Double strap type, with bodies cast of either epoxy-coated ductile iron or bronze, designed to hold pressures in excess pipe working pressure.
 - 2. Taps shall have Iron Pipe threads.

3. Service saddles shall be equipped with nylon bushings where connecting to copper pipe.

2.10. BEDDING AND COVER MATERIALS

- A. Per Specification 31 00 00 – Earthwork.

2.11. UNDERGROUND TRACER WIRE

- A. Underground tracer wire shall be #10 AWG THWN - Thermoplastic Heat and Water Resistant Nylon Coated - copper wire, with yellow insulation

2.12. DETECTABLE PIPE LOCATING TAPE

- A. Detectable pipe locating tape shall consist of solid aluminum foil encased in a protective high-visibility, inert polyethylene plastic jacket. Foil is to be visible on the unprinted side. Minimum overall thickness shall be 5.5 mils. Tape width shall be SIX (6) inches. Tape color and lettering shall be in accordance with the APWA Uniform Color Code for Marking of Underground Utility Locations. The identifying lettering shall be a minimum of one (1)-inch-high permanent black lettering imprinted continuously over the entire length. The tape shall be Terra "D" as manufactured by Reef Industries, Allen Detectable, or approved equal.
- B. After the trench is backfilled to within 18 inches of the finished grade the Contractor shall install a detectable pipe locating tape over all water mains. The backfill shall be sufficiently leveled so that the tape will be installed on a flat surface. The tape shall be centered in the trench and laid flat with printed side up. Caution shall be exercised to avoid displacement and to ensure its integrity.

2.13. PIPE BRACKETS AND STEM GUIDES

- A. Manufacturer:
 1. Cooper B-Line, Inc.
 2. Waterman.
 3. Substitutions: Section 01 60 00 - Product Requirements.
- B. Components:
 1. Brackets and Stem Guides: Provide brackets, stem guides, supports, bolts pipe clamps, and all other required installation hardware.

2.14. PIPE STRAPS

- A. Manufacturer:
 1. Gibson Stainless & Specialty Inc.
 - a. 2" Pipe Straps Model #3200-2
 - b. 3" Pipe Straps Model #3300-2
 - c. 4" Pipe Straps Model #3300-2

2. Cooper, B-Line
 - a. Figure B3180FL – Flush Mount Pipe Strap
 3. Substitutions: Section 01 60 00 - Product Requirements.
- B. Material: 316 stainless steel per ASTM 167.
- C. Bolts: 316 Stainless steel

2.15. FLANGE INSULATION KITS

- A. The Contractor shall provide a flange insulation kit for flanged connections between pipes of dissimilar materials. Flange insulation kits shall be of the full face gasketed type for use with domestic water.
- B. Manufacturer:
1. Calpico, Inc.
 2. Substitutions: Section 01 60 00 - Product Requirements.

PART 3 EXECUTION

3.01. EXAMINATION

- B. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
- C. Verify existing utility water main size, location, and inverts are as indicated on Contract Drawings.

3.02. PREPARATION

- A. Cut pipe ends square, ream pipe and tube ends to full pipe diameter, remove burrs. Use only equipment specifically designed for pipe cutting. Use of chisels or hand saws will not be permitted. Grind edges smooth with beveled end for push-on connections.
- B. Remove scale and dirt on inside and outside before assembly.
- C. Prepare pipe connections to equipment with flanges or unions.

3.03. BEDDING

- A. Install bedding in accordance with Specifications 31 00 00 – Earthwork.

3.04. PIPE INSTALLATION

- A. Install PVC pipe in accordance with AWWA C605, PE pipe in accordance with AWWA M55, and Ductile Iron pipe in accordance with AWWA C600.
- B. Carefully inspect all pipes, valves, and other appurtenances for cracks or other damage prior to installation. Under no circumstances shall damaged materials be installed.

Carefully lower pipe into trenches to prevent damage. Under no circumstances should the pipe be dropped into trenches.

- C. Install pipe to indicated elevation to within tolerance of 5/8 inches.
- D. Install pipe to have bearing along entire length of pipe.
- E. Install pipe with no high points other than as indicated in Contract Drawings. If unforeseen field conditions arise which necessitate high points, install air release valves as directed by Engineer.
- F. Excavate bell holes to permit proper joint installation.
- G. Do not lay pipe in wet or frozen trench.
- H. Install pipe to allow for expansion and contraction without stressing pipe or joints.
- I. Close pipe openings with watertight plugs during work stoppages.
- J. Install access fittings to permit pressure testing and disinfection of water system.
- K. Form and place concrete for thrust restraints at each elbow or change of direction of pipe main unless fully restrained joints are used.
- L. Establish elevations of buried piping with not less than three (3) feet of cover. Measure depth of cover from final surface grade to top of pipe barrel. When cover is less than three (3) feet, install pipe and backfill as shown in Contract Drawings.
- M. Install underground tracer wire on top of all pipelines. Bring tracer wire to surface at each valve box and provide approximately (3) feet of excess wire coiled neatly in valve box.
- N. Install detectable pipe warning tape continuous over top of pipe buried 18 inches below finish grade, above pipeline.

3.05. SAWCUTTING AND TAPPING AC PIPE

- A. Fifteen (15) calendar days prior to pipe installation, the Contractor shall submit, for review and approval, detailed written procedures outlining the methods, tools, and protective equipment to be used, and required training and certifications (if any) for all work associated with asbestos cement pipe.
- B. A notification must be submitted to Cal-OSHA, the local air management district and the Arcata Fire Department on an Asbestos Notification form at least 10 working days prior to the commencement of asbestos cement pipe removal.
- C. A competent person trained in accordance with OSHA regulations will perform the Work.
- D. Employees engaged in work operations involving asbestos cement pipe shall be provided with the medical monitoring and personnel protective equipment specified in the OSHA Construction Standard for Asbestos, 29 CFR 1926.1101.
- E. Expose the asbestos cement pipe without disturbing the pipe. Excavate no closer than 6 inches of the pipe. Carefully uncover the remainder of the pipe by hand or with a shovel. An assessment should then be made to determine if the pipe is damaged, cracked or broken.

1. Not Damaged (intact and not deteriorated or when tapping is necessary).
 - a. Place 6 mil thick polyethylene ("poly") sheeting under the asbestos cement pipe to prevent soil contamination.
 - b. Adequately wet the asbestos cement pipe with amended water using surfactant or liquid soap before and during to avoid creating air born dust.
 - c. Install tapping sleeve on asbestos cement pipe.
 - d. Mount valve to fitting.
 - e. Attach tapping machine to valve.
 - f. Cut coupon from line.
 - g. Close valve.
 - h. Remove tapping machine.
 - i. Attach line to valve.

2. Damaged (not intact, deteriorated, or when sawcutting is necessary).
 - a. Place 6-mil thick polyethylene sheeting under the asbestos cement pipe to prevent soil contamination.
 - b. Adequately wet asbestos cement pipe with amended water where cutting or breaking will occur.
 - c. Saw cutting of asbestos cement pipe shall only be conducted within a "mini-containment" unless such activity is conducted using High-Efficiency Particulate Air (HEPA) exhausted, shrouded cutting equipment.
 - d. Wrap wet asbestos cement pipe in two layers of 6 mil polyethylene sheeting, seal with duct tape and label. This can be done either in or adjacent to the trench.
 - e. Manage wrapped asbestos cement pipe, polyethylene sheathing and any other material contaminated with visible asbestos debris in accordance with OSHA requirements.
 - f. All asbestos containing waste material (ACWM) must be packaged, labeled, and disposed of in accordance with OSHA requirements.

F. original test procedure. Welds deficient in size shall be corrected by adding weld metal.

3.06. THRUST RESTRAINT

- A. Install clamps, set screw retainer glands, or restrained joints. Protect metal restrained joint components against corrosion by applying a bituminous coating, or by concrete mortar encasement of metal area. Do not encase pipe and fitting joints to flanges in concrete or mortar.

3.07. BACKFILLING

- A. Install backfill in accordance with Section 31 00 00 – Earthwork.
- B. Maintain optimum moisture content of bedding material to attain required compaction density.

3.08. FIELD QUALITY CONTROL

- A. Section 01 40 00 – "Quality Requirements": Field inspecting, testing, adjusting, and balancing.
- B. Compaction Testing for Bedding: In accordance with Section 31 00 00 – Earthwork.

PART 4 TESTING

4.01. GENERAL

- A. Scope. All water pipe and appurtenances shall be hydrostatically tested for below grade piping systems for pipe material structural integrity and leaks.

4.02. HYDROSTATIC AND LEAKAGE TEST

- A. Prior to acceptance of the Work by the District, the Contractor shall perform pressure testing on potable water distribution systems in accordance with AWWA C600/ C605.
- B. **Test Fluid**. The test fluid is to be District transmission system potable water. The Contractor shall be responsible for providing all connections, piping, fittings, etc. for conveying test water from the District's existing potable water system to the point of usage, and also for proper disposal, as required, of water used in the testing operations. All costs associated with supply and disposal of test water shall be at the Contractor's expense.

No final direct connection to the existing sterile water system shall be made until satisfactory completion of all testing (i.e., hydrostatic testing, chlorination, and bacteriological testing). The Contractor shall install temporary jumper pipe assemblies and temporary blowoffs to facilitate testing of the pipeline in segments as needed. The temporary facilities shall be removed by the Contractor prior to making the connections. The Contractor is responsible for all final closures and connections.

- C. **Test Equipment**

- 1. **Water**: Sufficient quantity to fill pipeline section under test. Contractor shall arrange with the District for locations for acquiring potable water for testing. Contractor shall be responsible for all temporary piping, fittings, meters, and appurtenances.
- 2. **Valves**: Suitable to isolate pipeline section under test without leaking.
- 3. **Relief Valve**: To permit pressure relief if pressure exceeds 20 to 25 percent above the required test pressure to prevent pipeline failure
- 4. **Pressure Gauge(s)**: Provide sufficient number of pressure gauges capable of measuring pressure 50 percent over the intended test pressure. Location of the gauges shall be determined by the Contractor and submitted with the pressure test plan. Contractor shall furnish all necessary equipment and make all taps in pipe required to perform testing.
- 5. **Pressure gauges and relief valves** shall be checked for accuracy before being used during actual testing of the pipeline.

- D. **Preparation for Test**

- 1. Contractor shall notify Engineer a minimum of three (3) working days prior to performance of testing. Engineer shall monitor all tests.
- 2. Contractor shall temporarily isolate the piping system into segments for testing purposes.

3. Contractor shall confirm that the pipeline is properly backfilled up to a minimum of the primary backfill levels and that all required thrust blocks and/or in-line restraints are in place prior to start of the pressure test.
 4. Connect booster pump and provide temporary closures for all of the external openings in the system. Use caution to ensure that the closures are properly designed and strong enough to withstand the test pressure.
 5. Tighten any flange connections loosened to vent air before applying test pressure.
 6. Permit the test fluid and the pipeline to set undisturbed for a minimum of 24 hours to achieve temperature equilibrium.
- E. Test Pressure: At least 150 percent of the working pressure (135 psi) at the lowest point of the pipeline under the river, and no less than 125 percent of normal working pressure (112.5 psi) at highest elevation.
- F. Test Duration: The hydrostatic and leakage test duration shall be two (2) hours.
- G. Test Procedure
1. The test procedures described herein shall be performed for each of the designated pipeline segments.
 2. Completely fill pipeline to be tested with water. The maximum rate of filling shall be limited so that the fluid filling the pipeline produces a maximum flow velocity of one (1) foot per second.
 3. Completely bleed off all trapped air during filling.
 4. Close all vents used to vent air from the pipe and restrict access in the test area to only those required for the test.
 5. During the initial expansion phase, slowly raise the pressure utilizing the booster pump until the desired test pressure is achieved.
 6. Add sufficient make-up test fluid to the system, at one-hour intervals for two hours, to maintain the system test pressure. The pipe should have obtained equilibrium.
 7. Turn off the booster pump and hold the final test pressure for the required test duration period.
 8. At the end of the test period add sufficient make-up water to return the pipe to the required test pressure. Record the value of make-up water required to return to test pressure. If the test pressure is not returned within the allowable volume of water as indicated by the equation below, the test fails.

The testing allowance shall be defined as the quantity of water that must be supplied to the pipe section being tested to maintain a pressure within 5 psi of the specified hydrostatic test pressure. No installation will be accepted if the quantity of makeup water is greater than that determined by the following formula:

$$Q = \frac{LD\sqrt{P}}{148,000}$$

Where Q is quantity of makeup water (gallons per hour), L is the length of pipe being tested (ft), D is the nominal diameter of the pipe (inches), and P is the average test pressure during the hydrostatic test (psi gauge).

The allowances only apply to the test period and not to the initial expansion phase.

9. Total test time shall not exceed eight (8) hours at the required test pressure. If the test is not completed due to leakage, equipment failure, etc. the test pressure shall be relieved and the test section shall be allowed to “relax” for a minimum of eight (8) hours before another test can be attempted.

H. Test Records

1. Records shall be maintained of all tests performed.
2. Test records shall include as minimum:
 - a. Date and time of beginning and end of pipeline testing
 - b. Identification of pipeline being tested
 - c. Test Fluid
 - d. Test Pressure
 - e. Ambient temperature
 - f. Pressure gauge reading taken during the test
 - g. Quantities of make-up water added during the test
 - h. Signatures of Test Technician, Contractor representative whom witnessed the test and the District representative who witnessed the test
- I. When tests indicate Work does not meet specified requirements, remove Work, replace and retest at the Contractor’s expense.

4.03. BACTERIOLOGICAL TESTING

- A. Refer to Section 33 01 10 – Disinfection of Water Utility Distribution.

PART 5 DISINFECTION

5.01. DISINFECTION

- A. Refer to Specification 33 13 00 - Disinfection of Water Utility Distribution.

END OF SECTION 33 14 00

SECTION 33 14 19

VALVES AND APPURTENANCES

PART 1 GENERAL

1.01. SUMMARY

- A. Section Includes:
 - 1. Plug Valves
 - 2. Butterfly Valves
 - 3. Combination Vacuum and Air Relief Valves

1.02. MEASUREMENT AND PAYMENT

- A. Measurement and payment for the items in this section shall be included in the Bid Item to which they relate. No additional measurement or payment shall be made for the requirements of this section.

1.03. RELATED SECTIONS

Related work specified in other sections:

- A. Section 03 48 00 – Precast Concrete Utility Boxes
- B. Section 31 00 00 – Earthwork
- C. Section 33 01 10 – Disinfection of Water Utility Distribution
- D. Section 33 14 00 – Piping Systems

1.04. REFERENCED CODES AND SPECIFICATIONS

The following standards apply:

- A. The American National Standards Institute/National Sanitary Federation (ANSI/NSF-61)
- B. The American Society for Testing and Materials (ASTM)
 - 1. A 126 - Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
 - 2. A 536 - Standard Specification for Ductile Iron Castings
- C. American Water Works Association Inc. (AWWA):
 - 1. C210 - Liquid-Epoxy Coating Systems for the Interior and Exterior of Steel Water pipelines
 - 2. C504 - Rubber-Seated Butterfly Valves

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3. C509 - Resilient-Seated Gate Valves for Water Supply Service
4. C517 - Resilient-Seated Cast Iron Eccentric Plug Valves.
5. C550 - Protective Epoxy Interior Coatings for Valves and Hydrants

1.05. SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal requirements.
- B. Shop drawings: Submit complete shop drawings including layouts, elevations, and details to the Engineer.
- C. Material list: Submit with the shop drawings a complete list of all materials and equipment catalog number, and catalog cuts for each item where applicable.
- D. Valve Data: Submit the following
 1. Valve dimensional assembly drawings
 2. Valve cross section drawings.
 3. Head loss, Cv, and calculated port area.
 4. Provide valve torque seating, un-seating, and dynamic torque at 10 degree increments.
 5. Test certifications, Seat leakage, Hydro-static, coating thickness.
- E. Operations and Maintenance Manuals: Submit copies of the manufacturer's current operation and maintenance manuals.
- F. Manufacturer's recommendations: Accompanying the materials list and shop drawings, submit copies of the manufacturers' current recommended method of installation.
- G. Coating Data: with applied coating thickness.

1.06. DESIGN REQUIREMENTS AND OPERATING CONDITIONS

- A. Valve Working Pressure:
 1. Minimum 150 psi unless otherwise specified or shown.
- B. Product Handling:
 1. Use all means necessary to protect the materials of this section before, during, and after installation and to protect the installed work and materials of all other trades.
 2. The Contractor shall provide and use proper implements, tools and facilities for the safe and proper handling and protection of the material.
 3. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Engineer, and at no additional cost to the District.

4. When damaged material cannot be repaired to the satisfaction of the Engineer, it shall be removed from the job and replaced at no cost to the Owner.
5. Material shall be stored in a safe location, protected from the elements where damage could result.

1.07. QUALIFICATIONS/RESPONSIBILITY/SAFETY

A. Qualifications of manufacturers:

1. The material shall be the product of a supplier regularly engaged in the manufacturing of pipe and plumbing products.
2. All materials shall be new and of current manufacture and shall be guaranteed against defects of workmanship in accordance with Part B-1 of the General Conditions.

B. Qualification of installers:

1. For the actual assembly, installation, and testing of the work of this section, use only thoroughly trained and experienced personnel who are completely familiar with the requirements for this work and with the installation recommendations of the manufacturers of the specified items.

PART 2 PRODUCTS

2.01. GENERAL

- A. All materials shall conform to sizes, capacity, quality, and quantities as shown on the Plans or described in these Specifications. Materials shall be from new stock and delivered in good condition; no damaged stock shall be used.
- B. Where no method of tests for materials is specified, the latest test specified by ASTM shall be followed.
- C. After delivery to the site, all materials shall be carefully unloaded, protected against breakage, rusting, accumulation of foreign matter, disintegration and injury. The Contractor shall be responsible for all lost or damaged material supplied and work done under this Contract.

2.02. BOLTS, GASKETS, GLANDS, NUTS

- A. Bolts, gaskets, glands, nuts, and miscellaneous accessories required to install all valves shall be furnished. All exposed nuts and bolts shall be 316 stainless steel. Gaskets for flanged connections shall be suitable for the pressure, temperature, and chemical characteristics of the fluid handled. The gasket materials shall also be suitable for the pipe system physical characteristics and materials and shall conform to NSF-61 requirements. Gaskets shall extend from the inside diameter of the flange to at least the inside edge of the bolt holes or they may extend beyond the bolt circle.
- B. Dissimilar Materials – Provide dielectric bolts and NBR gaskets where flanges of dissimilar materials are joined

2.03. PLUG VALVES

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Mad River Pipeline Crossing Project

- A. Manufacturer:
 - 1. DeZurik PEF 100% Port Eccentric Plug Valve per AWWA C517.
- B. Design:
 - 1. Type: Non-lubricated eccentric type rectangular port. The port area shall be 100% of the inner ID of ductile iron pipe port area. Round port plug valves are not acceptable.
 - 2. Plug face: Resilient material which operates satisfactorily at a temperature of 180 degrees Fahrenheit continuous and 215 degrees Fahrenheit intermittent.
 - 3. Grit seal: Provide flat upper and lower compression washers made of Teflon to isolate the bearing journals from grit and debris. Rubber seals are not acceptable.
 - 4. Stem seals: Provide Chevron type "V" stem seals externally adjustable by use of a packing gland, serviceable without un-bolting the actuator or valve bonnet assembly. For buried service the packing gland shall be factory set and sealed. O-ring and U cross section style seals are not allowed
 - 5. Discharge side of valve shall have a self-cleaning design to not allow buildup of debris inside the port areas.
 - 6. Clearly mark valves to indicate their open and closed positions.
 - 7. Provide valves with ends as required by piping details indicated on the Drawings and described in Specification 15 10 00.
- C. Materials:
 - a. Body: ASTM A 126, Class B, cast-iron or ductile iron ASTM A 536, Grade 65-45-12.
 - b. Plug: ASTM A 126, Class B, cast-iron or ductile iron ASTM A 536, Grade 65-45-12.
 - c. Plug Face: of Chloroprene material suitable for the intended service as specified under paragraph "Design" above.
 - d. Body seats in valves 3-inch size and larger: Provide with overlay of not less than 90 percent nickel and minimum thickness of 1/8 inch on surfaces contacting the plug face.
 - e. Stem bearing and bottom bearing: Type 316 stainless steel
 - f. Internal parts, except the body and plug: Type 316 stainless steel.
 - g. Exposed nuts, bolts, and washers: Zinc plated. Exception: Exposed nuts, bolts, and washers for buried service: Stainless steel.
- D. Pressure Rating – 175 psi
 - a. Worm gear actuator – shall be provided on all valves six (6) inches and larger. Actuators shall be enclosed in cast iron housing with outboard seals to protect the bearings and other internal components. The actuator shaft

and gear quadrant shall be supported on permanently lubricated bronze bearings.

E. Valve Operators

1. Furnish valves with an operating wrench or worm gear operator:
 - a. Equip valves 4 inch nominal size and smaller with a lever operator.
 - b. Equip valves 6 inch nominal size and larger with a worm gear operator.
2. All actuators shall be sized with a 1.5 times safety factor to the highest value of the valves torque for the application conditions. The worm gear travel stops are to be set for the valve application pressure.
3. Worm gears for manual operation shall be sized for the pressure of application. All input shafts to be stainless steel. All gear housing shall be cast or ductile iron. For buried service the gears housing shall be completely sealed with a AWWA 2" square operating nut to operate the valve.

F. Coating

1. Surface preparation shall be SSPC-SP10 Near-White Blast Cleaned surface, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products and other foreign matter
2. Coat interior metal surfaces with two part liquid epoxy minimum (8) mils DFT.
3. Coat exterior metal surfaces with two part liquid epoxy minimum (8) mils DFT.
4. End Connection:
 - a. 4" and Larger - Flanged, ANSI B16.1 Class 125.
 - b. 3" and smaller – Grooved joint end connections conform to ANSI/ AWWA C606

2.04. BUTTERFLY VALVES

A. Manufacturer: Butterfly valves, butterfly valve operators, and component parts as manufactured by one of the following:

1. Henry Pratt, Model:
 - a. 2FII Groundhog Butterfly 3" – 20"
 - b. Triton > 24"
2. Mueller
3. Millikan Valve
4. Substitutions: Section 01 60 00 - Product Requirements.

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- B. Performance requirements:
1. Isolation valve, which shall provide drip-tight shutoff to the full valve rating on the dead end or isolation service without a downstream flange.
 2. Maximum Velocity: 16 ft/s.
 3. Duty: Open/Close
 4. Permanently self-lubricating body bushings shall be provided and shall be sized to withstand bearing loads. Stuffing box of liberal dimensions shall be provided at the operator end of the vane shaft. Packing shall be of the self compensating-type. A sealing element utilizing O-rings shall also be acceptable. Packing shall be held in place by a bolted corrosion resistant retainer plate or gland; retainer clips are not acceptable. Replacement of seals shall not require removal of the valve from the line.
- C. Valve: AWWA C-504; fusion bonded epoxy coated cast iron.
- D. Resilient seat: Buna-N; molded in-body with integral shaft seal.
- E. Ends & Body: flanged; Class 150B per ANSI B16.1 and short bodied.
- F. Valve Discs:
1. ASTM A48, Class 40C, cast iron.
 2. Seating Edge: 316 stainless steel.
 3. Configuration: Offset to provide uninterrupted 360-degree sealing surface.
- G. Disc Seating Edge:
1. 316 Stainless Steel
- H. Valve Shaft and Disc Shaft Fasteners:
1. Material: 304 stainless steel, (one piece for 3" – 20" valves).
 2. Seal: V-type packing; carbon graphite/braided carbon with externally adjustable packing gland; minimum of 4 rings.
- I. Rubber seats:
1. Installed in valve body only. No cartridge type or seats attached to disc allowed.
 2. Buna-N.
 3. No retainer bolts, clamps, or rings are allowed to retain the seats.
- J. Valves shall be shop lined and coated with a High Solids Epoxy.
1. The Epoxy shall be NSF-61 Approved.

2. The Epoxy shall be a minimum of 8mils DFT per AWWA C550.

K. Butterfly Valves Operator

1. Operators and component parts: AWWA C504, unless otherwise specified in these Specifications.
2. Provide with counter-clockwise opening manual operators.
3. Compute operation torque of each valve and operator in accordance with Appendix of AWWA Standard C504 for velocity of 16 fps and applicable pressure drop across valve.
4. Operators: Sized for bi-directional flow and 450 ft-lb input torque.
5. Required input torque with maximum handwheel pull of:
 - a. 80 lbs. for hand wheels and chain wheels, or
 - b. 150 ft.-lbs. for operating nuts.
6. Hand wheels: 2-inch operating nut. Conform to detail drawings and provide adequate operating space.
7. Totally enclosed, permanently lubricated and sealed gear reducers.
8. Self-locking with open and close stops provided to limit valve disc travel.
9. Traveling nut type or worm gear.
10. Submit calculations for valve torque requirements to Engineer as part of Shop Drawing submittal package. Velocity for dynamic torque must be 16 fps.
11. Valve operators, as manufactured by:
 - a. Henry Pratt Company
 - b. Mueller
12. Provide butterfly valves which are directly buried or submerged with 2-inch square operating nut and do not equip with position indicator unless otherwise specified.

2.05. COMBINATION VACUUM AND AIR RELIEF VALVE

The Contractor shall furnish all air and vacuum relief valves required as shown on project drawings. Contractor shall furnish all piping, fittings, tap wrap, gaskets, bolts, washer, nuts, valve boxes, valve box risers, valve box lids, etc. required for satisfactory completed installation.

B. Manufacturer:

1. 2-inch ARI Model D-060
2. Substitutions: Section 01 60 00 - Product Requirements.

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- C. Ends: threaded.
- D. Ductile Iron Body
- E. Orifice: rated for 11 – 300 psig
- F. Orifice Seat: stainless steel and EPDM rubber
- G. Plug: Stainless Steel.
- H. Float and Frame Material: Polypropylene
- I. The air and vacuum relief assemblies shall be delivered to the Contractor as a complete assembly ready for installation.

2.06. FINISHES

- A. All cast iron valve components shall be liquid or fusion-bonded epoxy interior and exterior coated and lined per AWWA C210, AWWA C550 and NSF61. Minimum coating thickness shall be 12 mils. Epoxy shall not contain any coal tar and shall be NSF-61 compliant.

2.07. BUTTERFLY VALVE BOXES

- A. Each buried valve shall be installed in a pre-cast valve box.
- B. Refer to Section 03 48 00 – Precast Concrete Utility Boxes

2.08. COMBINATION AIR VACCUM AND RELIEF VALVE MANHOLES

- A. Each combination air vacuum and relief valve shall be installed in a manhole as shown in the Contract Drawings.
- B. Refer to Section 03 48 00 – Precast Concrete Utility Boxes

2.09. EXTENSION STEMS

- A. Extension stems shall be Mueller Model A-26441, Kennedy, or approved equal. Stem diameters shall be 1-1/4 in unless otherwise shown.
- B. Stem guides shall be Mueller A-26448, Kennedy, or approved equal.

2.10. T-HANDLED OPERATING WRENCHES

- A. Provide two 5-foot long galvanized T-handled operating wrenches with socket to fit 2-inch square nut. Wrenches shall be Mueller A-24610, Clow F-2520, or approved equal.

PART 3 EXECUTION

3.01. SURFACE CONDITIONS

A. Inspection:

1. Prior to all work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
2. Verify that all materials may be installed in accordance with all pertinent codes and regulations, the original design, and the referenced standards.

B. Discrepancies:

1. In the event of discrepancy, immediately notify the Engineer.
2. Do not proceed with installation in area of discrepancy until all such discrepancies have been fully resolved.

3.02. INSTALLATION

A. General:

1. Installation of valves and appurtenances shall be installed as shown on the Contract Drawings. Valves, appurtenances and miscellaneous items shall be installed as shown on the Contract Drawings and as specified herein.
2. Install all materials in strict accordance with the manufacturer's recommendations.
3. Before installation, carefully clean valves of all foreign material, adjust stuffing boxes, and inspect valves in open and closed positions. Install valves in accordance with the applicable portions of these Specifications. Unless otherwise indicated, install valves with the stem vertical. Mount horizontal valves in such a manner that adequate clearance is provided for operation. Installation practices shall conform to manufacturer's recommendations.
4. Support and restrain all valves where necessary, free from distortion or strain on valve or connecting pipe. Do not use pipe to support valve.
5. Prior to installing flanged valves, the flange faces shall be thoroughly cleaned. After cleaning, insert the gasket and tighten the nuts progressively and uniformly. If flanges leak under pressure, loosen the nuts, reseal or replace the gasket, re-tighten the nuts, and retest the joint. Joints must be watertight at test pressures before acceptance.
6. Thoroughly clean threads of screwed joints by wire brushing, swabbing, or other approved method. Apply approved joint compound to threads prior to making joint. Joints shall be watertight at test pressures before acceptance.
7. Provide all accessories necessary for the proper valve operation. Install all buried valves with 2-inch square nuts and valve box with cover. Provide buried valves with extension stems if the operating nut would be 36-inches or more underground.

3.03. PLUG VALVE INSTALLATION

- A. Install valves so that in the closed position the pressure in the pipeline applies a seating head on the valves.
- B. Lubrication: Lubricate valves gearboxes and fill extended lubricant pipes with lubricant suitable for service intended.
- C. Install valves so that in the open position the plug is located in the top half of the valve body.

3.04. AIR AND VACUUM RELEASE VALVE INSTALLATION

- A. Contractor shall furnish and install air and vacuum release valves as shown on the Contract Drawings and install per manufactures written directions.

3.05. VALVE BOX INSTALLATION

- A. Reference is made to Section 03 48 00 – Precast Concrete Utility Boxes.

3.06. PAINTING

- A. Prior to acceptance, thoroughly clean all materials contained herein and paint any surfaces requiring re-painting as determined by the Engineer, in accordance with manufacturers' recommendations.

3.07. VALVE IDENTIFICATION

- A. Provide all valves with a stamped valve tag with valve ID. Provide valve chart indicating valve tag number, location of valve, service and normal position of valve, valve manufacturer, size, and pressure rating.

3.08. ADJUSTMENT

- A. Check and adjust valves and accessories for smooth operation. Lubricate in accordance with manufacturer's recommendation.
- B. Pack all gate valve stuffing boxes with an excess of packing (30%) for future adjustment.

PART 4 TESTING

4.01. TESTS

- A. General: Upon completion of this portion of the work, and prior to acceptance by the District, make all required tests and perform all required disinfection and bacteriological testing per Section 33 01 10 – Disinfection of Water Utility Distribution.
- B. Hydrostatic Testing: Valves and related materials will be tested in accordance with Section 33 14 00 – Piping Systems at the same time that the adjacent pipeline is tested. Joints shall show no visible leakage under test. Repair joints that show signs of leakage prior to final acceptance. If there are any special parts of control systems or operators that might be damaged by the pipeline test, they shall be properly protected. The Contractor will be held responsible for any damage caused by the testing.

C. Functional Testing:

1. Valves which are normally closed shall satisfactorily be closed, opened and closed by the District's representative.
2. Valves which are normally open shall satisfactorily be opened, closed and opened by the District's representative.

END OF SECTION 33 14 19

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PART 5
APPENDICES

Appendix A
HBMWD Statewide NPDES General Permit for Drinking
Water System Discharges



H.B.M.W.D. AUG 22 2016



EDMUND G. BROWN JR.
GOVERNOR



MATTHEW RODRIGUEZ
SECRETARY FOR
ENVIRONMENTAL PROTECTION

State Water Resources Control Board

August 19, 2016

Mr. Paul Helliker
Humboldt Bay Municipal Water District
P.O. Box 95
Eureka, CA 95502-0095

NOTICE OF APPLICABILITY; HUMBOLDT BAY WATER DISTRICT WATER SYSTEM;
STATEWIDE GENERAL PERMIT FOR DRINKING WATER SYSTEM DISCHARGES TO
WATERS OF THE UNITED STATES

Dear Mr. Helliker:

Thank you for submitting the September 1, 2015 application package for coverage under the Statewide Drinking Water Systems Discharge Permit,¹ adopted by the State Water Resources Control Board (State Water Board) in November 2014. The Statewide Drinking Water Systems Discharge Permit provides Clean Water Act regulatory coverage for: (1) discharges resulting from essential operations and maintenance activities of drinking water systems undertaken to comply with the federal Safe Drinking Water Act, California Health and Safety Code, and State Water Board's Division of Drinking Water permitting requirements; and (2) emergency discharges.

Notice of Applicability

The information submitted in the September 1, 2015 application package, including the Notice of Intent form and map for the system described below, satisfies the permit application requirements. Therefore, the application package is deemed complete. This Notice of Applicability implements regulatory coverage under the Statewide Drinking Water Systems Discharge Permit for the water system described below, effective as of July 1, 2016. A waste discharge identification number of 4DW0732 has been assigned to this coverage.

Discharge Description

The Humboldt Bay Municipal Water District (District) Water System is a wholesaler that delivers treated groundwater to various retailers including the City of Arcata, City of Blue Lake, City of Eureka, Fieldbrook Glendale Community Services District, Humboldt Community Services District, Jacoby Creek Community Services District, Manila Community Services District, and Mckinleyville Community Services District in Humboldt County. The source of water for the system is groundwater obtained from the underflow of the Mad River. The system discharges to Arcata Bay, Humboldt Bay, and Mad River. There are no applicable total maximum daily loads for these receiving waters.

¹ Statewide General National Pollutant Discharge Elimination System (NPDES) Permit for Drinking Water System Discharges to Waters of the United States; State Water Board Order 2014-0194-DWQ (see http://www.waterboards.ca.gov/water_issues/programs/npdes/docs/drinkingwater/final_statewide_wqo2014_0194_dwq.pdf)

General Requirements

To comply with the Statewide Drinking Water Systems Discharge Permit, the District shall:

- a. Establish and implement appropriate best management practices.
- b. Ensure that all planned discharges comply with the terms and requirements of the permit including applicable effluent limitations for chlorine residual and turbidity.
- c. Take all necessary steps to review and update the effectiveness and adequacy of the control measures and best management practices.
- d. Keep best management practices updated and available onsite for all system operators.
- e. Conduct monitoring and reporting in compliance with the provisions and requirements in the Monitoring and Reporting Program, Attachment E of the Statewide Drinking Water Systems Discharge Permit.
- f. Maintain self-monitoring reports including compliant and non-compliant discharge monitoring information at the system's main office and make them available upon request of State Water Board and North Coast Regional Water Quality Control Board (North Coast Water Board) staff.
- g. Submit an annual report and all reporting information required by the Monitoring and Reporting Program to the following address:

State Water Resources Control Board
Division of Water Quality
NPDES Wastewater Unit
1001 I Street, 15th Floor
Sacramento, CA 95814

Include the following certification in the annual monitoring report:

"I certify under penalty of law that this document and all enclosures were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

If you prefer to submit an electronic copy of the report you can do so by sending it to the following e-mail: DMR@waterboards.ca.gov and title the e-mail "DWS No. 1210013 Annual Report."

- h. Notify the North Coast Water Board per notification requirements in the permit's Monitoring and Reporting Program. The staff contact at the North Coast Water Board is Ms. Colleen Hunt who may be contacted at (707) 576-2831 or Colleen.hunt@waterboards.ca.gov.

Previous Permitting Coverage

Based on your application package and staff review of the California Integrated Water Quality System database, the District's Water System does not have previous regulatory coverage for its discharges under any State Water Board or North Coast Water Board order.

If you have any questions regarding this Notice of Applicability or the Statewide Drinking Water Systems Discharge Permit, please contact Mr. Renan Jauregui in the NPDES Wastewater Unit of the Division of Water Quality at (916) 341-5505 or renan.jauregui@waterboards.ca.gov.

Sincerely,



Karen Larsen, Deputy Director
Division of Water Quality

cc: Pascal Mues
NPDES Permits Office
U.S. EPA Region 9, WTR-5
75 Hawthorne Street
San Francisco, CA 94105

Matthias St. John, Executive Officer
North Coast Regional Water Quality Control Board
5550 Skylane Blvd., Suite A - 1st Floor
Santa Rosa, CA 95403

Colleen Hunt, Environmental Scientist
North Coast Regional Water Quality Control Board
5550 Skylane Blvd., Suite A - 1st Floor
Santa Rosa, CA 95403

STATE WATER RESOURCES CONTROL BOARD

1001 I Street, Sacramento, California 95814
http://www.waterboards.ca.gov/water_issues/programs/npdes

**ORDER WQ 2014-0194-DWQ
GENERAL ORDER NO. CAG140001**

**STATEWIDE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
(NPDES) PERMIT FOR DRINKING WATER SYSTEM DISCHARGES
TO WATERS OF THE UNITED STATES**

Discharges from drinking water systems to surface waters in California are subject to waste discharge requirements as set forth in this Order, and as authorized by a Notice of Applicability issued by the Deputy Director of Water Quality (Deputy Director). Definitions for the purpose of this Order are included in Attachment A. Key definitions are as follows:

Table 1. Key Definitions for the Purpose of this Order

Drinking Water System ¹	A system with 1000 ² connections or greater that are regulated by the State Water Board Division of Drinking Water or a local county department of health, with the primary purpose of transmitting, treating and distributing safe drinking water. Drinking water systems include state owned/operated facilities such as parks, campgrounds, and rest areas ¹ This Order applies to community water systems as defined in Attachment A of this Order. This Order does not apply to non-community water systems or non-transient water systems as defined in Attachment A of this Order. ² Systems with fewer than 1000 connections that discharge to waters of the United States have the option to enroll in this Order. Non-enrollment does not exempt dischargers from Clean Water Act requirements.
Drinking Water System Discharge	Short-term or seasonal discharges from a drinking water system of water that has been dedicated for drinking water purposes
Water Purveyor	Any entity that discharges from a drinking water system, including water purveyors, wholesalers, distributors, districts, municipalities, private companies, and other entities that own or operate a community drinking water system
Discharger	A water purveyor that is authorized to discharge under this Order through an approved Notice of Applicability issued by the Deputy Director of Water Quality
Waters of the United States	Generally refers to surface waters, as defined for the purposes of the federal Clean Water Act. For the purpose of this Order, the terms “surface water,” and “receiving water” are interchangeably used to mean “waters of the United States,” unless noted otherwise

Table 2. Administrative Information

This Order was adopted by the State Water Board on November 18, 2014:
This Order shall become effective on February 26, 2015 (100 days after the adoption date of this Order)
This Order shall expire on February 25, 2020

CERTIFICATION

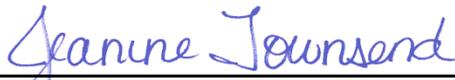
I, Jeanine Townsend, Clerk to the Board, do hereby certify that this Order with all attachments is a full, true, and correct copy of the Order adopted by the State Water Board on November 18, 2014.

AYE: Chair Felicia Marcus
Vice Chair Frances Spivy-Weber
Board Member Tam M. Doduc
Board Member Steven Moore
Board Member Dorene D'Adamo

NAY: None

ABSENT: None

ABSTAIN: None



Jeanine Townsend
Clerk to the Board

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I. SCOPE OF STATEWIDE GENERAL ORDER AND REQUIRED REGULATORY COVERAGE

This Order is a National Pollutant Discharge Elimination System (NPDES) general permit that authorizes discharges from drinking water systems, as defined on Page 1 of this Order. This Order provides regulatory coverage for short-term or seasonal planned and emergency (unplanned) discharges resulting from a water purveyor's essential operations and maintenance activities undertaken to comply with the federal Safe Drinking Water Act, the California Health and Safety Code, and the State Water Board's Division of Drinking Water permitting requirements for providing reliable delivery of safe drinking water.

Planned discharges include regularly scheduled, automated, or non-regularly scheduled activities that must take place to comply with mandated regulations and that the water purveyor knows in advance will result in a discharge to surface water. Emergency discharges include unplanned discharges that occur due to facility leaks, system failures, operational errors, or catastrophic events for which the water purveyor is not aware of the discharge until after the discharge has commenced. Planned and emergency discharges may occur directly, through a constructed storm drain or through another conveyance system, to waters of the United States (U.S.).

The Federal Water Pollution Control Act (also referred to as the Clean Water Act) section 402 requires that a discharge of any pollutant or combination of pollutants to surface waters that are deemed waters of the U.S., with certain exceptions, be regulated by a NPDES permit. (For the purpose of this Order, the terms "waters of the United States [or U.S.]", "surface waters" and "receiving waters" are used interchangeably unless noted otherwise.) On September 22, 1989, the U.S. Environmental Protection Agency (U.S. EPA) granted the State of California, through the State Water Resources Control Board (State Water Board) and the Regional Water Quality Control Boards (Regional Water Boards), the authority to issue NPDES permits pursuant to title 40 Code of Federal Regulations parts 122 and 123.

Discharges of a pollutant from a drinking water system, regardless of the size of the system, are required to be regulated by an NPDES permit if the discharges flow into a water of the U.S. Title 40 Code of Federal Regulations part 122.28 provides for issuance of general permits to regulate a category of dischargers if they involve the same or substantially similar types of operations; discharge the same type of waste; require the same type of effluent limitations or operating conditions; require similar monitoring; and are more appropriately regulated under a general order rather than individual orders. Discharges from drinking water systems that result from mandated activities to protect public health are of substantially similar types of operations, discharging the same type of waste.

This Order requires all water purveyors in California with drinking water system discharges to waters of the U.S. as described in Section I.B of this Order, except those water purveyors that meet the exception criteria identified in section I.A of this Order, to obtain NPDES regulatory coverage through enrollment in this statewide NPDES General Order. The water purveyor shall submit an application package to the State Water Board in accordance with section II.C.1 *Application Package Requirements* any time after the effective date of the permit but no later than **September 1, 2015**.

A. Water Purveyors NOT Required to Enroll in This Order

Water purveyors that meet any of the following criteria, items 1 through 6, are NOT required to submit an application package to obtain coverage through enrollment in this particular statewide NPDES General Order; this Order is, however, available for water purveyors that meet the criteria of items 1 through 3 below and choose to enroll. (This Order does not exempt any water purveyor from federal Clean Water Act requirements to obtain NPDES regulatory coverage for its discharges to waters of the U.S.) By **September 1, 2015**, water purveyors that meet any one of the items 2 through 5 below shall submit to the State Water Board a Notice of Non-Applicability form (see Attachment B-2) that certifies NPDES regulatory coverage from this Order is not required. A water purveyor with multiple community water systems in California need only submit one Notice of Non-Applicability for its systems that meet the same criterion.

1. The drinking water system has fewer than 1000 connections that deliver drinking water to end users. (This does not include water wholesalers as defined in Attachment A that deliver water to other drinking water systems); or
2. The water purveyor discharges solely to a municipal separate storm sewer system(s) (MS4) and has an established local agreement with the MS4 permittee to discharge into its system(s),

AND

The corresponding Regional Water Board Executive Officer provides written confirmation to the State Water Board Deputy Director that the local agreement provides sufficient regulation of the subject drinking water system discharges through an existing MS4 NPDES permit; or

3. The water purveyor is an MS4 permittee, or co-permittee, named on a State Water Board or a Regional Water Board issued MS4 permit that also authorizes discharges from drinking water systems, and all drinking water system discharges solely discharge into its own MS4 system; or
4. The water purveyor's discharge is regulated under an existing individual site-specific NPDES permit issued by the Regional Water Board because: (1) the discharge from the system is outside of the scope of this low threat Order, and/or (2) a Total Maximum Daily Load (TMDL) was adopted and the Regional Water Board determined that TMDL-specific permit requirements for its drinking water system(s) discharges are appropriate because those discharges may contribute to the impairment of the water body; or
5. All discharges from the drinking water system do not discharge to a water of the U.S.; or
6. The discharge is exempt from the legal requirement to obtain an NPDES permit under federal law.

After review, a Notice of Non-Applicability Approval by the State Water Board's Deputy Director of Water Quality (Deputy Director) may be issued. If the Notice of Non-Applicability is not complete or the discharge is deemed ineligible, the Deputy Director will send a response letter to the applicant outlining: (1) the missing information that deems the Notice of Non-Applicability incomplete, or (2) why the described discharge is not eligible and thus the water purveyor must obtain coverage under this Order. The State Water Board will provide the water purveyor **60 days from the date of the response letter** to provide State Water Board staff the items necessary to complete the Notice of Non-Applicability or to submit a complete application package in accordance with section II.C of this Order.

B. Discharges Authorized Under This Order

This Order authorizes drinking water system discharges (as defined on Page 1) resulting from a water purveyor's essential operations and activities undertaken to comply with the federal Safe Drinking Water Act, the California Health and Safety Code, and the State Water Board's Division of Drinking Water permitting requirements. Discharges authorized by this Order are composed solely of water that is dedicated by drinking water facilities for the primary purpose of providing safe and reliable drinking water. Additionally, discharges authorized under this Order are determined to not adversely affect or impact beneficial uses of the receiving waters when properly managed through best management practices. Such discharges include, but are not limited to, discharges from supply wells, transmission systems, water treatment facilities, water distribution systems, and storage facilities. Any discharges that are likely to cause or contribute to an exceedance of a water quality objective other than those granted an exception under the State Water Board Resolution 2014-0067, will not be authorized under this Order.

This Order authorizes single discharges at one identified location and multiple simultaneous discharges at multiple locations. Authorized discharges to waters of the U.S. may include, but are not limited to, the following discharges:

1. Planned Discharges Due To:

- a. Groundwater supply well flushing or pump-to-waste.
- b. Groundwater well development, rehabilitation, and testing.
- c. Groundwater monitoring for purpose of supply well development, rehabilitation and testing.
- d. Trench dewatering of drinking water during planned repairs.
- e. Transmission system installation, cleaning, and testing.
- f. Water treatment plant operations (excluding filter backwash that is discharged to a water of the U.S).
- g. Distribution system storage tank or reservoir releases.
- h. Distribution system dewatering, flushing, and pressure testing.
- i. Fire flow / fire hydrant testing.
- j. Meter testing.

- k. Automated water quality analyzers operations.
- l. Pressure relief valves.
- m. Unscheduled activities that must be undertaken to comply with mandates of the Federal Drinking Water Act and California Health and Safety Code.

2. Emergency (Unplanned) Discharges Due To:

- a. Emergency drinking water system failures and repairs including transmission and distribution system failures and repairs.
- b. Trench dewatering due to an emergency failure.
- c. Operation errors.
- d. Catastrophic events.

C. Discharges Not Authorized Under This Order

The State Water Board does not authorize any of the following discharges to waters of the U.S. under this Order:

- 1. Discharges that are not within the scope of this Order as described in section I and/or are not authorized by a Notice of Applicability issued by the Deputy Director of Water Quality (Deputy Director); or
- 2. Discharges to a water of the U.S. with a total maximum daily load (TMDL) that prescribes a waste load allocation to a water purveyor, where the Deputy Director determines that the requirements of this Order are not consistent with the assumptions and requirements of the TMDL and thus compliance with this Order is not sufficient for the water purveyor to comply with the imposed TMDL requirements; or
- 3. Discharges from new drinking water systems (not an expansion of an existing system) into a Clean Water Act section 303(d)-listed impaired water body that is impaired for a constituent that exists in the new discharge at a concentration greater than the criteria used to establish the impairment of the water body, and for which a regional water board has issued an individual permit that addresses the TMDL requirements; or
- 4. Direct discharges into areas designated by the State Water Board as Areas of Special Biological Significance (ASBS).

II. PERMIT COVERAGE AND APPLICATION REQUIREMENTS

A. Permit Coverage

This Order provides regulatory coverage to water purveyors with existing and potential authorized discharges as set forth in section I.B to waters of the U.S. from a community drinking water system that does not adversely affect or impact beneficial uses of the

receiving water. Permit coverage may include discharges from work conducted by contractors on behalf of the water purveyor.

B. Permit Effective Date

This Order becomes effective **February 26, 2015**, 100 days after the adoption date of this Order. Any time after the effective date but no later than **September 1, 2015**, all water purveyors that do not meet the criteria of section I.A. of this Order shall submit a complete application package in accordance with the following section II.C.

C. Application Package Requirements

To obtain regulatory coverage under this Order, a water purveyor must submit to the State Water Board a complete application package that includes all the following items. A water purveyor with multiple drinking water systems in California need only submit one complete application package (with individual Notice of Intent forms for each of its drinking water systems) and obtain one Notice of Applicability for regulatory coverage of all its systems that discharge to waters of the U.S.

1. **Notice of Intent.** A completed Notice of Intent form for each of its drinking water systems (shown as Attachment B1 of this Order), signed and certified in accordance with section V.B., *Signatory and Certification Requirements*, of Attachment D – Standard Provisions.
2. **Application Package Fee.** A fee payable to the State Water Board in accordance with California Code of Regulations, title 23, or subsequent fee regulations updates. The current fee schedule is available at the following website:
<http://www.waterboards.ca.gov/resources/fees>
Only one fee is required for an application package requesting coverage for multiple drinking water systems.
3. **Site Information.**
 - a. A site schematic showing the following items:
 - i. The general location of the community drinking water facilities and/or the boundaries of the water purveyor's service area(s); and
 - ii. The general location of groundwater supply wells and/or any discharge locations to surface waters; and
 - iii. General identification of the portion of the community water system that discharges within a 300-foot conveyance distance from the receiving water(s) and/or within a 300-foot radius of the receiving water(s).
 - b. Names of all named receiving water bodies and/or major downstream water bodies.

- c. A description of the multiple uses of the water prior to surface water discharge or beneficial reuse that the discharges will serve (i.e. ground water recharge, irrigation).
 - d. Reason(s) that the discharge water cannot be utilized for multiple uses or beneficial reuse. (Refer to section VI. MULTIPLE USES OR BENEFICIAL REUSE, below)
4. **Total Maximum Daily Loads (TMDL) Constituent-specific Application Package Supplement** (applicable for discharges into waters of the U.S. identified in section III. K of the Fact Sheet). A supplement to the application requirements listed above shall include the following items:
- i. **Laboratory Analysis of TMDL-specific constituent(s).** (The laboratory analysis shall be conducted by a laboratory certified by the Environmental Laboratory Accreditation Program (ELAP).) The application package supplement shall include a laboratory analysis sheet(s) indicating the concentration of the applicable TMDL specific constituent(s) in the drinking water system discharge at the point of discharge. The monitoring and analysis shall be conducted in accordance with title 40 Code of Federal Regulations part 136. The water purveyor shall submit the following items for the application supplement to be deemed complete:
 - a) A minimum of two samples representative of the drinking water system discharge that contains or has the potential to contain the greatest concentration or level of constituent/parameter associated with the TMDL constituent/parameter. The samples shall be taken at a location after the appropriate treatment or controls are implemented for the constituent associated with the TMDL; and
 - b) The estimated minimum and maximum discharge volume per discharge event; and
 - c) The estimated average discharge volume from the system per year. The estimated volumes may be based on historical data.
 - ii. **TMDL-specific Best Management Practices.** Description of site-specific best management practices that properly treat and/or control corresponding TMDL constituents in the discharge to a concentration or level less than the water purveyor's applicable TMDL-specific permit requirement (s) as set forth in Attachment G, if any.

The supplemental analytical information will be used to confirm that the discharge does not contribute to the specific impairment of the TMDL-related waterbody(ies) and that the requirements in this Order are sufficient to ensure compliance with the specific TMDLs.

D. State Water Board Notice of Applicability

After the water purveyor's application package is deemed complete, the Deputy Director will issue a Notice of Applicability. Regulatory coverage for the planned and emergency

discharges that occur within the areas identified in the application package commences with the date of issuance of a Notice of Applicability to the water purveyor. If the submitted application package is not complete in accordance with previous section II.C., or the discharge is deemed ineligible for coverage under this Order, the Deputy Director will send a response letter to the applicant outlining: (1) the missing information that renders the application package incomplete, or (2) why the described discharge is not eligible for coverage under this Order. The water purveyor will have **60 days from the date of the response letter** to provide State Water Board staff the items necessary to complete the application package.

E. Permit Coverage Termination

1. **Termination of Existing Regional Water Board Permit Coverage.** Upon the issuance of the NOA in accordance with this Order, the State Water Board expects the applicable Regional Water Board to terminate regulatory coverage under an existing non-MS4 Regional Water Board NPDES permit for discharges within the scope of this Order.
2. **Termination of Statewide Permit Coverage or Revocation of Notice of Non-Applicability.** The Deputy Director may terminate coverage or revoke a Notice of Non-Applicability Approval (NONAA) under this Order for any of the specified causes, and require application for coverage under an individual or other NPDES permit as set forth in title 40 Code of Federal Regulations part 122.28(b)(3). Causes for permit coverage termination or NONAA revocation include, but are not limited to, the following:
 - a. Violation of any term or condition of this Order; or
 - b. Misrepresentation or failure to disclose all relevant facts in obtaining permit coverage or non-applicability status under this Order, or
 - c. Written request from a Discharger to terminate enrollment because discharge has ceased or that the permit is no longer needed.

Annual permit fees will be assessed by the State Water Board up to the date of written termination notification from the State Water Board to the Discharger, or the date of a termination request letter from the Discharger to the State Water Board, whichever is applicable.

3. **Qualified Biologist Certification Following Project Completion.** Upon completion of the project, the Discharger shall provide certification by a qualified biologist that beneficial uses of the receiving waters have been restored. For drinking water system discharges, completion of the project is when the water purveyor ceases discharges from its drinking water system under this Order, or when the State terminates NPDES permit coverage for the discharge(s).

F. Permit Transfer

A change in ownership of the facilities authorized to discharge through coverage under this Order requires the current owner to provide written notice to the State Water Board

at least 30 days in advance of transfer of ownership. The Deputy Director may determine that the new owner must submit an application package to seek coverage under this Order if the nature or location(s) of the discharge(s) have changed from the application package on file.

III. FINDINGS

The State Water Board finds the following:

- A. Legal Authorities.** This Order serves as statewide Waste Discharge Requirements (WDRs) pursuant to California Water Code article 4, chapter 4, division 7 (commencing with § 13260). This Order is also issued pursuant to federal Clean Water Act (CWA) section 402 and implementing regulations adopted by the U.S. EPA, and the California Water Code, chapter 5.5, division 7 (commencing with § 13370). This Order shall serve as a statewide general NPDES permit for point source discharges from single or multiple discharge points to surface waters, storm drains, and other storm water conveyances leading to waters of the U.S.
- B. Background and Rationale for Requirements.** The Fact Sheet (Attachment F) contains background information and rationale for the requirements in this Order, and is hereby incorporated into and constitutes findings for this Order. Attachments A through E, G, and H are also incorporated into this Order.
- C. Termination of Existing Coverage Under Similar Regional Water Board Orders.** The State Water Board's intention in the issuance of this statewide NPDES Permit is to provide consistent and efficient regulation of discharges from drinking water systems statewide. To provide such consistency, the State Water Board intends that existing regulatory coverage under an existing non-MS4 Regional Water Board NPDES permit for discharges regulated under this Order will be terminated by the applicable regional water board upon issuance of the Notice of Applicability to a water purveyor per the terms of this Order.
- D. Threat and Complexity of Discharge.**
When mitigated through implementation of appropriate management practices, treatment and/or controls, discharges from community water systems, as defined under this Order, pose no adverse effects or impacts to beneficial uses of the receiving waters. In accordance with the State Water Board fee regulations, the discharges that are regulated under this general NPDES Permit require minimal or no additional treatment systems to meet limits and pose no significant threat to water quality and therefore are of low threat and low complexity.
- E. State Implementation Policy.** As adopted in March 2000, and amended in February 2005, the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (State Implementation Policy or SIP) establishes implementation provisions for priority pollutant criteria, and objectives and provisions for chronic toxicity control. Section 5.3 of the SIP allows for the granting of a categorical exception for drinking water system activities conducted to fulfill statutory requirements mandated by federal and state regulations.

F. California Ocean Plan. In 1972, the State Water Board adopted the Water Quality Control Plan for Ocean Waters of California (hereinafter Ocean Plan), as amended. The latest Ocean Plan amendment became effective on August 19, 2013. The Ocean Plan is applicable, in its entirety, to point source discharges to the ocean waters of the State. To protect the beneficial uses of ocean water, the Ocean Plan establishes water quality objectives and a program of implementation. Requirements of this Order implement the Ocean Plan and are applicable to those discharges directly into the Ocean or indirectly via a storm water system that drains into the Ocean near the location of discharge. This Order does not authorize direct discharges into Areas of Special Biological Significance (ASBS).

Section III.J of the Ocean Plan allows the State Water Board to grant an exception where the State Water Board determines that the exception will not compromise protection of the ocean waters or beneficial uses and the public interest will be served.

G. Exception Resolution. On November 18, 2014, the State Water Board adopted a Resolution approving an exception to the State Implementation Policy and the Ocean Plan to water purveyors statewide for discharges from drinking water systems from complying with specified priority pollutant criteria and ocean plan objectives. As provided in Resolution 2014-0067, the State Water Board granted an exception per section 5.3 of the State Implementation Policy to water purveyors statewide, for planned and emergency discharges to inland surface waters, enclosed bays and estuaries. Similarly, as provided in Resolution 2014-0067, the State Water Board granted water purveyors with drinking water system discharges to the ocean, other than direct discharges into ASBS, an Ocean Plan exception for compliance with specified Ocean Plan objectives. As further discussed in the Fact Sheet (Attachment F), the State Water Board finds that in accordance with the requirements of the SIP and Ocean Plan, discharges from drinking water systems qualify for an exception of the State Implementation Policy and Ocean Plan per Resolution 2014-0067.

H. California Environmental Quality Act. Under Water Code section 13389, this action to adopt an NPDES permit is exempt from the provisions of Chapter 3 of the California Environmental Quality Act (CEQA), (commencing with section 21100) of Division 13 of the Public Resources Code.

Additionally, pursuant to CEQA, Public Resources Code section 21100 et seq., on November 18, 2014 the State Water Board adopted Resolution 2014-0067 approving a Mitigated Negative Declaration for excepting the type of discharges as covered under this Order from specified requirements of the State Implementation Policy and the California Ocean Plan.

I. Total Maximum Daily Load (TMDL) Implementation. A review of Regional Water Board TMDLs found that, as of the adoption date of this Order, only the Los Angeles Regional Water Board and the San Diego Regional Water Board have TMDLs that either directly apply waste load allocations to, or may indirectly imply that waste load allocations are applicable to, the discharges from drinking water systems regulated under this General Order. None of these TMDLs established waste load allocations that apply exclusively to discharges from drinking water systems. These TMDLs are

applicable to the discharges from drinking water systems authorized under this Order and are therefore implemented by this Order.

This Order requires TMDL-related sampling of discharges from drinking water systems identified in a TMDL. If a Regional Water Board determines that any of these TMDLs, or any newly approved TMDLs, establish requirements that should be implemented through TMDL-specific permit requirements for the discharges from drinking water systems that are authorized under this Order, the Regional Water Board may issue permit(s) for those discharges, with coverage under this Order subsequently terminated. Alternatively, if further TMDLs are adopted that address pollutants that are likely to be in discharges from drinking water systems, and allocate waste loads specifically to water purveyors regulated under this Order, the State Water Board may consider adding additional TMDL-specific permit requirements to Attachment G of this Order in a subsequent permit amendment or renewal.

J. Notification of Interested Parties. State and Regional Water Board staffs have conducted eight stakeholder meetings statewide, and numerous other informal communications, and have notified prospective water purveyors and interested agencies and persons of the intent to issue this statewide NPDES permit and prescribe these statewide waste discharge requirements. The State Water Board provided an opportunity for all interested parties to submit written comments and testimony.

K. Consideration of Public Comment. The State Water Board, in an August 5, 2014 public hearing, heard and considered public comments pertaining to the draft Order. The State Water Board also considered all written public comments submitted by the public comment due date of August 19, 2014, prior to adopting this Order. The Fact Sheet (Attachment F) provides details regarding the public notice and public hearing.

THEREFORE, IT IS HEREBY ORDERED that, in order to meet the provisions contained in California Water Code, Division 7 (commencing with section 13000) and regulations adopted thereunder, and the provisions contained in the Clean Water Act and regulations and guidelines adopted thereunder, a water purveyor shall comply with the requirements of this Order. Water purveyors that have obtained coverage under this Order shall comply with the requirements in sections IV. through VII. (Discharge Specifications and Effluent Limitations, Receiving Water Limitations, Multiple Uses or Beneficial Uses Provisions, and Compliance Determination), Attachments D and E (Standard Provisions and Monitoring and Reporting Program) of this Order, and Attachment G (TMDL-related requirements) as applicable.

IV. DISCHARGE SPECIFICATIONS AND EFFLUENT LIMITATIONS (ONLY APPLICABLE TO DISCHARGES THAT ENTER A WATER OF THE U.S.)

For purposes of this Order, references to “discharge(s)” mean discharge(s) that may occur directly, through a constructed storm drain, or through other conveyance system, to waters of U.S. The Discharger shall comply with the following discharge specifications and effluent limitations.

A. Specification for Implementation of Best Management Practices

1. The Discharger shall implement best management practices (BMPs) that treat or control pollutants from its discharges to maintain compliance with this Order. Implementation of BMPs includes proper management, and routing of discharges to control the pollutants of concern. The Discharger shall properly manage planned discharges and implement proven BMPs provided by professional associations or institutes such as the American Water Works Association, to protect beneficial uses of the receiving water body(ies). For emergency discharges, the Discharger shall implement BMP procedures as soon as feasible while concurrently protecting public health and safety. Attachment C of this Order provides example BMPs.

At minimum, the Discharger shall implement BMPs for planned discharges to achieve the following performance measures:

- i. Prevent aquatic toxicity by using dechlorination chemical additions, implementing equivalent proven dechlorination methods, and/or assuring that the chlorine in the discharge dissipates naturally; such that the level of chlorine in the discharge is less than 0.019 mg/L prior to entering a receiving water.
 - ii. Prevent riparian erosion and hydromodification by implementing flow dissipation, erosion control, and hydromodification-prevention measures; and
 - iii. Minimize sediment discharge, turbidity and color impacts by implementing sediment, turbidity, erosion and color control measures.
2. For Groundwater Supply Well Operations, the Discharger shall implement treatment systems or BMPs for all groundwater well development, rehabilitation, or operation discharges to waters of the U.S. to ensure these discharges:
 - (1) Do not cause or contribute to an exceedance of the receiving water limitation for turbidity in Section V.G. of this Order, and
 - (2) Comply with a turbidity action level of 100 Nephelometric Turbidity Units (NTUs) or less in the discharge. An exceedance of the turbidity numeric action level of 100 NTU is not a violation of this Order, but any exceedance does require that the Discharger take action to modify, change or enhance BMPs when the turbidity level is greater than 100 NTU, until the turbidity level is 100 NTU or less.
3. The Discharger shall implement quality assurance and quality control protocol to assure best management practices, monitoring, and reporting are effective, valid, and in compliance with this Order. The Discharger shall train all personnel operating the drinking water system and responding to emergency discharges to assure the quality assurance and quality control protocol is properly implemented.
4. For planned discharges, BMPs shall be implemented prior to and during discharges that enter a water of the U.S. For planned discharges from pressure relief valves (*i.e.*, due to testing or maintenance) and unchlorinated pump-to waste wells, BMPs

shall be implemented unless infeasible (e.g., inaccessible, inadequate space). For emergency discharges, BMPs shall be implemented as soon as feasible following assurance that public safety, property, and infrastructure are protected.

5. In fulfilling the requirements of this section, the Discharger may implement the example BMPs contained in Attachment C, or proven BMPs per updated approved guidance established by industry experts, professional associations, or entities (e.g. *2014 Edition of the BMP Manual for Drinking Water System Releases* published by the California-Nevada Section of the American Water Works Association).
6. The Discharger shall maintain a documented log of all BMPs implemented for its different types of discharges that enter a water of the U.S., and make it available to State and Regional Water Board staff upon request.
7. The Discharger shall modify BMPs as necessary to maintain compliance with the requirements of this Order. If monitoring results or other available information demonstrate that the discharge is not in compliance, the Discharger shall determine the source of non-compliance, and develop and implement new or revised BMPs as necessary. As part of this process, the Discharger shall validate the effectiveness of any new or revised BMPs to achieve the requirements of this Order. All non-compliance and corresponding corrective actions to address non-compliance shall be reported to the State Water Board in the annual report, as required in the Monitoring and Reporting Program (Attachment E) of this Order. A log documenting the additional or revised BMPs shall be made available upon request by staff of the State and/or Regional Water Board.

B. Effluent Limitations

1. All Discharges of Superchlorinated Water:

- a. The total chlorine residual concentration in the discharge shall not exceed 0.019 mg/L.
- b. A field monitoring result with a total residual chlorine concentration greater than or equal to 0.1 mg/L shall be deemed out of compliance with a chlorine effluent limitation.

2. All Planned Discharges directly into, or within 300 feet of, Inland Surface Waters, Enclosed Bays, and Estuaries

- a. The total chlorine residual concentration in the discharge shall not exceed 0.019 mg/L.
- b. A field monitoring result with a total residual chlorine concentration greater than or equal to 0.1 mg/L shall be deemed out of compliance with a chlorine effluent limitation.

3. All Planned Discharges directly into, or within 300 feet of, Ocean Waters

- a. The total chlorine residual concentration in the discharge shall not exceed 0.008 mg/L.
- b. A field monitoring result with a total residual chlorine concentration greater than or equal to 0.1 mg/L shall be deemed out of compliance with a chlorine effluent limitation.

- c. The turbidity concentration in the discharge shall not exceed 225 NTU at any time.

V. RECEIVING WATER LIMITATIONS

Receiving water limitations are based on water quality objectives contained in Regional Water Quality Control Board Basin Plans and State Water Board water quality control plans, including the Ocean Plan, and policies, and are a required part of this Order. Drinking water system discharges to the receiving water that are authorized to discharge under this Order shall not cause or contribute to the exceedance of a water quality objective or standard in the receiving water, other than water quality objectives or standards for parameters that have been granted an exception under the State Water Board Resolution 2014-0067 and are not part of a TMDL, and at minimum shall not cause or contribute to an occurrence of the following in the receiving water:

- A. pH.** The pH level to be outside the range of the pH receiving water objective in a corresponding Regional Water Board basin plan.
- B. Chemical Constituents.** Chemical constituents to be present in concentrations that adversely affect beneficial uses.
- C. Floating Material and Trash.** Floating material, debris or trash to be present that cause nuisance or adversely affect beneficial uses.
- D. Sediment and Total Suspended Solids.** The sediment load and total suspended solids discharge rate of surface waters to be altered in such a manner as to cause nuisance or adversely affect beneficial uses.
- E. Toxicity.** Toxic substances to be present, individually or in combination, in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life.
- F. Hydromodification.** Velocity and/or volume of discharge to modify the existing physical characteristics of a water body.
- G. Turbidity.** Turbidity concentrations to exceed corresponding Regional Water Board basin plan water quality objectives for turbidity.

VI. MULTIPLE USES OR BENEFICIAL REUSE

The discharge to surface waters may be considered wasteful when it is feasible for the water to be used prior to discharge. The State Water Board strongly encourages all water purveyors to put all or part of the discharge water to multiple uses or a beneficial reuse prior to discharge into surface water. Because of the high quality of the discharge water addressed in this Order, discharges authorized under this Order that are put to multiple use or beneficial reuse are not required to be monitored and generally not required to obtain any other waste discharge requirements if the water that would otherwise be discharged is instead collected and reused for landscape irrigation, agricultural irrigation or other uses in

a manner that augments the existing water supply, or if the discharge is directly or indirectly discharged to: (1) storm water capture basin(s), (2) low impact development features, or (3) other groundwater-recharge system(s).

VII. PROVISIONS

A. Standard Provisions

The Discharger shall comply with all Standard Provisions in Attachment D.

B. Monitoring and Reporting Program Requirements

The Discharger shall comply with the Monitoring and Reporting Program requirements in Attachment E.

C. Special Provisions

1. Reopener Provisions

The State Water Board may modify or reopen this Order prior to its expiration date in any of the following circumstances:

- a. If present or future investigations demonstrate that the discharges governed by, and in compliance with, this Order cause adverse impacts on water quality or beneficial uses of the receiving waters;
- b. If State Water Board precedential decisions, new policies, new laws, or new regulations are adopted;
- c. To include specific implementation provisions in Attachment G for any existing or newly adopted TMDLs;
- d. If an administrative or judicial decision on a separate NPDES permit or Waste Discharge Requirements addresses requirements applicable to discharges authorized in this Order; and/or
- e. As otherwise authorized by law.

D. Noncompliance

Noncompliance with any requirement of this Order may be subject to enforcement action by the State Water Board and/or Regional Water Board as authorized under the Porter Cologne Water Quality Control Act (Water Code Section 13000), consistent with the State Water Board's enforcement policy.

VIII. COMPLIANCE DETERMINATION FOR PLANNED DISCHARGES

Compliance with the final effluent limitations contained in Section IV.B of this Order will be determined as specified below:

A. Permit Compliance for Planned Discharges only

Compliance with applicable effluent limitations, BMP implementation requirements, receiving water limitations, monitoring, notification, and reporting requirements of the permit constitutes compliance with this Order. Due to the infeasibility of a Discharger to self-monitor compliance with receiving water limits in distant receiving water bodies (for discharges into drainage conveyance systems), non-compliance with receiving water limitations for indirect discharges will be determined based on additional site-specific information made available to the Water Boards indicating that drinking water system discharges caused or contributed to the exceedance of the receiving water limitations and adversely impacted beneficial uses.

B. General

Compliance with effluent limitations shall be determined using monitoring and reporting protocols defined in the Monitoring and Reporting Program of this Order. For purposes of reporting and administrative enforcement by the State and/or Regional Water Boards, the Discharger shall be deemed out of compliance with the effluent limitations if the constituent concentration or level is greater than the effluent limitation and greater than or equal to the minimum level (ML, also known as the Reporting Level (RL)) of properly calibrated in-field monitoring equipment.

C. Total Residual Chlorine

Handheld chlorine measuring devices that are U.S. EPA-approved are appropriate to measure residual chlorine in the field for compliance determination. The minimum level of a hand-held chlorine meter used to determine compliance with the total chlorine residual effluent limitations is 0.1 mg/L or lower. A discharge monitoring result with a total residual chlorine concentration greater than or equal to 0.1 mg/L shall be deemed out of compliance with a chlorine effluent limitation. Due to other possible interferences of these handheld devices, if readings are false positives, these will not be evaluated for compliance if explanation of cause of false positive is provided.

ATTACHMENT A – DEFINITIONS

Adverse Effect or Adverse Impact to Beneficial Uses of a Receiving Water Body

A detrimental effect upon water quality or beneficial uses of a receiving water body caused by a discharge or loading of a pollutant or pollutants.

Authorized Discharge

Any discharge that is authorized pursuant to this National Pollutant Discharge Elimination System (NPDES) permit and meets the requirements and conditions set forth in this Order.

Basin Plan

The Water Quality Control Plan(s) adopted by a Regional Water Quality Control Board. A Basin Plan designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve water quality objectives for all waters of the Basin.

Beneficial Uses

The existing or potential uses of receiving waters in the permit area as designated by a Regional Water Board basin plan or other water quality control plan.

Best Management Practices (BMPs)

Methods, measures, or practices designed and selected to reduce or eliminate the discharge of pollutants to surface waters from point and nonpoint source discharges. BMPs include structural and nonstructural controls, and operation and maintenance procedures, which can be applied before, during, and/or after pollution producing activities.

Community Water System

A public water system for the provision of water for human consumption through pipes or other constructed conveyances that has 15 or more service connections or regularly serves at least 25 individuals daily at least 60 days out of the year.

Drinking Water System

A system regulated by the State Water Resources Control Board Division of Drinking Water or a local county department of health, with the primary purpose of conveying, treating, storing and distributing safe drinking water to at least 15 service connections used by yearlong residents or regularly serves at least 25 year around residents of the area served by the system.

Deputy Director

The Deputy Director of Water Quality for the State Water Resources Control Board or any person(s) delegated by the Deputy Director to serve as acting Deputy Director.

Direct Discharge

Any discharge that enters a Water of the U.S. without first traveling via a storm drain or any other constructed conveyance system.

Discharger

Any water purveyor named in this Order as being responsible for permit requirements within its jurisdiction. A discharger to this Order includes a public or private water purveyor, wholesaler, or district, or a contractor working on behalf of the water purveyor, wholesaler or district.

Drinking Water System Discharges

Release of flows from drinking water intakes, transmission, storage, pumping, treatment and distribution systems including flows due to: (1) system failures and pressure releases, (2) system development, testing and maintenance that is performed to comply with the federal Safe Drinking Water Act, the California Health and Safety Code, and State Water Board Division of Drinking Water permit requirements.

Emergency Discharge

A discharge due to a sudden unexpected occurrence involving a clear and imminent danger, demanding immediate action to prevent or mitigate loss of, or damage to, life, health, property, or essential public services, including the provision of drinking water supplies in accordance with applicable drinking water statutes and regulations.

Estuaries

Surface waters, including coastal lagoons, located at the mouths of streams that serve as areas of mixing for fresh and ocean waters. Estuarine waters shall be considered to extend from a bay or the open ocean to a point upstream where there is no significant mixing of fresh water and seawater.

Enclosed Bays

Enclosed bays are hydrological indentations along the coast that enclose an area of oceanic water within distinct headlands or harbor works. Enclosed bays include all bays where the narrowest distance between the headlands or outermost harbor works is less than 75 percent of the greatest dimension of the enclosed portion of the bay.

Impaired Water Body

A water body that is currently listed on the Clean Water Act section 303(d) list.

Indirect Discharge

Any discharge that enters a Water of the U.S. by first traveling via a storm drain or any other constructed conveyance system.

Inland Surface Waters

All surface waters of the state that do not include the ocean, enclosed bays, or estuaries.

Low Impact Development (LID)

A storm water management and land development strategy that emphasizes water conservation and the use of on-site natural features integrated with engineered, small-scale hydrologic controls to more closely reflect pre-development hydrologic functions.

Method Detection Limit (MDL)

Minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero, as defined in 40 C.F.R. part 136, Attachment B, revised as of July 3, 1999.

Minimum Level (ML) and Reporting Level (RL)

The minimum level (ML) means the concentration at which a properly calibrated monitoring system gives a recognizable signal and acceptable calibration point. The ML is the concentration in a sample that is equivalent to the concentration of the lowest calibration standard analyzed by a specific monitoring procedure, assuming that all the method specified sample weights, volumes, and processing steps have been followed. A reporting level (RL) is the ML for reporting and compliance determination included in this Order.

MS4 Operator

The MS4 Operator is the entity responsible for the operation of its local municipal separate storm sewer system subject to an MS4 NPDES Permit.

Monitoring Well

Specialized wells in which the depth to groundwater can be measured and samples of ground water can be collected for analysis for the purpose of managing drinking water aquifers and/or to fulfill requirements mandated by the federal Safe Drinking Water Act and the California Health and Safety Code.

Non-community Water System

A water system that is not a community water system, as defined in this attachment. A non-community water system is a water system that generally serves less than 15 service connections used by yearlong residents or does not regularly serve at least 25 year around residents with the water system's service area.

Not Detected (ND)

Sample results less than the properly calibrated monitoring equipment's MDL.

Non-transient Water System

A water system that is not a community water system, as defined in this attachment, and that regularly serves at least 25 of the same persons over six months per year. Non-transient water systems are regulated by the State Water Board Division of Drinking Water.

National Pollutant Discharge Elimination System (NPDES)

The national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under Clean Water Act sections 307, 402, 318, and 405.

Pollutants

Substances defined in Clean Water Act section 502(6) (33 U.S.C. § 1362(6)), and incorporated by reference into Water Code section 13373.

Pollution Prevention

Any action that causes a net reduction in the use or generation of a hazardous substance or other pollutant that is discharged into water and includes, but is not limited to, input change, operational improvement, production process change, and product reformulation (as defined in Water Code section 13263.3). Pollution prevention does not include actions that merely shift a pollutant in discharge water from one environmental medium to another environmental medium, unless clear environmental benefits of such an approach are identified to the satisfaction of the State Water Board or Regional Water Board.

Receiving Water

The term receiving water is used interchangeably with the term waters of the U.S.

Superchlorinated Water

Water that is dosed with chlorine in order to adequately sanitize and disinfect drinking water system facilities

Supply Well

A groundwater well that is installed, operated, maintained and/or rehabilitated in accordance with the federal Safe Drinking Water Act and the California Health and Safety Code to pump ground water for the primary purpose of delivering drinking water to a municipality or community.

Transmission Systems

Transmission systems include pipes, pumps, canals, pump houses, and other components used to move water from the point of origin to storage reservoirs, treatment facilities, and distribution systems. Transmission systems do not have connections to serve end users.

Water Purveyor

Any entity that discharges from a drinking water system, including water purveyors, wholesalers, distributors, districts, municipalities, private companies, and other entities that own or operate a community drinking water system.

Water Wholesaler

An entity that provides potable water to a person, political subdivision, or municipality that is not the ultimate consumer of the service.

Waters of the State

Any surface water or groundwater, including saline waters, within boundaries of the state.

Waters of the United States (U.S.)

Generally refers to surface waters, as defined for the purposes of the federal Clean Water Act.

ATTACHMENT B1 – NOTICE OF INTENT
STATE WATER RESOURCES CONTROL BOARD
TO APPLY FOR REGULATORY COVERAGE UNDER
ORDER WQ 2014-0194-DWQ, NPDES NO. CAG140001
FOR DRINKING WATER SYSTEM DISCHARGES TO WATERS OF THE U.S.

1. DRINKING WATER SYSTEM OWNER¹

Name		Number of Connections: _____	
State Water Board Division of Drinking Water Drinking Water System No.: _____ (If Applicable - Conceptual Letter Approval – System No.: _____)			
Mailing Address			
City	State	ZIP	Phone
Contact Person			
Signature: ²			Date:

2. APPLICANT (IF DIFFERENT FROM SYSTEM OWNER)

Name			
Mailing Address			
City	State	ZIP	Phone
Contact Person			
Signature: ²			Date:

3. WATER SUPPLIERS (IF APPLICABLE)

Name			
Mailing Address			
City	State	ZIP	Phone
Contact Person			
Signature: ²			Date:

4. BILLING ADDRESS

Name			
Mailing Address			
City	State	ZIP	Phone
Contact Person			

¹ If additional property owners are involved, provide the information in a supplementary letter.

² By signing this notice of intent, you are certifying under penalty of perjury that the information provided in this application and in any attachments is true and accurate to the best of your knowledge. By signing this Notice of Intent, you agree to closely monitor and stop the discharge if there is any violation of Order WQ 2014-0194-DWQ or impact to receiving water beneficial uses.

5. PLANNED DISCHARGE INFORMATION

Identify the type of facilities that will have drinking water system discharge (all that apply)	
<input type="checkbox"/> Intake and/or Transmission Facilities <input type="checkbox"/> Storage Tanks and/or Reservoirs <input type="checkbox"/> Water Treatment Facilities	<input type="checkbox"/> Distribution Systems <input type="checkbox"/> Supply Wells <input type="checkbox"/> Other (explain below)
List and description of other discharges.	
Are the discharges existing discharges as of the adoption date of this Order)? _____ If not, identify the new discharges that are proposed to take place prior to the expiration date of this Order?	
List any additives to the drinking water not affiliated with drinking water treatment, their purpose, and quantity: (For example, algaecides, anticorrosion agents, etc.)	

6. MULTIPLE WATER USE OR BENEFICIAL USE OPTIONS

Is using a portion of the discharge for irrigation, groundwater infiltration/recharge or other use a viable option?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Is land disposal of a portion of your discharge a viable option?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Provide a brief description of the discharge (or portion thereof), that is collected and applied for irrigation or other beneficial reuse. If no multiple water use options of any portion of your discharge are viable, explain why (attach additional sheet as necessary).		

7. RECEIVING WATER INFORMATION (provide on separate sheet if necessary) *Note that identification of receiving waters does not necessarily constitute a formal finding that any specific water body is a water of the U.S.*

Name of all named receiving water bodies and/or major downstream water bodies:		
Circle the Regional Water Quality Control Board(s) where receiving water body (ies) is/are located: REGION 1, 2, 3, 4, 5, 6, 7, 8, or 9 (See Attachment H for identification of the various regions)		
Are any of the receiving water bodies receiving drinking water system discharges listed on the current 303d list ¹ for a constituent in your discharge? ¹	<input type="checkbox"/> Yes	<input type="checkbox"/> No
If Yes, then list the water bodies on the 303d list, the constituent causing the impairment:		
Does/Do the receiving water body(ies) have applicable waste load allocations identified in Section K of the Fact Sheet or TMDL-related requirements in Attachment G? If yes, the following items must be attached to this form for the application package to be deemed complete: a. Laboratory Analysis and estimated volume of your discharge per section II.C.1.d.i. of this Order b. If applicable, a description of the additional best management practices, including applicable treatment or controls that will be implemented to comply with TMDL-related requirements per section II.C.1.d.ii. of this Order	<input type="checkbox"/> Yes	<input type="checkbox"/> No

¹ See http://www.waterboards.ca.gov/water_issues/programs/tmdl/ for current Clean Water Act section 303(d) listing.

8. BEST MANAGEMENT PRACTICES (CHECK ALL THAT APPLY)

- Best Management Practices (BMPs) are being implemented by trained personnel of the subject drinking water system(s) and an instruction copy of the BMPs are available to all personnel and available at the water purveyor's main office(s) upon State or Regional Water Board staff request.
Date that implementation of BMPs commenced for the above identified Drinking Water System:

- If not, provide date BMPs will be implemented and available. (Date must be within 6 months of the effective date of this Order.)* _____

9. APPLICATION FEE

- Provide the appropriate applicable fees. Information on applicable fees can be found at <http://www.waterboards.ca.gov/resources/fees/> Checks shall be made payable to the State Water Resources Control Board.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature

Date

**ATTACHMENT B2 – NOTICE OF NON-APPLICABILITY
 STATE WATER RESOURCES CONTROL BOARD**

**CERTIFYING NON-APPLICABILITY OF REGULATORY COVERAGE UNDER
 ORDER WQ 2014-0194-DWQ, NPDES NO. CAG140001**

1. DRINKING WATER SYSTEM OWNER

Name		State Board Division of Drinking Water Drinking Water System Permit No.:	
Mailing Address			
City	State	ZIP	Phone
Contact Person			
Signature:		Date:	

2. WATER PURVEYOR (IF DIFFERENT FROM ABOVE)

Name			
Mailing Address			
City	State	ZIP	Phone
Contact Person			
Signature:		Date:	

3. REASON FOR NON-APPLICABILITY: (check one that applies and complete information)

Discharges from the above system(s):
<input type="checkbox"/> Are regulated by a separate individual NPDES Permit issued by a Regional Water Board to address site-specific discharges outside the scope of this Order or a Total Maximum Daily Load (TMDL) –related water quality impairments: Regional Water Board Order No. _____ NPDES Permit No. _____
<input type="checkbox"/> Are covered under a local agreement with an municipal sewer storm system (MS4) permittee (Attach a copy of agreement and acknowledgement by the corresponding Regional Water Board)
<input type="checkbox"/> Are from a drinking water system owned/operated by an (MS4) permittee or co-permittee named on an existing Water Board NPDES Permit and <u>all</u> discharges flow into the same regulated storm drain system. Provide Order No. _____ NPDES Permit No. _____
<input type="checkbox"/> Do not discharge to a water of the U.S. or a conveyance that drains to a water of the U.S.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature

Date

ATTACHMENT C – EXAMPLE BEST MANAGEMENT PRACTICES (BMPs)

The Discharger shall implement BMPs to comply with the requirements of this Order, to protect the beneficial uses of the receiving waters and to prevent erosion or hydromodification caused by drinking water system discharges. Required BMPs include but are not limited to the proven practices established by the American Water Works Association, or other professional associations or institutes, in accordance with updated available technology. Dischargers shall implement BMPs comparable to the following example procedures and measures to achieve compliance.

I. Example BMP Procedures

A. Chlorinated Water Discharges

All chlorinated water shall be dechlorinated chemically or naturally. Filter bags, filter rolls and fabric filters, shall be used to remove any sand, silt or debris from entering the surface water or storm drain system.

B. Superchlorinated Water Discharges

All superchlorinated water shall be dechlorinated at the point of discharge directly into a surface water or the point of discharge into any storm water conveyance system. Filter bags or rolls, or equivalent, shall be used to remove any sand, silt or debris from entering the surface water or storm drain system.

C. Facility Drainage Discharges

All discharges from transmission, treatment, storage and distribution facility draining for cleaning and maintenance shall be dechlorinated. Filter bags, filter rolls and fabric filters shall be used to remove sediment prior to discharging to surface waters or storm drains.

D. Groundwater Supply Well Discharges

During flushing, rehabilitation, or development of water supply wells, multi-baffled settling tanks, or equivalent, shall be used if necessary to remove large particles and to reduce turbidity. If further management is needed to reduce solids after settling, the Discharger shall filter the water implementing a filter-bag filtration system, or equivalent practice, before discharging to achieve a turbidity threshold that is in compliance with this Order.

II. Example BMP Measures

A. Sediment and Erosion Control

Sediment and erosion control BMPs that assess and prevent potential impacts to receiving waters, at discharge points and downstream reaches.

1. **Receiving Waters.** The Discharger shall identify methods for locating discharge points and receiving waters to determine appropriate sediment and erosion control measures.

2. **Sediment Control.** Sediment control practices shall be used to filter and trap sediment particles, and prevent them from reaching storm drains or receiving waters. Sediment control practices to control sedimentation discharge and buildup in receiving waters include:
 - (a) Straw wattles and gravel bags may be placed in a flow pathway and around storm drain inlets;
 - (b) Plastic sheets may be used to line a trench and flow pathway to prevent water contact with soil;
 - (c) Check dams may be constructed to dissipate flow energy and minimize the potential for discharges to dislodge soil; and
 - (d) A storm water swale, if available nearby to the point of discharge that has sufficient capacity for the discharge.
 - (e) Discharge to an open field or turf to remove sand and/or silt or larger particles prior to surface water discharge.
3. **Erosion Controls.** Erosion control practices shall be used to protect soil surfaces at discharge points and receiving waters. Erosion control practices shall be used to prevent re-suspension of ambient sediment within a receiving water, and shoreline erosion and streambed scour. Such controls shall minimize the energy of discharges by managing flow velocities and volumes, and shall be appropriately designed so that the discharge does not exceed the hydraulic capacity of the receiving water at the point of discharge and areas downstream of the discharge point. The following measures may be used to control erosion in receiving waters:
 - (a) Construct check dams to slow down the flow;
 - (b) Install flow diffusers at discharge point;
 - (c) Fashion discharge flow path with as little slope as possible; and
 - (d) Decrease discharge flow rates and duration.

B. Dechlorination

The following types of dechlorination methods, or equivalent, to remove chlorine:

1. **Dechlorinating Diffuser** – The dechlorinating diffuser connects directly to a discharge nozzle (e.g., to a fire hydrant or fire hose) and contains a chamber that houses dechlorination agent. Some diffusers feature a siphon for dechlorinating agent tablets or a solution to dechlorinate the water.
2. **Dechlorination Mats** – These mats are used to facilitate effective contact between the flow and dechlorinating agent during dechlorination. For dechlorination of discharges from trenches during main breaks, the tablets are placed inside synthetic mesh fabric pockets sewn together in a grid or line. The dechlorinating mats are laid across the flow path or over the storm water conveyance system.

As the discharged water contacts the tablets, dechlorinating agent is released and chlorine is inactivated.

3. Broadcast Dechlorination – Dechlorination granules are spread over an area, such as pavement, where chlorinated water is flowing toward a storm water conveyance system inlet. As the discharged water contacts the tablets, dechlorinating agent is released and chlorine is inactivated.
4. Chemical Injection Metering Pump – Occasionally, a dechlorination agent is injected into a discharge pipe, such as a tank drain, to dechlorinate the water before entering the storm water system.

Addition of dechlorination chemicals shall be managed to ensure the dechlorination agent does not adversely affect or impact beneficial uses of the receiving waters.

C. Copper and Zinc Management

A Discharger that applies copper-based herbicides or zinc-based corrosion inhibitors to its water shall implement BMP measures to eliminate or reduce copper and zinc concentrations in its discharges to the extent feasible, including but not limited to the following:

1. Record keeping of where, when and how much zinc or copper is used to treat water that has the potential to be discharged to a surface water.
2. Implementation of BMPs that eliminate planned discharges and minimize emergency discharges to surface water bodies from occurring within 48 hours of applying copper-based herbicides or zinc-based corrosion inhibitors.
3. Implementation of BMPs to eliminate or reduce to the extent feasible the use of copper-based herbicides or zinc-based corrosion inhibitors by using less toxic agents or other methods in place of copper-based herbicides or zinc-based corrosion inhibitors.

D. Training

All personnel using, operating and maintaining all facilities and equipment shall be properly trained to implement BMPs to discharges when conducting mandated operational and maintenance activities. The Discharger's staff and/or contractors shall be properly trained to understand permit compliance needs and perform the required monitoring, notification and reporting.

E. Equipment and Supplies

Equipment and sampling meters shall be inspected, maintained and calibrated per manufacturer instructions and specifications.

ATTACHMENT D – STANDARD PROVISIONS

I. STANDARD PROVISIONS – PERMIT COMPLIANCE

A. Duty to Comply

1. The Discharger shall comply with all of the conditions of this Order. Any noncompliance constitutes a violation of the Clean Water Act (CWA) and the California Water Code (Water Code) and is grounds for a potential enforcement action, permit termination, revocation and reissuance, or modification; or denial of a permit renewal application. (40 C.F.R. § 122.41(a).)

B. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this Order. (40 C.F.R. § 122.41(c).)

C. Duty to Mitigate

The Discharger shall take all reasonable steps to minimize or prevent any discharge in violation of this Order that has a reasonable likelihood of adversely affecting human health or the environment. (40 C.F.R. § 122.41(d).)

D. Proper Operation and Maintenance

The Discharger shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Water Purveyor to achieve compliance with the conditions of this Order. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision includes the operation of backup or auxiliary facilities or similar systems that are installed by a Water Purveyor only when necessary to achieve compliance with the conditions of this Order. (40 C.F.R. § 122.41(e).)

E. Property Rights

1. This Order does not convey any property rights of any sort or any exclusive privileges. (40 C.F.R. § 122.41(g).)
2. The issuance of this Order does not authorize any injury to persons or property or invasion of other private rights, or any infringement of state or local law or regulations. (40 C.F.R. § 122.5(c).)

F. Inspection and Entry

The Water Purveyor shall allow State and/or Regional Water Board staff, United States Environmental Protection Agency (U.S. EPA), and/or their authorized representatives

(including an authorized contractor acting as their representative), upon the presentation of credentials and other documents, as may be required by law, to (40 C.F.R. § 122.41(i); Water Code section 13383):

1. Enter upon the Discharger's premises where a regulated facility or activity is located or conducted, or where records are kept under the conditions of this Order (40 C.F.R. § 122.41(i)(1));
2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this Order (40 C.F.R. § 122.41(i)(2));
3. Inspect and photograph, at reasonable times, any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Order (40 C.F.R. § 122.41(i)(3)); and
4. Sample or monitor, at reasonable times, for the purposes of assuring Order compliance or as otherwise authorized by the CWA or the Water Code, any substances or parameters at any location. (40 C.F.R. § 122.41(i)(4).)

II. STANDARD PROVISIONS – PERMIT ACTION

A. General

This Order may be modified, revoked and reissued, or terminated for cause. The filing of a request by the Discharger for modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any Order condition. (40 C.F.R. § 122.41(f).)

B. Duty to Reapply

If the Discharger chooses to continue a discharge regulated by this Order after the expiration date of this Order and after the State Water Board has reissued this Order, the Discharger shall apply for and obtain new permit coverage as required by the new Order. (40 C.F.R. § 122.41(b).)

C. Transfers

This Order is not transferable to any person except after notice to the State Water Board. The State Water Board may require modification or revocation and reissuance of the Order or Notice of Applicability to change the name of the Discharger and incorporate such other requirements as may be necessary under the CWA and the Water Code. (40 C.F.R. § 122.41(l)(3) and 122.61.)

III. STANDARD PROVISIONS – MONITORING

- A.** Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. (40 C.F.R. § 122.41(j)(1).)
- B.** If applicable, monitoring results shall be conducted according to test procedures under 40 Code of Federal Regulations part 136. (40 C.F.R. § 122.41(j)(4) and 122.44(i)(1)(iv).)

IV. STANDARD PROVISIONS – RECORDS

A. Records Retention

The Discharger shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this Order, and records of all data used to complete the application for this Order, for a period of at least three (3) years from the date of the sample, measurement, report or application. This period may be extended by request of the State Water Board's Division of Water Quality Deputy Director at any time. (40 C.F.R. § 122.41(j)(2).)

B. Records of monitoring information shall include:

- 1. The date, exact place, and time of sampling or measurements (40 C.F.R. § 122.41(j)(3)(i));
- 2. The individual(s) who performed the sampling or measurements (40 C.F.R. § 122.41(j)(3)(ii));
- 3. The date(s) sampling and monitoring were performed (40 C.F.R. § 122.41(j)(3)(iii));
- 4. The individual(s) who performed the analyses (40 C.F.R. § 122.41(j)(3)(iv)); and
- 5. The results of such monitoring. (40 C.F.R. § 122.41(j)(3)(vi).)

C. Claims of confidentiality for the following information will be denied (40 C.F.R. § 122.7(b)):

- 1. The name and address of any permit applicant or Discharger (40 C.F.R. § 122.7(b)(1)); and
- 2. Permit applications and attachments, permits and monitoring data. (40 C.F.R. § 122.7(b)(2).)

V. STANDARD PROVISIONS – REPORTING

A. Duty to Provide Information

The Discharger shall furnish to the State Water Board or the United States Environmental Protection Agency (U.S. EPA) within a reasonable time, any information which the State Water Board or U.S. EPA may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this Order or to determine compliance with this Order. Upon request, the Discharger shall also furnish to the State Water Board, a Regional Water Board or U.S. EPA copies of records required to be maintained by this Order. (40 C.F.R. § 122.41(h) and Wat. Code, §§ 13267, 13383.)

B. Signatory and Certification Requirements

1. All applications, reports, or information submitted to the State Water Board, and/or U.S. EPA shall be signed and certified in accordance with Standard Provisions – Reporting sections V.B.2 through V.B.7, below. (40 C.F.R. § 122.41(k).)
2. For a corporation, a responsible corporate officer shall sign all permit applications. For the purpose of this section, a responsible corporate officer means: (i) A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures. (40 C.F.R. § 122.22(a)(1).)
3. For a partnership or sole proprietorship, a general partner or the proprietor shall sign all permit applications, respectively. (40 C.F.R. § 122.22(a)(2).)
4. For a municipality, State, federal, or other public agency, all permit applications shall be signed by either a principal executive officer or ranking elected official. For purposes of this provision, a principal executive officer of a federal agency includes: (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of U.S. EPA). (40 C.F.R. § 122.22(a)(3).)
5. All reports required by this Order and other information requested by the State Water Board, a Regional Water Board or U.S. EPA shall be signed by a person described in Standard Provisions – Reporting V.B.2 above, or by a duly authorized representative of that person. A person is a duly authorized representative only if:

- a. The authorization is made in writing by a person described in Standard Provisions – Reporting V.B.2 above (40 C.F.R. § 122.22(b)(1));
 - b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.) (40 C.F.R. § 122.22(b)(2)); and
 - c. The written authorization is submitted to the State Water Board. (40 C.F.R. § 122.22(b)(3).)
6. If an authorization under Standard Provisions – Reporting V.B.3 above is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Standard Provisions – Reporting V.B.3 above shall be submitted to the State and Regional Water Board prior to or together with any reports, information, or applications, to be signed by an authorized representative. (40 C.F.R. § 122.22(c).)
7. Any person signing a document under Standard Provisions – Reporting V.B.2 or V.B.3 above is making the following certification:

“I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.” (40 C.F.R. § 122.22(d).)

C. Monitoring Reports

1. Monitoring results shall be reported at the intervals specified in the Monitoring and Reporting Program in Attachment E of this Order.
2. If the Discharger monitors any pollutant more frequently than required by this Order using test procedures approved under 40 Code of Federal Regulations part 136, the results of this monitoring shall be included in the calculation and reporting of the data to the State Water Board. (40 C.F.R. § 122.41(l)(4)(ii).)

D. Twenty-Four Hour Reporting

1. The Discharger shall report any noncompliance that may endanger health or the environment to the Regional Water Board. Any information shall be provided orally within 24 hours from the time the Discharger becomes aware of the circumstances.

A written submission shall also be provided to the applicable regional water quality control board within five (5) days of the time the Discharger becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance. (40 C.F.R. § 122.41(l)(6)(i).)

2. The State Water Board or a Regional Water Board may waive the above-required written report under this provision on a case-by-case basis if an oral report has been received within 24 hours. (40 C.F.R. § 122.41(l)(6)(iii).)

E. Anticipated Noncompliance

The Discharger shall give advance notice to the appropriate Regional Water Board or State Water Board of any planned changes in the permitted facility or activity that may result in noncompliance with General Order requirements. (40 C.F.R. § 122.41(l)(2).)

F. Other Noncompliance

The Discharger shall report all instances of noncompliance not reported under Standard Provisions – Reporting V.C and V.D above at the time monitoring reports are submitted. The reports shall contain the information listed in Standard Provision – Reporting V.D above. (40 C.F.R. § 122.41(l)(7).)

G. Other Information

When the Water Purveyor becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Regional Water Board, State Water Board, or U.S. EPA, the Water Purveyor shall promptly submit such facts or information. (40 C.F.R. § 122.41(l)(8).)

VI. Standard Provisions – Enforcement

The State and Regional Water Board are authorized to enforce the terms of this permit under several provisions of the Water Code, including, but not limited to, sections 13385, 13386, and 13387.

ATTACHMENT E – MONITORING AND REPORTING PROGRAM

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ATTACHMENT E – MONITORING AND REPORTING PROGRAM

Discharges from drinking water systems, as authorized by this Order, shall be properly managed to not adversely affect or impact beneficial uses of a receiving water body. The purpose of the monitoring and reporting requirements contained in the following Monitoring and Reporting Program is to provide information demonstrating that management practices are properly implemented to protect surface water quality. The objective of the monitoring is to validate that the management practices are performing properly to maintain compliance with this Order and protect receiving waters from adverse impacts to beneficial uses.

Title 40 Code of Federal Regulations part 122.48 requires that all National Pollutant Discharge Elimination System (NPDES) permits specify monitoring and reporting requirements. California Water Code sections 13267 and 13383 also authorize the State Water Resources Control Board (State Water Board) and a Regional Water Quality Control Board (Regional Water Board) to require technical and monitoring reports. This Monitoring and Reporting Program establishes monitoring and reporting requirements, which implement the federal and State of California regulations.

Dischargers authorized under this Order shall comply with all Standard Provisions in Attachment D related to monitoring, reporting and recordkeeping.

I. GENERAL MONITORING PROVISIONS

- A.** Samples and measurements taken as required herein shall be representative of the nature of the monitored discharge after implementation of best management practices (BMPs). All samples shall be taken at the monitoring locations specified below and, unless otherwise specified, before the discharge flow joins or is diluted by any other waste stream or body of water.
- B.** Chemical analyses that require laboratory testing are not required in this Order (with the exception of application requirements for discharge into a water body with already established TMDL requirements identified in Section K of the Fact Sheet and/or TMDL-related requirements prescribed to the water purveyors listed in Attachment G). The Discharger shall conduct onsite field measurements for pH, turbidity, and total chlorine residual per quality assurance and quality control (QA/QC) protocol that conform to U.S. EPA guidelines, or procedures approved by the American Water Works Association or other professional drinking water industry association.
- C.** The Discharger shall maintain sufficient resources, including trained personnel and properly calibrated and maintained field instruments to adequately perform all field measurements required in this Order. Onsite field measurements shall be performed using handheld devices by trained personnel acting on the Discharger's behalf. A manual containing the proper operating procedures for all onsite field monitoring equipment, shall be maintained onsite or at the water purveyor's office, and shall be available for inspection by State or Regional Water Board staff.

- D. Appropriate field meter devices shall be selected consistent with accepted scientific practices and used to ensure the accuracy and reliability of measurements of monitored discharges. All devices shall be properly maintained and calibrated per manufacturer instructions and as necessary to ensure their continued accuracy.

II. MONITORING REQUIREMENTS FOR PLANNED DISCHARGES

A. Event Monitoring Requirements for Superchlorinated, Well development and/or rehabilitation, and Large Volume Discharges.

The Discharger shall monitor all superchlorinated discharges, all discharges from well development and/or rehabilitation activities, and individual discharges greater than 325,850 gallons (one acre-foot) for the constituents specified in Table E-1 and per the frequency specified in Table E-2.

Table E-1. Event Monitoring of Superchlorinated Discharges, Well Development and/or Rehabilitation, and Individual Discharge Events Greater than 325,850 Gallons

Parameter	Units	Sampling ²	Sample Type
Chlorine, Total Residual ^{1,3,4}	mg/L	1/Event	Grab ¹
Volume	Gallons	1/Event	Estimate ⁵
pH ⁶	Standard Units	1/Event	Grab
Turbidity	NTU	1/Event	Visual Estimate
Turbidity for Well Development and/or Rehabilitation Only ¹	NTU	1/Event	Grab ¹

¹ A handheld field meter shall be used, provided the meter utilizes a U.S. EPA-approved algorithm/method and is calibrated and maintained in accordance with the manufacturer's instructions. The Discharger shall maintain a calibration and maintenance log for each meter used for monitoring required by this Monitoring and Reporting Program.

² Sampling shall take place downstream of management practices, as feasible.

³ Total chlorine residual shall be monitored with a method sensitive to and accurate at a minimum level of 0.1 mg/L. False positives are acceptable if explanation of the cause is included.

⁴ Total Chlorine Residual monitoring is not required of non-chlorinated discharges.

⁵ Calculated estimate using available meter reading information or visual estimate.

⁶ pH monitoring is required for superchlorinated discharges only.

Table E-2. Event Frequency Requirements for Superchlorinated Discharges, Well Development and/or Rehabilitation Discharges to a Water of the U.S., and Discharges Greater than 325,850 Gallons

Duration of Discharge	Sampling Requirements
Less than 20 minutes	One sample is required during the first 10 minutes of the discharge.
20 minutes to 60 minutes	One sample is required during the first 10 minutes of the discharge, plus a second sample is required within the last 10 minutes of the discharge.
Greater than 60 minutes	One sample is required within the first 10 minutes, a second sample is required within the next 50 minutes, and a third sample is required approximately within the last 10 minutes of the discharge or as close to the end of the discharge as is feasible.

B. Annual Representative Monitoring Requirements

This Order allows discharges of similar nature to be monitored on a representative basis. Representative monitoring is the use of monitoring results of one water quality monitoring sample to represent other discharges expected to have the same water quality. A representative monitoring measurement must represent discharges of similar nature, meaning discharges that have all the following items in common:

- (a) The same general water source (ground water or surface water of similar water quality), and
- (b) The same water treatment, and
- (c) The same type of implemented BMPs.

The Discharger shall monitor all planned discharges not listed in Section II.A above, using representative monitoring, as previously defined in this section, for the constituents specified in Table E-3 and per the frequency specified in Table E-4.

Table E-3. Annual Representative Monitoring Requirements

Parameter	Units	Sampling ²	Sample Type ¹
Chlorine, Total Residual ^{3,4}	mg/L	1/Year	Grab ¹
Volume	Gallons	1/Year	Estimate ⁵
Turbidity	NTU	1/Year	Visual Estimate

¹ A handheld field meter shall be used, provided the meter utilizes a U.S. EPA-approved algorithm/method and is calibrated and maintained in accordance with the manufacturer's instructions. The Discharger shall maintain a calibration and maintenance log for each meter used for monitoring required by this Monitoring and Reporting Program.

² Sampling shall take place downstream of management practices, as feasible.

³ Total chlorine residual shall be monitored with a method sensitive to and accurate at a minimum level of 0.1 mg/L. False positives are acceptable if explanation of the cause is included.

⁴ Total Chlorine Residual monitoring is not required of non-chlorinated discharges.

⁵ Calculated estimate using available meter reading information or visual estimate.

Table E-4. Annual Representative Monitoring Frequency Requirements

Duration of Discharge	Sampling Requirements
Less than 20 minutes	One sample is required during the first 10 minutes of the discharge.
20 minutes to 60 minutes	One sample is required during the first 10 minutes of the discharge, plus a second sample is required within the last 10 minutes of the discharge.
Greater than 60 minutes	One sample is required within the first 10 minutes, a second sample is required within the next 50 minutes, and a third sample is required approximately within the last 10 minutes of the discharge or as close to the end of the discharge as is feasible.

In its annual report, the Discharger shall:

- (a) Submit a copy of its site schematic submitted in its application for enrollment with labeled representative monitoring locations, and

- (b) Identify the portions of its system that the representative monitoring results represent, and
- (c) Identify all changes in its representative monitoring locations that have occurred during the monitoring-year.

C. Annual Discharge Volume Monitoring Requirements

The Discharger shall keep:

- (a) A record of the number of direct discharges to a water of the U.S. that is greater than 50,000 gallons, during each calendar year,
- (b) An estimate of the total volume discharged to surface water during each calendar year, and
- (c) An estimate of the total volume of discharge water directed to a reuse or beneficial use in accordance with section VI. of this Order.

D. Monitoring Not Required

Monitoring is not required for any discharges that:

- (a) Do not ultimately reach a water of the U.S., and
- (b) Are put to multiple uses or beneficial reuse, in accordance with section VI. of the Order, prior to surface water discharge.

E. Increase in Monitoring Requirements

The Deputy Director may increase the monitoring or frequency at any time to ensure the protection of beneficial uses of the receiving water. Any requirement for increased monitoring will be based on site-specific data or information that indicates a site-specific discharge threatens to cause or contribute to an exceedance of a receiving water quality criteria or objective.

III. RECEIVING WATER MONITORING REQUIREMENTS DURING NON-COMPLIANCE WITH THIS ORDER

The receiving water must be monitored for all direct planned discharges that do not comply with the requirements contained in section IV of the Order and the discharge potentially causes or contributes to an adverse effect or impact to beneficial uses. Receiving water monitoring shall be conducted during or immediately after the Discharger became aware of a non-compliant discharge that adversely effects or impacts beneficial uses of the receiving water. The Discharger shall monitor the point of confluence of the discharge and the receiving water. If the receiving water presents hazards to the monitoring personnel, visual monitoring shall be conducted using telephoto lenses and binoculars. If further hazards exist beyond such measures, monitoring is not required, and the hazards shall be documented in the corresponding monitoring report.

Receiving water monitoring shall consist of digital photographs and documentation of observed effects and impacts the discharge has on the receiving water body including the presence or absence of:

- a. Erosion;

- b. Floating or suspended matter;
- c. Discoloration;
- d. Impact on aquatic life;
- e. Visible films, sheens, or coatings; and
- f. Potential nuisance conditions.

Photographs and documented observations of the receiving water conditions shall be included in the annual monitoring report, and made available to State and Regional Water Board staff upon request.

Receiving water monitoring is not required for emergency discharges.

IV. POST-NOTIFICATION OF EMERGENCY OR NON-COMPLIANT DISCHARGES THAT ADVERSELY EFFECT OR IMPACT BENEFICIAL USES

Within 24 hours of the Discharger becoming aware of an adverse effect(s) or impact on beneficial uses of the receiving water body due to non-compliance with this Order, or due to a system failure or emergency involving a discharge from its drinking water system, the Discharger shall notify the corresponding Regional Water Board and the MS4 operator if applicable, and shall confirm this notification in writing within five days.

The notification shall include all of the following:

- a. The location and extent of non-compliance or emergency discharge;
- b. The cause of the non-compliance or emergency discharge;
- c. The date, time and expected duration of the non-compliance or emergency discharge;
- d. The estimated volume of discharge;
- e. The applicable receiving water body; and
- f. The corrective actions taken (or being taken) to prevent future non-compliance or repair the system failure.

V. PRE-NOTIFICATION OF LARGE PLANNED DISCHARGES GREATER THAN ONE ACRE-FOOT (325,850 GALLONS)

Three (3) days prior to initiation of a planned discharge (or retroactively within 24-hours after the Discharger is informed to conduct an urgent planned discharge) of a volume equal to or greater than one acre-foot (325,850 gallons), the Discharger shall notify the MS4 operator if applicable, and the appropriate Regional Water Board and provide:

- a. The start date of discharge
- b. The location of discharge and the applicable receiving water
- c. The estimated volume of discharge, and
- d. The reasons for discharge

VI. REPORTING AND RECORDKEEPING REQUIREMENTS

A. Self-Monitoring Report Requirements

1. Self-monitoring reports including compliant and non-compliant discharge monitoring information shall be maintained in the Discharger’s main office and made available upon request of State and Regional Water Board staff.
2. Monitoring periods and reporting for all required monitoring shall be completed according to the schedule in Table E-5 below. Each discharge event that meets the conditions in section II and Table E-1 of this MRP shall be monitored.

Table E-5. Monitoring Periods and Reporting Schedule

Sampling Frequency	Monitoring Period	Record Keeping Due Date
1/Event or Year	January 1 thru December 31	1 March

3. The Discharger shall arrange and summarize any reported numerical data in a tabular format. When electronic submittal of data is required and CIWQS does not provide for entry into a tabular format within the system, the Discharger shall electronically submit the data in a tabular format as an attachment.
4. If no discharge occurred during the reporting period, the monitoring report shall report that there was no discharge.
5. Authorized Dischargers shall maintain the results for all monitoring specified in this Monitoring and Reporting Program and as specified in this Order. If a Discharger monitors any pollutant more frequently than required by this Order, the results of this monitoring shall be included in the self-monitoring report.

B. REPORTING REQUIREMENTS TO STATE WATER BOARD

1. Dischargers shall report to the State Water Board any toxic chemical release data it reports to the State Emergency Response Commission within 15 days of reporting the data to the Commission pursuant to section 313 of the "Emergency Planning and Community Right to Know Act" of 1986.
2. By March 1 of every year, all non-compliant discharge monitoring information contained in the Discharger’s self-monitoring report for the past calendar year shall be submitted to the State Water Board annually and shall include all non-compliant monitoring results required in this Monitoring and Reporting Program. All non-compliant discharge monitoring information shall be accompanied by the corrective actions the Discharger has taken to return the discharge to compliance. Dischargers shall also submit the annual discharge volume monitoring requirements specified in section II.C of this Attachment.

3. The Discharger shall attach a cover letter to the SMR. The information contained in the cover letter shall clearly identify discharge events of non-compliance with the permit; discuss corrective actions taken or planned; and the proposed time schedule for corrective actions. Identified non-compliance shall include a description of the requirement that was violated and a description of the violation.
4. Monitoring reports shall be submitted to the State Water Board, signed and certified as required by the Standard Provisions (Attachment D), to the address listed below:

State Water Resources Control Board
Division of Water Quality
NPDES Permitting Unit
1001 I Street, 15th Floor
Sacramento, CA 95814

5. At any time during the term of this permit, the Deputy Director may notify authorized Dischargers to electronically submit monitoring reports using the State Water Board's California Integrated Water Quality System (CIWQS) Program Web site (<http://www.waterboards.ca.gov/ciwqs/index.html>). Until such notification is given, each Discharger shall submit a hard copy of its monitoring reports. Subsequent guidance will be provided to the Discharger upon the Deputy Director's notification for electronic submittal of reports. (Direction and guidance for electronic SMR submittals is currently available on the CIWQS Web site at http://www.waterboards.ca.gov/water_issues/programs/ciwqs/chc_npdes.shtml)

ATTACHMENT F – FACT SHEET

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This Fact Sheet includes the legal requirements and technical rationale that serve as the basis for the requirements of this Order. As described in section III.B of the Order, the State Water Board incorporates this Fact Sheet as its findings supporting the issuance of the Order.

I. PERMIT INFORMATION

A. Background

Water wholesalers and purveyors are responsible for developing water supplies and providing drinking water to their communities and customers in accordance with statutory requirements of the federal Safe Drinking Water Act and the California Health and Safety Code. Mandatory system-development and system-maintenance activities often result in surface water discharges, either via storm drain systems or other conveyance systems, or directly to a surface water body.

The Federal Water Pollution Control Act (also referred to as the Clean Water Act) section 402 requires that a discharge of any pollutant or combination of pollutants to surface waters that are waters of the United States, with certain exceptions, be regulated by a National Pollutant Discharge Elimination System (NPDES) permit. (For the purpose of this Order, the terms “waters of the United States”, “surface waters” and “receiving waters” are used interchangeably unless noted otherwise.) On September 22, 1989, the U.S. Environmental Protection Agency (U.S. EPA) granted the State of California, through the State Water Resources Control Board (State Water Board) and the Regional Water Quality Control Boards (Regional Water Boards), the authority to issue general NPDES permits pursuant to title 40 Code of Federal Regulations parts 122 and 123.

Discharges to waters of the U.S. required to be regulated with an NPDES permit, in accordance with the Clean Water Act, include discharges of pollutants from drinking water systems. The Clean Water Act does not include an exemption from federal regulation based on volume or flow of discharge; therefore, all sizes of drinking water systems, including very small systems with small volumes of surface water discharges, are required to be regulated with an NPDES permit. Many drinking water system discharges in California that enter waters of the U.S. (either directly or via a storm water conveyance system) are unregulated. The systems that are regulated are permitted with Regional Water Quality Control Board (Regional Water Board) permits.

The State Water Board recognizes that although the quality of the discharges from different locations within a system (raw water, potable water, chlorinated water, etc.) varies, the set of discharges from the different systems throughout the state are fairly uniform. The discharges are of water that must be discarded as water purveyors conduct similar mandatory activities to assure the water that is ultimately delivered is safe for drinking and other potable uses.

Although the discharges are similar in nature, they are regulated differently throughout the state. Some are not regulated at all. Others are regulated by various Regional Water Boards permits, depending on the region the system is located. Some Regional

Water Boards regulate the raw and potable drinking water discharges using region-wide low threat-type general NPDES permits that regulate a broad range of constituents through differing regulatory approaches. Other Regional Water Board general permits do not address the constituents of concern from these types of discharges, and/or contain requirements that are not feasible for water purveyors to comply without creating obstacles to the proper operation of drinking water systems. The following table illustrates more detail on part of the Regional Water Boards' differing regulatory approaches for discharges from drinking water systems:

Table F-1. Differences in Existing Regional Water Boards' Permit Requirements

Region	Effluent Limitations ⁰										
	Chlorine Residual (mg/L)	Settleable Solids (ml/L)	pH (standard units.)	TDS (mg/L)	BOD ₅ (mg/L)	Ammonia	Turbidity (Nep Turbidity Units)	O&G (mg/L)	Temp (°F)	Priority Pollutant	Acute Toxicity
1	0.11 ¹ and 0.019 ²	0.1	6.5 ³ and 8.5 ⁴	BPO ¹⁷	--	--	--	--	--	--	--
2 ⁵	--	--	--	--	--	--	--	--	--	--	--
3	0.02	--	--	BPO ¹⁷	--	--	--	--	--	MCLs	--
4	0.1 ⁶	0.3 ⁶ and 0.1 ⁷	6.5 ³ and 8.5 ⁴	150 ⁶ and 50 ⁷	30 ⁶ and 20 ⁷	--	150 ⁶ and 50 ⁷	15 ⁶ and 10 ⁷	86 °F	--	90% Survival
5	0.11 ¹ and 0.019 ²	0.1 ⁶	⁸ 6.5 - 8.5 ⁹ 7.5 - 9.5 ¹⁰ 6.5 - 8.3	--	¹¹ 30 ⁶ , 15 ¹² , and 10 ⁷	--	--	--	--	MCLs	--
6 ¹⁴	0.003 ⁴ and 0.002 ¹³	--	BPO ¹⁷	--	--	BPO ¹⁷	--	--	--	--	--
7	0.11 ¹ and 0.019 ²	0.2	6.0 ³ and 9.0 ⁴	--	55 and 95	--	75	25	--	--	--
8	0.1 ⁶	--	6.5 ³ and 8.5 ⁴	BPO ¹⁷	75 ^{6, 15}	--	--	15	--	--	--
9	0.1 ¹⁶	--	6.0 ³ and 9.0 ⁴	--	--	--	--	--	--	--	--

0. TDS=Total Dissolved Solids, BOD5=5-day Biochemical Oxygen Demand, O&G=Oil and Grease, Temp=Temperature

- 1. 4-day Average
- 2. 1-hour Average
- 3. minimum value
- 4. maximum value
- 5. Region 2 recently issued a tentative individual NPDES Permit for public review and comment
- 6. Daily Maximum
- 7. Monthly Average
- 8. 6.5 minimum and 8.5 maximum for discharges to Sacramento/San Joaquin River Basins
- 9. 7.5 minimum and 9.5 maximum for discharges to Goose Creek
- 10. 6.5 minimum and 8.3 maximum for discharges to Tulare Lake Basin
- 11. Same effluent limits for Total Suspended Solids (TSS)
- 12. Weekly Average

STATEWIDE GENERAL NPDES PERMIT FOR DRINKING WATER SYSTEM DISCHARGES
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13. Median value of daily measurements
14. Also has effluent limits for bacteria and dissolved oxygen based on the basin plan objective
15. TSS only
16. 90 percentile of all samples during discharge
17. Basin Plan Objective
18. Region 1 - North Coast Region, 2 - San Francisco Bay Region, 3 - Central Coast Region, 4 - Los Angeles Region, 5 - Central Valley Region, 6 - Lahontan Region, 7 - Colorado River Region, 8 - Santa Ana Region, 9 - San Diego Region

Additionally, most large and small municipalities have Municipal Separate Storm Sewer System (MS4) NPDES permits for discharge of storm water to waters of the United States (U.S.). Some MS4 permit holders (permittees) allow drinking water system discharges to enter their storm water systems as authorized non-storm water discharges, typically through established local agreements. Other MS4 permittees do not allow such discharges to enter their storm water systems unless the State Water Board or Regional Water Board separately regulates those discharges prior to entering the system.

Title 40 Code of Federal Regulations part 122.28 provides for issuance of general permits to regulate a category of point sources if the sources: (1) involve the same or substantially similar types of operations; (2) discharge the same type of waste; (3) require the same type of effluent limitations or operating conditions; (4) require similar monitoring; and (5) are more appropriately regulated under a general order rather than individual orders. Thus:

1. This Order issues NPDES Permit No. CAG140001 with the intent to provide consistent and efficient regulatory coverage and requirements for drinking water system discharges statewide that have a low threat to water quality when properly mitigated through implementation of best management practices.
2. This Order authorizes drinking water system discharges of water that is dedicated to drinking water facilities for the primary purpose of providing safe and reliable drinking water including, but not limited to treatment facilities, storage and distribution systems, transmission systems, and water supply and monitoring wells in drinking water aquifers. Owners or operators of drinking water systems that apply for coverage under this Order and that are issued a Notice of Applicability are hereinafter referred to as “dischargers”. For the purposes of this Order, references to “discharger” or “permittee” in applicable federal and State laws, regulations, plans, and policy are considered equivalent to references to the Dischargers herein.

Regulatory coverage under this Order serves as authorization for the Discharger to discharge water from its drinking water system(s) to waters of the United States (U.S.) either directly into waters of the U.S. or via other conveyance, including through a municipal storm sewer system. Coverage under this Order does not authorize discharges into a municipal storm water system. The municipal storm water system owner/operator has authority to allow these non-storm water discharges into the system. A municipal storm water system owner/operator retains authority to impose further conditions, restrictions or limitations, above and beyond the requirements of this Order, on water purveyors, as a condition for discharging into the system.

B. Water Purveyors NOT Required to Enroll in This Order

All water purveyors that have discharges to waters of the U.S. as described in this Order require an NPDES permit to discharge. The State Water Board is not mandating that small systems of less than 1,000 service connections enroll in this Order. However, the State Water Board strongly encourages water purveyors with small systems to obtain the regulatory coverage under this Order to comply with the Clean Water Act. The State Water Board recognizes that some water purveyors have obtained regulatory coverage through MS4 permits, or, due to their discharge contributing to an impairment managed by a previously-adopted Total Maximum Daily Load, the discharge must be regulated by a separate individual NPDES permit.

The State Water Board issues statewide NPDES permits for the regulation of storm water discharges from small communities and non-traditional entities. Regional Water Quality Control Boards issue NPDES permits for the regulation of storm water from large (non-small) municipalities. These storm water orders may authorize non-storm water discharges from fire hydrant flushing, operation, maintenance, or testing of potable water systems, and groundwater dewatering systems, similar to discharges covered under this Order. The State Water Board will not require a water purveyor that holds a local agreement with a municipal storm water permittee to obtain regulatory coverage under this Order provided the corresponding Regional Water Board acknowledges in writing that the local agreement demonstrates coverage under the municipal storm water permit.

This Order requires that, **by September 1, 2015**, water purveyors that meet the criteria **below** submit a Notice of Non-Applicability form (Attachment B2) certifying, in accordance with section V.B., *Signatory and Certification Requirements*, of Attachment D – Standard Provisions, that regulatory coverage from this Order is not required.

- The water purveyor discharges solely to a municipal separate storm sewer system(s) (MS4) and has an established local agreement with the MS4 permittee to discharge into its system(s), **AND** the corresponding Regional Water Board Executive Officer provides written confirmation to the State Water Board Deputy Director of Water Quality that the local agreement provides sufficient regulation of the subject drinking water system discharges through an existing MS4 NPDES permit; or
- The water purveyor is an MS4 permittee, or co-permittee, named on a State Water Board or a Regional Water Board issued MS4 permit that also authorizes discharges from drinking water systems, and all drinking water system discharges solely discharge into its own MS4 system.

Also by **September 1, 2015**, this Order requires water purveyors that meet the criteria **below** to submit a Notice of Non-Applicability form (Attachment B2) certifying, in accordance with section V.B., *Signatory and Certification Requirements*, of Attachment D – Standard Provisions, that regulatory coverage from this Order is not required.

- The water purveyor is regulated under an existing NPDES permit issued by the Regional Water Board because a Total Maximum Daily Load (TMDL) was adopted and the Regional Water Board determined that TMDL-specific permit requirements for its drinking water system(s) discharges are appropriate because those discharges may contribute to the impairment of the water body.

Also by **September 1, 2015**, this Order allows water purveyors that meet the criteria **below** the option of submitting a Notice of Non-Applicability form (Attachment B2) certifying, in accordance with section V.B., *Signatory and Certification Requirements*, of Attachment D – Standard Provisions, that regulatory coverage from this Order is not required.

- All discharges from the drinking water system do not discharge to a water of the U.S.

A water purveyor with multiple drinking water systems in California need only submit one Notice of Non-Applicability for its systems that meet the same criterion.

After review of each submitted Notice of Non-Applicability, the State Water Board's Deputy Director of Water Quality (Deputy Director) will either issue 1) a Notice of Non-Applicability Approval or 2) a response letter to the applicant outlining: (a) the missing information that deems the Notice of Non-Applicability incomplete, or (b) why the described discharge is not eligible and thus the water purveyor must obtain coverage under this Order. The water purveyor will have **60 days from the date of the response letter** to submit the items necessary to complete the Notice of Non-Applicability or to submit a complete application package in accordance with section II.C of this Order. A notice may be issued to a water purveyor that holds a drinking water system permit through the State Water Board Division of Drinking Water, and that has not submitted a Notice of Non-Applicability (or an application package for enrollment, as explained later in this Fact Sheet) by September 1, 2015, if that purveyor discharges from its drinking water system to a water of the U.S.

Drinking water systems that serve less than 1,000 connections that serve end users (this does not include water wholesalers), maintain the option to enroll in this Order and are not required to submit the Notice of Non-Applicability form.

C. Facilities and Discharges Covered Under this Order

This Order covers discharges from drinking water systems that qualify as a "community water system" as defined in the California Health and Safety Code, and wholesalers of water to community water systems. Community water systems provide daily drinking water for at least 15 service connections and at least 25 individuals at least 60 days each year. Community water systems must comply with the California Health and Safety Code per the California Code of Regulations titles 17 and 22. Title 17 ensures that water delivered by community water systems is wholesome and potable. Title 22 contains potable water standards, including the primary and secondary maximum contaminant levels (MCLs), and requires monitoring and reporting on surface water and groundwater drinking water sources.

Community water systems authorized to discharge under this Order include the following facilities:

1. **Transmission Systems.** Transmission systems are the pipes, pumps, canals, pump houses, and other components used to move water from the point of origin to storage reservoirs, treatment facilities, and distribution systems. Transmission systems do not have connections to serve end users. Above ground and underground pipes generally range in diameter from 24 inches to 90 inches. Some facilities are open channels. The water in transmission systems may or may not meet standards for human consumption.
2. **Distribution and Storage Systems.** Distribution systems are the pipes and associated pumps, valves, hydrants, storage facilities and other structures that distribute and store potable water from treatment plants, wells, reservoirs, and transmission systems to end users. Distribution pipes generally range in diameter from 2 inches to 24 inches.
3. **Wells in Drinking Water Aquifers.** Drinking water supply wells are installed in borings advanced into the ground to extract groundwater for use as drinking water. These types of wells are typically 12 inches to 36 inches in diameter. Monitoring wells are also in borings advanced into the ground to gage the depth to groundwater for drinking water aquifer management purposes such as groundwater overdraft protection. In addition monitoring wells serve as access points to sample the aquifer to characterize the water quality and to detect contaminants such as bacteria before the contaminant reaches the water supply. Monitoring wells are typically 12 inches or less in diameter. Discharges from water supply and monitoring wells occur during well development, maintenance (including flushing), rehabilitation, and sampling. This Order covers discharges from wells in unpolluted drinking water aquifers, and discharges from polluted drinking water aquifers that are properly treated to not cause or contribute to an adverse effect or impact to beneficial uses of the receiving waters.
4. **Water Treatment Plant or Facility.** Water treatment facilities treat water to the quality that is suitable for potable drinking water in accordance with the federal Safe Drinking Water Act, California Health and Safety Code and the State Water Board Division of Drinking Water permitting requirements. Water treatment systems range from large treatment plants to small treatment facilities including well head treatment apparatuses.

D. Discharge Description

This Order provides regulatory coverage for planned and emergency discharges. Planned discharges are part of a water purveyor's essential activities to comply with the federal Safe Drinking Water Act, the California Health and Safety Code, and State Water Board Division of Drinking Water permitting requirements for providing reliable and safe drinking water. Planned discharges include scheduled and unscheduled discharges that take place under the control of the Discharger to comply with regulatory mandates. Emergency discharges occur due to system failures and emergencies. This Order serves as a general

NPDES permit for the discharge to waters of the U.S. of surface water or groundwater that may be altered by chlorine, corrosion inhibiting agents, algaecides, or addition of other chemicals, but that does not adversely affect or impact beneficial uses of the receiving waters.

E. Discharger's Activities

This Order covers discharges that are essential to comply with the federal Safe Drinking Water Act, the California Health and Safety Code, and State Water Board Division of Drinking Water permitting requirements for providing reliable and safe drinking water. Discharges from these activities described in detail below are intermittent, short-term or seasonal in nature.

- 1. Maintenance and Repair.** Facility maintenance and repairs occur frequently (e.g., multiple times a day) at different locations within a system. Discharges may be necessary when dewatering the repair or maintenance site. Underground facilities require excavation for access, and dewatering is necessary to prevent flooding. The resulting "trench dewatering" discharges are usually turbid because the discharge velocity may be high enough to dislodge and transport sediment from trenches and pits. Discharges may also be necessary to maintain positive water pressure within the drinking water system. Positive pressure may be necessary during repair and replacement of pipes, valves, and other components to prevent sediment, debris, and microorganisms from entering the system.
- 2. System Flushing.** Flushing portions of a system may be necessary to replace stagnant water when demand is low, or to remove poor quality drinking water. Flushing may also be needed to respond to consumer complaints. Fire hydrants serve as access portals for flushing water distribution systems. Flushing can also occur from other valves or standpipe connections. Flushing may be part of routine operations, and can occur daily, weekly, monthly, or annually based on seasonal water use or known water quality trends. New system facilities or facilities that are periodically taken out of service for maintenance or in response to low water demands may necessitate flushing with super-chlorinated water prior to full operation.
- 3. Pipeline, Tunnel, and Reservoir Drainage.** Occasionally, pipelines, tunnels, and reservoirs must be taken out of service for maintenance, such as inspections, repairs, and upgrades. Planned discharges may occur as often as once per year or as infrequently as once every 20 years. These facilities may also be drained in emergency circumstances due to unanticipated drinking water quality concerns.
- 4. Groundwater Pumping.** The most common type of discharge from a supply well is well "blow-off" or purging water from the well. Well blow-off is required to reactivate a well after it has been out of service, to purge the system to collect a monitoring sample, or to purge the system when monitoring indicates that the water supply does not meet drinking water quality requirements. Discharges from water supply wells also occur as a result of well maintenance, such as unclogging a filter screen from sediment and mineral build-up.

F. Types of Discharges from Discharger's Activities

This Order covers planned and emergency discharges that occur daily throughout the State. Planned discharges are a part of the Discharger's essential activities, described in part in the previous section of this Fact Sheet. Emergency discharges occur when pipelines or other infrastructure break or leak, valves malfunction, or other unanticipated events occur, such as noncompliance with drinking water standards or hydraulic releases necessary to prevent pipeline rupture. Planned and emergency discharges may include, but are not limited to the following:

1. Planned Discharges include discharges from:

- a. Water treatment plant operations (excluding filter backwash that is discharged to a water of the U.S.)
- b. Distribution system storage tanks
- c. Distribution system dewatering, flushing, and pressure testing
- d. Fire flow/fire hydrant testing
- e. Meter testing
- f. Automated water quality analyzers
- g. Pressure relief valves
- h. Groundwater supply well flushing
- i. Groundwater well development, rehabilitation, and testing.
- j. Groundwater monitoring for purpose of supply well development, rehabilitation, and testing.
- k. Transmission system installation, cleaning, and testing.

2. Emergency Discharges include discharges from:

- a. Emergency system repairs, including transmission system failure or leaks, and distribution system pipe breaks.
- b. Trench dewatering.
- c. Catastrophic events.

G. Water Treatment Methods and Additives

This Order covers discharges to waters of the U.S. of surface water or groundwater that may be altered by chlorine, corrosion-inhibiting or algacides agents containing metals such as zinc and copper, or other chemicals but that do not adversely affect or impact beneficial uses of the receiving water when properly managed. For disinfection, water purveyors treat their water with chlorine to comply with California Code of Regulations title 22 or to control microbial growth that can lead to corrosion. Chlorine removal, (also referred to as dechlorination) and its effectiveness depends in part on chemical dose and contact time. Discharger's disinfection and dechlorination processes may include, but are not limited to the following:

1. Disinfection Treatment Methods.

- a. **Chlorination.** Most dischargers use chlorine to disinfect their drinking water in accordance with California Code of Regulations, title 22, or to control microbial growth that can lead to corrosion. Chlorine reacts with organic matter and pipe materials (such as iron). As a result, the total chlorine residual decreases following chlorine treatment as water flows throughout the distribution system, making a system vulnerable to bacterial regrowth. Dischargers manage the lack of adequate chlorine concentrations in the distribution system by occasionally flushing water from dead end areas or other parts of their system with new water that has a sufficient chlorine residual concentration. Dischargers may also use booster stations to inject additional chlorine.
- b. **Chloramination.** Some Dischargers prefer chloramine over chlorine. Chloramine forms when chlorine and ammonia combine. Chloramine's disinfection power is one-hundredth that of free chlorine, but chloramine is also more stable and less reactive. Chloramine is also more persistent when released into the environment. Chloramine provides longer-lasting, more reliable protection against bacterial regrowth.
- c. **Super-chlorination.** Some treatment processes require superchlorinated treatment of the drinking water. Superchlorination is necessary when disinfecting new facilities, when returning facilities to service after taking them offline, and when contamination is detected. Superchlorinated water typically has a total chlorine residual concentration greater than 4.0 mg/L.

- 2. Dechlorination Treatment Methods.** During planned discharges, flows may be connected to devices that add dechlorinating chemicals prior to discharge. During emergency discharges, dissolving pellets or mesh bags containing the dechlorinating chemicals may be placed in the path of the flow.

H. Example Drinking Water Discharge Characteristics

The following table illustrates the typical characteristics of the types of discharges covered by this Order. This table is not inclusive of all potential discharges:

Table F-1. Typical Characteristics of Drinking Water System Discharges

Facility and Discharge Category ^[1]	Planned or Emergency	Flow Rate (gpm) ^[2]	Duration ^[2]	Frequency ^[2]	Total Residual Chlorine (mg/L) Or Turbidity (NTU) ^[2]
Transmission Systems					
Dewatering for new construction, maintenance, or inspection ^[3]	Planned	200 to 3,500	2 hours to 21 days	Once per year to 20 years	0.8 to 2.5 mg/L
Disinfecting of new construction	Planned	200 to 1,350	2 hours to 14 days	Upon start-up	10 to 50 mg/L
Maintenance or construction	Planned	50 to 200	2 to 10 minutes	Once per year to 20 years	0.8 to 2.5 mg/L
Aqueduct dewatering	Planned	250 to 50,000	1 to 2 days	Once per 2 to 10 years	0.8 to 2.5 mg/L
Disinfecting (new pipeline or storage facility after repair) ^[4]	Both	Up to 3,500	1 hour to 21 days	Upon initial use	25 to 200 mg/L
Water pipeline breaks, pipeline diameter > 24 inches (includes trench dewatering)	Emergency	5 to 3,500	30 minutes to 2 day		0.8 to 2.5 mg/L
Storage Facilities					
Drain valve testing	Planned	5 to 300	60 to 120 minutes	Once per 5 to 10 years	0.8 to 2.5 mg/L
Reservoir rehabilitation pipe flushing	Planned	Varies	Varies		0.8 to 2.5 mg/L
Tank and reservoir draining for maintenance	Planned	200 to 1,350	1 to 14 days	2 per year to 1 per 5 years	0.8 to 2.5 mg/L
Reservoir overflow	Emergency	Varies	Varies	Varies	0.8 to 2.5 mg/L
Distribution Systems					
Standpipe cleaning	Planned	500 to 2,000	1 to 2 days		0.8 to 2.5 mg/L
Water meter field testing	Planned	50 to 1,000	30 to 60 minutes		0.8 to 2.5 mg/L
Dead-end pumping	Both	200 to 2,000	30 minutes to 1 hour	4 to 12 per year	0.8 to 2.5 mg/L
Line flushing through a hydrant	Both	700 to 1,600	≤10 to 60 minutes	1 to 3 per year per hydrant	0.8 to 2.5 mg/L
Distribution system maintenance or pipe breaks, pipeline diameter < 24 inches (includes trench dewatering)	Both	5 to 1,350	10 to 60 minutes		0.8 to 2.5 mg/L

Facility and Discharge Category ^[1]	Planned or Emergency	Flow Rate (gpm) ^[2]	Duration ^[2]	Frequency ^[2]	Total Residual Chlorine (mg/L) Or Turbidity (NTU) ^[2]
Water quality management and water quality sampling (e.g., for bacteria; metals; taste; odor; etc.)	Both	100 to 15,000	5 minutes to several hours	1 to 50 (for management); up to 5,000+ events per year (for sampling)	0.8 to 2.5 mg/L
Unauthorized hydrant opening	Emergency	500 to 1,000	60 minutes to 8 hours		0.8 to 2.5 mg/L
Groundwater Well Operations					
Water supply well development	Planned	500 to 5,000	15 to 40 hours	Upon start-up	500 to 25,000 NTU
Water supply well rehabilitations	Planned	500 to 3,500	7 days	As-needed; up to 4 per year	500 to 20,000 NTU
Monitoring well sampling	Planned	15-60	20 minutes to 3 hours per well	Semi-annual or as needed	500 to 5000 NTU
Water supply well disinfection		500 to 3,500	30 minutes to 24 hours	As needed	≤ 200 mg/L
Monitoring well development	Planned	15-60	3-8 hours	Semi-annual or as needed	500 to 25,000 NTU
Discharge by water supply well ("blow-off") for reactivation or monitoring	Both	500 to 3,500	30 minutes to 24 hours	Up to 4 per year (planned); or more frequently for emergency circumstances	500 to 20,000 NTU

Unit Abbreviations:

gpm = gallons per minute
 mg/L = milligrams per liter

Footnotes:

- ^[1] Source: Tikkanen, Maria, John Schroeter, Lawrence Y.C. Leong, and Rajagopalon Ganesh, 2001. Guidance Manual for the Disposal of Chlorinated Water. Denver, CO. AWWA Research Foundation and American Water Works Association; with modifications by the Alameda County Water District, Alameda County and San Jose Water Company, Santa Clara County, 2013.
- ^[2] Milligrams per liter or Nephelometric Turbidity Units prior to implementation of best management practice. The data presented are typical ranges; actual conditions may vary outside of these ranges.
- ^[3] This information does not apply to raw unaltered water.
- ^[4] The processes to disinfect water pipelines and storage facilities use different chlorination methods, which have different chlorine contact times. Chlorinated water is dechlorinated before discharge under planned operations.

I. Example Discharges, Potential Threat to Receiving Water and Corresponding Permit Requirements.

As shown above, discharges to waters of the U.S. from the discharger's essential activities may have the potential to impact the receiving water. The threat to water

quality is from toxicity of chlorination or metal-containing agents, loading of solids, large volume discharges, and discharges having high velocities. This Order contains permit requirements specifically targeted to protect the beneficial uses of the receiving water from impacts due to these threats, as shown in the following examples:

1. Direct discharge to inland surface waters, enclosed bays and estuaries
Threat: Toxicity to aquatic life; Potential adverse impact on beneficial uses due to:
(1) concentrations of chemical constituents, (2) sediment and turbidity loading from discharge water and erosion, and (3) hydromodification.
Applicable Permit Requirements:
section IV.A Best Management Practices specifications,
section IV.C.1. Total chlorine effluent limitation,
section VI. Receiving water limitations,
Attachment E., section II. Monitoring requirements,
Attachment E., section VII. Reporting and record-keeping requirements.

2. Discharge to a municipal storm water system where the discharge travels less than 300 feet from the point of discharge into the storm drain system to the receiving water body; if the length of the storm drain conveyance is unknown, the distance shall be a direct 300 feet to a water of the U.S.
Threat: Toxicity to aquatic life; Potential adverse impact on beneficial uses due to:
(1) concentrations of chemical constituents, (2) sediment, debris, trash and turbidity loading from discharge water and street scouring, and (3) hydromodification.
Applicable Permit Requirements:
section IV.A Best Management Practices specifications,
section IV.C.1. Total chlorine effluent limitation,
section VI. Receiving water limitations,
Attachment E., section II. Monitoring requirements,
Attachment E., section VII. Reporting and record-keeping requirements.

3. Discharge to a municipal storm water system where: (1) the discharge travels more than 300 feet, or (2) the receiving water body outside of a 300-foot radius of the location of discharge into the storm drain.
Threat: Potential adverse impact on beneficial uses due to: (1) sediment, debris, trash and turbidity loading from discharge water and street scouring, and (2) hydromodification.
Applicable Permit Requirements:
section IV.A Best Management Practices specifications,
section VI. Receiving water limitations,
Attachment E., section II. Monitoring requirements,
Attachment E., section VII. Reporting and record-keeping requirements.

4. Discharges of superchlorinated, supply well water due to development and rehabilitation, and large volume discharge, either directly or via a storm water system, to waters of the U.S.

Threat: Toxicity to aquatic life. Potential adverse impact on beneficial uses due to:

- (1) concentrations of chemical constituents, (2) sediment, debris, trash and turbidity loading from discharge water and street scouring, and
- (3) hydromodification.

Applicable Permit Requirements:

section IV.A Best Management Practices specifications,
section IV.B.1. Final total chlorine effluent limitation,
Attachment E., section II. Event Monitoring Requirements for
Superchlorinated,
Attachment E., section VII. Reporting Requirements.

5. Discharges from portions of the drinking water system that:

(1) Directly discharge into or discharge to a storm water conveyance system that conveys the discharge into:

- i. Storm water capture basin(s),
- ii. Low impact development features, or
- iii. Other groundwater-recharge system(s); and

(2) Are collected and used for landscape irrigation and/or other beneficial reuse.

Threat: No threat to water of the U.S. or water of the state.

Applicable Permit Requirements: Reporting only. No effluent limits or monitoring requirements. No further waste discharge requirements necessary.

J. Discharge Points and Receiving Waters

Although drinking water system discharges potentially occur along any point of the system alignment, and may occur concurrently, the discharges are considered “point source discharges” – discharges of a pollutant from a distinct point source, as defined more fully in title 40 Code of Federal Regulations part 122.2, to a water of the U.S. Discharges flow directly into receiving waters or indirectly to receiving waters via storm drains and other conveyance systems. Discharges into creeks, rivers, lakes, enclosed bays, estuaries, and the ocean occur throughout the State. The application package for coverage under this Order requires the water purveyor to identify the receiving waters for its discharges. If the system discharges into numerous small tributaries prior to discharging into a major water body, the application only requires a general description of the immediate receiving water bodies and the name of the major downstream water body(ies).

II. NOTIFICATION REQUIREMENTS

A. General Order Application

Dischargers enrolling for coverage under this General Order are required to submit a complete application package, including a Notice of Intent (NOI), Attachment B1 of this Order any time after the effective date of the Permit but no later than **September 1, 2015**. A water purveyor with multiple community water systems need only submit one complete application package, containing individual NOIs for each of its water systems and obtain one Notice of Applicability for regulatory coverage of all its systems that discharge to waters of the U.S. The application package must include all of the following items to be deemed complete:

1. A Notice of Intent for each community water system, including general information about the water purveyor and the existing or proposed discharge(s).
2. A site map that identifies:
 - a. The boundaries of the water purveyor's service areas,
 - b. The general location of the drinking water system,
 - c. The approximate general location of groundwater supply wells, and
 - d. The general identification of the portion of the community water system that discharges within a 300-foot conveyance distance from the receiving water(s) and/or within a 300-foot radius of the receiving water(s).

The intent of the site map is to provide general information regarding where the discharges are originating and their locations relative to receiving waters. The site map is part of the application package. Regulatory coverage applies to discharges identified in the application package. By providing boundaries of service areas and/or approximate locations of facilities, regulatory coverage of all potential discharges is included in the Notice of Applicability.

3. An application fee payable to the State Water Board that shall be in accordance with California Code of Regulations, title 23, or subsequent fee regulations updates. The current fee schedule is available at <http://www.waterboards.ca.gov/resources/fees>.
4. Evaluation of multiple water use or beneficial reuse options, or the reason(s) that the discharge water cannot be placed for multiple uses or beneficial uses, as encouraged by the State Water Board in accordance with Article X, section 2 of the California Constitution, and Water Code section 100 (prohibition of the waste or unreasonable use of water). Pursuant to these state policies, the State Water Board strongly encourages discharges of water from drinking water systems to be captured for multiple uses prior to surface water discharge, or to be routed to groundwater infiltration facilities. Therefore, to obtain coverage under this Order, a water purveyor is required to evaluate its water reuse options. These options include:
 - a. Discharging into a storm water system that employs low impact development practices or flows into storm water capture basins to recharge groundwater.

- b. Collecting and using the water for landscape or agricultural irrigation or other appropriate uses in lieu of potable drinking water supply.

Discharges to land from drinking water systems that do not drain to waters of the U.S. do not need authorization to discharge under an NPDES permit. Discharges to groundwater may require waste discharge requirements issued by the State and/or Regional Water Boards. As an incentive to promote multiple uses of drinking water system discharges, the State Water Board generally will not require separate waste discharge requirements or monitoring for discharges otherwise regulated under this Order that are beneficially reused because they are intermittent and of relatively-good quality (not including waste that threatens ground water quality). A water purveyor must estimate the quantity of water discharged from its system that is beneficially reused, and report it in the annual report. If the entire drinking water system does not discharge to waters of the U.S., NPDES permit coverage is not needed.

5. Receiving water information, including names of receiving water bodies and major downstream water bodies.
6. For applicable discharges into waters of the U.S. identified in section III.K of this Fact Sheet, a TMDL constituent-specific supplement to the application package that includes: a) laboratory analysis of TMDL-specific constituents listed in section III.K, and b) TMDL-specific Best Management Practices to address the constituents.

B. State Water Board Notice of Applicability or Ineligibility for Coverage Under this Order

After the water purveyor's application package is deemed complete, the State Water Board's Deputy Director of Water Quality (Deputy Director) will issue a Notice of Applicability (NOA). Regulatory coverage for the planned and emergency discharges that occur within the areas identified in the application package commences with the date of issuance of a Notice of Applicability to the water purveyor. If the submitted application package is not complete in accordance with this Order, or the discharge is deemed ineligible for coverage under this Order, the Deputy Director will send a response letter to the applicant outlining: (1) the missing information that renders the application package incomplete, or (2) why the described discharge is not eligible for coverage under this Order. The water purveyor has **60 days from the date of the response letter** to provide State Water Board staff the items necessary to complete the application package.

C. Permit Coverage Termination

1. **Termination of Existing Regional Water Board Permit Coverage.** Upon the issuance of the NOA in accordance with this Order, the State Water Board expects the applicable Regional Water Board to terminate regulatory coverage under an existing non-MS4 Regional Water Board NPDES permit for discharges newly

regulated under this Order. The State Water Board expects all Regional Water Board permit coverage of drinking water systems that are not separately regulated due to site-specific TMDL requirements to be terminated within one year of the Adoption Date of this Order.

2. **Termination of Statewide Permit Coverage or Revocation of Notice of Non-Applicability.** The Deputy Director may terminate coverage or revoke a Notice of Non-Applicability Approval (NONAA) under this Order for any of the specified causes, and require application for coverage under an individual or other NPDES permit as set forth in title 40 Code of Federal Regulations part 122.28(b)(3). Causes for permit coverage termination or NONAA revocation include, but are not limited to, the following:
 - a. Violation of any term or condition of this Order; or
 - b. Misrepresentation or failure to disclose all relevant facts in obtaining permit coverage or non-applicability status under this Order; or
 - c. Written request from a Discharger to terminate enrollment because discharge has ceased or that the permit is no longer needed.

Annual permit fees will be assessed by the State Water Board up to the date of written termination notification from the State Water Board to the Discharger, or the date of a termination request letter from the Discharger to the State Water Board, whichever is applicable.

D. Permit Transfer

A change in ownership of the facilities authorized to discharge through coverage under this Order requires the current owner to provide written notice to the State Water Board at least 30 days in advance of transfer of ownership. The Deputy Director may determine that the new owner must submit an application package to seek coverage under this Order if the nature or location(s) of the discharge(s) have changed from the application package on file.

III. APPLICABLE PLANS, POLICIES, AND REGULATIONS

The requirements contained in this Order are based on the applicable plans, policies, and regulations identified in the Findings in section III of this Order. This section provides supplemental information, where appropriate, for the plans, policies, and regulations relevant to the discharge.

A. Legal Authorities

This Order serves as Waste Discharge Requirements pursuant to California Water Code article 4, chapter 4, division 7 (commencing with § 13260). This Order is also issued pursuant to federal Clean Water Act (CWA) section 402 and implementing regulations adopted by U.S. EPA, and California Water Code chapter 5.5, division 7 (commencing with § 13370). It shall serve as an NPDES permit for point source

discharges from multiple discharge points to surface waters, storm drains, and other conveyances leading to surface waters.

B. State Implementation Policy

The *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (State Implementation Policy or SIP) establishes implementation provisions for priority pollutant criteria, and objectives and provisions for chronic toxicity control. However, section 5.3 of the SIP allows the State Water Board to grant categorical exceptions from meeting priority pollutant criteria/objectives for discharges from drinking water systems conducted by the owners or operators to fulfill statutory requirements mandated by the federal Safe Drinking Water Act and the California Health and Safety Code. The California Toxics Rule contains criteria for 126 priority pollutants that may be present in these drinking water systems discharges. In many cases, discharges from drinking water systems do not comply with all of the applicable priority pollutant criteria (such as for the protection of aquatic life) since potable and treated drinking water are only required to comply with maximum contaminant levels (MCLs) for the protection of public health. A review of the 126 priority pollutants found that there are priority pollutant criteria that are more stringent than the established MCLs.

The planned and emergency drinking water systems discharges covered under this Order are in accordance with the exception granted by the State Water Board through Resolution 2014-0067, allowing water purveyors an exception to comply with priority pollutant criteria for the priority pollutants that have an applicable California Toxic Rule (CTR) criterion more stringent than its corresponding MCL, or do not have an adopted pollutant-specific MCL. The exception was granted in accordance with the requirements set forth in Section 5.3 of the State Implementation Policy.

C. California Ocean Plan

In 1972, the State Water Board adopted the Water Quality Control Plan for Ocean Waters of California (hereinafter Ocean Plan), as amended. The latest Ocean Plan amendment became effective on August 19, 2013. The Ocean Plan is applicable, in its entirety, to point source discharges to the ocean waters of the State. To protect the beneficial uses of ocean water, the Ocean Plan establishes water quality objectives and a program of implementation. Requirements of this Order implement the Ocean Plan and are applicable for those discharges entering directly into the Ocean or indirectly via a storm water system that drains into the Ocean near the location of discharge. This Order does not authorize direct discharges into Areas of Special Biological Significance (ASBS).

Section III.J of the Ocean Plan allows the State Water Board to grant an exception to specified Ocean Plan requirements where the State Water Board determines that the exception will not compromise protection of beneficial uses of ocean waters and the public interest will be served. In many cases, discharges from drinking water systems due to

mandated activities do not comply with all of the established Ocean Plan objectives (such as for protection of aquatic life or human health based on more stringent carcinogenic objectives) since these discharges are only required to comply with MCLs for the purpose of public health and safety. A review of the Ocean Plan pollutant water quality objectives shows that there are a number of pollutants that may occur in mandated drinking water system discharges, with Ocean Plan objectives that are more stringent than the MCLs. State Water Board Resolution 2014-0067 granted an Ocean Plan exception to water purveyors for the pollutants that have an Ocean Plan objective more stringent than its corresponding MCL or do not have an adopted pollutant-specific MCL. The exception was granted in accordance with the Ocean Plan exception requirements.

D. California Environmental Quality Act (CEQA).

Under Water Code section 13389, this action to adopt an NPDES permit is exempt from the provisions of Chapter 3 of CEQA, (commencing with section 21100) of Division 13 of the Public Resources Code.

Pursuant to CEQA, Public Resources Code section 21100 et seq., on November 18, 2014 the State Water Board adopted Resolution 2014-0067 approving a Mitigated Negative Declaration (MND) for exceptions from specified requirements of the State Implementation Policy and California Ocean Plan for statewide discharges resulting from mandated activities required by the federal Safe Drinking Water Act and California Health and Safety Code. The MND concludes that discharges from drinking water systems have less than significant impact to the environment with appropriate mitigation incorporated. This Order implements Resolution 2014-0067 and establishes appropriate mitigation requirements for discharges authorized under this Order.

E. Regional Water Boards' Water Quality Control Plans

The Regional Water Boards have adopted Water Quality Control Plans (hereinafter Basin Plans) that designate beneficial uses, establish water quality objectives, and contain implementation programs and policies to achieve those objectives. In addition, the Basin Plans implement State Water Board Resolution No. 88- 63, which established state policy that all waters, with certain exceptions, should be considered suitable or potentially suitable for municipal or domestic supply. The Basin Plans identify typical beneficial uses as follows: municipal and domestic supply, agricultural irrigation, stock watering, process supply, service supply, hydropower supply, water contact recreation, canoeing and rafting recreation, other non-contact water recreation, warm freshwater aquatic habitat, cold freshwater habitat, warm fish migration habitat, cold fish migration habitat, warm and cold spawning habitat, wildlife habitat, navigation, rare, threatened, or endangered species habitat, groundwater recharge, and freshwater replenishment. Requirements of this Order implement provisions contained in the applicable Basin Plans.

F. Antidegradation Policy

Section 131.12 of 40 C.F.R. requires that state water quality standards include an antidegradation policy consistent with the federal policy. The State Water Board established California's antidegradation policy in State Water Board Resolution 68-16. Resolution 68-16 incorporates the federal antidegradation policy where the federal policy applies under federal law. Resolution 68-16 requires that existing high water quality be maintained unless degradation is justified based on specific findings. The State Water Board and Regional Water Board's Water Quality Control Plans implement, and incorporate by reference, both the state and federal antidegradation policies. The permitted discharges must be consistent with the antidegradation provision of section 131.12 and State Water Board Resolution 68-16.

Given the nature of a general permit and the broad range of beneficial uses to be protected across the state, it is not feasible to analyze each surface water body in the state to determine which water bodies are of high quality for the constituents in the discharges authorized by this Order. The State Water Board finds that, due to the intermittent, seasonal and temporary characteristics of these discharges, the impact on existing surface water quality from these discharges will be insignificant, as further explained in the MND approved by the State Water Board in Resolution 2014-0067. While surface waters may be temporarily degraded and there may be temporary excursions above water quality objectives in the immediate vicinity of these discharges, any such impacts to surface water quality that may occur are consistent with the maximum social and economic benefit of the people of the state, provided that the discharges comply with this Order. The discharges are a necessary consequence of providing safe, clean, affordable, and accessible drinking water to the people of the state in accordance with the state policy declared in Water Code section 106.3, subdivision (a), and the discharges are mandated by drinking water laws and regulations. The BMPs required under this Order constitute best practical treatment and control of these discharges. Therefore the discharges permitted under this Order are consistent with the antidegradation provision of section 131.12 and the State Water Board Resolution 68-16.

G. Anti-Backsliding Requirements

Sections 402(o)(2) and 303(d)(4) of the CWA and title 40 Code of Federal Regulations part 122.44(l) prohibit backsliding in NPDES permits. These anti-backsliding provisions require that effluent limitations in a reissued permit must be as stringent as those in the previous permit, with some exceptions in which limitations may be relaxed. This Order is a new statewide NPDES permit that regulates discharges from community drinking water systems statewide. Some of these same discharges are currently regulated under existing Regional Water Board NPDES permits. Some of these same discharges are not regulated at all. This Order, when implemented, will provide consistent regulatory requirements that apply to discharges from drinking water systems statewide. The following existing Regional Water Board NPDES permits regulate discharges from community drinking water systems, among other types of discharges, and were used to

guide the development of this Order. Existing NPDES permits' effluent limitations and requirements in these Regional Water Board permits were analyzed for the purpose of analyzing backsliding.

The San Francisco Bay Regional Water Board Permit (Order R2-2009-0033) is a general permit applicable only to surface water treatment facilities for potable supply discharges for either long term or short term. The short term discharges include limits for TSS, settleable matter, pH, total chlorine residual, total trihalomethanes (TTHMs), zinc, and acute toxicity. The treatment of any surface waters to make them suitable for drinking includes filtration and disinfection. This treatment is expected to remove any BOD, TSS or settleable matter present in the surface water. For the other effluent limits of TTHMs and zinc, the discharges would be in compliance with MCLs for TTHMs as required by the federal Safe Drinking Water Act, the California Health and Safety Code, and the State Water Board's Division of Drinking Water permitting requirements. In addition, pursuant to the SIP and Ocean Plan exceptions, the discharges covered under this Order are not required to comply with zinc objectives. Therefore, there is no need to establish TSS, TTHMs and zinc effluent limitations, nor an effluent limitation for pH.

The Los Angeles Regional Water Board Permit (Order R4-2003-0108) is a general permit for discharges of groundwater from potable water supply wells to surface waters and it includes limits of TSS, turbidity, BOD, settleable solids, chlorine residual, pH, TTHMs, Methyl tertiary butyl ether (MTBE) and a list of 15 volatile organic compounds (VOCs) that are also considered priority pollutants, PCBs, and various limits for TDS, Sulfate, Chloride, Boron and Nitrogen applicable per watershed/stream reach. Groundwater that is suitable for drinking water purposes receives natural or well-head treatment so it is not expected to have BOD, TSS, or settleable solids. For this reason and as previously discussed, there is no need to impose limits for BOD, TSS, settleable solids, pH, and TTHMs. In the case of PCBs and the 15 VOCs, as these are priority pollutants that are granted exceptions, it is not necessary to establish limits for these pollutants. With regards to the limits for TDS, Sulfate, and chloride, compliance with the federal Safe Drinking Water Act, the California Health and Safety Code, and the State Water Board's Division of Drinking Water permitting requirements, should result in compliance with the TDS, sulfate, and chloride limits, so there is no need to impose the same limitations in this Order. With regards to nitrogen, compliance with the nitrate MCL should ensure compliance with the nitrogen limitations. During the effective period of R4-2003-0108 there were no issues of non-compliance with the boron limitations. This is new information to justify that there is no reasonable potential to exceed the boron limits. Therefore, there is no need to impose a boron limitation.

The Central Valley Regional Water Board Permit (Order R5-2013-0074) is a general permit applicable to dewatering activities and other types of low threat discharges to surface waters including discharges from drinking water systems. It includes limitations for Biochemical Oxygen Demand (BOD), Total Suspended Solids (TSS), settleable solids, pH, and total chlorine residual. Since this Permit applies to a large set of what the Central Valley Water Board considered low threat discharges, it established a wide range of effluent limitations to ensure protection of beneficial uses.

This statewide Order and its requirements are specifically applicable to drinking water systems that discharge either groundwater and/or surface water that have/has received treatment per state regulations. As previously discussed, treated surface water and groundwater suitable for drinking water purposes are not expected to have BOD, TSS, or settleable solids. In addition, sedimentation and erosion control BMPs are required to be implemented to prevent the discharges authorized by this Order from carrying sediment and causing soil erosion that would add TSS and settleable solids in their discharge prior to entering a storm drain or receiving water directly. It is therefore unnecessary to establish effluent limits for BOD, TSS, or settleable solids in this Order.

Community drinking water systems are required to maintain a pH of 7.0 in their distribution systems as part of their corrosion control treatment plans (40 C.F.R. section 141.82(f)). For all other community systems that do not need to maintain a corrosion control plan, it is expected that they will have no issues with pH levels because they have no issues with corrosion of their systems. Including an effluent limitation for pH in this Order would unnecessarily regulate those systems that are already required to comply with a 7.0 pH level and force other community drinking water systems to add additional chemicals prior to discharging, which in turn may add salts and other pollutants that may cause water quality impacts. Therefore, it is unnecessary to include an effluent limitation for pH in this Order.

The San Diego Regional Water Board Permit (Order R9-2010-0003) is a general permit for discharges of hydrostatic test water and potable water to surface waters and storm drains or other conveyance systems. It establishes limits for total chlorine residual and pH. As previously discussed there is no need to include an effluent limit for pH.

This statewide Order requires that discharges be managed by the use of multiple BMPs, and also contains effluent limitations for chlorine residual and turbidity and receiving water limitations for pH, chemical constituents, sediment and total suspended solids, and toxicity, among other requirements. This Order does not include specific effluent limitations for BOD, TSS, settleable solids or settleable matter, pH, TTHMs, zinc, acute toxicity, MTBE, 15 priority pollutants VOCs, PCBs, TDS, sulfate, chloride, boron and nitrogen, which are included in some of the comparable Regional Water Board permits, as described above. To the extent that this Order may impose less stringent limitations than those contained in the existing Regional Water Board permits, applicable exceptions to the anti-backsliding prohibition that are supported by the analysis above include: waters in attainment, where permit requirements are consistent with antidegradation (§ 303(d)(4)(B)); new information available (§ 402(o)(2)(B)(i)); and events beyond dischargers' control (§ 402(o)(2)(C)), due to the mandatory or emergency nature of the discharges. All requirements under this Order, when implemented, will increase the regulatory requirements over drinking water system discharges on a statewide basis. The effluent limitations for chlorine residual and numerical threshold of 100 NTU for turbidity in this Order are as stringent as the Regional Water Board permits. Effluent limits in broader Regional Board General Permits for discharges to inland waters, enclosed bays and estuaries consist of monthly averages of 50 NTU or 75 NTU. The 100 NTU numerical threshold in this Order is an instantaneous numeric action level that requires further implementation of BMPs when

exceeded. An instantaneous action level of 100 NTU for applicable discharges that are short term and intermittent is as protective, if not more protective, than a monthly average of 50 NTU or 75 NTU.

H. Monitoring and Reporting Requirements

Title 40 Code of Federal Regulations part 122.48, requires that all NPDES permits specify requirements for recording and reporting monitoring results. Section 13267 and section 13383 of the Water Code authorize the regional boards to require technical and monitoring reports. The Monitoring and Reporting Program (MRP) in this Order establishes monitoring, recordkeeping, notification, and reporting requirements to implement State and federal requirements. This MRP is provided in Attachment E.

To address the cost of compliance to dischargers and the cost of implementation to the Water Boards, the monitoring and reporting requirements in this Order are designed to provide necessary information for the discharger to make informed decisions regarding implementation of best management practices, and for the reporting of information that has pertinent value to the protection of water quality. This Order implements representative monitoring requirements, allowing one monitoring sample to represent the quality of other repetitive discharges that are similar in nature. Discharges that are considered to be similar in nature include those that have the following elements in common: (1) the same general water supply, (2) undergo the same water treatment, and (3) are managed through the same series of best management practices. This Order additionally requires annual monitoring and reporting of non-compliant discharges, mandatory recordkeeping, Regional Water Board notification of high volume discharges, reporting of estimated annual volumes discharged to surface water and reporting of the estimated volume of water put to multiple uses prior to surface water discharge or routed to ground water infiltration.

I. Endangered Species Act

This Order does not authorize any act that results in the taking of a threatened or endangered species or any act that is now prohibited, or becomes prohibited in the future, under either the California Endangered Species Act (Fish and Game Code § 2050 et. seq) or the Federal Endangered Species Act (16 U.S.C.A. § 1531 et. seq). This Order requires compliance with effluent limitations, receiving water limitations, and other requirements to protect the beneficial uses of waters of the state. The Discharger is responsible for meeting all requirements of the applicable Endangered Species Act.

J. Impaired Water Bodies on CWA 303(d) List

Under section 303(d) of the 1972 CWA, states, territories, and authorized tribes are required to develop lists of water quality limited segments. The waters on these lists do not meet water quality standards, even after discharges of point sources of pollution have installed the minimum required levels of pollution control technology. On

October 11, 2011, U.S. EPA gave final approval to California's 2010 section 303(d) List of Water Quality Limited Segments. The Basin Plans reference this list of Water Quality Limited Segments (WQLSs), which are defined as "...those sections of lakes, streams, rivers or other fresh water bodies where water quality does not meet (or is not expected to meet) water quality standards even after the application of appropriate limitations for point sources (40 C.F.R. part 130.2(j))." The Basin Plans also state, "Additional treatment beyond minimum federal standards will be imposed on dischargers to [WQLSs]. Dischargers will be assigned or allocated a maximum allowable load of critical pollutants so that water quality objectives can be met in the segment." Impaired waters are those waters not meeting quality standards pursuant to section 303(d) of the CWA, thus do not support beneficial uses. States must also prioritize the water bodies on the list and develop action plans, called total maximum daily loads (TMDLs) to improve the water quality. California impaired waters, as approved by the State Water Board, are listed on http://www.waterboards.ca.gov/water_issues/programs/tmdl/2010state_ir_reports/2010_combo303d.xls.

This Order does not authorize discharges from new drinking water systems (not an expansion of an existing system) into an impaired water body that is impaired for a constituent that exists in the new discharge at a concentration greater than the criteria used to establish the impairment of the water body.

K. Applicable Total Maximum Daily Loads (TMDLs) with Waste Load Allocations (WLAs) to Water Purveyors

TMDLs in California are developed either by the Regional Water Boards or by U.S. EPA. TMDLs developed by Regional Water Boards are designed as Basin Plan amendments and include implementation provisions. TMDLs developed by U.S. EPA typically contain the total load and load allocations required by section 303(d), but do not contain comprehensive implementation provisions. This stems from the fact that U.S. EPA authorities related to implementation of nonpoint source pollution control measures are generally limited to education and outreach as provided by CWA section 319. TMDLs are currently required for all waters and pollutants on the 303(d) list. TMDLs must consider and include allocations to both point sources and nonpoint sources of listed pollutants. Although the abbreviation stands for "Total Maximum Daily Load," the limitations contained in a TMDL may be other than "daily load" limits. There also can be multiple TMDLs on a particular water body, or there can be one TMDL that addresses numerous pollutants. The basis for grouping pollutants into one TMDL is typically whether or not there can be a common analytical approach to the assessment or a common management response to the impairment.

A review of Regional Water Board TMDLs found that, as of the adoption date of this Order, only the Los Angeles Regional Water Board and the San Diego Regional Water Board have existing (previously adopted) TMDLs in their basin plans that may indirectly imply that waste load allocations are applicable to the discharges from drinking water systems regulated under this General Order. In many of the existing TMDLs, waste

load allocations apply to general categories of discharges (such as “other NPDES discharges”, “general NPDES discharges” or “minor NPDES discharges”) that indirectly include discharges from drinking water systems.

The State Water Board is required to ensure that the effluent limits in this Order are “consistent with the assumptions and requirements of any available waste load allocation for the discharge.” (40 C.F.R. § 122.44(d)(1)(vii)(B).) Although these TMDLs apply to the discharges that are authorized under this Order, none of the TMDLs or supporting staff reports indicate that the discharges from drinking water systems authorized under this Order are significant sources of the relevant pollutants. Based on the data that is currently available, and due to the high quality and intermittent and short-term nature of the discharges from drinking water systems authorized under this Order, it is unlikely that these discharges contribute to the impairment of the TMDL-related water bodies. The State Water Board has determined that the intermittent, short-term and seasonal discharges regulated under this Order do not contribute to the impairment, and requirements more stringent than those included in this Order will not contribute to the actions needed to address the impairment. Therefore, it is consistent with the assumptions and requirements of the waste load allocation in these TMDLs for this Order to not include any TMDL-specific effluent limitations. However, due to the existing language in the TMDLs identified in this section, the State Water Board is requiring laboratory sampling to be included in the application process of this Order, to confirm that pollutants in the subject drinking water system discharges are not at levels that are contributing to the existing impairment. The State Water Board is also requiring that applicants describe and implement applicable TMDL pollutant-specific management practices to reduce the subject pollutant concentration to the maximum extent possible. The data submitted will be evaluated on a case by case basis and in consultation with Regional Board staff. The evaluation will be based on specific factors such as the amount of discharge, duration of discharge, type of pollutant, and consideration of the applicable established Waste Load Allocations for each TMDL to determine whether the conditions of this Order address the applicable TMDL requirements.

If the Deputy Director determines that any of these TMDLs, or any newly approved TMDLs, establish waste load allocations that should be implemented through TMDL-specific permit requirements for the discharges from drinking water systems that are authorized under this Order, the water purveyor will be required to enroll in this Order and maintain enrollment unless and until the Regional Water Board issues an individual or general permit for those discharges contributing to the impairment. Alternatively, if further TMDLs are adopted that address pollutants that are likely to be in discharges from drinking water systems, and allocate waste loads specifically to water purveyors regulated under this Order, the State Water Board may consider adding additional TMDL-specific permit requirements to Attachment G of this Order in a subsequent permit amendment or renewal.

To facilitate a water purveyor’s identification of an applicable TMDL in the Los Angeles and San Diego regions, the following table has been provided to identify the receiving water bodies and corresponding pollutants for which an applicant must provide an application supplement, in accordance with Section II.C.4 of this Order. The table

below includes only the TMDL-specific constituents that may pertain to drinking water discharges and/or additional pollutants the discharges assimilate as they flow into receiving waters. A summary providing general information regarding each TMDL adopted by U.S. EPA or the Regional Water Boards for the Los Angeles and San Diego regions that are applicable to the discharges from drinking water systems authorized under this Order, is provided following the table.

Table F-2. Los Angeles Regional Water Boards' 303(d) list Waterbodies and applicable TMDL-specific constituents

TMDL WATERBODY	TMDL CONSTITUENT
Ballona Creek	Copper Lead Zinc
Ballona Creek Estuary	Cadmium Copper Lead Silver Zinc TSS Chlordane DDTs DDD Total PCBs
Ballona Creek, Ballona Estuary and Sepulveda Channel	Total Coliform E. coli
Calleguas Creek	Boron Total Dissolved Solids Sulfate Chloride Chronic Toxicity Unit (TU _c) Chlorpyrifos Diazinon Chlordane 4,4-DDD 4,4,-DDE 4,4,-DDT Dieldrin PCBs Toxaphene
Calleguas Creek, Reach 1, 2, 3, 4, 5, 9, 10, 11, 12, and 13	Copper Nickel
Calleguas Creek, Reach 4 and 5	Selenium

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Colorado Lagoon	Chlordane Dieldrin Lead Zinc PAHs PCBs DDT
Dominguez Channel	Toxicity
Dominguez Channel and Torrance Lateral	Copper Lead Zinc
Dominguez Channel Estuary	PAHs Chlordane Dieldrin
Dominguez Channel Estuary and Greater Harbor Waters	Copper Lead Zinc 4-4-DDT Total PCBs
Compton Creek	Copper Lead
Echo Lake	Total Nitrogen Total Phosphorus
El Dorado Park Lake	Total Nitrogen Total Phosphorus Mercury
Lake Calabasas	Total Nitrogen Total Phosphorus
Lincoln Lake	Total Nitrogen Total Phosphorus
Long Beach City Beaches and the Los Angeles River Estuary	Total Coliform
Los Angeles Harbor	Total Coliform

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Los Angeles River	Nitrate-nitrogen Nitrite-nitrogen Nitrate-nitrogen + nitrite-nitrogen Cadmium Copper Lead Zinc E. coli
Los Angeles River above LA-Glendale WRP	Ammonia
Los Angeles River below LA-Glendale WRP	Ammonia
Los Angeles River Reach 1	Copper Lead
Los Angeles River Reach 2 and Arroyo Seco	Copper Lead
Los Angeles River Reach 3 above LA- Glendale WRP and Verdugo	Copper Lead
Los Angeles River Reach 3 below LA- Glendale WRP	Copper Lead
Los Angeles River Reach 4	Copper Lead
Los Angeles River Reach 5,6 and Bell Creek	Copper Lead Selenium
Los Angeles River Burbank Western Channel, above WRP	Copper Lead
Los Angeles River Burbank Western Channel, below WRP	Copper Lead
Los Angeles River tributaries	Ammonia
Los Cerritos Channel	Copper Lead Zinc
Macado Lake	Total PCB DDD (all congeners) DDE (all congeners) DDT (all congeners) Total DDT Chlordane Dieldrin

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Malibu Creek	E. coli
Malibu Creek Lagoon	Total Coliform
Marina Del Rey Mothers Beach and Back Basins	Total Coliform
Park Lake, Peck Rd	Total Nitrogen Total Phosphorus
Rainbow Creek	Total Nitrogen Total Phosphorus
Rio Hondo Reach 1	Copper Lead Zinc
San Gabriel River Estuary	Copper
San Gabriel River, Reach 1	Copper
San Gabriel River, Reach 2	Lead
San Gabriel River, Coyote Creek	Copper Lead Zinc
San Gabriel River, San Jose Creek, Reach 1 and 2	Selenium
Santa Clara River	Total Coliform E. coli
Santa Clara River, Reach 7	Ammonia as Nitrogen Nitrate plus Nitrite as Nitrogen
Santa Clara River, Reach 3	Ammonia as Nitrogen Nitrate plus Nitrite as Nitrogen
Santa Fe Dam Park Lake	Total Nitrogen Total Phosphorus
Santa Monica Bay	Total Coliform
Upper Santa Clara River, Reach 3	Chloride
Upper Santa Clara River, Reaches 4B, 5 and 6	Chloride
Ventura Coastal (Miscellaneous)	Total Coliform
Ventura River	Total Nitrogen Total Phosphorus

Table F-3. San Diego Regional Water Boards' 303(d) list Waterbodies and applicable TMDL-specific constituents

TMDL WATERBODY	POLLUTANT
Alisa Hydrologic Subarea	Total Coliform
Chollas Creek	Copper Lead Zinc
Chollas Hydrologic Subarea	Total Coliform
Dana Point Hydrologic Subarea	Total Coliform
Lower San Juan Hydrologic Subarea	Total Coliform
Miramar Reservoir Hydrologic Subarea	Total Coliform
Mission San Diego Hydrologic Subarea & Santee Hydrological Subarea	Total Coliform
Rainbow Creek	Total Nitrogen Total Phosphorus
San Clemente Hydrologic Subarea	Total Coliform
San Dieguito Hydrologic Subarea	Total Coliform
San Joaquin Hills Hydrologic Subarea & Laguna Hills Hydrologic Subarea	Total Coliform
San Marcos Hydrologic Subarea	Total Coliform
San Luis Rey Hydrologic Subarea	Total Coliform
Scripps Hydrologic Subarea	Total Coliform
Tecolote Hydrologic Subarea	Total Coliform

Summary of Los Angeles Region Water Quality Control Board TMDLs

The following is a summary of TMDLs in the Los Angeles region that have waste load allocations for general NPDES discharge categories, followed by a general description. Table F-2 in this section lists the 303(d) list water bodies and TMDL-specific constituents. These TMDLs have been adopted by the Regional Water Board, and approved by the State Water Board and/or the U.S. EPA under Clean Water Act section 303(c), prior to the adoption date of this Order. This Order solely implements the requirements of existing TMDLs; this Order does not modify an existing TMDL or basin plan language. Further detailed information on the summary of listed TMDLs below, as adopted by the Regional Water Quality Control Boards or U.S. EPA, can be found at the following websites:

http://www.waterboards.ca.gov/losangeles/water_issues/programs/tmdl/

or

<http://epa.gov/region09/water/tmdl/final.html>

1. Total Maximum Daily Load for Nitrogen, Phosphorus, Mercury, Trash, Organochlorine Pesticides and Polychlorinated Biphenyls (PCBs) in the Los Angeles Area Lakes

U.S. EPA established TMDLs in the following nine lakes in the Los Angeles region, for the following pollutants:

- Peck Road Park Lake: nitrogen, phosphorus, chlordane, DDT, dieldrin, PCBs, trash
- Lincoln Park Lake: nitrogen, phosphorus, trash
- Echo Park Lake: nitrogen, phosphorus, chlordane, dieldrin, PCBs, trash
- Lake Calabazas: nitrogen, phosphorus
- El Dorado Park Lakes: nitrogen, phosphorus, mercury
- Legg Lakes (North, Center and Legg): nitrogen, phosphorus
- Puddingstone Reservoir: nitrogen, phosphorus, chlordane, DDT, PCBs, mercury, dieldrin
- Santa Fe Dam Park: nitrogen, phosphorus
- Lake Sherwood: mercury

The NPDES permits in the watersheds draining to the impaired lakes include municipal separate storm sewer system (MS4) permits, a California Department of Transportation (Caltrans) storm water permit, general construction storm water permits, general industrial storm water permits, and a general NPDES permit. Other than the MS4 and Caltrans storm water permits, there are no major individual NPDES permits in the watersheds draining to the impaired lakes. Sources of pollutants include discharges of potable water used to maintain lake levels.

2. Total Maximum Daily Load for Chloride in the Upper Santa Clara River

Chloride levels in Reach 3 of the Santa Clara River exceed the water quality objective (WQO) of 80 mg/L for chloride in Reach 3 established in the Water Quality Control Plan, Los Angeles Region (Basin Plan). U.S. EPA established a TMDL for Reach 3. There are two major point sources that discharge into Reach 3, the Santa Paula and Fillmore Water Reclamation Plants. Minor point source discharges to Reach 3 include:

- storm water regulated under the NPDES municipal stormwater permit
- runoff from construction sites regulated under the statewide construction general NPDES permit,
- storm water regulated under the Caltrans statewide NPDES permit,
- runoff from industrial sites regulated under the statewide industrial facility general NPDES permit, and
- dewatering operations regulated under NPDES permits

In addition, elevated chloride concentrations are causing impairments of the water quality objective of 100 mg/L in Reach 5 (EPA 303(d) list Reach 7) and Reach 6 (EPA 303(d) list Reach 8) of the Santa Clara River (SCR). These reaches were on the 1998 and 2002 Clean Water Act (CWA) 303(d) lists of impaired water bodies as impaired due to chloride. The objectives for these reaches were set to protect all beneficial uses; agricultural beneficial uses have been determined to be most sensitive, and not currently attained at the downstream end of Reach 5 (EPA 303(d) list Reach 7) and Reach 6 (EPA 303(d) list Reach 8) in the Upper Santa Clara River (USCR). Irrigation of salt sensitive crops such as avocados, strawberries, and nursery crops with water containing elevated levels of chloride results in reduced crop yields. Chloride levels in groundwater in Piru Basin underlying the reach downstream of Reach 5 are also rising.

3. Total Maximum Daily Load for Bacteria in the Santa Monica Bay

Many of the beaches along Santa Monica Bay (SMB) were listed on the California's 1998 section 303(d) List, due to impairments for coliform or for beach closures associated with bacteria generally. The Los Angeles Regional Board adopted TMDLs to address bacteriological water quality impairments for 44 beaches along Santa Monica Bay located in Los Angeles County, California. WLA(s) are expressed as the number of sample days at a shoreline monitoring site that may exceed the following single sample numeric targets:

- Total coliform density shall not exceed 10,000/100ml.
- Fecal coliform density shall not exceed 400/100ml
- Enterococcus density shall not exceed 104/100ml
- Total coliform density shall not exceed 1000/100 ml if the ratio of fecal-to-total coliform exceeds 0.1.

With the exception of isolated sewage spills, storm water runoff conveyed by storm drains and creeks is the primary source of elevated bacterial indicator densities to the SMB beaches during wet weather. Waste load allocations are expressed as allowable exceedance days because the bacterial density and frequency of single sample exceedances are the most relevant to public health protection. All responsible jurisdictions and responsible agencies (local agencies that are responsible for discharges from a publicly owned treatment works to the SMB watershed or directly to the Bay, permittees or co-permittees on a municipal storm water permit, the California Department of Transportation, and other agencies that have jurisdiction over a beach adjacent to SMB) within a subwatershed are jointly responsible for complying with established allowable number of exceedance days.

4. Total Maximum Daily Load for Nutrients in the Los Angeles River

Reaches of the Los Angeles River and its tributaries were listed as impaired for nitrogen compounds (ammonia, nitrate, and nitrate) and related effects such as

algae, pH, odor, and scum on the 2002 303(d) list. These reaches were listed because numeric and narrative water quality objectives for nitrogen compounds and related effects were exceeded, thereby impairing warm, freshwater, and wildlife habitats, and recreation beneficial uses.

The principal source of nitrogen compounds to the Los Angeles River is discharges from the Donald C. Tillman Water Reclamation Plant (WRP), the Los Angeles-Glendale WRP, and the Burbank WRP. During dry weather period, the major POTWs contribute 84.1% of the total dry weather nitrogen load. Urban runoff, storm water, and groundwater discharge may also contribute nitrate loads. Further evaluation of these sources is set forth in the Implementation Plan

Concentration based WLAs for nitrogen compounds are allocated to minor point sources enrolled under NPDES or WDR permits including but not limited to Tapia Water Reclamation Plant (WRP), Whittier Narrows WRP, Los Angeles Zoo WRP, industrial and construction storm water, and municipal storm water and urban runoff from municipal separate storm sewer systems (MS4s). The WLA(s) are listed by receiving water and established as the applicable one-hour and thirty-day average effluent limitations at the point of discharge.

5. Total Maximum Daily Load for Nutrients in the Santa Clara River

Discharge of wastes containing nitrite, nitrate and ammonia to the Santa Clara River causes exceedances of water quality objectives for ammonia, nitrate and nitrite established in the Basin Plan. The Santa Clara River is listed as impaired by ammonia in Reach 3 and by nitrate plus nitrite in Reach 7 on the 2002 303(d) list of impaired water bodies. Reach 8 of the Santa Clara River is included on the State Monitoring List for organic enrichment/dissolved oxygen, which may be caused by excessive nitrogen. Nitrate and nitrite are biostimulatory substances that can cause eutrophic effects such as low dissolved oxygen and algae growth. Excessive ammonia can cause aquatic life toxicity.

The principal source of ammonia, nitrite, and nitrate to the Santa Clara River is discharges from the Saugus and Valencia Water Reclamation Plants (WRPs) and the Fillmore and Santa Paula Publicly Owned Treatment Works (POTWs). Agricultural runoff, storm water discharge and groundwater discharge may also contribute nitrate loads. Further evaluation of these sources is set forth in the Implementation Plan.

Concentration-based waste loads are allocated to major point sources of ammonia and nitrate+nitrite in Reach 3, which include the Fillmore and Santa Paula POTWs; concentration-based waste loads are allocated to major point sources of ammonia and nitrite+nitrate in Reaches 7 and 8, which include the Valencia and Saugus WRPs. Concentration-based waste loads are also allocated to municipal, industrial and construction storm water sources regulated under NPDES permits and minor discharges enrolled under NPDES or WDR permits. The allocations for minor point sources are based on the water quality

objectives for ammonia, nitrite, nitrate and nitrite plus nitrate. The WLAs are established as one-hour and thirty day average concentrations.

6. Total Maximum Daily Load for Bacteria in the Marina del Rey Mothers Beach and Back Basins

Elevated bacterial indicator densities are causing impairment of the water contact recreation (REC-1) beneficial use at Marina del Rey Harbor (MdRH) Mothers' Beach and back basins. Dry-weather urban runoff and storm water conveyed by storm drains are the primary sources of elevated bacterial indicator densities to MdRH Mothers' Beach and back basins during dry and wet-weather. As of December 2002, there were seven dischargers located within the Marina del Rey watershed. These dischargers were issued general NPDES permits, general industrial and/or general construction storm water permits. The bacteria loads associated with these discharges are largely unknown, since most do not monitor for bacteria. However, these discharges are not expected to be a significant source of bacteria.

The Los Angeles County MS4 and Caltrans storm water permittees and co-permittees are assigned waste load allocations (WLAs) expressed as the number of daily or weekly sample days that may exceed the single sample targets identified under "Numeric Target" at a monitoring site. Waste load allocations are expressed as allowable exceedance days because the bacterial density and frequency of single sample exceedances are the most relevant to public health protection.

According to the TMDL, discharges from general NPDES permits, general industrial storm water permits and general construction storm water permits are not expected to be a significant source of bacteria.

7. Total Maximum Daily Load for Bacteria in the Los Angeles Harbor

Elevated bacterial indicator densities are causing impairment of the water contact recreation (REC-1) beneficial use of Inner Cabrillo Beach and the potential REC-1 uses of the Main Ship Channel in the Los Angeles Harbor.

Dry-weather urban runoff and storm water conveyed by storm drains are major sources of elevated bacterial indicator densities to Inner Cabrillo Beach and the Main Ship Channel during dry and wet-weather. As of March 2004, there are 15 active individual and 15 active general, NPDES permits for discharges to the Inner or Outer Los Angeles Harbor including the Terminal Island Treatment Plant. While the fecal coliform counts in the wastewater field indicate a contribution of bacteria to the Harbor by the Terminal Treatment Plant, the wastewater field is sufficiently diluted and the bacterial densities are so much lower in the Harbor than the high bacterial densities and exceedances at the sites at Cabrillo Beach and in the Main Ship Channel that it appears that the

Treatment Plant is not a significant source of bacteria to the Beach or to the Ship Channel.

Waste load allocations are expressed as allowable exceedance days because the bacterial density and frequency of single sample exceedances are the most relevant to public health protection. According to the TMDL, discharges from general NPDES permits, general industrial storm water permits and general construction storm water permits are not expected to be a significant source of bacteria.

8. Total Maximum Daily Load for Bacteria in Malibu Creek and Lagoon

Elevated bacterial indicator densities are causing impairment of the water contact recreation (REC-1) beneficial use at Malibu Creek, Lagoon, and adjacent beach. Fecal coliform bacteria may be introduced from a variety of sources including storm water runoff, dry-weather runoff, onsite wastewater treatment systems, and animal wastes. Waste Load Allocations (WLAs) are expressed as the number of daily sample days that may exceed the single sample limits as identified under "Numeric Target." WLAs are expressed as allowable exceedance days because the bacterial density and frequency of single sample exceedances are the most relevant to public health protection.

The responsible jurisdictions and responsible agencies are the County of Los Angeles, County of Ventura, the cities of Malibu, Calabasas, Agoura Hills, Hidden Hills, Simi Valley, Westlake Village, and Thousand Oaks; Caltrans, and the California Department of Parks and Recreation. The responsible jurisdictions and responsible agencies include the permittees and co-permittees of the municipal storm water (MS4) permits for Los Angeles County and Ventura County, and Caltrans. In addition, according to the TMDL, discharges from Tapia WWRF and effluent irrigation, and general construction storm water permits are not expected to be a significant source of bacteria.

9. Total Maximum Daily Load for Metals in the Los Angeles River

Segments of the Los Angeles River and its tributaries are on the Clean Water Act section 303(d) list of impaired waterbodies for copper, cadmium, lead, zinc, aluminum and selenium. The metals subject to this TMDL are toxic pollutants, and the existing water quality objectives for the metals reflect national policy that the discharge of toxic pollutants in toxic amounts be prohibited. When one of the metals subject to this TMDL is present at levels exceeding the existing numeric objectives, then the receiving water is toxic. The beneficial uses impaired by metals in the Los Angeles River and its tributaries are those associated with aquatic life and water supply, including wildlife habitat, rare, threatened or endangered species, warm freshwater habitat, wetlands, and groundwater recharge.

There are significant differences in the sources of metals loadings during dry weather and wet weather. During dry weather, most of the metals loadings are in the dissolved form. The three major publicly owned treatment works (POTWs) that discharge to the river (Tillman WRP, LA-Glendale WRP, and Burbank WRP) constitute the majority of the flow and metals loadings during dry weather. The storm drains also contribute a large percentage of the loadings during dry weather because although their flows are typically low, concentrations of metals in urban runoff may be quite high. The remaining portion of the dry weather flow and metals loadings represents a combination of tributary flows, groundwater discharge, and flows from other permitted NPDES discharges within the watershed.

TMDLs are developed for reaches on the 303(d) list and for reaches where recent data indicate additional impairments. Addressing the impairing metals throughout the Los Angeles River watershed will ensure that the metals do not contribute to an impairment elsewhere in the watershed. Metals allocations are therefore developed for upstream reaches and tributaries that drain to impaired reaches. These TMDLs address wet- and dry-weather discharges of copper, lead, zinc and selenium and wet-weather discharges of cadmium.

Impairments related to cadmium only occur during wet weather. Impairments related to selenium are confined to Reach 6 and its tributaries. Dry-weather impairments related to zinc only occur in Rio Hondo Reach 1. The aluminum listing was based on water quality objectives set to support the municipal water supply beneficial use (MUN). MUN is a conditional use in the Los Angeles River watershed. The United States Environmental Protection Agency (U.S. EPA) has determined that TMDLs are not required for impairments of conditional uses.

10. Total Maximum Daily Load for Metals in Ballona Creek

Ballona Creek is on Clean Water Act Section 303(d) list of impaired waterbodies for dissolved copper, dissolved lead, total selenium, and dissolved zinc and Sepulveda Canyon Channel is 303(d) listed for lead. TMDLs are developed for reaches on the 303(d) list and metal allocations are developed for tributaries that drain to impaired reaches. Recent data indicates that selenium is not present at levels exceeding existing numeric targets and is not impairing the designated beneficial uses. Therefore a TMDL for selenium is not included. This TMDL address dry- and wet-weather discharges of copper, lead, and zinc in Ballona Creek and Sepulveda Canyon Channel.

There are significant differences in the sources of copper, lead, and zinc loadings during dry weather and wet weather. During dry weather, most of the metals loadings are in the dissolved form. Storm drains convey a large percentage of the metals loadings during dry weather because although their flows are typically low, concentrations of metals in urban runoff may be quite high. During dry years, dry weather loadings account for 25-35 percent of the annual metals loadings. Additional sources of dry weather flow and metals loading include groundwater

discharge and flows from other permitted NPDES discharges within the watershed. During wet weather, most of the metals loadings in Ballona Creek are in the particulate form and are associated with wet-weather storm water flows.

Concentration-based dry- and wet-weather waste load allocations are assigned to the minor NPDES permits and general non-storm water NPDES permits that discharge to Ballona Creek or its tributaries.

11. Total Maximum Daily Load for Toxic Pollutants in the Ballona Creek Estuary

Ballona Creek Estuary (Estuary) is on the Clean Water Act Section 303(d) list of impaired water bodies for cadmium, copper, lead, silver, zinc, chlordane, DDT, PCBs, PAHs and toxicity in sediments. Urban storm water has been recognized as a substantial source of metals. Numerous researchers have documented that the most prevalent metals in urban storm water (i.e., copper, lead, zinc, and to a lesser degree cadmium) are consistently associated with suspended solids. Because metals are typically associated with fine particles in storm water runoff, they have the potential to accumulate in estuarine sediments where they may pose a risk of toxicity.

TMDLs are developed for cadmium, copper, lead, silver, zinc, chlordane, DDT, and PCBs within the sediments of the Ballona Creek Estuary. WLAs are assigned to point sources for the Ballona Creek watershed. A grouped mass-based waste load allocation is developed for the storm water permittees (Los Angeles County MS4, Caltrans, General Construction and General Industrial permittees) by subtracting the load allocations from the total loading capacity.

Sediment based waste load allocations are assigned to minor NPDES permits and general non-storm water NPDES permits that discharge to Ballona Creek or its tributaries. The Los Angeles Water Board implements an approach for compliance for these waste load allocations by establishing a total suspended solids (TSS) effluent limitation together with a concentration-based limit for the each specific TMDL pollutant.

12. Total Maximum Daily Load for Toxicity in Calleguas Creek

Discharge of wastes containing chlorpyrifos, diazinon, other pesticides and/or other toxicants to Calleguas Creek, its tributaries and Mugu Lagoon cause exceedances of water quality objectives for toxicity established in the Basin Plan. Source analysis determined that agricultural and urban uses are the largest sources of chlorpyrifos and diazinon in the watershed.

A waste load of 1.0 TUc is allocated to the major point sources (POTWs) discharging to the Calleguas Creek Watershed. Minor sources include NPDES

permittees other than wastewater treatment plants, and urban storm water co-permittees (MS4s) discharging to the Calleguas Creek watershed.

A WLA of 1.0 TUc is allocated to minor point sources. In addition, WLAs for acute and chronic toxicity for diazinon and chlorpyrifos are allocated to the minor point sources.

13. Total Maximum Daily Load for Organochlorine (OC) Pesticides and Polychlorinated Biphenyls (PCBs) in Calleguas Creek

Eleven of fourteen reaches in the Calleguas Creek Watershed (CCW) were identified on the 2002 303(d) list of water-quality limited segments as impaired due to elevated levels of organochlorine (OC) pesticides and/or polychlorinated biphenyls (PCBs) in water, sediment and/or fish tissue. Additionally, Mugu Lagoon was listed as impaired for sedimentation/siltation. OC pesticides and PCBs can bioaccumulate in fish tissue and cause toxicity to aquatic life in estuarine and inland waters. Siltation may transport OC Pesticides and PCBs to surface waters and impair aquatic life and wildlife habitats.

Monitoring data from major NPDES discharges and land use runoff were analyzed to estimate the magnitude of OC pesticides and PCBs loads to Calleguas Creek, its tributaries and Mugu Lagoon. The largest source of OC pesticides in the listed waters is agricultural runoff. Most PCB residues are due to past use of PCBs as coolants and lubricants in transformers, capacitors, and other electrical equipment. Atmospheric deposition is also a potential source of PCBs. Urban runoff and POTWs are minor sources of OC pesticides and PCBs.

14. Total Maximum Daily Load for Toxics in the Marina del Rey Harbor

The back basins of Marina del Rey Harbor are on the Clean Water Act Section 303(d) list of impaired water bodies for chlordane, copper, lead, zinc, PCBs, DDT, dieldrin, sediment toxicity and a fish consumption advisory. Review of available data during the development of this TMDL indicated that dieldrin and DDT are no longer causes of impairment. The following designated beneficial uses are impaired by chlordane, copper, lead, zinc, PCBs, and toxicity: water contact recreation (REC1); marine habitat (MAR); wildlife habitat (WILD); commercial and sport fishing (COMM); and shellfish harvesting (SHELL).

Urban storm water has been recognized as a substantial source of metals. Numerous researchers have documented that the most prevalent metals in urban storm water (i.e., copper, lead, and zinc) are consistently associated with suspended solids. Because metals are typically associated with fine particles in storm water runoff, they have the potential to accumulate in marine sediments where they may pose a risk of toxicity. Similar to metals, the majority of organic constituents in storm water are associated with particulates.

Waste load allocations (WLA) are assigned to point sources for the Marina del Rey watershed. A grouped mass-based waste load allocation is developed for the storm water permittees (Los Angeles County MS4, Caltrans, General Construction and General Industrial) by subtracting the load allocations from the total loading capacity. Sediment concentration-based waste load allocations are developed for other point sources in the watershed.

15. Total Maximum Daily Load for Bacteria in Ballona Creek, the Ballona Estuary, and the Sepulveda Channel

Elevated bacterial indicator densities are causing impairment of the water contact recreation (REC-1) beneficial use designated for Ballona Estuary and Sepulveda Channel, limited water contact recreation (LREC) designated for Ballona Creek Reach 2, and non-contact recreation (REC-2) beneficial uses of Ballona Creek Reach 1.

The major contributors of flows and associated bacteria loading to Ballona Creek and Estuary are dry- and wet-weather urban runoff discharges from the storm water conveyance system. Run-off to Ballona Creek is regulated as a point source under the Los Angeles County MS4 Permit, the Caltrans Storm Water Permit, and the General Construction and Industrial Storm Water Permits. In addition to these regulated point sources, the Ballona Estuary receives input from the Del Rey Lagoon and Ballona Wetlands through connecting tide gates.

The Los Angeles County MS4 and Caltrans storm water permittees and co-permittees are assigned waste load allocations (WLAs) expressed as the number of daily or weekly sample days that may exceed the single sample targets equal to the TMDLs established for the impaired reaches.

Waste load allocations are expressed as allowable exceedance days because the bacterial density and frequency of single sample exceedances are the most relevant to public health protection. According to the TMDL, discharges from general NPDES permits, general industrial storm water permits and general construction storm water permits are not expected to be a significant source of bacteria.

16. Total Maximum Daily Load for Metals in the Calleguas Creek Watershed

Three of fourteen reaches in the Calleguas Creek Watershed (CCW) including Revolon Slough, Lower Calleguas Creek – Reach 2, and Mugu Lagoon are identified on the 2002 Clean Water Act Section 303(d) list of water-quality limited segments as impaired due to elevated levels of metals and selenium in water. The 303(d) listings, which were approved by the State Water Resources Control Board in February 2003, require the development of Total Maximum Daily Loads (TMDLs) to establish the maximum amount of pollutants a water body can receive without exceeding water quality standards.

Significant sources of metals and selenium include urban runoff, agricultural runoff, groundwater seepage, and POTW effluent. For mercury, open space was also a significant source. Sources were also analyzed as a function of wet and dry weather. Higher loads were delivered during wet weather for all constituents, due to the association between metals and particulate matter.

In the case of copper, nickel, and selenium, waste load allocations (WLAs) were developed for both wet and dry-weather. The dry-weather WLAs apply to days when flows in the stream are less than the 86th percentile flow rate for each reach. The wet-weather WLAs apply to days when flows in the stream exceed the 86th percentile flow rate for each reach. Annual mass loads of mercury in suspended sediment were developed according to low, medium, and high annual flow categories. Final WLAs were established for POTWs, permitted storm water dischargers, and for all other NPDES dischargers.

17. Total Maximum Daily Load for Salts in the Calleguas Creek Watershed

Eleven of fourteen reaches in the Calleguas Creek Watershed (CCW) are identified on the 2002 Clean Water Act Section 303(d) list of water quality limited segments as impaired due to elevated levels of boron, chloride, sulfate, or total dissolved solids (TDS) (these constitutions are commonly referred to as salts). Sources of salts in the watershed include water supply (water imported from the State Water Project or Freeman Diversion and deep aquifer groundwater pumping), water softeners that discharge to publicly owned treatment works (POTWs), POTW treatment chemicals, atmospheric deposition, pesticides and fertilizers, and indoor water use (chemicals, cleansers, food, etc.). Salts that are transported during dry weather to the surface water are quantified via the following mechanisms: groundwater pumping, groundwater exfiltration, POTWs, dry weather urban and agricultural runoff. Wet weather loadings from each of these sources have the potential to be significant, but tend to be lower in concentration and do not occur during the critical conditions for salts. Wet weather loads are significant from the perspective of transporting stranded salts off the watershed.

The TMDL includes WLAs for five POTWs, permitted storm water dischargers, and all other NPDES dischargers. Concentration-based WLAs are assigned to all other NPDES dischargers based on the Basin Plan objectives.

18. Total Maximum Daily Load for Bacteria in the Harbor Beaches of Ventura County

Elevated bacteria indicator densities are causing impairment of the water contact recreation (REC-1) beneficial use at Kiddie Beach and Hobie Beach. Kiddie and Hobie Beach are referenced in the Staff Report as the Harbor Beaches of Ventura County. Bacteria sources in the Harbor Beaches of Ventura County include anthropogenic and non-anthropogenic sources and point and non-point sources. Each of these sources contributes to the elevated levels of bacteria

indicator densities at the Harbor Beaches of Ventura County during dry- and wet-weather.

WLAs are expressed as allowable exceedance days. According to the TMDL, discharges from general NPDES permits, general industrial storm water permits and general construction storm water permits are not expected to be a significant source of bacteria.

19. Total Maximum Daily Load for OC Pesticides, Polycyclic Aromatic Hydrocarbons (PAHs), Polychlorinated Biphenyls (PCB), and Metals in the Colorado Lagoon

Colorado Lagoon is identified on the 1998, 2002, and 2006 Clean Water Act Section 303(d) lists of water quality limited segments as impaired due to elevated levels of OC pesticides, PCBs, sediment toxicity, PAHs, and metals in fish tissue and sediment. The point sources of OC pesticides, PCBs, PAHs, and metals discharged to Colorado Lagoon are urban runoff and storm water discharges from MS4s and the California Department of Transportation (Caltrans).

Mass-based WLAs for MS4 permittees including the City of Long Beach, Los Angeles County Flood Control District, and Caltrans are allocated to the five major storm drain outfalls that currently discharge to the lagoon. Concentration-based WLAs for sediment are also assigned to these mentioned permittees. For all other point sources such as minor NPDES permits, other storm water and non-storm water permittees, sediment concentration-based WLAs are also assigned.

20. Total Maximum Daily Load for Bacteria in the Santa Clara River

Elevated bacterial indicator densities are causing impairment of the water contact recreation (REC-1) beneficial use designated for the Santa Clara River (SCR) Estuary and Reaches 3, 5, 6, and 7. Recreating in waters with elevated bacterial indicator densities has long been associated with adverse human health effects. The significant contributors of bacteria loading to the SCR and Estuary are dry- and wet-weather urban runoff discharges from the storm water conveyance system.

General NPDES permits, individual NPDES permits, the Statewide Industrial Stormwater General Permit, the Statewide Construction Activity Storm Water General Permit, and the Statewide Stormwater Permit for Caltrans Activities are assigned WLAs of zero (0) allowable exceedance days of the single sample targets for both dry and wet weather and no exceedances of the geometric mean targets.

Discharges from general NPDES permits, general industrial storm water permits and general construction storm water permits are not expected to be a significant source of bacteria.

21. Total Maximum Daily Load for Toxics in Machado Lake

Machado Lake is identified on the 1998, 2002, 2006, and 2008 Federal Clean Water Act Section 303(d) lists of impaired water bodies due to chlordane, DDT, dieldrin, Chem A, and PCBs in fish tissue. Chem A (the abbreviation for 'chemical group A') is a suite of bio-accumulative pesticides that includes chlordane and dieldrin. The 1998 303(d) listing (and subsequent listings) for Chem A was predominately based on fish tissue concentrations of chlordane and dieldrin; there was only minimal detection of other Chem A pollutants in 1983 and 1984. Chlordane and dieldrin have been recently detected in fish tissue, while other Chem A pollutants have not been detected in 25 years. Therefore, this TMDL only addresses the Chem A pollutants (chlordane and dieldrin) that are causing impairment.

Because of potential harm to human health and the environment, the use of these pollutants has been banned for many years; however, the physiochemical properties of the pollutants cause them to persist in the environment. These pollutants, bound to soil particles, are easily transported with surface runoff to water bodies. Contaminated sediments accumulate in the receiving water bodies and aquatic organisms are exposed to the toxic pollutants. Sediment toxicity has been documented at Machado Lake, and it is likely that pesticides and PCBs contribute to the toxic condition of the sediments. Moreover, all of these pollutants biomagnify as they move up the food chain, thereby increasing concentrations in higher trophic-level aquatic organisms and wildlife.

22. Total Maximum Daily Load for Bacteria in the Los Angeles River

General NPDES permits, individual NPDES permits, the Statewide Industrial Storm Water General Permit, the Statewide Construction Activity Storm Water General Permit, and WDR permittees in the Los Angeles River Watershed are assigned WLAs of zero (0) days of allowable exceedances of the single sample target for both dry and wet weather.

Discharges from general NPDES permits, general industrial storm water permits and general construction storm water permits are not expected to be a significant source of bacteria. Therefore, the WLAs for these discharges are zero (0) days of allowable exceedances for all three time periods and for single sample limits.

23. Total Maximum Daily Load for Metals and Toxics in the Los Angeles and Long Beach Harbors

The waters of Dominguez Channel and the Greater Los Angeles and Long Beach Harbor area are impaired by heavy metals and organic pollutants. These water bodies are included on the State's Clean Water Act 303(d) impaired waters list for one or more of the following pollutants: cadmium, chromium, copper, mercury, lead, zinc, chlordane, dieldrin, toxaphene, DDT, PCBs, certain PAH compounds, benthic community effects and toxicity. These impairments exist in

one or more environmental media—water, sediment, or tissue. Impairments in fish tissue are for DDT, PCBs, toxaphene, chlordane and dieldrin. Beneficial uses designated in these waters to protect aquatic life include the marine habitat use (MAR) and rare, threatened or endangered species habitat use (RARE). In addition, the estuaries (EST) are recognized as areas for spawning, reproduction and/or early development (SPWN), migration of aquatic organisms (MIGR), and wildlife habitat (WILD). Dominguez Channel also has an existing designated use of warm freshwater habitat (WARM) and the Los Angeles River Estuary has the designated use of wetland habitat (WET). Beneficial uses associated with human use of these waters include recreational use for water contact (REC1), non-contact water recreation (REC2), industrial service supply (IND), navigation (NAV), commercial and sport fishing (COMM), and shellfish harvesting (SHELL).

24. Total Maximum Daily Load for Algae, Eutrophic Conditions and Nutrients in the Ventura River and its Tributaries

The Ventura River Estuary and Reaches 1 and 2 are on the Clean Water Act (CWA) section 303(d) list as impaired for algae and eutrophic conditions. San Antonio Creek and Cañada Larga are on the CWA section 303(d) list as impaired for nitrogen and dissolved oxygen, respectively. Recent data confirm these impairments and demonstrate additional impairments for low dissolved oxygen in the Estuary, San Antonio Creek, and Reaches 1-4. The algae and nutrient related impairments are caused by excessive loading of nutrients, particularly nitrogen and phosphorus, to Ventura River and its tributaries. The water quality impairments due to eutrophication and increased nutrient loading occur during the dry season when algae growth primarily occurs. For purposes related to this TMDL, the dry season is defined as occurring from May 1 to September 30.

Waste load allocations addressing point and non-point sources of nutrients are assigned to discharges to the Ventura River watershed.

25. Total Maximum Daily Load for Metals in the San Gabriel River

Segments of the San Gabriel River and its tributaries are on the Clean Water Act section 303(d) list of impaired water bodies for copper, lead, zinc, and selenium. The constituents subject to this TMDL are toxic pollutants, and the existing water quality objectives for these constituents reflect national policy that the discharge of toxic pollutants in toxic amounts be prohibited. When one of the constituents subject to this TMDL is present at levels exceeding the existing numeric objectives, then the receiving water is toxic. The beneficial uses impaired by metals and selenium in the San Gabriel River and its tributaries are those associated with aquatic life and water supply, including wildlife habitat, rare, threatened or endangered species, warm freshwater habitat, wetlands, and groundwater recharge.

TMDLs are developed for reaches on the 303(d) list and for reaches where recent data indicate additional impairments. Addressing the impairing metals and selenium throughout the San Gabriel River watershed will ensure that they do not contribute to impairments elsewhere in the watershed. Metals and selenium allocations are therefore developed for upstream reaches and tributaries that drain to impaired reaches.

These TMDLs address dry-weather impairments of copper in the estuary and selenium in San Jose Creek Reach 1 and wet-weather impairments of lead in San Gabriel River Reach 2 and copper, lead, and zinc in Coyote Creek.

26. Total Maximum Daily Load for Metals in the Los Cerritos Channel

Los Cerritos Channel was included on the 1998, 2002 and 2006 California 303(d) lists as an impaired water body for copper, zinc, and lead. (Regional Board, 1998 and California State Water Resources Control Board, 2002 and 2006.)

The NPDES permits in the Los Cerritos Channel Freshwater Watershed include municipal separate storm sewer system (MS4) permits, the California Department of Transportation (Caltrans) storm water permit, general construction storm water permits, general industrial storm water permits, minor NPDES permits, and general NPDES permits.

Concentration based waste load allocations are established for minor NPDES permits and general non-storm water permits that discharge to the Los Cerritos Channel to ensure that these discharges do not contribute to exceedances of the California Toxic Rule criteria. The waste load allocation for these metals is based on dry and wet weather flows.

27. Total Maximum Daily Load for Indicator Bacteria in the Long Beach City Beaches and Los Angeles River Estuary

General NPDES permits, individual NPDES permits, the Statewide Industrial Storm Water General Permit, the Statewide Construction Activity Storm Water General Permit, the Statewide General Waste Discharge Requirements for Sanitary Systems, and the Vessel General Permit in the Long Beach City Beaches Watershed are assigned WLAs of zero (0) days of allowable exceedances for all time periods for the single sample targets and no exceedances of the 30-day geometric mean targets because they are not expected to be a significant source of indicator bacteria.

San Diego Regional Board TMDLs

Continuing the listing from above, the following is a summary of the TMDLs in the San Diego region that have waste load allocation for general NPDES discharge categories, followed by a general summary. Further detailed information on the already adopted

TMDLs can be found at the following website:

http://www.waterboards.ca.gov/sandiego/water_issues/programs/tmdls/index.shtml

28. Total Maximum Daily Load for Metals in Chollas Creek

Chollas Creek was placed on the Clean Water Act (CWA) section 303(d) List of Water Quality Limited Segments (List of Water Quality Limited Segments) in 1996 for the metals copper, lead, and zinc. Storm water samples from Chollas Creek collected between 1994 and 2003 periodically exceeded California Toxics Rule (CTR) water quality criteria for copper, lead, and zinc, dissolved copper, lead and zinc concentrations in Chollas Creek violate numeric water quality criteria for copper, lead, and zinc promulgated in the California Toxics Rule, and the narrative objective for toxicity. Concentrations of these metals in Chollas Creek threaten and impair the designated beneficial uses of warm freshwater habitat (WARM), and wildlife habitat (WILD). For Chollas Creek, essentially all metals sources (point and nonpoint) are discharged through municipal separate storm sewer systems (MS4) that are regulated under waste discharge requirements (WDRs), NPDES Permits. The point source discharges that could affect Chollas Creek are the MS4 discharges, storm water discharges from industrial sites, and discharges of extracted groundwater. All point source discharges to Chollas Creek will be required to achieve this WLA.

This TMDL establishes concentration-based WLAs set equal to 90 percent of the numeric water quality objectives for copper, lead, and zinc, as defined in the California Toxics Rule. Because the concentration of these metals resulting in toxic effects varies significantly with hardness, the resulting WLAs are hardness dependent.

29. Total Maximum Daily Load for Total Nitrogen and Total Phosphorus in Rainbow Creek

Nitrate, total nitrogen, and total phosphorus concentrations in Rainbow Creek exceed the inorganic chemicals nitrate and biostimulatory substances water quality objectives. These exceedances threaten to unreasonably impair the municipal supply (MUN), warm freshwater habitat (WARM), cold freshwater habitat (COLD), and wildlife habitat (WILD) beneficial uses of Rainbow Creek. Excessive nutrient levels in Rainbow Creek promote the growth of algae in localized areas, creating a nuisance condition, that unreasonably interferes with aesthetics and contact and non-contact water recreation (REC1, REC2) and threatens to impair WARM, COLD and WILD beneficial uses. State highways, agricultural fields and orchards, commercial nurseries, residential and urban areas, and septic tank disposal systems contribute to increased nutrient levels in Rainbow Creek as a result of storm water runoff, irrigation return flows, and ground water contributions to the creek.

WLAs for the discharge of total nitrogen and total phosphorus into Rainbow Creek were established. Identified dischargers of total nitrogen and total phosphorus loading include Caltrans, County of San Diego and nonpoint sources. The TMDL provides WLAs of 2 percent of the total annual TMDL for both total nitrogen and total phosphorus for additional point sources, however the TMDL Implementation Action Plan does not provide for the assignment of WLAs to unidentified point source discharges, effectively resulting in the prohibition of discharges of total nitrogen and total phosphorus into Rainbow Creek.

30. Total Maximum Daily Load Indicator Bacteria in Twenty Beaches and Creeks in the San Diego Region for Direct Discharges Only

Bacteria densities in the Pacific Ocean at various beach and coastal creek mouth segments (referred to hereafter as “beaches”) exceed water quality objectives (WQOs) for indicator bacteria. Bacteria densities in ocean water at these beaches unreasonably impair and threaten to impair the water quality needed to support the contact water recreation (REC-1) designated beneficial use. Bacteria densities in the waters of Aliso Creek, San Juan Creek, Tecolote Creek, Forrester Creek, the (lower) San Diego River, and Chollas Creek exceed WQOs for indicator bacteria. Bacteria densities in these creeks unreasonably impair and threaten to impair the water quality needed to support REC-1. The federal Clean Water Act requires the establishment of Total Maximum Daily Loads (TMDLs) for pollutants that exceed the WQOs needed to support designated beneficial uses, i.e., that cause or contribute to exceedances of state “water quality standards”.

Unidentified point sources have not been assigned WLAs, which is equivalent to being assigned a WLA of zero. No discharges of bacteria are expected or allowed from unidentified point sources under the dry or wet weather TMDLs.

IV. RATIONALE FOR DISCHARGE SPECIFICATIONS AND EFFLUENT LIMITATIONS

The Clean Water Act (CWA) requires point source dischargers to control the amount of conventional, non-conventional, and toxic pollutants discharged into waters of the United States. The control of pollutants discharged during drinking water system discharge events is established primarily through required Best Management Practices specifications established to require water purveyors to implement a minimum level of pollutant control through best management practices that are proven to be effective in the water supply industry. Numeric effluent limitations are established for chlorine in circumstances where the water discharged from a drinking water system poses an immediate threat to aquatic life with receiving waters. There are two principal bases for effluent limitations: 40 C.F.R. section 122.44(a) requires that permits include applicable technology-based limitations and standards, and 40 C.F.R. section 122.44(d) requires that permits include water quality-based effluent limitations to attain and maintain applicable water quality objectives and criteria to protect the beneficial uses of receiving waters.

A. Applicable Objectives and Criteria

This Order authorizes discharges to inland surface waters, enclosed bays, estuaries and the ocean, statewide. The water quality objectives and criteria applicable to these receiving waters are contained in the corresponding Basin Plan(s), other water quality control plans, and policies, such as the State Implementation Plan and the California Ocean Plan, that implement federal and state water quality objectives.

1. **Regional Boards Basin Plans Objectives.** Basin Plans specify various narrative and numeric water quality objectives, including the maximum contaminant levels (MCLs) in California Code of Regulations, title 22. Typical narrative objectives most relevant to this Order are listed below:
 - a. **Toxicity.** The toxicity objective typically states, "All waters shall be maintained free of toxic substances in concentrations that are lethal to or that produce other detrimental responses in aquatic organisms." U.S. EPA water quality criteria were used to translate this objective with respect to chlorine. U.S. EPA's recommended 1-hour average acute criterion for chlorine is 0.019 mg/L and its 4-day average chronic criterion is 0.011 mg/L (the acute or chronic criteria are not to be exceeded more than once every three years on average in any single location).
 - b. **pH.** The pH objective in basin plans vary; some objectives are fixed numeric objectives while others provide a numeric range such as *"the pH shall not be depressed below 6.5 nor raised above 8.5. This encompasses the pH range usually found in waters. Controllable water quality factors shall not cause changes greater than 0.5 units in normal ambient pH levels."*
 - c. **Sediment.** Sediment objectives in basin plans vary; however, the basin plans typically provide a narrative objective such as, *"The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses."*
 - d. **Settleable Material.** The settleable material objectives in basin plans vary; however, the basin plans typically provide a narrative objective such as, *"Waters shall not contain substances in concentrations that result in the deposition of material that cause nuisance or adversely affect beneficial uses."*
 - e. **Suspended Material.** The suspended material objectives in basin plans vary; however, the basin plans typically provide a narrative objective that typically states, *"Waters shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses."*
 - f. **Turbidity.** The turbidity objectives in basin plans vary; some objectives are fixed numeric objectives while others provide a narrative objective such as, *"Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Increases from normal background light penetration or turbidity*

relatable to waste discharge shall not be greater than 10 percent in areas where natural turbidity is greater than 50 NTU.”

2. **California Toxic Rule (CTR) Criteria.** The CTR specifies numeric aquatic life and human health criteria for numerous priority pollutants. Some human health criteria are for consumption of “water and organisms” and others are for consumption of “organisms only.” The criteria applicable to “water and organisms” apply to many receiving waters subject to this Order because they are potential drinking water sources with the municipal and domestic supply (MUN) beneficial use. In accordance with Resolution 2014-0067, this Order implements a SIP exception to the CTR criteria for a number of priority pollutants on the basis that these discharges are less than significant with mitigation, and that mandated activities to protect public safety and health are held paramount.
3. **Ocean Plan Water Quality Objectives.** The Ocean Plan specifies in Table 1 of the Ocean Plan numeric water quality objectives for the protection of Marine Aquatic Life and Human Health (Carcinogens and non-carcinogens) for numerous priority pollutants. In accordance with Resolution 2014-0067, this Order implements an exception to the Ocean Plan water quality objectives for a number of priority pollutants on the basis that these discharges are less than significant with mitigation, and that mandated activities to protect public safety and health are held paramount.
4. **Sediment Quality Objectives.** The *Water Quality Control Plan for Enclosed Bays and Estuaries – Part 1, Sediment Quality* contains a narrative water quality objective: “Pollutants in sediments shall not be present in quantities that, alone or in combination, are toxic to benthic communities in bays and estuaries of California.” This objective is to be implemented by integrating three lines of evidence: sediment toxicity, benthic community condition, and sediment chemistry. The policy requires that if the Water Board determines that a discharge has reasonable potential to cause or contribute to an exceedance of this objective, it is to impose the objective as a receiving water limit.

B. Technology-Based Effluent Specifications and Effluent Limitations

CWA section 301(b) and 40 C.F.R. section 122.44 require that permits include conditions meeting technology-based requirements at a minimum, and any more stringent effluent limitations necessary to meet water quality standards. The CWA requires U.S. EPA to develop effluent limitations guidelines (ELGs), and standards representing application of best practicable treatment control technology (BPT), best available technology economically achievable (BAT), best conventional pollutant control technology (BCT), and best available demonstrated control technology for new sources (NSPS). CWA section 402(a)(1) and 40 C.F.R. section 125.3 authorize the use of Best Professional Judgment to derive technology-based requirements and effluent limitations on a case-by-case basis when ELGs are unavailable.

1. Technology-Based Best Management Practices Effluent Specifications

This Order does not establish technology-based effluent limitations because U.S. EPA has not established ELGs for the types of discharges this Order authorizes. Moreover, data necessary to develop technology-based effluent limitations on a case-by-case basis for each water body in California, using Best Professional Judgment, are unavailable. The State Water Board finds that the technology-based effluent limitations in Regional Water Board Basin Plans apply to discharges that are continuous in nature and contain “wastes”. This statewide Order regulates intermittent and seasonal discharges of drinking water that are short-term, and in and of themselves do not contain the degree of “waste” contained in municipal or industrial wastewater or storm water. Therefore technology-based effluent limitations are not included.

The State Water Board finds that technology is available to control solids in drinking water system discharges, and chemical constituents such as chlorine and other chemical agents added to the water supply source, treatment, and distribution process. Therefore numeric and narrative technology-based best management practices specifications are included in this Order. Attachment C of this Order provides example of such BMPs.

To assure that implemented BMPs are effective, this Order requires:

- Dischargers to assure that quality assurance and quality control protocol is implemented to assure best management practices, monitoring, and reporting are effective, valid, and in compliance with this Order. A Discharger shall train all personnel operating the drinking water system and responding to emergency discharges to assure the quality assurance and quality control protocol is properly implemented.
- For planned discharges, a Discharger shall implement BMPs prior to and during discharges that enter a water of the U.S. For planned but unscheduled or automated discharges from pressure relief valves and unchlorinated pump-to waste wells, BMPs shall be implemented unless infeasible (e.g., inaccessible, inadequate space). For emergency discharges, the BMPs shall be implemented as soon as feasible following assurance that public safety, property, and infrastructure are protected.
- In fulfilling the requirements of this section, the Discharger may implement the example BMPs contained in Attachment C, or proven BMPs per updated approved guidance established by industry experts, professional associations, or entities (e.g. *2014 Edition of the BMP Manual for Drinking Water System Releases* published by the California-Nevada Section of the American Water Works Association).
- The Discharger shall maintain a documented log of all BMPs implemented for its different types of discharges that enter a water of the U.S, and make it available to State and Regional Water Board staff upon request.

- The Discharger shall modify its BMPs as necessary to maintain compliance with the requirements of this Order. If monitoring results or other available information demonstrates that the discharge is not in compliance, the Discharger shall determine the source of non-compliance, and develop and implement new or revised BMPs as necessary. As part of this process, the Discharger shall validate the effectiveness of any new or revised BMPs to comply with the requirements of this Order. All non-compliance and corresponding corrective actions to address non-compliance are required to be reported to the State Water Board in the annual report, as required in the Monitoring and Reporting Program (Attachment E) of this Order. A log documenting the additional or revised BMPs shall be made available upon request by staff of the State and/or Regional Water Board.

2. Toxicity (Chlorine and other chemical agents). This Order translates the narrative toxicity objective with respect to chlorine by using U.S. EPA's water quality criteria for chlorine. Water distribution systems are usually chlorinated to meet the minimum total chlorine residual requirements in California Code of Regulations, title 22. According to the most recent Annual Consumer Confidence Reports from various water agencies, the typical average total chlorine residual concentration in a distribution system is about 2.0 mg/L, which is roughly 100 times U.S. EPA's acute water quality criterion of 0.019 mg/L. However, chlorine in water discharges can dissipate from volatilization and reaction with dirt and organic matter on streets and storm drain systems. Based on the analysis in section IV.C. below, reasonable potential for toxicity exists only for superchlorinated waters and other chlorinated waters that are in closer proximity to receiving waters (within 300 feet). For all other discharges, this Order establishes narrative technology-based specifications, specifying that proven management practices must be implemented to treat or control pollutants from its discharges to maintain compliance with this Order.

At minimum, this Order requires that dischargers properly manage all planned discharges and implement proven dechlorination or chemical-control BMPs provided by professional associations or institutes such as the American Water Works Association, to assure that beneficial uses of the receiving water body(ies) are not adversely affected or impacted. Such BMPs include natural dissipation of chlorine in the discharge prior to it reaching the surface water body. For emergency discharges, the Discharger shall implement BMP procedures as soon as feasible while concurrently protecting public health and safety. Attachment C of this Order provides example of such dechlorination BMPs.

Copper and zinc are known constituents in chemical agents used for to control algae in water supplies and control corrosion in drinking water facilities. Management practices proven to control copper and other metals during pesticide applications are not the same management practices needed to control these metals in drinking water system discharges. Although the State Water Board has granted a regulatory exception to CTR constituents including copper and zinc, the State Water Board expects dischargers to implement BMPs to reduce metals concentrations to the best

extent possible. Attachment C of this Order provides example BMPs for copper and zinc concentration reduction specifically in drinking water system discharges.

3. Solids (Sediment, Settleable Material, Suspended Material, Debris, and Turbidity)

Various discharges from drinking water systems may contain sediment as follows:

- Sediment accumulates at the dead ends of distribution systems during periods of low water demand. The sediment within a system must be flushed periodically.
- Raw transmitted water may contain sediment due to naturally occurring minerals and organic debris.
- Trench dewatering can result in relatively high sediment loads, depending on soil type, flow rate and duration, and excavation size.
- Discharges from new well development and inactive well rehabilitation may have high sediment loads due to drilling mud, cuttings, and removal of solids from the bottom of the well and around the screen casing.

Discharges can also contribute to sediment loading, solids loading and erosion within receiving waters due to high flows and volumes. Such discharges can dislodge sediment and transport it to receiving waters, or destabilize and erode shorelines or other natural receiving water features.

At minimum, this Order requires that dischargers implement BMP for planned discharges to:

- Prevent riparian erosion and hydromodification by implementing flow dissipation, erosion control, and hydromodification-prevention measures; and
- Minimize sediment discharge, turbidity and color impacts by implementing sediment, turbidity, erosion and color control measures.

For groundwater supply well operations, this Order requires dischargers to implement treatment systems or BMPs for all groundwater well development, rehabilitation, or operation discharges to waters of the U.S. to assure these discharges:

- Do not cause or contribute to an exceedance of the receiving water limitation for turbidity in Section V.G. of this Order, and
- Comply with a turbidity action level of 100 Nephelometric Turbidity Units (NTUs) or less in the discharge. An exceedance of the turbidity numeric action level of 100 NTU is not a violation of this Order, but any exceedance does require the Discharger take action to modify, change, or enhance BMPs when the turbidity level is greater than 100 NTU, until the turbidity level is 100 NTU or less.

- 4. Instream Sediment Quality.** Pollutants in some receiving water sediments may be present in quantities that alone or in combination are toxic to benthic communities. Efforts are underway to identify stressors causing such conditions. Due to the relative clean nature of potable water, it is unlikely that these discharges contribute to sediment toxicity. However, to date there is no evidence either way; therefore, the State Water Board cannot draw a definitive conclusion about reasonable potential for these discharges to cause or contribute to exceedances of the sediment quality objectives.

C. Water Quality Based Effluent Limitations

1. Scope and Authority

This Order contains water quality-based effluent limitations (WQBELs) that implement water quality objectives and criteria that protect beneficial uses. CWA section 301(b) and 40 C.F.R. section 122.44(d) require that permits include limitations more stringent than federal technology-based requirements where necessary to achieve applicable water quality standards. According to 40 C.F.R. section 122.44(d)(1)(i), permits must include effluent limitations for all pollutants that are or may be discharged at levels that have a reasonable potential to cause or contribute to an exceedance of a water quality standard, including numeric and narrative objectives within a standard. Where reasonable potential has been established for a pollutant, but there is no numeric criterion or objective, WQBELs must be established using: (1) U.S. EPA criteria guidance under CWA section 304(a), supplemented where necessary by other relevant information; (2) an indicator parameter for the pollutant of concern; or (3) a calculated numeric water quality criterion, such as a proposed state criterion or policy interpreting a narrative criterion, supplemented with relevant information (40 C.F.R. § 122.44[d][1][vi]). The process for determining reasonable potential and calculating WQBELs is intended to establish effluent limitations for discharges to comply with applicable water quality objectives established to protect designated beneficial uses of receiving waters.

2. Need for Water Quality Based Effluent Limitations (Reasonable Potential Analysis)

Assessing whether a pollutant has reasonable potential to exceed a water quality objective or criterion is the fundamental step in determining whether a water quality based effluent limitation is required. As explained below, this Order finds reasonable potential for toxicity due to the chlorinated drinking water system discharges.

- a. Analysis for Numeric Objectives and Promulgated Criteria.** The State Implementation Plan (SIP), section 1.3 sets forth the method used in this Order for assessing whether a pollutant has reasonable potential to exceed a numeric water quality objective or promulgated criterion. The analysis begins with identifying the maximum effluent concentration (MEC) observed for each pollutant based on available effluent concentration data and the ambient background concentration (B). The SIP, section 1.4.3 states that ambient

background concentrations are either the maximum ambient concentration observed or, for water quality objectives intended to protect human health, the arithmetic mean of observed concentrations. There are three triggers in determining reasonable potential and the need for a numeric effluent limitation:

- Trigger 1 is activated if the maximum effluent concentration is greater than or equal to the lowest applicable water quality objective ($MEC \geq$ water quality objective).
- Trigger 2 is activated if the ambient background concentration observed in the receiving water (B) is greater than the water quality objective ($B >$ water quality objective) *and* the pollutant is present in any effluent sample.
- Trigger 3 is activated if a review of other information indicates that a WQBEL is needed to protect beneficial uses.

The Ocean Plan provides a similar method for assessing reasonable potential as described in Appendix V of the Ocean Plan.

Water in drinking water systems is required to comply with maximum contaminant levels (MCLs) per state regulations; therefore for pollutants that have MCLs more stringent than the CTR or Ocean Plan water quality objectives, this Order finds those priority pollutants do not have reasonable potential to exceed a water quality objective. However for the remaining priority pollutants for which the MCL is not the most stringent applicable water quality objective, an exception to those objectives has been granted through Resolution 2014-0067.

- b. Analysis for Toxicity due to Chlorine.** This Order translates the narrative toxicity objective with respect to chlorine by using U.S. EPA's water quality criteria for chlorine. Water distribution systems are usually chlorinated to meet the minimum total chlorine residual requirements in California Code of Regulations title 22. According to the most recent Annual Consumer Confidence Reports from various water agencies, the typical average total chlorine residual concentration in a distribution system is about 2.0 mg/L, which is roughly 100 times U.S. EPA's acute water quality criterion of 0.019 mg/L. However, chlorine in water discharges can dissipate from volatilization and reaction with dirt and organic matter on streets and storm drain systems. Based on the analysis below, reasonable potential for toxicity exists only for superchlorinated waters and other chlorinated waters that are in closer proximity to receiving waters (within 300 feet). Therefore this Order contains numeric chlorine water quality based effluent limitations for superchlorinated discharges and chlorinated water discharged within 300 feet of a surface water body.

Numeric effluent limitations are not included in this Order for sediment, settleable material, and suspended material, as there is no readily available means to translate the sediment, settleable material, and suspended material objectives into numeric WQBELs appropriate for the many receiving waters that could be affected by the discharges covered by this Order. This Order controls sediment,

settleable material, and suspended material through BMPs as discussed above in this fact sheet.

All 126 priority pollutants in the California Toxic Rule and pollutants with Ocean Plan water quality objectives have also been considered. The pollutants with MCLs as the most stringent water quality objective have shown no reasonable potential because these discharges are already required to comply with MCLs per state regulations and State Water Board Division of Drinking Water permits. For the remaining pollutants, a categorical SIP and Ocean Plan exception has been granted, therefore there is no reasonable potential since the exceptions lead to no applicable numeric criteria for these discharges.

3. Calculation of Water Quality Based Effluent Limitations (WQBELs)

Regulations at 40 C.F.R. section 122.44(k)(3) require numeric WQBELs unless numeric WQBELs are infeasible. This Order imposes numeric WQBELs for total residual chlorine because it is feasible and necessary to calculate numeric WQBELs for this toxic pollutant in order to protect beneficial uses in the receiving water bodies. Field chlorine meters are readily available and used to measure chlorine in drinking water system discharges, therefore it is feasible to collect representative total residual chlorine concentration data to determine compliance.

The total chlorine residual WQBEL established in this Order for discharges to inland surface waters, enclosed bays and estuaries is 0.019 mg/L based on U.S. EPA's acute water quality criterion for chlorine, which is expressed as a one-hour average. The total chlorine residual WQBEL established in this Order for discharges to the ocean is 0.008, mg/L based on the Ocean Plan criteria for chlorine. The numeric WQBELs for total residual chlorine are applicable to: (1) all superchlorinated discharges, and (2) chlorinated discharges located within 300 feet of a receiving water body.

According to a controlled field study conducted by East Bay Municipal Utilities District (EBMUD), when dechlorination BMPs are properly implemented, the total chlorine residual concentration in chlorinated discharges is fully neutralized within 200 feet to concentrations below a minimum level of 0.1 mg/L (Tikkanen et. al, 2001, *Guidance Manual for Disposal of Chlorinated Water*). The study analyzed samples from nine fire hydrants discharging at varying flow rates and treated with dechlorination BMPs within the EBMUD jurisdiction. Similarly, the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP) analyzed samples from ten fire hydrants discharging at varying flow rates and treated with dechlorination BMPs in the Cities of Palo Alto, San Jose and Sunnyvale. Based on the SCVURPPP study, eight of the discharge events monitored achieved full neutralization (to concentrations below 0.1 mg/L) by 160 feet. The two remaining discharge events spiked above the minimum level of 0.1 mg/L, but ultimately achieved full neutralization within 425 feet. The spike in concentration was suspected to be due to turbidity interference.

Based on these data and adding an additional safety factor due to the immediate toxicity to aquatic life from chlorine, the State Water Board determines that discharges where dechlorination BMPs (chemically or naturally) have been properly implemented that are more than 300 feet from a receiving water body do not pose a reasonable potential to exceed the applicable total residual chlorine water quality objective. Thus, the numeric WQBEL is not applicable to such discharges.

The turbidity numeric WQBEL established in this Order for discharges to the ocean is 225 NTU based on the Ocean Plan criteria for turbidity. The numeric WQBELs for turbidity is applicable to all discharges located within 300 feet of the ocean. These discharges pose a reasonable potential to cause exceedance of ocean turbidity water quality objective due to high solids levels in drinking water systems discussed in detail above in this fact sheet.

V. DISCHARGES NOT AUTHORIZED BY THIS ORDER

This Order implements the regulatory exceptions granted to water purveyors by Resolution 2014-0067. Requirements in this Order are designed for discharges described in the corresponding Mitigated Negative Declaration (attached to Resolution 2014-0067) that, when properly mitigated through the implementation of BMPs, monitoring, and reporting, do not pose a significant threat to the environment. .

Discharges not authorized by this Order include:

- Discharges other than those authorized in the Notice of Applicability issued by the Deputy Director of Water Quality; or
- Discharges to a water of the U.S. with a total maximum daily load (TMDL) that prescribes a waste load allocation to a water purveyor, where the Deputy Director determines that the requirements of this Order are not consistent with the assumptions and requirements of the TMDL, and thus compliance with this Order is not sufficient for the water purveyor to comply with the imposed TMDL requirements; or
- Discharges from new drinking water systems (not an expansion of an existing system) into an impaired water body that is impaired for a constituent that exists in the new discharge at a concentration greater than the criteria used to establish the impairment of the water body; or
- Direct discharges into areas designated by the State Water Board as Areas of Special Biological Significance (ASBS).

VI. RATIONALE FOR RECEIVING WATER LIMITATIONS

The receiving water limitations in this Order are established in accordance with federal and State water quality standards per the CWA and regulations adopted thereunder, and

narrative and numeric water quality objectives in the Regional Water Boards' Basin Plans and State Water Board water quality control plans and policies.

VII. RATIONALE FOR MONITORING AND REPORTING REQUIREMENTS

Title 40 Code of Federal Regulations part 122.48 requires that all NPDES permits specify requirements for recording and reporting monitoring results. Water Code sections 13267 and 13383 authorize the Regional Water Board to require technical and monitoring reports. The Monitoring and Reporting Program (Attachment E) of this Order, establishes monitoring, recordkeeping and reporting requirements to implement federal and state requirements. The following provides the rationale for the monitoring and reporting requirements contained in Attachment E of this Order.

A. Effluent Monitoring

Pursuant to the requirements of title 40 Code of Federal Regulations part 122.44(i)(2), reporting of effluent monitoring is required for all constituents with effluent limitations and specifications. Effluent monitoring is necessary to assess compliance with effluent limitations and specifications, assess the effectiveness of the implemented BMPs and treatment process (where applicable), and to assess the impacts of the discharge on the receiving water.

Effluent monitoring requirements have been established in this Order to provide: (1) the Discharger with necessary information to make informed decisions regarding the implementation of effective management practices, and (2) the State Water Board to determine compliance with effluent specifications and limitations. Required effluent monitoring includes event monitoring and representative monitoring as follows:

1. **Event Monitoring.** This Order requires monitoring of all superchlorinated discharges, all discharges from well development and rehabilitation activities, and individual discharge events that are greater than 325,850 gallons (one acre-foot). The Discharger shall monitor all such events per the sample types and frequencies specified in Attachment E.
2. **Annual Representative Monitoring.** This Order allows discharges of similar nature to be monitored on a representative basis. Representative monitoring is the use of monitoring results of one water quality monitoring sample to represent other discharges expected to have the same water quality. A representative monitoring measurement must represent discharges of similar nature, meaning discharges that have all the following items in common:
 - (i) The same general water source (ground water or surface water of similar water quality), and
 - (ii) The same water treatment, and

(iii) The same type of implemented BMPs.

The Discharger shall monitor all planned discharges not defined as events (Item 1. above) using representative monitoring per the sample types and frequencies specified in Attachment E. In its annual report, the Discharger shall:

- (a) Submit a copy of its site schematic submitted in its application for enrollment with labeled representative monitoring locations, and
- (b) Identify the portions of its system in which the representative monitoring results represent, and
- (c) Include any changes in its representative monitoring locations that have occurred during the monitoring-year, as applicable.

3. Annual Discharge Volume Monitoring Requirements

This Order requires the Discharger to monitor and keep record of:

- (a) The number of direct discharge to a water of the U.S that is greater than 50,000 gallons, during each calendar year,
- (b) An estimate of the total volume discharged to surface water during each calendar year, and
- (c) An estimate of the total volume of discharge water directed to a reuse or beneficial use in accordance with section VI. of this Order.

4. Monitoring Not Required

This Order does not establish monitoring requirements for any discharges that:

- (a) do not ultimately reach a water of the U.S., (b) are implemented for multiple uses or routed to a beneficial reuse, in accordance with section V. of the Order, prior to surface water discharge, or (c) are emergency discharges.

B. Receiving Water Monitoring

This Order requires visual receiving water monitoring for all direct planned discharges that do not comply with the requirements contained in section IV of the Order, and that may potentially adversely affect or impact beneficial uses of the receiving waters. Receiving water monitoring shall be conducted during or immediately after the Discharger became aware of a non-compliant discharge that adversely effects or impacts beneficial uses of the receiving water. The Discharger shall monitor the point of confluence of the discharge and the receiving water. If the receiving water presents hazards to the monitoring personnel, visual monitoring shall be conducted using telephoto lenses and binoculars. If further hazards exist beyond such measures, monitoring is not required, and the hazards shall be documented in the corresponding monitoring report.

C. Post-Notification Requirements

Within 24 hours of the Discharger becoming aware of an adverse effect(s) or impact on beneficial uses of the receiving water body due to non-compliance with this Order, or

due to a system failure or emergency involving a discharge from its drinking water system, the Discharger shall notify the corresponding Regional Water Board and the MS4 operator, and the Discharger shall confirm this notification in writing within five days. The notification shall include all of the following:

1. The location and extent of non-compliance or emergency discharge;
2. The cause of the non-compliance or emergency discharge;
3. The date, time and expected duration of the non-compliance or emergency discharge;
4. The estimated volume of discharge;
5. The applicable receiving water body; and
6. The corrective actions taken (or being taken) to prevent future non-compliance or repair the system failure.

D. Pre-Notification Requirements

Three (3) days prior to initiation of a planned discharge (or retroactively within 24-hours after the Discharger is informed to conduct an urgent planned discharge) of a volume equal to or greater than one acre-foot (325,850 gallons), the Discharger shall notify the MS4 operator, if applicable, and the appropriate Regional Water Board and provide:

1. The start date of discharge
2. The location of discharge and the applicable receiving water
3. The estimated volume of discharge, and
4. The reasons for discharge

E. Reporting and Recordkeeping Requirements

1. This Order requires the Discharger to maintain self-monitoring reports, including compliant and non-compliant discharge monitoring information, in its main office and to make those reports available upon request of State and Regional Water Board staff.
2. Monitoring periods and reporting for all required monitoring shall be completed according to the schedule in Attachment E.
3. The Order requires the Discharger to arrange and summarize any reported numerical data in a tabular format.
4. If a Discharger monitors any pollutant more frequently than required by this Order, the results of this monitoring shall be included in the self-monitoring report.
5. The Order requires the Discharger to report to the State Water Board any toxic chemical release data it reports to the State Emergency Response Commission within 15 days of reporting the data to the Commission pursuant to section 313 of the "Emergency Planning and Community Right to Know Act" of 1986.

6. This Order requires the Discharger to report, by March 1 of every year, all non-compliant discharge monitoring information contained in the Discharger's self-monitoring report for the past calendar year. All non-compliant discharge monitoring information shall be accompanied by the corrective actions the Discharger has taken to return the discharge to compliance. Identified non-compliance must include a description of the requirement that was violated and a description of the violation.
7. The Discharger is required to attach a cover letter to the report that clearly identifies discharge events of non-compliance with the permit; discuss corrective actions taken or planned; and the proposed time schedule for corrective actions.

F. Increase in Monitoring Requirements

The Deputy Director may modify the monitoring and reporting requirements at any time to ensure the protection of the beneficial uses of the receiving water. The modified requirements will be based on site-specific data or information indicating that a site-specific discharge threatens to cause or contribute to an exceedance of a receiving water quality criteria or objective.

At any time during the term of this permit, the Deputy Director may notify authorized Dischargers to electronically submit monitoring reports using the State Water Board's California Integrated Water Quality System (CIWQS) Program Web site (<http://www.waterboards.ca.gov/ciwqs/index.html>). Until such notification is given, each Discharger shall submit a hard copy of its monitoring reports. Subsequent guidance will be provided to the Discharger upon the Deputy Director's notification for electronic submittal of reports. (Direction and guidance for electronic SMR submittals is currently available on the CIWQS Web site at http://www.waterboards.ca.gov/water_issues/programs/ciwqs/chc_npdes.shtml)

VIII. RATIONALE FOR PROVISIONS

A. Standard Provisions

Standard Provisions, which apply to all NPDES permits in accordance with 40 Code of Federal Regulations part 122.41, and additional conditions applicable to specified categories of permits in accordance with 40 Code of Federal Regulations part 122.42, are provided in Attachment D. The discharger must comply with all standard provisions and with those additional conditions that are applicable under 40 Code of Federal Regulations part 122.42.

Title 40 Code of Federal Regulations part 122.41(a)(1) and (b) through (n) establish conditions that apply to all State-issued NPDES permits. These conditions must be incorporated into the permits either expressly or by reference. If incorporated by reference, a specific citation to the regulations must be included in the Order. Title 40 Code of Federal Regulations part 123.25(a) allows the state to omit or modify conditions to impose more stringent requirements. In accordance with

40 Code of Federal Regulations part 123.25, this Order omits federal conditions that address enforcement authority specified in 40 Code of Federal Regulations part 122.41(j)(5) and (k)(2) because the enforcement authority under the Water Code is more stringent. In lieu of these conditions, this Order incorporates by reference Water Code section 13387(e).

B. Special Reopener Provisions

The reopener provisions in this Order provide an explanation of the State Water Board authority to reopen this Order in accordance with 40 Code of Federal Regulations part 122.62. For example, the State Water Board is developing a Proposed Total Residual Chlorine and Chlorine-Produced Oxidants Policy of California, which when adopted is intended to establish consistent standards and implementation procedures for regulating chlorine statewide. This provision is the avenue by which the State Water Board may reopen this Order to include a revised reporting level to determine compliance with effluent limitations for total residual chlorine if a statewide policy for total residual chlorine is adopted during the term of this Order.

IX. PUBLIC PARTICIPATION

The State Water Board adopted this Order that serves as a statewide general NPDES permit for low threat discharges from drinking water systems on November 18, 2014. State Water Board staff developed the draft Order using input from water purveyors and other interested parties over the course at least two years. The language and requirements in the draft order were developed to eliminate, where possible, unnecessary interference with mandated activities to protect public health. State Water Board staff held nine stakeholder meetings statewide and other verbal correspondences to incorporate the most crucial concerns related to small systems, and the feasibility and cost of permit compliance. The State Water Board encouraged public participation at the August 5, 2014 public hearing, the October 21, 2014 workshop meeting and the November 18, 2014 adoption meeting for this item.

A. Notification of Interested Parties

The State Water Board notified interested agencies, parties, and persons of its intent to consider adoption of this general Order for low threat discharges from drinking water systems and provided them with an opportunity to submit their written comments and recommendations. Notification was provided to interested parties through specific mailings, distribution through the Water Board Lyris Email System and through publication in the following newspapers for the following communities:

- Inter-City Express - Alameda County
- Tahoe Daily Tribune - Alpine County
- Fresno Bee - Fresno County
- Imperial Valley Press - Imperial County
- Los Angeles Daily Journal - LA County
- Orange County Recorder - Orange County

- Daily Recorder - Sacramento County
- San Diego Commerce - San Diego County
- New Times - San Luis Obispo County
- Record Searchlight - Shasta County
- Sonoma County Herald - Sonoma County

B. Public Comments

A draft Order was issued for public comment and review on June 6, 2014. Interested persons were invited to submit written comments concerning the draft Order. A revised draft Order was issued on July 3, 2014, mainly incorporating TMDL implementation language to the previously issued draft Order. For State Water Board staff and the State Water Board to be fully responsive and consider public comments, all comments were required to be submitted to the State Water Board by noon on August 19, 2014.

C. Public Hearing

The State Water Board held a public hearing on the draft Order during its regular Board meeting on the following date and time and at the following location:

Date: August 5, 2014
Time: 9:00 a.m.
Location: California Environmental Protection Agency Headquarters Office
1001 I Street, 2nd Floor
Sacramento, CA 95814

Interested persons were invited to attend. At the public hearing, the State Water Board heard testimony pertinent to the subject discharges, and this Order. Oral testimony was heard; however, for accuracy of the record, important testimony was required to be submitted in writing.

The State Water Board considered comments that were provided orally at the public hearing, and in writing in accordance with the public notice issued for this Order, for the development of the final draft permit. Due to the numerous changes to the draft permit, a subsequent public workshop was held on October 21, 2014, and further oral comments were heard as the final draft permit was considered for adoption on November 18, 2014.

All pertinent dates, documents and agendas were kept updated and accessible on the NPDES Program Page of the State Water Board website at the following web address: http://www.waterboards.ca.gov/water_issues/programs/npdes/.

D. Waste Discharge Requirements

This Order serves as statewide Waste Discharge Requirements (WDRs) pursuant to California Water Code, article 4, chapter 4, division 7 (commencing with § 13260). This Order is also issued pursuant to federal Clean Water Act (CWA) section 402 and implementing regulations adopted by the U.S. Environmental Protection Agency

(U.S. EPA), and California Water Code chapter 5.5, division 7 (commencing with § 13370). This Order shall serve as a statewide general NPDES permit for point source discharges from single or multiple discharge points to surface waters, storm drains, and other storm water conveyances leading to waters of the U.S.

Due to the drought conditions and the State of California water conservation goals, the State Water Board strongly encourages water purveyors with a discharge authorized under this Order to place the discharge water to multiple uses prior to surface water discharge, or to a beneficial reuse. The multiple use or beneficial reuse of the discharges authorized under this Order generally does not require coverage under waste discharge requirements if the discharge is collected and reused for landscape irrigation or other uses in a manner that augments the existing supply, or if the discharge is directly or indirectly discharged to:

- Storm water capture basin(s),
- Low impact development features
- Other groundwater-recharge system(s), or

Discharges from drinking water systems to land that do not drain to waters of the U.S. do not need authorization to discharge under an NPDES permit. Although discharges to groundwater may require waste discharge requirements issued by the State and/or Regional Water Boards, as an incentive to promote multiple uses of drinking water system discharges, the State Water Board generally will not require waste discharge requirements or monitoring for such drinking water system discharges that are beneficially reused rather than discharged to a water of the U.S. A water purveyor must estimate and report in its annual report, the quantity of water that would otherwise have been discharged but is used multiple times or is beneficially reused for this provision to apply.

E. Register of Interested Persons

Any person interested in being placed on the mailing list for information regarding this Order must register on the Drinking Water Systems Discharge Permit Iyris listing at http://www.waterboards.ca.gov/resources/email_subscriptions/swrcb_subscribe.shtml, by selecting 'Water Quality Topics', then selecting 'Drinking Water Systems Discharges'.

F. Additional Information

Requests for additional information or questions regarding this Order should be directed to Ms. Diana Messina, staff of the State Water Board, at diana.messina@waterboards.ca.gov.

**ATTACHMENT G – WATER BODIES WITH TOTAL MAXIMUM DAILY LOADS (TMDLs)
AND WASTE LOAD ALLOCATIONS (WLAs) TO WATER PURVEYORS**

As of the adoption date of this Order, no already-adopted TMDLs have established WLAs that apply exclusively to discharges from drinking water systems regulated under this Order. Due to the nature of the discharges authorized under this Order, it is unlikely that these discharges contribute to the impairment of the TMDL-related water bodies; therefore existing TMDL-related requirements that include WLAs to general categories of discharges are not applicable.

This Attachment is reserved for the State Water Board to include additional permit requirements in a subsequent permit renewal to implement future TMDLs that:

- 1) address pollutants likely to be in discharges from drinking water systems, and
- 2) allocate waste loads specifically to water purveyors regulated under this Order.

ATTACHMENT H - MAP OF THE REGIONAL WATER QUALITY CONTROL BOARDS

To find the Regional Water Board for a particular location, click on the map or enter a street address at the following website: http://www.waterboards.ca.gov/waterboards_map.shtml#rwqcb

Or click on the map below:



Appendix B
Final Geotechnical Report, Water Transmission Pipeline
Replacement under Mad River
(Crawford & Associates, Inc.; December 2017)

FINAL GEOTECHNICAL REPORT

Humboldt Bay Municipal Water District
Water Transmission Pipeline Replacement Under Mad River
Blue Lake and Fieldbrook-Glendale Community Services District
Humboldt County, California

Prepared by:



Crawford & Associates, Inc.
4220 Rocklin Road, Suite 1
Rocklin, CA 95677

December 14, 2017

Prepared for:



GHD Inc.
718 3rd Street
Eureka, CA 95501

File No. 15-245.2
December 14, 2017

Mr. Patrick Kaspari
GHD Inc.
718 3rd Street
Eureka, CA 95501

Subject: **FINAL GEOTECHNICAL REPORT**
Humboldt Bay Municipal Water District
Water Transmission Pipeline Replacement under Mad River
Humboldt County, California

Dear Mr. Kaspari,

Crawford & Associates, Inc. (CAInc) is pleased to submit this Final Geotechnical Report for the Humboldt Bay Municipal Water District water pipeline project. CAInc prepared this report in accordance with the Phase-2 GHD Purchase Order dated April 4, 2017.

Thank you for selecting CAInc to be on your design team. Please call if you have questions or require additional information.

Sincerely,

Crawford & Associates, Inc.,



Nate Majerus
Senior Project Geologist



Rick Sowers, P.E., C.E.G.
Principal

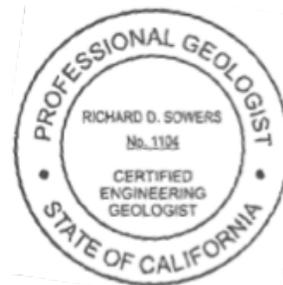


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APPENDIX A

Boring Logs

APPENDIX B

Refraction Seismic Profiles

APPENDIX C

Laboratory Test Results

1 INTRODUCTION

1.1 PURPOSE

Crawford & Associates, Inc. (CAInc) prepared this Final Geotechnical Report in accordance with our agreement and GHD Purchase Order No. 38000853, dated April 4, 2017. This report provides our Phase-2 geotechnical assessment and recommendations for the proposed trenchless pipeline crossing of the Mad River.

1.2 BACKGROUND

CAInc prepared a Preliminary Geotechnical Report, dated December 9, 2015 that provided Phase-1 (preliminary) geotechnical assessment for the project. Four test borings were completed for that study in October, 2015 (two on each side of the Mad River), along with geologic reconnaissance and preliminary laboratory testing. The Phase-1 study considered two alternatives: (1) a new aerial bridge crossing located immediately upstream of the existing railroad bridge and supported by suspension towers located on each bank; and (2) a trenchless crossing beneath the river.

Based on the preliminary geotechnical report, Bennett Trenchless Engineers (BTE) completed a feasibility report (dated February 1, 2016) that evaluated trenchless construction methods for installing the pipeline under the river. BTE concluded that horizontal directional drilling (HDD) was a feasible and cost-efficient construction method pending verification of the subsurface conditions and hydrofracture risk. For preliminary design purposes, BTE assumed a bore depth at 20 feet below channel bottom.

This report incorporates the data from the Phase 1 study and provides design recommendations for a trenchless replacement using HDD.

1.3 SCOPE OF SERVICES

For Phase-2, CAINC completed the following tasks:

Project Coordination and Preparation – Discussed the HDD design/construction issues with representatives of GHD and BTE; developed exploration details and scheduling; reviewed existing geotechnical data and published geologic maps; conducted a site visit to mark borehole locations; and obtained the necessary permits, including CA Fish & Wildlife, for drilling within the channel.

Geologic Reconnaissance – Completed supplemental geologic mapping along the updated pipeline alignment.

Subsurface Exploration - Drilled and sampled three additional boreholes, including one within the active channel and one each near the proposed HDD entry and exit points.

Geophysical Surveys – Completed four, double-ended, refraction seismic profiles within the channel to correlate the boring data and develop a rock profile across the channel.

Laboratory Testing – Conducted moisture content, dry density, sieve analysis and plasticity index for materials classification; corrosivity tests for soil/rock corrosion potential; and point load index and uniaxial compressive tests for rock strength and hydrofracture analysis.

Geotechnical Report – Performed engineering analysis of the data to develop the conclusions and recommendations presented in this report.

2 PROJECT AND SITE DESCRIPTION

The project will replace an existing 14” ductile iron water supply pipeline that presently crosses the Mad River attached to a 1930’s era North Coast Railroad Authority (NCRA) steel-truss bridge. The bridge is vulnerable to damage or failure during an earthquake or severe flood. The pipeline is the main water supply to the communities of Blue Lake, Fieldbrook and Glendale.

The proposed pipe alignment crosses the Mad River approximately two miles upstream from Arcata, CA. The channel at this location is about 450 feet wide and generally at about elev. 35 ft, with the lowest channel point along the northeast bank at about elev. 30 ft. Steep banks on both sides of the river rise to terrace surfaces at about elev. 85-90 ft. Access to the southwest bank is along an abandoned railroad grade east of Warren Creek Road. Access to the northeast bank is through an equipment yard operated by GR Sundberg, Inc., located at 1220 Glendale Drive, McKinleyville. A project location map is attached as Figure 1.

Site topography by GHD (received electronically on November 10, 2017) shows the replacement pipe extending for a horizontal length of approximately 1,117 ft. The entry point is shown to be on the northeast bank (at Sta. 21+17), near the back of Sundberg’s equipment yard and at about elev. 90 ft. The alignment extends west under the Mad River. The exit point is shown to be approximately 50 feet east of Warren Creek Road (at Sta. 10+00) at an approximate elevation of 78 feet. The low point of the channel (elev. 32+/-) is at approximately Sta. 17+00.

3 GEOLOGIC SETTING

The site is located within the Coast Range geomorphic province, characterized by northwest trending ridges and valleys. Published geologic mapping shows the site within the central belt of the Franciscan Formation, consisting of Early Tertiary to Late Cretaceous mélangé and Late Cretaceous to Late Jurassic meta-sediments.

The sediments within the Mad River channel are mapped as Recent alluvial deposits. Quaternary terrace deposits are present along the top of both banks. Bedrock in the area is mapped as Late Cretaceous to Late Jurassic arkosic and lithic meta-sandstone and meta-argillite that depositionally overlie chert. These meta-sedimentary rocks are unnamed and are distinguished by their topographic expression and degree of fracture.

The regional geology is shown on Figure 3.

4 SEISMICITY

4.1 ACTIVE FAULTING

The project site is located within the Mad River Fault Zone, defined by a series of subparallel low angle thrust faults that strike to the northwest. The United States Geological Survey (USGS) Earthquake Hazards Program Fault Map (earthquake.usgs.gov) shows an unnamed branch of the Mad River Fault Zone crossing under the NCRA bridge near the northeast abutment, truncating just southeast of the project site (see Figure 4).

The CGS Special Studies Zones map (maps.conservation.ca.gov) of the Arcata North Quadrangle shows portions of the Mad River Fault Zone within an Earthquake Fault Zone (EFZ) for fault rupture hazard. The site is not included within a mapped zone. The two closest EFZs terminates approximately 1.4 miles northwest and 1.1 miles south of the site. Based on this mapping, the potential for fault rupture is considered generally low. However, the EFZ to the south aligns with the unnamed (USGS) fault that crosses the site, suggesting that the two faults might be connected. If so, the thrust fault mapped by the USGS has the potential to show displacement in the future. Further study would be required if this potential is considered significant.

The California Geological Survey, Probabilistic Seismic Hazards Mapping Ground Motion Page (www.conservation.ca.gov) indicates a maximum peak horizontal ground acceleration (PGA) on the order of 0.61g for a seismic event with a 10% probability of exceedance in 50 years (design basis earthquake).

4.2 SEISMIC DESIGN PARAMETERS

Based on our exploratory borings, we provide the California Building Code (CBC) design parameters below. Table 1 shows the 2013 California Building Code and ASCE 7-10 seismic design parameters for the site. CAInc determined the values using a site latitude of 40.900°N and longitude of 124.028°W with the Earthquake Ground Motion Parameters - Version 5.1.0 developed by the United States Geological Survey.

Table 1: Seismic Design Parameters

Site Class	C
S_s – Acceleration Parameter	3.003 g
S_1 – Acceleration Parameter	1.173 g
F_a – Site Coefficient	1.0
F_v – Site Coefficient	1.3
S_{MS} – Adjusted MCE* Spectral Response Acceleration Parameter	3.003 g
S_{M1} – Adjusted MCE* Spectral Response Acceleration Parameter	1.525 g
S_{DS} – Design Spectral Acceleration Parameter	2.002 g
S_{D1} – Design Spectral Acceleration Parameter	1.016 g
T_L – Long-Period Transition Period**	8 seconds

* Maximum Considered Earthquake

** Figure 22-12, ASCE 7-10

5 GEOLOGIC RECONNAISSANCE

Our geologic reconnaissance of the river channel and both banks noted bedrock outcrops in the river channel and along the river banks near the existing bridge abutments. These outcrops are shown on Figure 2.

Along the northeast side of the river, meta-argillite outcrops were observed approximately 75 yards upstream from the current bridge. These outcrops were very hard, needing heavy blows from a sledge hammer to remove hand samples. The exposed surfaces and fracture faces were slightly weathered with discoloration and oxidation ranging from light orange-yellow to dark reddish-brown. Meta-argillite outcrops were also observed along the northeast channel just below and slightly upstream from the bridge abutment; the rock at these locations is fresh and massive with some quartz veins and could only be chipped with a sledge hammer.

The southwest bank had fewer, and more weathered, outcrops. The largest outcrop was approximately 1500 feet upstream from the bridge in a cut bank next to the river channel. That outcrop was moderately hard and slightly to moderately weathered meta-argillite. A separate outcrop was observed approximately 300 feet downstream from the bridge along steps dug in the hillside for a hiking trail. This outcrop – located near the proposed pipe alignment -- was intensely weathered (to a residual soil) that maintained a steep slope but crumbled when hit with a hammer.

The final outcrop was fresh, fine grained meta-sandstone observed in the middle of the channel just upstream from the northeast pier. This outcrop is very hard and is approximately 120 feet west of the meta-argillite outcrops at the northeastern bank. The difference in rock types suggest that either the meta-sedimentary beds are tilted in the region or the unnamed thrust fault is located between these outcrops.

The river channel near the proposed HDD crossing is linear compared to the channel upstream and downstream from the site. This linear portion of the river appears to line up with the apparent strike of the unnamed fault that crosses the site, according to Figures 3 and 4.

6 SUBSURFACE EXPLORATION

CAInc observed and logged a total of seven exploratory test borings ranging in depth between 15.5 and 75 feet below ground surface (bgs). Two borings were drilled near the northeast bridge abutment and two near the southwest abutment in October 2015. These were supplemented by three test borings in September 2017 near the entry/exit points of the proposed HDD line and one in the active channel.

The approximate boring locations are shown on Figure 2 and the detailed logs in Appendix A. Our interpreted cross-section along the pipeline alignment is shown on Figure 5.

6.1 CHANNEL ALLUVIUM

The channel alluvium is comprised of poorly-graded gravel with sand. These materials were encountered in B-6 (within active channel) to a depth of approximately 30 ft (about elev. 5). Elsewhere across the channel these materials are present as loose gravel bars that represent bedload deposits and likely shift seasonally depending on flows. Most of these deposits contain fine to coarse gravel (up to about 3-inch in size). The drilling operation in B-6 suggested some cobble-size particles (between 3-12

inch) at a depth of about 16 ft (elev. 20 ft). The sandy gravel below channel bottom is typically medium dense to dense.

6.2 TERRACE ALLUVIUM

Terrace alluvium is present at the top of both banks, near the proposed entry and exit points for the HDD line. These soils are composed of stiff lean clay and sand with varying amounts of gravel and trace cobbles. They extend to about depth 8-15 ft at both banks. Near the proposed entry and exit points, they were encountered to depths of 12 ft and 13 ft in B-5 and B-7, respectively.

6.3 RESIDUAL SOIL

The terrace alluvium is underlain at each bank by dense, in-situ residual soils derived from the underlying bedrock. These soils retain the appearance and structure of the deeper source bedrock, but with heavy staining and discoloration. These soils are dense lean clay with varying amounts of angular to subangular sand and rock fragments. The coarser materials are composed of resistant portions of the source rock, including quartz from younger joint infilling.

At the west bank, B-5 (near proposed entry point) encountered these soils to a depth of about 13 ft. At the east bank, B-7 (near proposed exit point) encountered these soils to a depth of about 18 ft.

6.4 BEDROCK

The residual soils transition to weathered rock and, with depth, to fresh, hard bedrock. The weathered rock is a dark gray color with some staining on joint surfaces. This rock was typically drillable with power-auger equipment and broke into clayey gravel with sand by the drilling and sampling process. Standard Penetration Tests in the weathered rock were >50 blows per foot, with an increased difficulty of drilling and hard angular rock fragments.

Moderately weathered to fresh bedrock was encountered in each of the borings below the weathered rock. This rock is described as meta-argillite, consistent with the mapped geology of the region and hard-rock outcrops observed near the borings. Samples of this rock were obtained by diamond coring to a maximum depth of 75 feet (elev. -40, B-7 in channel). Rock Quality Designation (RQD)¹ ranged from 0-90%, reflecting the highly variable degree of rock quality affected by weathering and/or fractures. Core sections that are not hard and sound are not included in the RQD evaluation. The majority of the rock core obtained for this study shows an RQD < 50%, an indication of generally poor rock quality. However, when the rock was fresh and most competent, the RQD values ranged from 52% to 90%.

6.5 FAULT GOUGE

The rock quality was particularly poor in B-6 (channel) and in the lower portion of B-7 (east bank). The rock in these areas appears to be highly sheared into a dense lean clay with sand and gravel particles. This clay shows some signs of linear “smear” and micro-folding, indicating that it is gouge in a shear zone. B-6 lines up with the mapped fault seen on the regional geologic map (Figure 3) and the regional fault map (Figure 4), so we interpret this rock as likely old fault gouge. The deepest portion of the river bedload is in this gouge, since residual clay weathers more readily than the bedrock.

¹ RQD = sum of the length of sound rock greater than 4” in length divided by the total core run length, expressed as a percentage.

Bedrock outcrops are located both east and west of B-6, indicating that the fault gouge is contained under the eastern portion of the river channel. However, since some gouge is also seen at the bottom of B-7 (assumed to be a smaller parallel shear) it is possible that fault gouge will be encountered under the western portion of the river channel. Even if this is the case, we feel confident that the deepest area of bedload gravels is at or near the eastern edge of the river channel.

Despite using a lot of water at a high pressure during drilling to ensure that the clay did not plug the bit, a significant portion of the clay was retrieved (up to 100% retrieval near the bottom of borehole B-6). Little to no signs of secondary minerals or alteration due to excessive water flowing through the clay was observed, and the clay was moist, but not wet, despite being located below the active river channel. All of this seems to indicate that the clay gouge is dense and massive enough to prevent water flow or chemical alteration to the clay minerals.

We include photographs of the rock core with the boring logs in Appendix A.

6.6 GROUNDWATER

Free groundwater was not encountered in the initial borings completed on October 2015. The bank borings completed in 2017 were also dry within the depth of auger drilling (14 ft in B-5 and 18 ft in B-7); measurements below this depth are not available due to the diamond coring drill method. In B-6 (within the channel), groundwater was encountered in the channel bedload at depth 3 ft.

We consider the channel bedload and terrace alluvium to be saturated and yield water freely at depths below the encountered groundwater (about elev. 32 ft). Groundwater within the bedrock is likely restricted to local fracture and shear zones. Groundwater within the terrace soils at the banks likely varies with rainfall, seasonal changes, and surface water levels of the Mad River.

7 REFRACTION SEISMIC PROFILES

We performed four seismic refraction surveys along gravel bars within the Mad River channel in October 2017 to supplement the boring data. Figure-2 shows the approximate location of each seismic line. Appendix B contains the results of the seismic surveys and seismic profiles.

Each seismic line consisted of 9 shot points distributed along a linear array of 24 geophones, with a multi-channel receiver (seismograph) located at one end of the array to collect the data. We placed geophones at intervals of 5 feet along the array. We generated compressional wave energy (P-waves) at each shot point using multiple impacts with a 20-pound sledge hammer striking a steel plate placed on the ground surface. We used a *Geometrics ES-3000* seismograph to detect, digitize, and record the P-waves.

Our recorded seismic velocities range from about 2,000 feet per second (fps) to 6,800 fps. We interpret velocities of 2,000 – 3,200 fps to represent channel alluvium and velocities in excess of 6,400 fps to represent weathered bedrock and/or the dense fault gouge. Depths to weathered bedrock are interpreted to range from about 10-15 ft below the ground surface across the channel. We interpret the relatively high velocities in Line 4 (near B-6) to represent dense, saturated gravel as encountered in B-6. While it is possible that deeper pockets of dense gravel also exist along the west side of the

channel, the channel geology suggests that the deeper, backfilled portion of the channel is along the northeast side, likely following the weak rock and/or fault gouge.

8 LABORATORY TEST RESULTS

We completed the following laboratory tests on representative soil samples obtained from the exploratory borings:

- Moisture Content - Dry Density (ASTM D2216 / D2937)
- Particle Size Analysis (ASTM D422)
- Atterberg Limits (ASTM D4318)
- Sulfate/Chloride Content (CTM 417/422)
- pH/Minimum Resistivity (CTM 643)
- Point Load Index (ASTM D5731)
- Unconfined Compressive Strength (ASTM 2938)

The complete test results are presented in Appendix C.

8.1 SOIL INDEX TESTS

Index tests were performed on the soils encountered in the original four borings to verify the USCS classifications. Representative gradations, Atterberg Limits, and Moisture/Density test results can be found in Appendix C.

8.2 POINT LOAD AND UNCONFINED COMPRESSIVE TESTS

Unconfined Compressive Strength and Point Load Index tests were performed on the fresh rock cores obtained from the test borings. These strengths are assumed to be representative of the hardest rock that will be encountered during the HDD. These test results are summarized in Table 2.

Table 2: Unconfined Compressive Strength Results

Boring Number	Depth (ft)	Uniaxial Compressive Strength (psi)
B5	35.0	13,100
B5	35.7	14,400
B5	42.7	10,900*
B5	43.5	17,000*
B5	44.1	14,100*
B5	44.8	12,000*
B5	45.3	13,100*
B5	45.7	12,800*
B5	46.0	13,900*
B5	46.5	11,400
B5	47.2	9,700
Average:		11,900
*- indicates UCS value estimated using Point Load Index		

8.3 SOIL CORROSION

Results of the soil corrosivity tests are summarized in Table 3.

Table 3: Corrosivity Test Results

Boring Number	Depth (ft)	Geologic Unit	pH	Minimum Resistivity (ohm-cm)	Chloride (ppm)	Sulfate (ppm)
B1	5-6	Terrace Alluvium	5.40	9,110	14.2	21.1
B1	8.5-9	In-Situ Residual Soil	7.40	2,140	7.9	4.3
B2	4-7	Terrace Alluvium	5.22	7,770	15.5	4.4
B2	16-16.5	In-Situ Residual Soil	5.49	6,700	9.1	36.1
B3	8-9	Terrace Alluvium	5.05	12,330	16.0	7.2
B3	12-13	Terrace Alluvium	5.05	5,900	12.8	4.8
B3	16-17	In-Situ Residual Soil	5.33	4,960	24.8	8.7
B4	8-9.5	In-Situ Residual Soil	5.65	2,950	19.2	54.8
B6	56-58	Fault Gouge	8.88	540	6.6	67.8

Caltrans considers a site to be corrosive if the chloride concentration is 500 ppm or greater, sulfate concentration is 2000 ppm or greater, soil pH is 5.5 or less, or minimum resistivity is 1000 ohm-cm or less. Based on the test results, the soil pH is slightly lower than the Caltrans guideline and the resistivity of the fault gouge (and therefore the source rock as well) is well below the Caltrans guideline. Therefore, materials encountered by the pipeline could be corrosive to steel or concrete. HDPE pipe, or other material not subject to corrosion, may be preferable for this project.

9 CONCLUSIONS AND RECOMMENDATIONS

9.1 HDD CONDITIONS

Based on the subsurface data developed for this study, we consider conditions along the proposed pipeline alignment to be suitable for horizontal directional drilling (HDD) construction. The bedrock is estimated at depths of about 10-15 feet across the majority of the channel, with bedrock dipping to about 30 feet below channel bottom along a deeper, backfilled section of the channel along the northeast side (near B-6). We show our interpreted bedrock profile on Figure 5. We recommend the HDD pipeline be maintained within the bedrock unit as shown on Figure 5 to reduce the potential for frack-out.

We consider the channel alluvium above the rock-line to be saturated and yield water freely. Free groundwater within the terrace soils at each bank is expected to be limited to seasonal occurrences and generally discontinuous. Groundwater within the underlying bedrock is expected to be restricted to fracture and shear/fault zones.

The presence of cobbles and clean gravel can cause loss of drill fluid and collapse of the HDD borehole. Based on our data, we consider the potential for these conditions to be low for a pipe profile within rock. Areas of weak rock (e.g., shear/fault zones) and fractures can cause binding of drill tools and fracking of drill mud; these conditions may occur along the projected path, especially within the shear

zone identified between about Stations 16+00 and 17+70. Caving soils in the upper 10-20 feet at the entry and exit points can generally be controlled by driving conductor casing.

The alignment crosses linear shear zones that likely represent faults. These could, with further study, be identified as “active”. We recommend this hazard be mitigated by design features to accommodate strong ground shaking and possible movement, such as flexible connections and/or emergency shut-off valves.

9.2 LIQUEFACTION

Liquefaction can occur when loose to medium dense, granular, saturated soils (generally within 50 feet of the surface) are subjected to ground shaking. Due to the generally cohesive nature of the soils at the banks and the presence of bedrock at depths generally greater than 10-15 feet below the channel, we consider the potential for liquefaction to be low, except within the saturated channel alluvium extending about 30 ft below the northeast side of the active channel.

9.3 SEISMIC SETTLEMENT

During a seismic event, ground shaking can cause densification of granular soil above the water table that can result in settlement of the ground surface. Based on our data, some seismic settlement may occur within loose portions of the alluvium along the banks and within the channel, however, is not expected to affect a trenchless crossing below these soils.

9.4 SEISMIC SLOPE INSTABILITY

We consider the potential for seismic slope instability along the existing channel banks, including lateral spreading, to be moderate to high due to the steep banks and high seismic ground motions. This hazard is mitigated by a trenchless crossing that will follow an arc-path beneath the banks and river.

10 LIMITATIONS

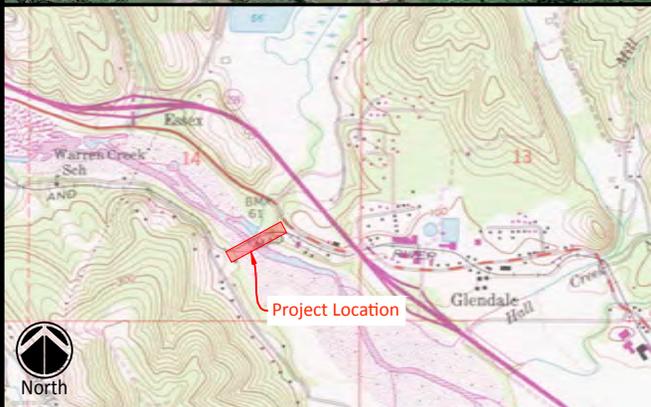
This report is intended for GHD Inc. and the design team for use in design and construction of the project as described above. Our scope did not include evaluation of on-site hazardous materials. CAInc performed these services in accordance with generally accepted geotechnical engineering principles and practices currently used in this area. Do not use or rely on this report for different locations or improvements without the written consent of CAInc.

FIGURES

- Figure 1 – Vicinity Map
- Figure 2 – Exploration Location Map
- Figure 3 – Regional Geologic Map
- Figure 4 – Regional Fault Map
- Figure 5 – Geologic Cross-Section



Map Sources: Google Earth Pro; GHD, Inc.; USGS



Project Mgr.	RDS	11/29/17
Project Geol.	NBM	11/29/17
Designer		
Checked By		
Drawn By	NRA	11/29/17
By		Date

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 Geotechnical Engineering, Design and Construction Services

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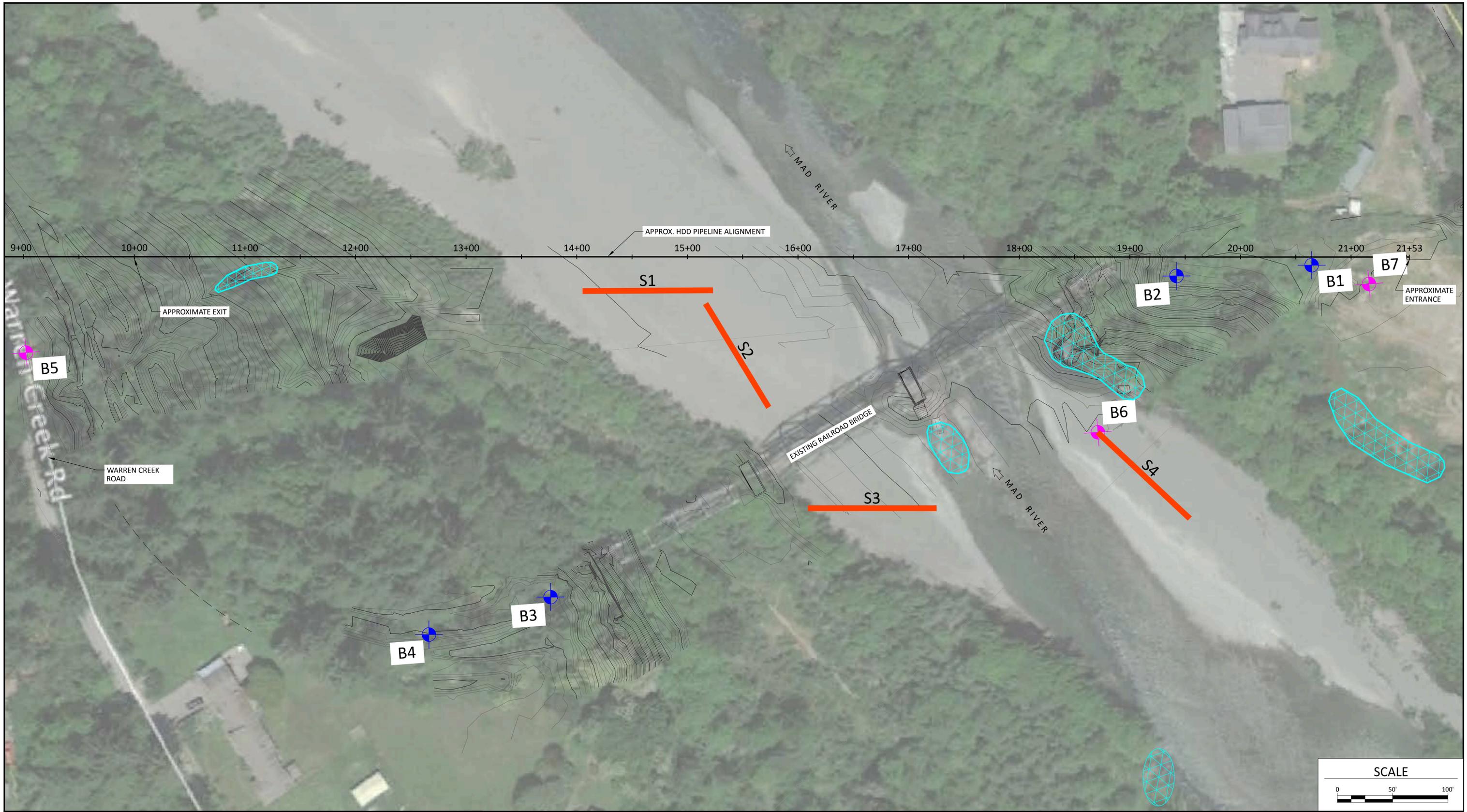
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**GEOTECHNICAL INVESTIGATION
 HBMWD PIPELINE CROSSING
 PHASE 2**

HUMBOLDT COUNTY, CA

Figure 1
 Vicinity Map

Project No.	15-245.2
Scale	See above
Date	11/29/17

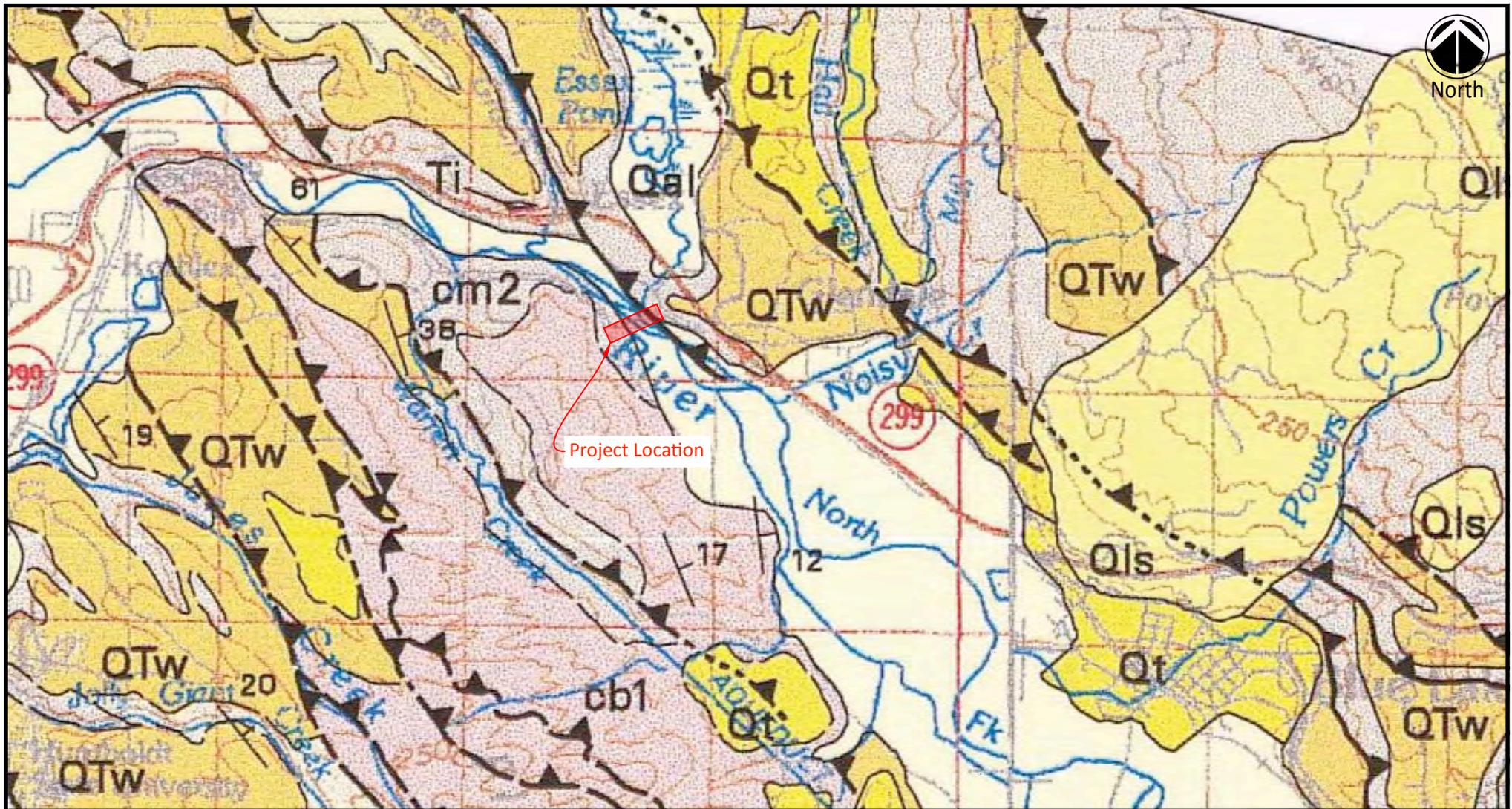


LEGEND	
	B1 BORING LOCATIONS - PHASE 1
	B5 BORING LOCATIONS - PHASE 2
	SEISMIC LINE LOCATIONS
	BEDROCK OUTCROPPINGS

PLAN			
 NORTH	Map and Data Source: Topography and Proposed Pipeline Alignment provided by GHD via electronic transfer.	 Geotechnical Engineering, Design and Construction Services Since 1954 1100 Corporate Way Suite 230 Sacramento, CA 95831 (916) 455-4225	Figure 2 Exploration Location Map Proj. No: 15-245.2 Scale: As Noted Date: 11/29/2017
GEOTECHNICAL INVESTIGATION HBMWD PIPELINE CROSSING PHASE 2 HUMBOLDT COUNTY, CA			



North



LEGEND

- Qal Alluvial deposits (Holocene and late Pleistocene)
- QTW Marine and nonmarine overlap deposits (late Pleistocene to middle Miocene)
- cb1 Broken metasedimentary formation (Cretaceous to Jurassic)
- Qt Undifferentiated nonmarine terrace deposits (Holocene and Pleistocene)
- Ti Volcanic rocks of Fickle Hill (Oligocene)
- cm2 Metasedimentary melange (Cretaceous to Jurassic)
- Thrust fault
- Strike and dip of bedding

Project Mgr.	RDS	11/29/17
Project Geol.	NBM	11/29/17
Designer		
Checked By		
Drawn By	NRA	11/29/17
By		Date

Geologic Map Source: R.J. McLaughlin et al, 2000, Geology of the Cape Mendocino, Eureka, Garberville, and Southwestern part of the Hayfork, 7.5 minute Quadrangles.

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**GEOTECHNICAL INVESTIGATION
HBMWD PIPELINE CROSSING
PHASE 2**

HUMBOLDT COUNTY, CA

Figure 3
Geology Map

Project No. 15-245.2
Scale 1"=3,000'
Date 11/29/17



LEGEND

Quaternary Fault (Age)
 — — <15,000 years
 — — <130,000 years

Location
 — Observed
 - - - - - Approximated
 Alquist-Priolo Zone

Project Mgr.	RDS	11/29/17
Project Geol.	NBM	11/29/17
Designer		
Checked By		
Drawn By	NRA	11/29/17
By		Date

Fault Map Source: Google Earth Pro with USGS Fault Location Overlay

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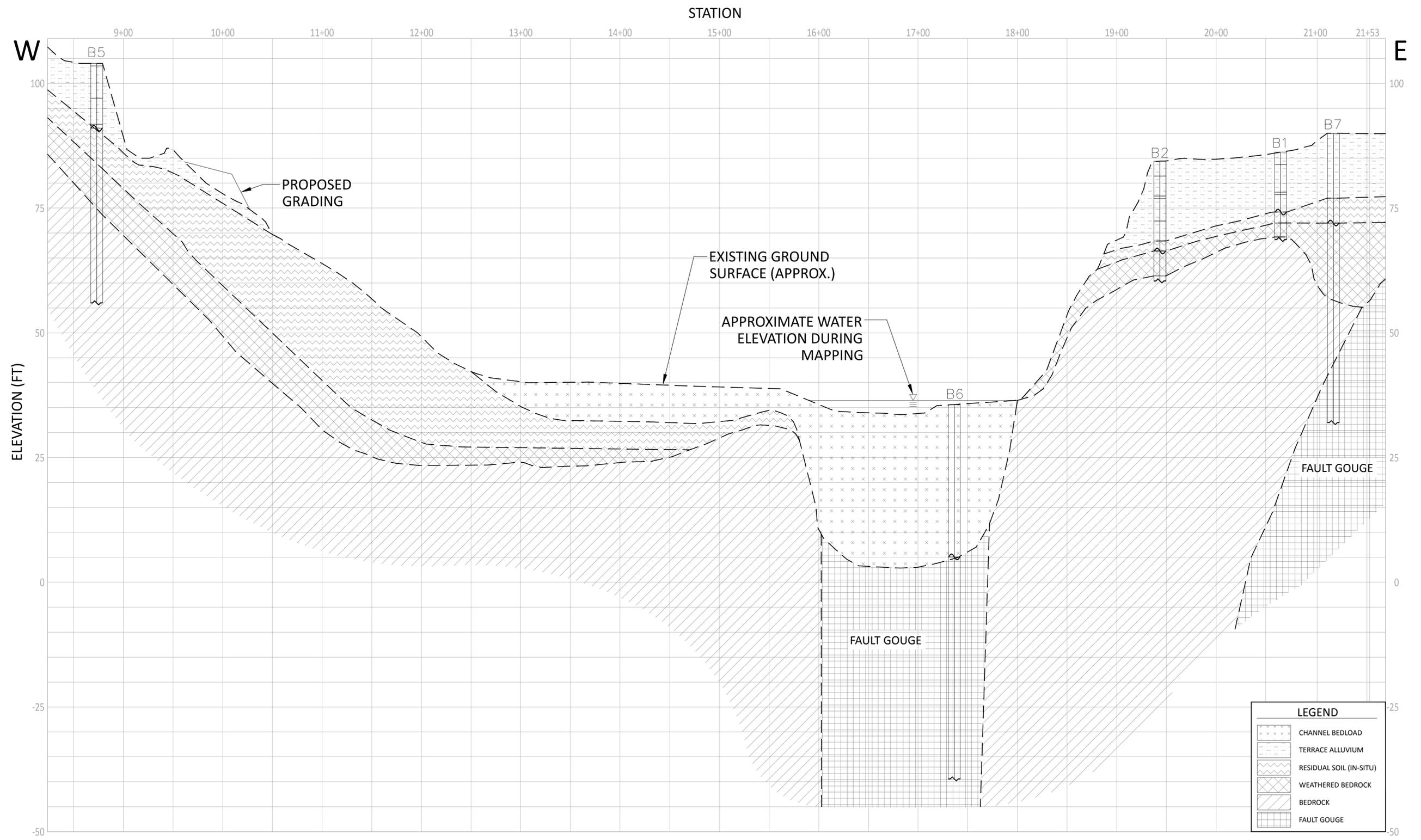
Taber
 Since 1964

**GEOTECHNICAL INVESTIGATION
 HBMWD PIPELINE CROSSING
 PHASE 2**

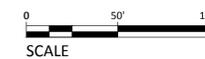
HUMBOLDT COUNTY, CA

Figure 4
 Fault Activity Map

Project No.	15-245.2
Scale	1"=5,000'
Date	11/29/17



PROFILE OF CROSS SECTION



GEOTECHNICAL INVESTIGATION
HBMWD PIPELINE CROSSING
PHASE 2

HUMBOLDT COUNTY, CA

Figure 5
Geologic Cross
Section

Proj. No: 15-245.2
Scale: As Noted
Date: 11/29/2017

Boring Logs

UNIFIED SOIL CLASSIFICATION (ASTM D 2487-06)

MATERIAL TYPES	CRITERIA FOR ASSIGNING SOIL GROUP NAMES			GRAPHIC SYMBOL	GROUP SYMBOL	SOIL GROUP NAMES
COARSE-GRAINED SOILS >50% RETAINED ON NO. 200 SIEVE	GRAVELS >50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS <5% FINES	$Cu \geq 4$ AND $1 \leq Cc \leq 3$		GW	WELL-GRADED GRAVEL
			$Cu < 4$ AND/OR $1 > Cc > 3$		GP	POORLY-GRADED GRAVEL
		GRAVELS WITH FINES >12% FINES	FINES CLASSIFY AS ML OR MH		GM	SILTY GRAVEL
			FINES CLASSIFY AS CL OR CH		GC	CLAYEY GRAVEL
	SANDS <50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN SANDS <5% FINES	$Cu \geq 6$ AND $1 \leq Cc \leq 3$		SW	WELL-GRADED SAND
			$Cu < 6$ AND/OR $1 > Cc > 3$		SP	POORLY-GRADED SAND
		SANDS WITH FINES >12% FINES	FINES CLASSIFY AS ML OR MH		SM	SILTY SAND
			FINES CLASSIFY AS CL OR CH		SC	CLAYEY SAND
FINE-GRAINED SOILS >50% PASSING NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT <50	INORGANIC	PI>7 AND PLOTS ON OR ABOVE "A" LINE		CL	LEAN CLAY
			PI>4 AND PLOTS BELOW "A" LINE		ML	SILT
	SILTS AND CLAYS LIQUID LIMIT >50	ORGANIC	LL (oven dried)<0.75/LL (not dried)		OL	ORGANIC CLAY OR SILT
		INORGANIC	PI PLOTS ON OR ABOVE "A" LINE		CH	FAT CLAY
			PI PLOTS BELOW "A" LINE		MH	ELASTIC SILT
		ORGANIC	LL (oven dried)<0.75/LL (not dried)		OH	ORGANIC CLAY OR SILT
HIGHLY ORGANIC SOILS		PRIMARILY ORGANIC MATTER, DARK COLOR, ORGANIC ODOR			PT	PEAT

NOTE: $Cu = D_{60}/D_{10}$
 $Cc = (D_{30})^2 / D_{10} \times D_{60}$

BLOW COUNT

The number of blows of a 140-lb. hammer falling 30-inches required to drive the sampler the last 12-inches of an 18-inch drive. The notation 50/0.4 indicates 4-inches of penetration achieved in 50 blows.

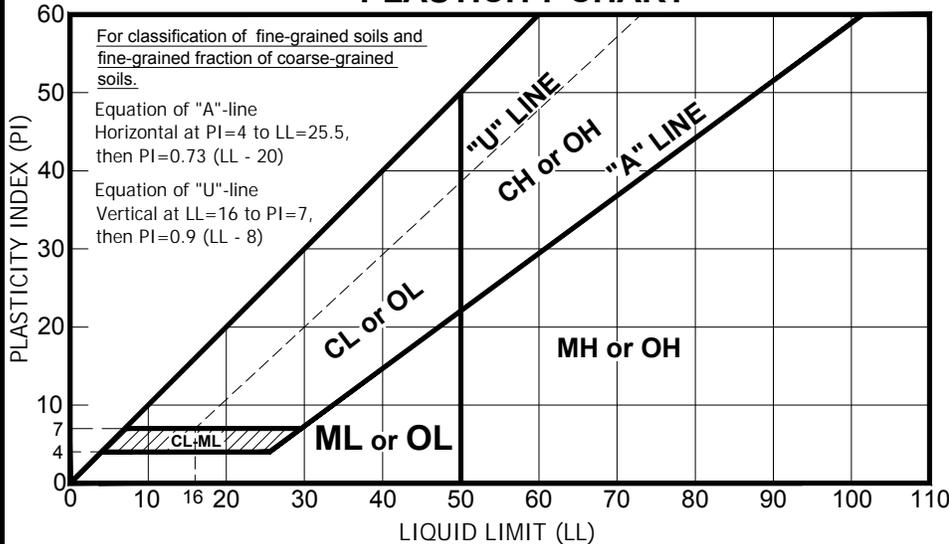
SAMPLE TYPES

- Auger or backhoe cuttings
- Shelby tube
- Standard Penetration (SPT)
- Bulk Sample
- Modified California 2"
- California Standard 2.5"
- Rock core

ADDITIONAL TESTS

- C - Consolidation
- CP - Compaction Curve
- CR - Corrosivity Testing
- CU - Consolidated Undrained Triaxial
- DS - Direct Shear
- EI - Expansion Index
- P - Permeability
- PA - Partical Size Analysis
- PI - Plasticity Index
- PP - Pocket Penetrometer
- R - R-Value
- SE - Sand Equivalent
- SG - Specific Gravity
- SL - Shrinkage Limit
- SW - Swell Potential
- TV - Pocket Torvane Shear Test
- UC - Unconfined Compression
- UU - Unconsolidated Undrained Triaxial

PLASTICITY CHART



GROUND WATER LEVELS

- Later water level after drilling
- Water level at time of drilling



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 and Construction Services

BORING LOG / TEST PIT LEGEND AND SOIL DESCRIPTIONS

CALTRANS SOIL & ROCK LOGGING MANUAL (2010)

LEGEND OF ROCK MATERIALS

	IGNEOUS ROCK
	SEDIMENTARY ROCK
	METAMORPHIC ROCK

BEDDING SPACING

DESCRIPTION	THICKNESS / SPACING
MASSIVE	GREATER THAN 10'
VERY THICKLY BEDDED	3' - 10'
THICKLY BEDDED	1' - 3'
MODERATELY BEDDED	4" - 1'
THINLY BEDDED	1" - 4"
VERY THINLY BEDDED	¼" - 1"
LAMINATED	LESS THAN ¼"

FRACTURE DENSITY

DESCRIPTION	OBSERVED FRACTURE DENSITY
UNFRACTURED	NO FRACTURES.
VERY SLIGHTLY FRACTURE	CORE LENGTHS GREATER THAN 3 ft.
SLIGHTLY FRACTURED	CORE LENGTHS MOSTLY FROM 1 TO 3 ft.
MODERATELY FRACTURED	CORE LENGTHS MOSTLY FROM 4 INCHES TO 1 ft.
INTENSELY FRACTURED	CORE LENGTHS MOSTLY FROM 1 TO 4 INCHES.
VERY INTENSELY FRACTURED	MOSTLY CHIPS AND FRAGMENTS.

PERCENT CORE RECOVERY (REC) & ROCK QUALITY DESIGNATION (RQD)

$$REC = \frac{\sum \text{LENGTH OF THE RECOVERED CORE PIECES (INCHES)}}{\text{TOTAL LENGTH OF CORE RUN (INCHES)}} \times 100\%$$

$$RQD = \frac{\sum \text{LENGTH OF INTACT CORE PIECES} = 4 \text{ INCHES}}{\text{TOTAL LENGTH OF CORE RUN (INCHES)}} \times 100\%$$

ROCK HARDNESS

DESCRIPTION	CRITERIA
EXTREMELY HARD	CANNOT BE SCRATCHED WITH A POCKETKNIFE OR SHARP PICK. CAN ONLY BE CHIPPED WITH REPEATED HEAVY HAMMER BLOWS
VERY HARD	CANNOT BE SCRATCHED WITH A POCKETKNIFE OR SHARP PICK. BREAKS WITH REPEATED HEAVY HAMMER BLOWS.
HARD	CAN BE SCRATCHED WITH A POCKETKNIFE OR SHARP PICK WITH DIFFICULTY (HEAVY PRESSURE). BREAKS WITH HEAVY HAMMER BLOWS.
MODERATELY HARD	CAN BE SCRATCHED WITH POCKETKNIFE OR SHARP PICK WITH LIGHT OR MODERATE PRESSURE. BREAKS WITH MODERATE HAMMER BLOWS.
MODERATELY SOFT	CAN BE GROOVED ¼" INCH DEEP WITH A POCKETKNIFE OR SHARP PICK WITH MODERATE OR HEAVY PRESSURE. BREAKS WITH LIGHT HAMMER BLOW OR HEAVY MANUAL PRESSURE.
SOFT	CAN BE GROOVED OR GOUGED EASILY BY A POCKETKNIFE OR SHARP PICK WITH LIGHT PRESSURE, CAN BE SCRATCHED WITH FINGERNAIL. BREAKS WITH LIGHT TO MODERATE MANUAL PRESSURE.
VERY SOFT	CAN BE READILY INDENTED, GROOVED OR GOUGED WITH FINGERNAIL, OR CARVED WITH A POCKETKNIFE. BREAKS WITH LIGHT MANUAL PRESSURE.

WEATHERING DESCRIPTORS FOR INTACT ROCK

DESCRIPTION	CHEMICAL WEATHERING-DISCOLORATION AND/OR OXIDATION		GENERAL CHARACTERISTICS
	BODY OF ROCK	FRACTURE SURFACES	
FRESH	NO DISCOLORATION, NOT OXIDIZED.	NO DISCOLORATION OR OXIDATION.	HAMMER RINGS WHEN CYRSTALLINE ROCKS ARE STRUCK.
SLIGHTLY WEATHERED	DISCOLORATION OR OXIDATION IS LIMITED TO SURFACE OR, OR SHORT DISTANCE FROM, FRACTURES; SOME FELDSPAR CRYSTALS ARE DULL.	MINOR TO COMPLETE DISCOLORATION OR OXIDATION OF MOST SURFACES.	HAMMER RINGS WHEN CRYSTALLINE ROCKS ARE STRUCK. BODY OF ROCK NOT WEAKENED.
MODERATELY WEATHERED	DISCOLORATION OR OXIDATION EXTENDS FROM FRACTURES USUALLY THROUGHOUT; Fe-Mg MINERALS ARE "RUSTY," FELDSPAR CRYSTALS ARE "CLOUDY."	ALL FRACTURE SURFACES ARE DISCOLORED OR OXIDIZED.	HAMMER DOES NOT RING WHEN ROCK IS STRUCK. BODY OF ROCK IS SLIGHTLY WEAKENED.
INTENSELY WEATHERED	DISCOLORATION OR OXIDATION THROUGHOUT; ALL FELDSPARS AND Fe-Mg MINERALS ARE ALTERED TO CLAY TO SOME EXTENT; OR CHEMICAL ALTERATION PRODUCES IN-SITU DISAGGREGATION, SEE GRAIN BOUNDARY CONDITIONS.	ALL FRACTURE SURFACES ARE DISCOLORED OR OXIDIZED, SURFACES FRIABLE.	DULL SOUND WHEN STRUCK WITH HAMMER, USUALLY CAN BE BROKEN WITH MODERATE TO HEAVY MANUAL PRESSURE OR BY LIGHT HAMMER BLOW WITHOUT REFERENCE TO PLANES OF WEAKNESS SUCH AS INCIPIENT OR HAIRLINE FRACTURES, OR VEINLETS. ROCK IS SIGNIFICANTLY WEAKENED.
DECOMPOSED	DISCOLORED OR OXIDIZED THROUGHOUT, BUT RESISTANT MINERALS SUCH AS QUARTZ MAY BE UNALTERED; ALL FELDSPAR AND Fe-Mg MINERALS ARE COMPLETELY ALTERED TO CLAY.		CAN BE GRANULATED BY HAND. RESISTANT MINERALS SUCH AS QUARTZ MAY BE PRESENT AS "STRINGERS" OR "DIKES."

LOG OF BORING B1

PROJECT NO: 15-245.1
 PROJECT: HBMWD Pipeline Crossing
 LOCATION: East Side of Mad River
 CLIENT: GHD
 LOGGED BY: NBM
 DEPTH OF BORING: 17.5(ft)

BEGIN DATE: 10/20/2015
 COMPLETION DATE: 10/20/2015
 SURFACE ELEVATION: 86.09(ft)
 SURFACE CONDITION:
 WATER DEPTH: Dry During Drilling
 READING TAKEN:
 HAMMER EFFICIENCY: 75.2%

DRILLING CONTRACTOR: Geo-Ex Subsurface
 DRILLING METHOD: Hollow-Stem Auger
 DRILL RIG: CME 45c
 HAMMER TYPE: Autohammer (140lbs, 30" drop)
 SAMPLER TYPE & SIZE: SPT/CalMod/Bulk
 BOREHOLE DIAMETER: 4"
 BACKFILL METHOD: Native Soil Backfill

ELEVATION (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT				POCKET PEN. (TSF)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	
84	1		1				Lean CLAY (CL); 7.5YR 4/4 (brown), dry, medium stiff, trace fine gravel, trace woody organics.							Fill from old railroad bed
82	2													
82	3		2	11	39		CLAYEY SAND with GRAVEL (SC); 7.5YR 4/4 (brown), dry, stiff, 20-30% fine to medium rounded to subrounded gravel, 30-40% fine to coarse sand (low on medium), occasional coarse gravel to cobble; gravels are basalt, quartzite, quartz, chlorite, feldspars.	19	28	9.1	131.1			PI
80	4			18										
80	5		3											Hit quartzite cobble (approximately 6"), hard and fresh
78	6													
78	7													
78	8		4	6	38		Lean CLAY (CL); 10YR 4/2 (dark grayish brown), dry to moist, stiff, trace coarse sand/ fine gravel.							In-situ residual soil
76	9			19			CLAYEY SAND with GRAVEL (SC); 10YR 4/2 (dark grayish brown) with 10YR 2/1 (black) infilling (thin) in some residual fractures, stiff, shows structure of source rock.	16	33					PI
76	10		5											31
74	11													
74	12		6	18	57		METAMORPHIC ROCK, Meta-Argillite, 10YR 3/1 (very dark gray), dry to moist, moderately to slightly weathered, moderately soft to moderately hard.							Bedrock, rock appears to be massive but fractures and shears easily during drilling/sampling
72	13			24										
72	14		7	12	17		METAMORPHIC ROCK, Meta-Argillite, Moderately soft.							Shear zone
70	15			8										
70	16		8	11	62/11									
68	17		9	12			METAMORPHIC ROCK, Meta-Argillite, Hard to moderately hard, fresh rock.							
68	18						Bottom of borehole at 17.5 ft bgs							
66	19													
66	20													
64	21													
64	22													
62	23													
62	24													



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PROJECT NUMBER: 15-245.1
 PROJECT: HBMWD Pipeline Crossing
 BORING: B1
 ENTRY BY: NBM
 CHECKED BY: RDS

LOG OF BORING B2

PROJECT NO: 15-245.1
 PROJECT: HBMWD Pipeline Crossing
 LOCATION: East Side of Mad River
 CLIENT: GHD
 LOGGED BY: NBM
 DEPTH OF BORING: 24(ft)

BEGIN DATE: 10/20/2015
 COMPLETION DATE: 10/20/2015
 SURFACE ELEVATION: 82.44(ft)
 SURFACE CONDITION:
 WATER DEPTH: Dry During Drilling
 READING TAKEN:
 HAMMER EFFICIENCY: 75.2%

DRILLING CONTRACTOR: Geo-Ex Subsurface
 DRILLING METHOD: Hollow-Stem Auger
 DRILL RIG: CME 45c
 HAMMER TYPE: Autohammer (140lbs, 30" drop)
 SAMPLER TYPE & SIZE: SPT/CalMod/Bulk
 BOREHOLE DIAMETER: 4"
 BACKFILL METHOD: Native Soil Backfill

ELEVATION (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT				POCKET PEN. (TSF)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)		% PASSING 200 SIEVE
80	1						Lean CLAY (CL); 7.5YR 4/4 (brown), dry, moderately stiff, trace gravel, trace woody organics.								Backfill from old railroad bed
78	2														
	3	1	1	7	8										
	4			4			SANDY lean CLAY (CL); 7.5YR 4/4 (brown), dry, stiff, minor orangish yellow staining, 30% fine to medium subrounded gravel, 10% fine to coarse sand.							58	
76	5	2	2												
	6														
	7														
74	8	3	3	5	15		GRAVELLY lean CLAY with SAND (CL); 7.5 YR 4/4 (brown), dry, stiff, up to 40% fine to coarse rounded to subrounded gravel, 20% fine to coarse sand, majority of gravel is quartzite.								
	9			7			SANDY lean CLAY (CL); 7.5YR 4/4 (brown), dry, stiff, minor orangish yellow staining, 30% fine to medium subrounded gravel, 10% fine to coarse sand.	19	32	16.7	101.4			PI	
	10			8											
72	11														
	12														
70	13	4	4	10	28		Lean CLAY with GRAVEL (CL); 10YR 3/2 (very dark grayish brown), dry, stiff, 10-20% fine to medium gravel, 10% fine sand.								
	14			14											
68	15	5	5												
	16	6	6	7	30										Dense below 15', difficult drilling
	17			13											
66	18	7	7	9	25		Lean CLAY (CL); 10YR 4/2 (dark grayish brown) with 2.5YR 3/3 (dark reddish brown) staining on retained fracture faces (tight joints/fractures), dry to moist, stiff.								In-situ residual soil
	19			12											
64	20	8	8	15	42		METAMORPHIC ROCK, Meta-Argillite, some 2.5 YR 3/3 (dark reddish brown) staining, 10YR 5/1 (gray) with some 2.5YR 3/3 (dark reddish brown) and minor decomposed to 2.5 YR 5/6 (light oliver brown), moderately to slightly weathered, moderately soft to soft.	24	41	8.7	131.1	22	PI	Bedrock	
	21			16											
62	22			26											
	23	9	9	22	74/11										
	24			24											
60				50/5"											
58							METAMORPHIC ROCK, Meta-Argillite, 10YR 5/1 (gray), fresh, moderately hard to hard.								
							Bottom of borehole at 24.0 ft bgs								



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PROJECT NUMBER: 15-245.1
 PROJECT: HBMWD Pipeline Crossing
 BORING: B2
 ENTRY BY: NBM
 CHECKED BY: RDS SHEET 1 of 1

LOG OF BORING B3

PROJECT NO: 15-245.1
 PROJECT: HBMWD Pipeline Crossing
 LOCATION: West Side of Mad River
 CLIENT: GHD
 LOGGED BY: NBM
 DEPTH OF BORING: 35(ft)

BEGIN DATE: 10/19/2015
 COMPLETION DATE: 10/19/2015
 SURFACE ELEVATION: 83.47(ft)
 SURFACE CONDITION:
 WATER DEPTH: Dry During Drilling
 READING TAKEN:
 HAMMER EFFICIENCY: 75.2%

DRILLING CONTRACTOR: Geo-Ex Subsurface
 DRILLING METHOD: Hollow-Stem Auger
 DRILL RIG: CME 45c
 HAMMER TYPE: Autohammer (140lbs, 30" drop)
 SAMPLER TYPE & SIZE: SPT/CalMod/Bulk
 BOREHOLE DIAMETER: 4"
 BACKFILL METHOD: Tremmie Grouted

ELEVATION (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS		
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT				POCKET PEN. (TSF)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)		% PASSING 200 SIEVE	
81	1						Lean CLAY (CL); 5YR 4/4 (reddish brown), dry, moderately stiff, 10% sand.								Backfill from old railroad bed	
79	4		1	4	11		SANDY lean CLAY (CL); 10YR 4/6 (dark yellowish brown), dry, stiff, trace to 5% fine subrounded gravel, 30% fine sand, minor woody organics.									
	5			5												
	6			6												
75	8		2				Lean CLAY (CL); 10YR 4/6 (dark yellowish brown), dry, stiff, 10% fine sand, some 2-5mm dark brown to black bands.	23	41	12.7		63	PI			
73	9		3	8	38										Microcrystalline quartz cobble, hard, fresh, 6", 5GY 6/2 (light grayish green)	
	10			17												
	11			21												
71	12		4				GRAVELLY lean CLAY with SAND (CL); 10YR 4/3 (brown), dry to moist, very stiff, 10-20% fine to medium angular gravel (residual rock, 10YR 5/2 grayish brown), dense.	20	44			89	PI			
	13															
	14		5	13	83											
69	15			37												
	16		6	46												
67	17		7	42	50/5		Lean CLAY (CL); 10YR 4/6 (dark yellowish brown), dry, stiff, 10% fine sand, some 2-5mm dark brown to black bands.	21	47			63	PI	In-situ residual soil		
	18			50/5"											Switch to rotary drilling, difficult drilling for auger, approximately 25% hard rock in soil	
	19															
65	20		8													
	21															
61	22															
	23		9	30	50/5		METAMORPHIC ROCK, Meta-Argillite, 7.5YR 4/3 (brown) with 7.5 YR 2.5/2 (very dark brown) staining in fractures, moderately weathered, moderately hard.									
59	24			50/5"											Bedrock	



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PROJECT NUMBER: 15-245.1
 PROJECT: HBMWD Pipeline Crossing
 BORING: B3
 ENTRY BY: NBM
 CHECKED BY: RDS SHEET 1 of 2

ELEVATION (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT				POCKET PEN. (TSF)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)		% PASSING 200 SIEVE
57	26		10				METAMORPHIC ROCK (continued).								
55	27														
	28	X	11	23 50/5"	50/5		METAMORPHIC ROCK, Meta-Argillite, 7.5YR 4/3 (brown), discoloration in fractures more orangish, overall slightly less weathered than above, moderately weathered, moderately hard to hard.								
	29														
53	30		12				METAMORPHIC ROCK, Meta-Argillite, 10YR 4/1 (dark gray), slightly weathered to fresh, moderately hard to hard.								
51	31														
	32														
	33	X	13	15 50/5"	50/5		METAMORPHIC ROCK, Meta-Argillite, 10YR 4/1 (dark gray), fresh, hard.								
49	34														
	35						Bottom of borehole at 35.0 ft bgs								
47	36														
	37														
45	38														
	39														
43	40														
	41														
41	42														
	43														
39	44														
	45														
37	46														
	47														
35	48														
	49														
33	50														
	51														
31	52														
	53														
29	54														
	55														

LOG OF BORING B4

PROJECT NO: 15-245.1
 PROJECT: HBMWD Pipeline Crossing
 LOCATION: West Side of Mad River
 CLIENT: GHD
 LOGGED BY: NBM
 DEPTH OF BORING: 15.5(ft)

BEGIN DATE: 10/19/2015
 COMPLETION DATE: 10/19/2015
 SURFACE ELEVATION: 85.22(ft)
 SURFACE CONDITION:
 WATER DEPTH: Dry During Drilling
 READING TAKEN:
 HAMMER EFFICIENCY: 75.2%

DRILLING CONTRACTOR: Geo-Ex Subsurface
 DRILLING METHOD: Hollow-Stem Auger
 DRILL RIG: CME 45c
 HAMMER TYPE: Autohammer (140lbs, 30" drop)
 SAMPLER TYPE & SIZE: SPT/CalMod/Bulk
 BOREHOLE DIAMETER: 4"
 BACKFILL METHOD: Native Soil Backfill

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
83	1						GRAVELLY lean CLAY (CL); 5YR 4/4 (reddish brown), dry, moderately stiff, 25% fine to medium gravel, 10% sand.							Backfill from old railroad bed to 3.2 feet, gravel is ballast	
	2						Lean CLAY (CL); 5YR 4/4 (reddish brown), dry, stiff, trace sand.								
81	3	▲	1	17	69		CLAYEY SAND with GRAVEL (SC); Mottled color (brown, reddish brown, dark brown, grayish brown), dry, very stiff, dense.						17	In-situ residual soil	
	4	▲		32			CLAYEY SAND with GRAVEL (SC); 10YR 4/6 (dark yellowish brown), dry, stiff, black staining on retained fracture/joint faces, retained structure from source rock.	24	29	10.6	122.8	14	PI		
	5			37			CLAYEY SAND with GRAVEL (SC); 10YR 4/6 (dark yellowish brown), dry, stiff, black staining on retained fracture/joint faces, retained structure from source rock.								
79	6						Lean CLAY with SAND (CL); 10YR 4/1 (dark gray), dry to moist, stiff.							Same color as bedrock but still residual soil	
	7						Lean CLAY with SAND (CL); 10YR 3/4 (dark yellowish brown), dry to moist, stiff, dense, rock structure retained.								
77	8	△	2	4	18		Lean CLAY with SAND (CL); 10YR 3/4 (dark yellowish brown), dry to moist, stiff, dense, rock structure retained.							Bedrock	
	9	△		7			METAMORPHIC ROCK, Meta-Argillite, 10YR 4/1 (dark gray), becomes harder with depth, starts at moderately hard and slightly weathered, rock is fresh and hard at 15.5 feet.								
75	10	■	3				METAMORPHIC ROCK, Meta-Argillite, 10YR 4/1 (dark gray), becomes harder with depth, starts at moderately hard and slightly weathered, rock is fresh and hard at 15.5 feet.								
	11														
73	12														
	13														
71	14	▲	4	11	52										
	15	▲		25											
	16		5	27			Bottom of borehole at 15.5 ft bgs								
69	17														
	18														
67	19														
	20														
65	21														
	22														
63	23														
	24														
61	25														



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 Sacramento, CA 95822
 (916) 455 4225

PROJECT NUMBER: 15-245.1
 PROJECT: HBMWD Pipeline Crossing
 BORING: B4
 ENTRY BY: NBM
 CHECKED BY: RDS SHEET 1 of 1

ELEVATION (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY (%)		LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT			POCKET PEN. (TSF)	RQD (%)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE	
78	26		C				METAMORPHIC ROCK (continued).	23	10						
76	28		D				Light gray, slightly weathered to fresh, moderately hard to hard, slightly fractured, occasional slight discoloration on fractures, most fractures are clean and tight.	90	35						
70	34		E					100	77						
66	38		F					97	52						
60	44		G					97	90						
56	48	Bottom of borehole at 48.0 ft bgs													



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PROJECT NUMBER: 15-245.2
PROJECT: HBMWD Phase 2
BORING: B5
ENTRY BY: NBM
CHECKED BY:

15-245.2 - B5

Core Photographs

Box 1



Box 2



Box 3



LOG OF BORING B6

PROJECT NO: 15-245.2
 PROJECT: HBMWD Phase 2
 LOCATION: 150' rt Sta. 18+74
 CLIENT: GHD
 LOGGED BY: KKL
 DEPTH OF BORING: 75(ft)

BEGIN DATE: 10/9/2017
 COMPLETION DATE: 10/9/2017
 SURFACE ELEVATION: 35.5 (ft)
 SURFACE CONDITION: Gravel Bar
 WATER DEPTH: 3 (ft)
 READING TAKEN: 10/9/2017
 HAMMER EFFICIENCY: 75

DRILLING CONTRACTOR: Geo-Ex Subsurface
 DRILLING METHOD: Rotary Wire-Line
 DRILL RIG: CME 45
 HAMMER TYPE: Auto, 140-lb, 30-inch drop
 SAMPLER TYPE & SIZE: CAL (2.4" ID), HQ Core
 BOREHOLE DIAMETER: 4 in
 BACKFILL METHOD: Grout

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				RQD (%)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	
34	1						 <p>Poorly graded GRAVEL with SAND (GP); medium dense to dense, moist to 3' then wet, medium to coarse rounded gravel, 30% subrounded sand, trace fines.</p> <p>Cobbles in addition to above.</p>								
	2														
	3														
	4														
	5														
	6														
	7														
	8														
	9														
	10														
	11														
	12														
	13														
	14														
	15														
	16														
	17														
	18														
	19														
	20														
	21														
	22														
	23	X	1	19 17 19	36										
	24	X													



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PROJECT NUMBER: 15-245.2
 PROJECT: HBMWD Phase 2
 BORING: B6
 ENTRY BY: NBM
 CHECKED BY: SHEET 1 of 3

ELEVATION (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY (%)		LABORATORY					REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT			POCKET PEN. (TSF)	RQD (%)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE		
10	26						Poorly graded GRAVEL with SAND (GP) <i>(continued)</i> .									
8	28	X	2	13	25											
	29	X		13												
	30			12												
4	32						METAMORPHIC ROCK, meta-argillite, light reddish brown, intensely weathered to decomposed, significant wash loss, soft to moderately hard, subangular pieces of weathered rock in residual clay matrix, clay becomes more dense with depth.									
	33	X	3	10	50/3											
	34			50/3												
	35															
	36															
	37															
	38															
	39															
-5	40							71	0							Switch from rotary wash to HQ core. Casing drilled to 39 feet.
	41															
-7	42							33	0							
	43															
	44															
	45															
-11	46						Light gray, dense residual argillitic clay with subangular gravel sized peices of argillite (sheared zone), secondary microcrystalline quartz mineralization in heavily sheared zones, overall moderately soft with some areas of moderately hard.	68	0							
	47															
	48															
	49															
-15	50															
	51															
-17	52							55	0							
	53															
	54															
	55						METAMORPHIC ROCK <i>(continued)</i> .									



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PROJECT NUMBER: 15-245.2
 PROJECT: HBMW Phase 2
 BORING: B6
 ENTRY BY: NBM
 CHECKED BY:

15-245.2 - B6

Core Photographs

Box 1 (first boring attempt)



Box 2



Box 3



Box 4



LOG OF BORING B7

PROJECT NO: 15-245.2
 PROJECT: HBMWD Phase 2
 LOCATION: 22' rt Sta. 21+18
 CLIENT: GHD
 LOGGED BY: KKL
 DEPTH OF BORING: 58(ft)

BEGIN DATE: 9/21/2017
 COMPLETION DATE: 9/22/2017
 SURFACE ELEVATION: 90 (ft)
 SURFACE CONDITION: Native Soil
 WATER DEPTH: N/A (ft)
 READING TAKEN: 9/22/2017
 HAMMER EFFICIENCY: NA

DRILLING CONTRACTOR: Geo-Ex Subsurface
 DRILLING METHOD: Rotary Wire-Line
 DRILL RIG: CME 45
 HAMMER TYPE: NA
 SAMPLER TYPE & SIZE: Bulk, HQ Core
 BOREHOLE DIAMETER: 4 in
 BACKFILL METHOD: Grout/native backfill

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				RQD (%)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	
88	1						Lean CLAY (CL); stiff, light brown, moist, medium plasticity and toughness fines, 10% fine sand.								Auger used to start hole
84	2														
82	3						15% fine to coarse sand, 5% fine to coarse gravel.								
78	4														
76	5						GRAVELLY lean CLAY (CL); in-situ residual clay, stiff, dark gray, moist, 60% medium to high plasticity fines, medium toughness, 10% fine sand, 30% fine to coarse gravel.								
74	6														
72	7						METAMORPHIC ROCK, meta-argillite, light gray, intensely weathered, moderately soft to moderately hard, intensely fractured.	27	0						Switch to Diamond bit rotary at 18 ft depth
70	8														
68	9														
66	10							28	13						



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PROJECT NUMBER: 15-245.2
 PROJECT: HBMWD Phase 2
 BORING: B7
 ENTRY BY: NBM
 CHECKED BY:

ELEVATION (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY(%)		LABORATORY					REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT			POCKET PEN. (TSF)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200 SIEVE		
64	26	B					METAMORPHIC ROCK (continued).	28	13						
62	28	C						47	30						
56	34	D					Slightly to moderately weathered, moderately hard, moderately fractured.	100	73						
52	38	E						100	88						
46	44	F					(sheared zone); intensely weathered, soft to moderately soft, very intensely fractured, some secondary quartz mineralization.	100	42						
42	48	G						100	0						
36	54	H						97	0						



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PROJECT NUMBER: 15-245.2
 PROJECT: HBMWD Phase 2
 BORING: B7
 ENTRY BY: NBM
 CHECKED BY:

ELEVATION (ft)	DEPTH (ft)	FIELD					RECOVERY (%)	LABORATORY						REMARKS		
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)		GRAPHIC LOG	DESCRIPTION	RQD (%)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)		DRY DENSITY (PCF)	% PASSING 200 SIEVE
34	56		H				97	0								
	57															
32	58															
	59															
30	60															
	61															
28	62															
	63															
26	64															
	65															
24	66															
	67															
22	68															
	69															
20	70															
	71															
18	72															
	73															
16	74															
	75															
14	76															
	77															
12	78															
	79															
10	80															
	81															
8	82															
	83															
6	84															
	85															

Bottom of borehole at 58.0 ft bgs



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PROJECT NUMBER: 15-245.2
PROJECT: HBMWD Phase 2
BORING: B7
ENTRY BY: NBM
CHECKED BY:

15-245.2 - B7

Core Photographs

Box 1



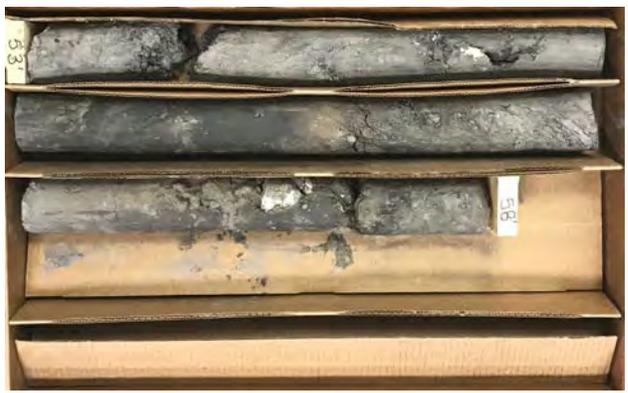
Box 2



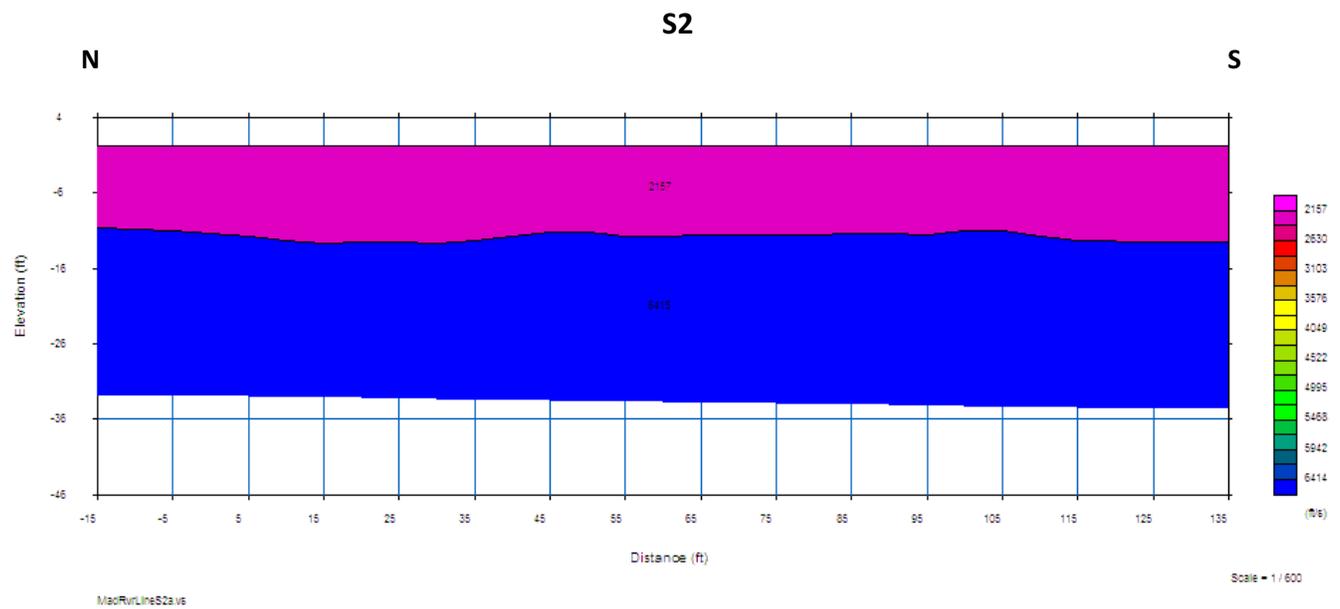
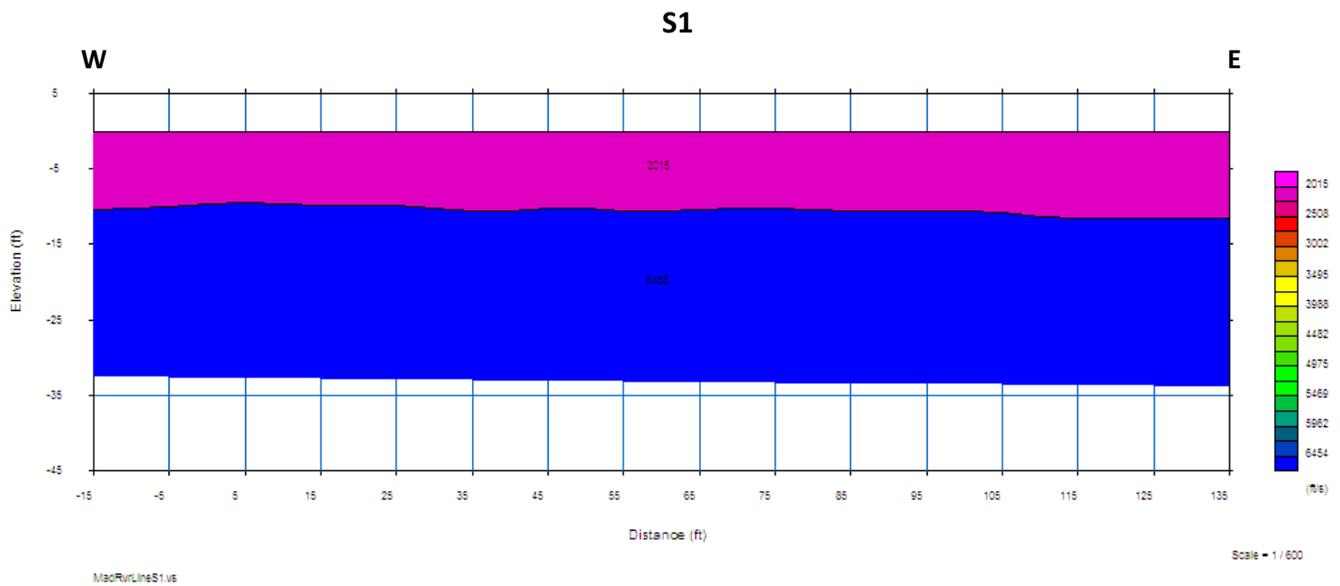
Box 3

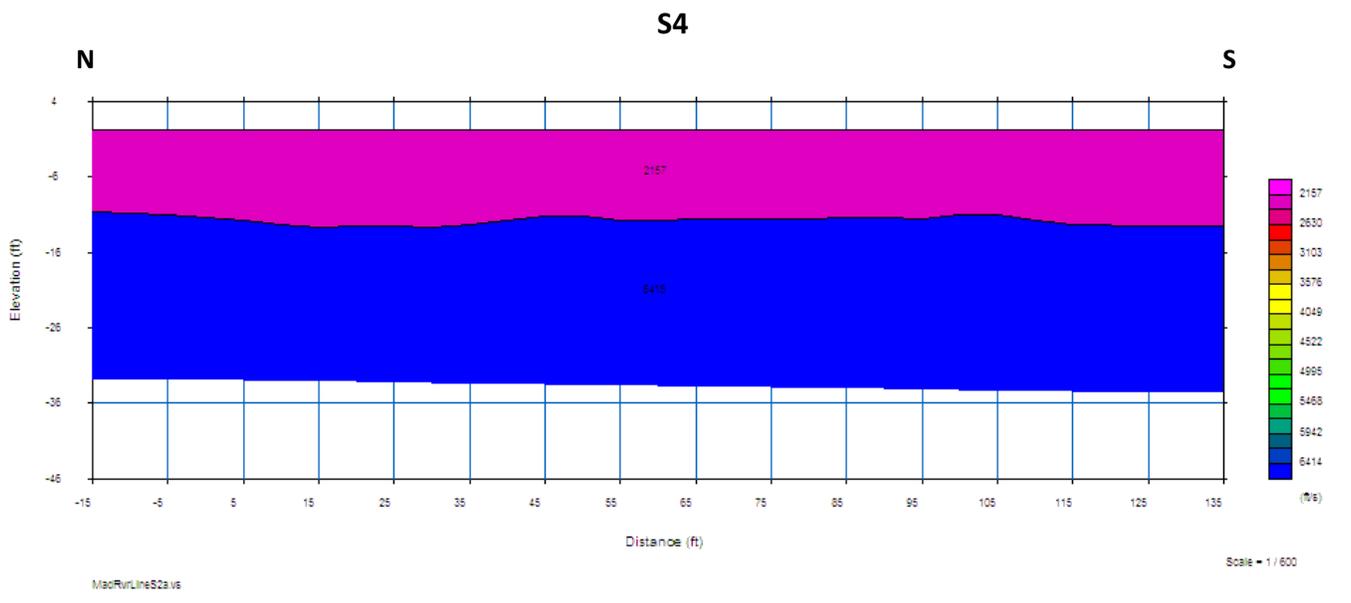
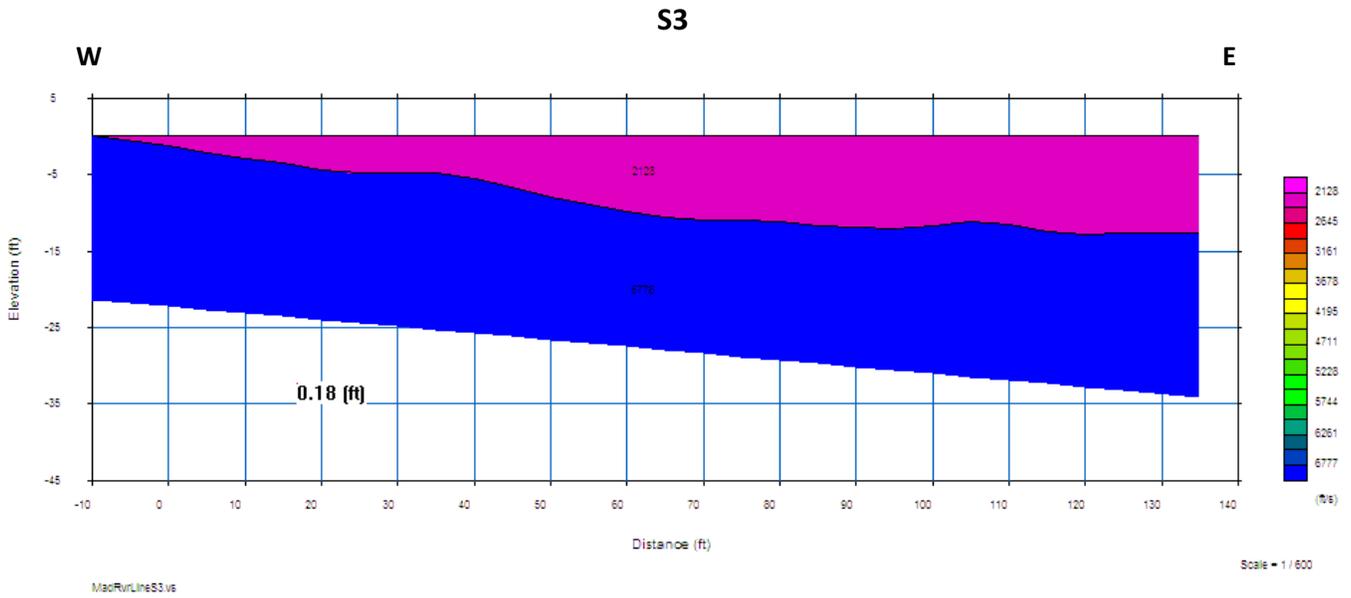


Box 4



Refraction Seismic Profiles





Laboratory Test Results



Project Name: HBMWD Pipeline Crossing
 CAInc File No: 15-245.1
 Date: 11/23/15
 Technician: KKL

MOISTURE-DENSITY TESTS - D2216

	1	2	3	4	5
Sample No.	B1	B1	B2	B2	B3 (4/4)
USCS Symbol	CL	Rock	CL	Rock	CL
Depth (ft.)	4-4.5	9-9.5	8-8.5	19.5-20	8-9
Sample Length (in.)	5.124	4.890	4.629	5.650	
Diameter (in.)	2.388	2.414	2.411	2.425	
Sample Volume (ft ³)	0.01328	0.01295	0.01223	0.01510	
Total Mass Soil+Tube (g)	983.2	1096.3	862.4	1196.3	
Mass of Tube (g)	239.1	256.2	206.2	219.6	
Tare No.	C17	C12	B10	2	C12
Tare (g)	13.9	13.9	13.7	127.6	13.9
Wet Soil + Tare (g)	55.6	78.9	48.0	536.5	67.9
Dry Soil + Tare (g)	51.6	73.5	43.1	503.7	61.8
Dry Soil (g)	37.7	59.6	29.4	376.1	47.9
Water (g)	4.0	5.4	4.9	32.8	6.1
Moisture (%)	10.6	9.1	16.7	8.7	12.7
Dry Density (pcf)	111.7	131.1	101.4	131.1	



Project Name: HBMWD Pipeline Crossing
 CAInc File No: 15-245.1
 Date: 11/23/15
 Technician: KKL

MOISTURE-DENSITY TESTS - D2216

	1	2	3	4	5
Sample No.	B4				
USCS Symbol	Rock				
Depth (ft.)	4-4.5				
Sample Length (in.)	4.839				
Diameter (in.)	2.407				
Sample Volume (ft ³)	0.01274				
Total Mass Soil+Tube (g)	1036.6				
Mass of Tube (g)	251.0				
Tare No.	C20				
Tare (g)	13.6				
Wet Soil + Tare (g)	47.3				
Dry Soil + Tare (g)	44.0				
Dry Soil (g)	30.5				
Water (g)	3.2				
Moisture (%)	10.6				
Dry Density (pcf)	122.8				

Project Name: HBMWD Pipeline Crossing

CAInc File No: 15-245.1

Date: 11/13/15

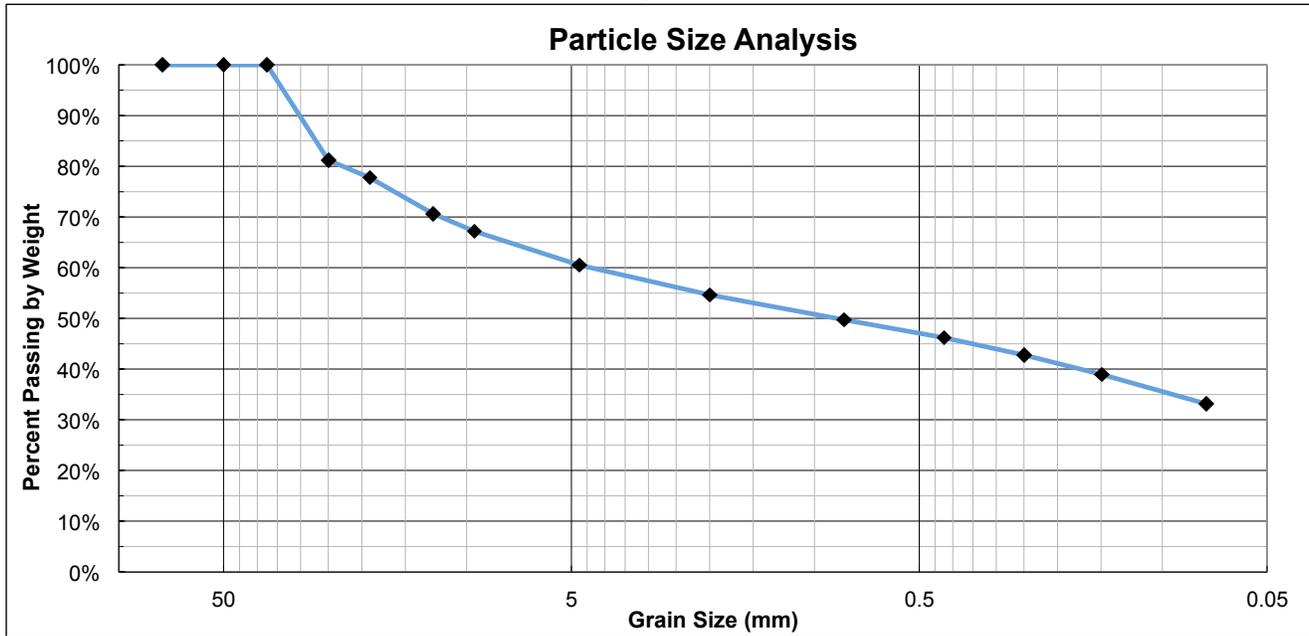
Technician: KKL

Sample ID: B1 (1/2)

Depth: 5-6'

USCS Classification: Clayey GRAVEL with SAND

Grain Size Analysis - ASTM 6913



% Cobble	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	Silt/Clay
0	22	17	6	8	13	33
0	40		27			33

		Sieve #	Opening mm	Cummulative Mass Retained	% Passing %
Cobbles		3"	75	0.00	100%
Gravel	Coarse	2"	50	0.00	100%
		1-1/2"	37.5	0.00	100%
		1"	25.0	113.30	81%
		3/4"	19.0	134.40	78%
	Fine	1/2"	12.5	177.00	71%
		3/8"	9.50	198.10	67%
Sand	Coarse	#4	4.75	238.30	61%
		#10	2.00	273.80	55%
		#20	0.825	303.30	50%
	Medium	#40	0.425	324.70	46%
		#60	0.250	345.30	43%
		#100	0.150	368.40	39%
Fine	#200	0.075	403.40	33%	

Project Name: HBMWD Pipeline Crossing

CAInc File No: 15-245.1

Date: 11/12/15

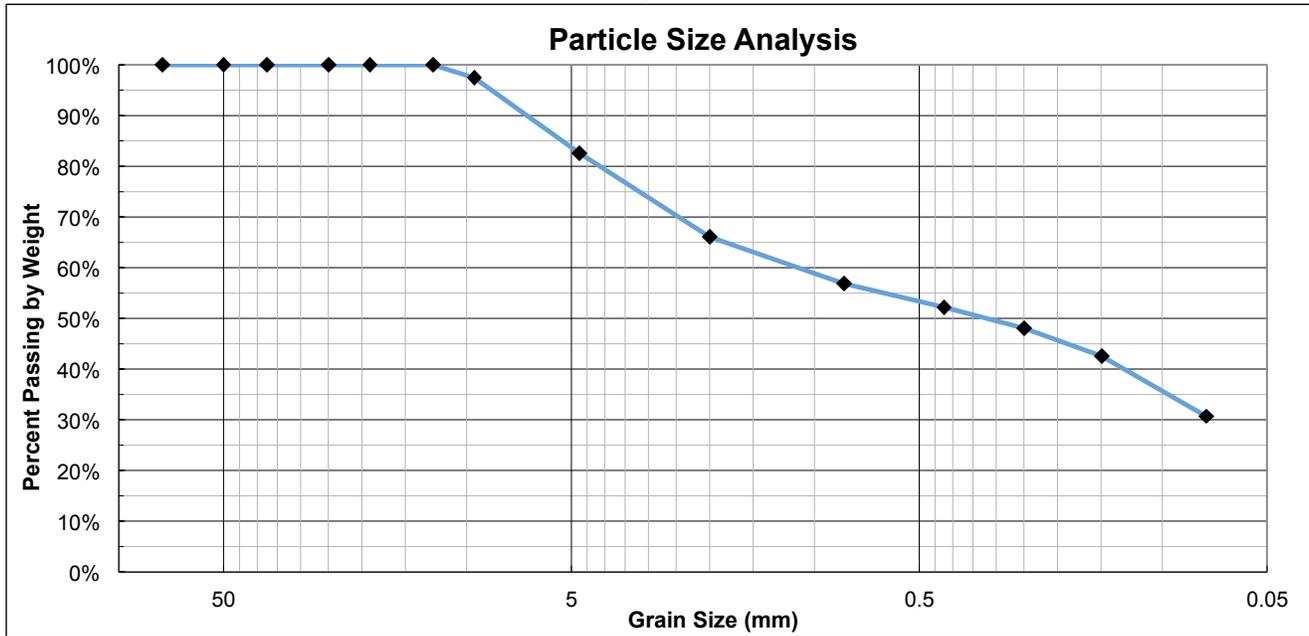
Technician: KKL

Sample ID: B1

Depth: 9.5-10'

USCS Classification: Clayey SAND with GRAVEL

Grain Size Analysis - ASTM 6913



% Cobble	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	Silt/Clay
0	0	17	17	14	21	31
0	17		52			31

		Sieve #	Opening mm	Cummulative Mass Retained	% Passing %
Cobbles		3"	75	0.00	100%
Gravel	Coarse	2"	50	0.00	100%
		1-1/2"	37.5	0.00	100%
		1"	25.0	0.00	100%
		3/4"	19.0	0.00	100%
	Fine	1/2"	12.5	0.00	100%
		3/8"	9.50	5.10	97%
		#4	4.75	34.70	83%
Sand	Coarse	#10	2.00	67.80	66%
	Medium	#20	0.825	86.10	57%
		#40	0.425	95.40	52%
	Fine	#60	0.250	103.70	48%
		#100	0.150	114.60	43%
		#200	0.075	138.30	31%

Project Name: HBMWD Pipeline Crossing

CAInc File No: 15-245.1

Date: 11/12/15

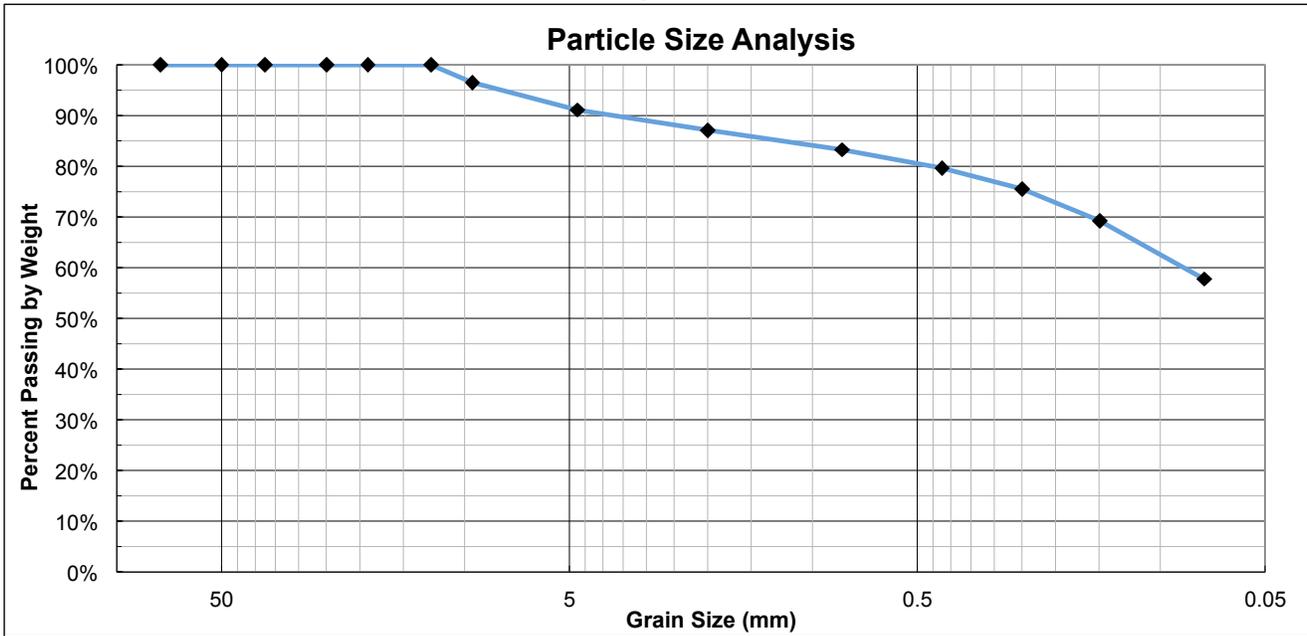
Technician: KKL

Sample ID: B2 (1/2)

Depth: 4-7'

USCS Classification: Sandy lean CLAY

Grain Size Analysis - ASTM 6913



% Cobble	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	Silt/Clay
0	0	9	4	7	22	58
0	9		33			58

		Sieve #	Opening mm	Cummulative Mass Retained	% Passing %
Cobbles		3"	75	0.00	100%
Gravel	Coarse	2"	50	0.00	100%
		1-1/2"	37.5	0.00	100%
		1"	25.0	0.00	100%
		3/4"	19.0	0.00	100%
	Fine	1/2"	12.5	0.00	100%
		3/8"	9.50	9.50	97%
		#4	4.75	24.20	91%
Sand	Coarse	#10	2.00	35.10	87%
	Medium	#20	0.825	45.60	83%
		#40	0.425	55.50	80%
	Fine	#60	0.250	66.80	76%
		#100	0.150	83.80	69%
		#200	0.075	115.20	58%

Project Name: HBMWD Pipeline Crossing

CAInc File No: 15-245.1

Date: 11/13/15

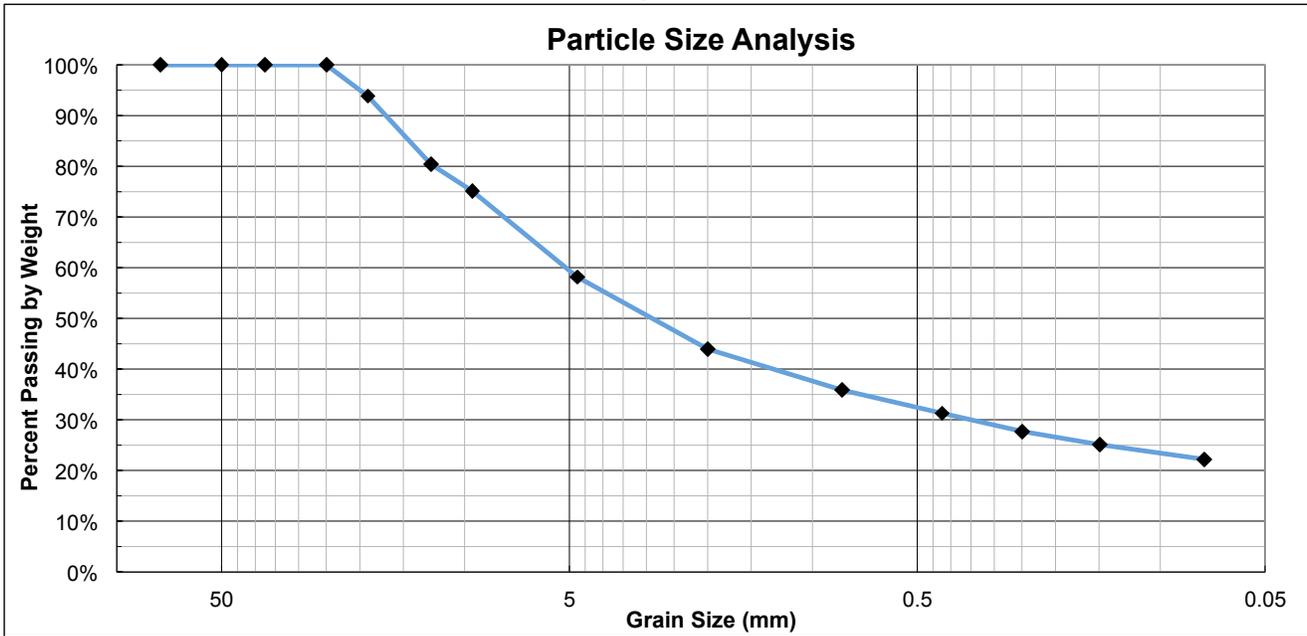
Technician: KKL

Sample ID: B2

Depth: 19.5-20'

USCS Classification: Clayey GRAVEL with SAND

Grain Size Analysis - ASTM 6913



% Cobble	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	Silt/Clay
0	6	36	14	13	9	22
	42		36			

		Sieve #	Opening mm	Cummulative Mass Retained	% Passing
Cobbles		3"	75	0.00	100%
Gravel	Coarse	2"	50	0.00	100%
		1-1/2"	37.5	0.00	100%
		1"	25.0	0.00	100%
		3/4"	19.0	23.10	94%
	Fine	1/2"	12.5	73.70	80%
		3/8"	9.50	93.60	75%
Sand	Coarse	#4	4.75	157.30	58%
		#10	2.00	210.90	44%
		#20	0.825	241.10	36%
	Medium	#40	0.425	258.40	31%
		#60	0.250	271.80	28%
		#100	0.150	281.60	25%
Fine	#200	0.075	292.60	22%	

Project Name: HBMWD Pipeline Crossing

CAInc File No: 15-245.1

Date: 11/23/15

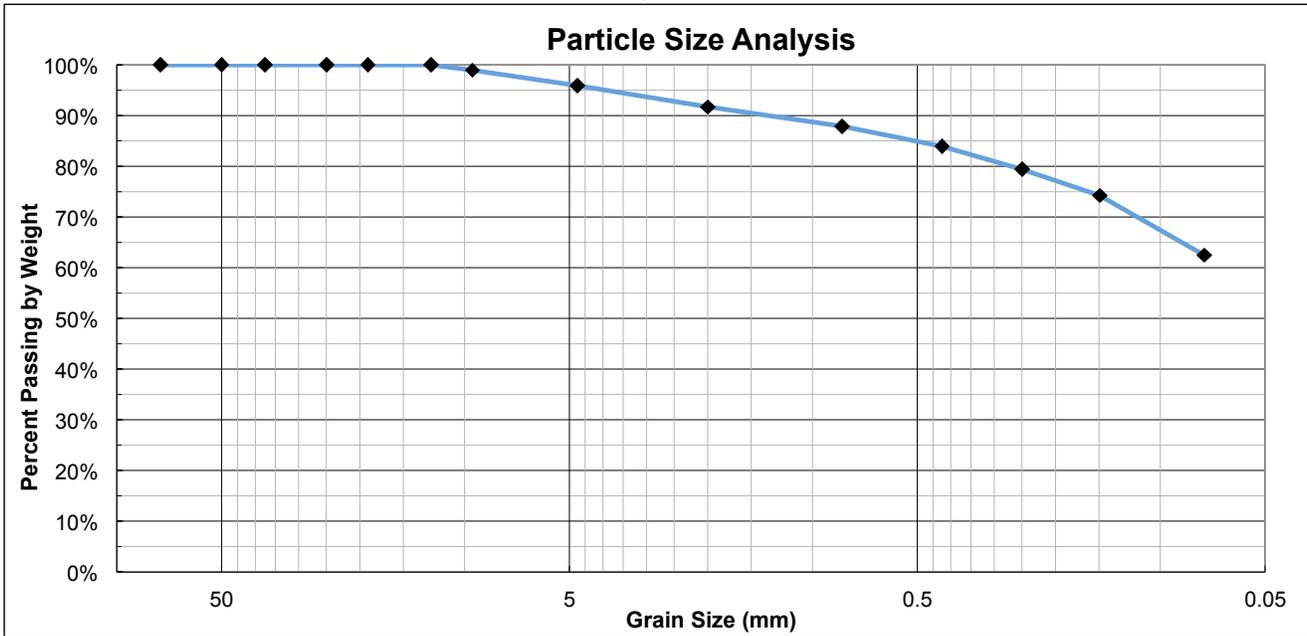
Technician: KKL

Sample ID: B3 (1/4)

Depth: 8-9'

USCS Classification: Sandy lean CLAY

Grain Size Analysis - ASTM 6913



% Cobble	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	Silt/Clay
0	0	4	4	8	21	63
0	4		33			63

		Sieve #	Opening mm	Cummulative Mass Retained	% Passing %
Cobbles		3"	75	0.00	100%
Gravel	Coarse	2"	50	0.00	100%
		1-1/2"	37.5	0.00	100%
		1"	25.0	0.00	100%
		3/4"	19.0	0.00	100%
	Fine	1/2"	12.5	0.00	100%
		3/8"	9.50	2.20	99%
Sand	#4	#4	4.75	8.50	96%
		Coarse	#10	2.00	17.30
	Medium	#20	0.825	25.30	88%
		#40	0.425	33.60	84%
	Fine	#60	0.250	43.10	79%
		#100	0.150	53.80	74%
#200	0.075	78.40	63%		

Project Name: HBMWD Pipeline Crossing

CAInc File No: 15-245.1

Date: 11/17/15

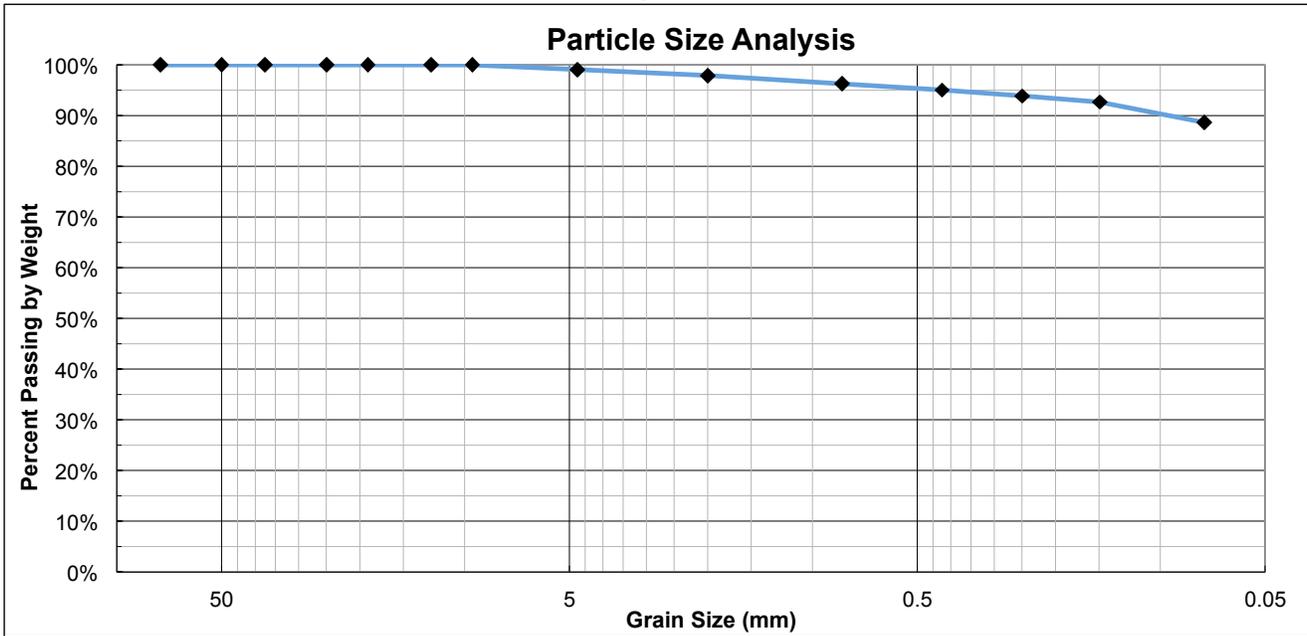
Technician: KKL

Sample ID: B3 (1/2)

Depth: 12-13'

USCS Classification: Lean CLAY

Grain Size Analysis - ASTM 6913



% Cobble	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	Silt/Clay
0	0	1	1	3	6	89

		Sieve #	Opening mm	Cummulative Mass Retained	% Passing %
Cobbles		3"	75	0.00	100%
Gravel	Coarse	2"	50	0.00	100%
		1-1/2"	37.5	0.00	100%
		1"	25.0	0.00	100%
		3/4"	19.0	0.00	100%
	Fine	1/2"	12.5	0.00	100%
		3/8"	9.50	0.00	100%
		#4	4.75	1.80	99%
Sand	Coarse	#10	2.00	4.10	98%
	Medium	#20	0.825	7.30	96%
		#40	0.425	9.60	95%
	Fine	#60	0.250	11.90	94%
		#100	0.150	14.30	93%
		#200	0.075	22.10	89%

Project Name: HBMWD Pipeline Crossing

CAInc File No: 15-245.1

Date: 11/23/15

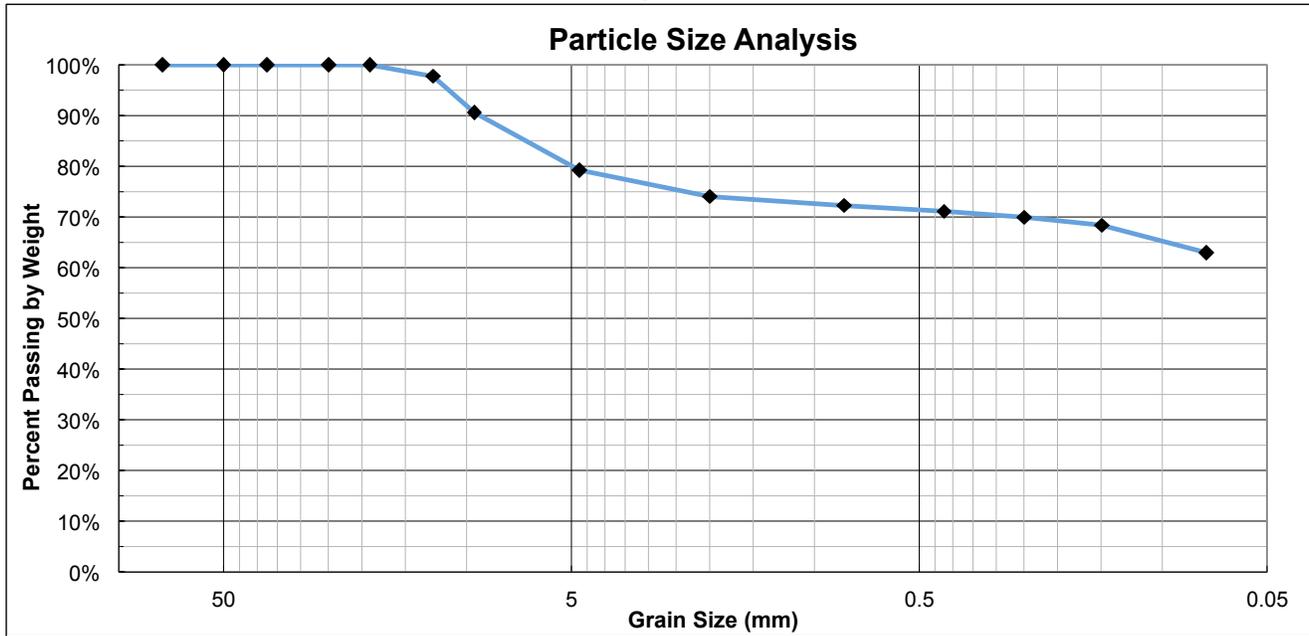
Technician: KKL

Sample ID: B3 (1/3)

Depth: 16-17'

USCS Classification: Gravelly lean CLAY with SAND

Grain Size Analysis - ASTM 6913



% Cobble	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	Silt/Clay
0	0	21	5	3	8	63

		Sieve #	Opening mm	Cummulative Mass Retained	% Passing %
Cobbles		3"	75	0.00	100%
Gravel	Coarse	2"	50	0.00	100%
		1-1/2"	37.5	0.00	100%
		1"	25.0	0.00	100%
		3/4"	19.0	0.00	100%
	Fine	1/2"	12.5	6.80	98%
		3/8"	9.50	28.60	91%
		#4	4.75	63.00	79%
Sand	Coarse	#10	2.00	78.90	74%
	Medium	#20	0.825	84.30	72%
		#40	0.425	87.70	71%
	Fine	#60	0.250	91.30	70%
		#100	0.150	96.00	68%
		#200	0.075	112.40	63%

Project Name: HBMWD Pipeline Crossing

CAInc File No: 15-245.1

Date: 11/23/15

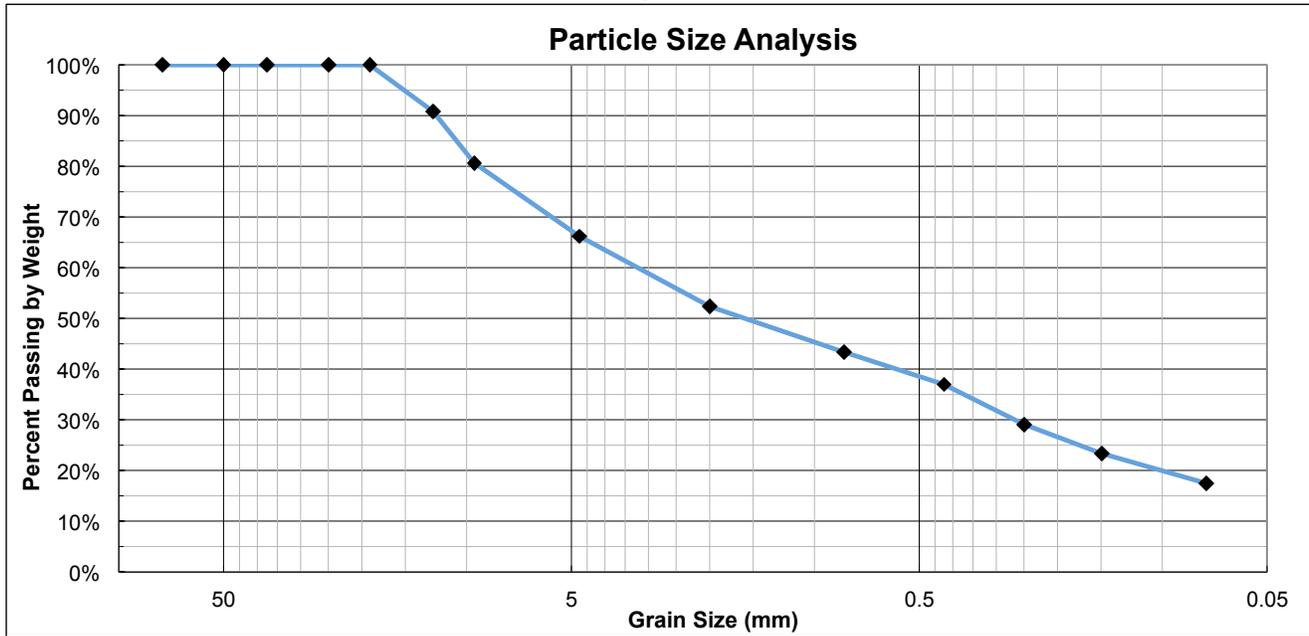
Technician: KKL

Sample ID: B4

Depth: 3-3.5'

USCS Classification: Clayey SAND with GRAVEL

Grain Size Analysis - ASTM 6913



% Cobble	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	Silt/Clay
0	0	34	14	15	20	17
0	34		49			17

		Sieve #	Opening mm	Cummulative Mass Retained	% Passing %
Cobbles		3"	75	0.00	100%
Gravel	Coarse	2"	50	0.00	100%
		1-1/2"	37.5	0.00	100%
		1"	25.0	0.00	100%
		3/4"	19.0	0.00	100%
	Fine	1/2"	12.5	14.00	91%
		3/8"	9.50	29.50	81%
		#4	4.75	51.50	66%
Sand	Coarse	#10	2.00	72.70	52%
	Medium	#20	0.825	86.40	43%
		#40	0.425	96.20	37%
	Fine	#60	0.250	108.20	29%
		#100	0.150	116.90	23%
		#200	0.075	125.90	17%

Project Name: HBMWD Pipeline Crossing

CAInc File No: 15-245.1

Date: 11/17/15

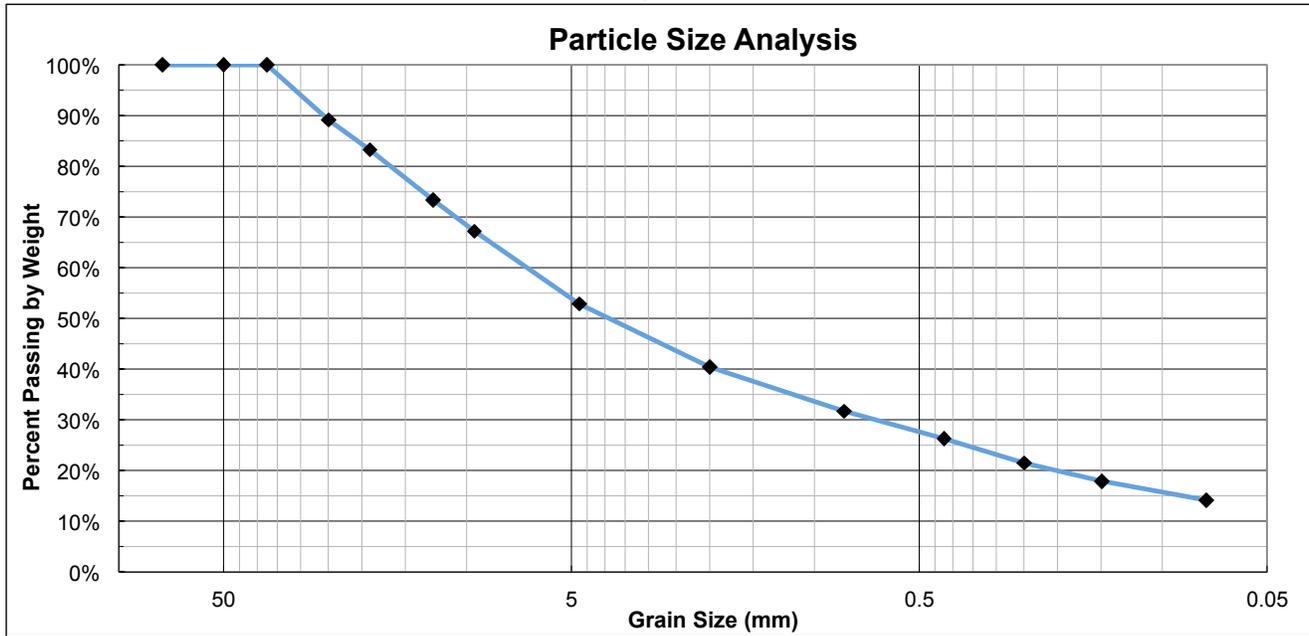
Technician: KKL

Sample ID: B4

Depth: 3.5-4'

USCS Classification: Clayey GRAVEL with SAND

Grain Size Analysis - ASTM 6913



% Cobble	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	Silt/Clay
0	17	30	13	14	12	14
	47		39			

		Sieve #	Opening mm	Cummulative Mass Retained	% Passing %
Cobbles		3"	75	0.00	100%
Gravel	Coarse	2"	50	0.00	100%
		1-1/2"	37.5	0.00	100%
		1"	25.0	51.40	89%
		3/4"	19.0	79.60	83%
	Fine	1/2"	12.5	126.40	73%
		3/8"	9.50	155.50	67%
Sand	Coarse	#4	4.75	223.80	53%
		#10	2.00	282.90	40%
		#20	0.825	324.00	32%
	Medium	#40	0.425	349.90	26%
		#60	0.250	372.70	22%
		Fine	#100	0.150	389.60
#200	0.075		407.50	14%	

Project Name: HBMWD Pipeline Crossing

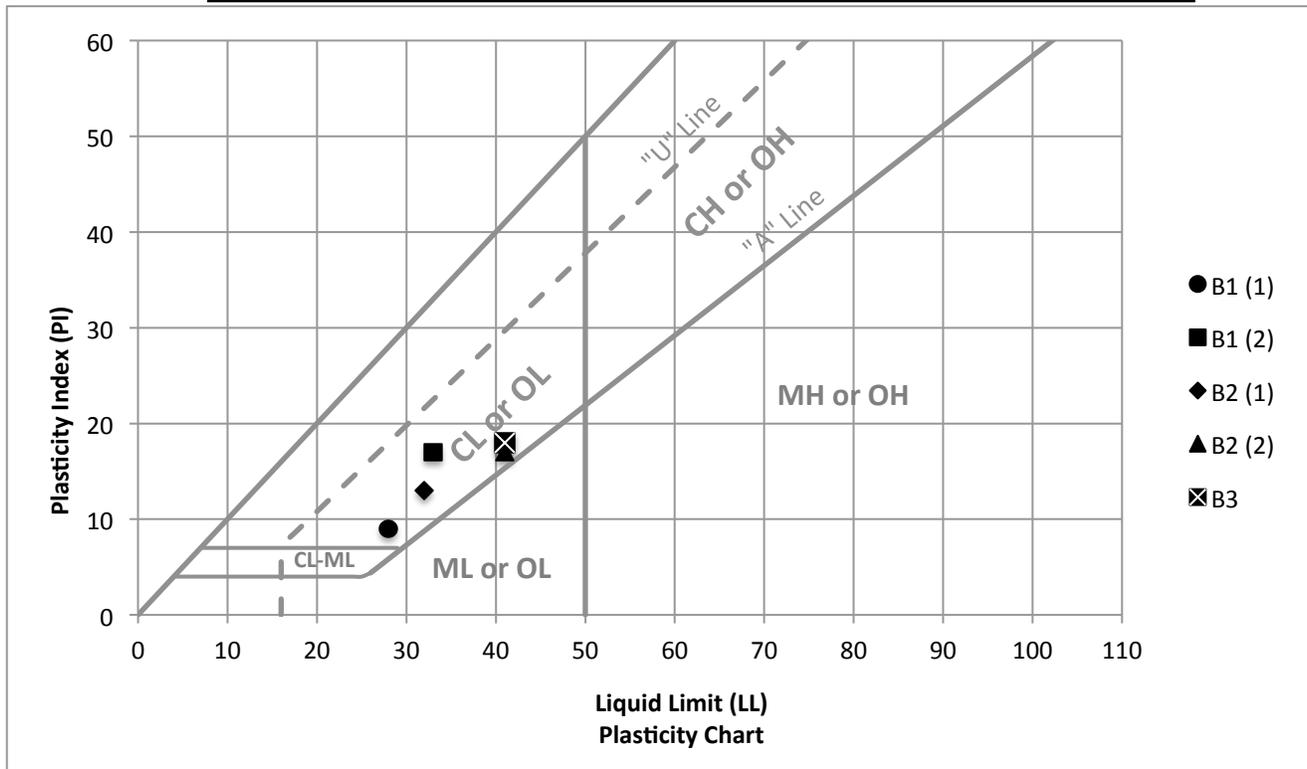
CAInc File No: 15-245.1

Date: 11/17/15

Technician: KKL

Plastic Index - ASTM D4318

Sample ID	Depth (ft)	Plastic Limit	Liquid Limit	PI
B1 (1)	3.5-4	19	28	9
B1 (2)	9-9.5	16	33	17
B2 (1)	8.5-9	19	32	13
B2 (2)	19.5-20	24	41	17
B3	8-9.0	23	41	18



Project Name: HBMWD Pipeline Crossing

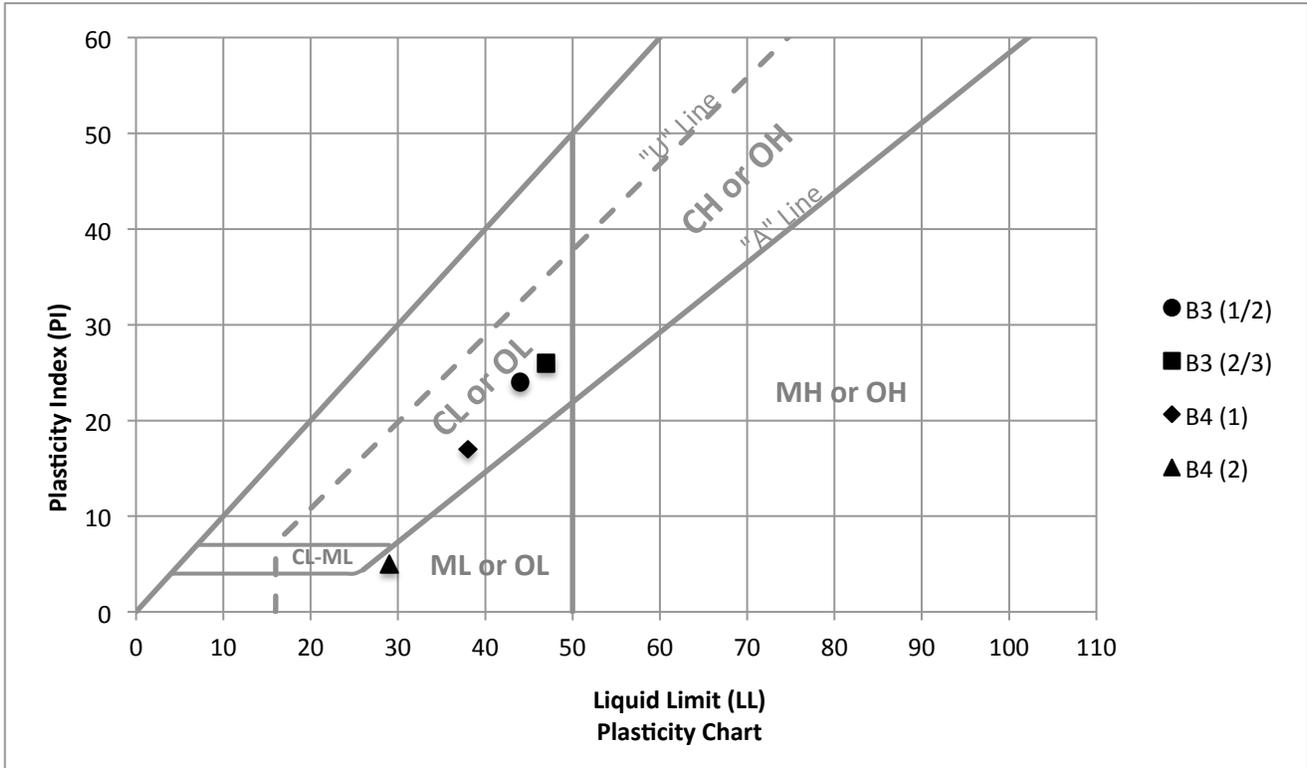
CAInc File No: 15-245.1

Date: 11/17/15

Technician: KKL

Plastic Index - ASTM D4318

Sample ID	Depth (ft)	Plastic Limit	Liquid Limit	PI
B3 (1/2)	12-13.0	20	44	24
B3 (2/3)	16-17.0	21	47	26
B4 (1)	3-3.5	21	38	17
B4 (2)	4-4.5	24	29	5





Sunland Analytical
11419 Sunrise Gold Cir.#10
Rancho Cordova, CA 95742
(916) 852-8557

Date Reported 11/11/15
Date Submitted 11/04/15

To: Nate Majerus
Crawford & Associates, Inc.
4030 S.Land Park Dr. Ste C
Sacramento, CA, 95822

From: Gene Oliphant, Ph.D. \ Randy Horney 
General Manager \ Lab Manager

The reported analysis was requested for the following:
Location : PROJECT-15-245.1 Site ID: B1 AT 5-6FT 2/2
Thank you for your business.

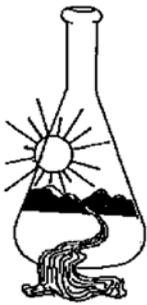
* For future reference to this analysis please use SUN # 70795 - 147731

EVALUATION FOR SOIL CORROSION

Soil pH	5.40		
Minimum Resistivity	9.11	ohm-cm (x1000)	
Chloride	14.2 ppm	0.0014	%
Sulfate-S	21.1 ppm	0.0021	%

METHODS:

pH and Min.Resistivity CA DOT Test #643 Mod.(Sm.Cell)
Sulfate CA DOT Test #417, Chloride CA DOT Test #422



Sunland Analytical
11419 Sunrise Gold Cir.#10
Rancho Cordova, CA 95742
(916) 852-8557

Date Reported 11/11/15
Date Submitted 11/04/15

To: Nate Majerus
Crawford & Associates, Inc.
4030 S.Land Park Dr. Ste C
Sacramento, CA, 95822

From: Gene Oliphant, Ph.D. \ Randy Horney 
General Manager \ Lab Manager

The reported analysis was requested for the following:
Location : PROJECT-15-245.1 Site ID: B1 AT 8.5-9FT
Thank you for your business.

* For future reference to this analysis please use SUN # 70795 - 147732

EVALUATION FOR SOIL CORROSION

Soil pH	7.40		
Minimum Resistivity	2.14	ohm-cm (x1000)	
Chloride	7.9 ppm	0.0008	%
Sulfate-S	4.3 ppm	0.0004	%

METHODS:

pH and Min.Resistivity CA DOT Test #643 Mod.(Sm.Cell)
Sulfate CA DOT Test #417, Chloride CA DOT Test #422



Sunland Analytical
11419 Sunrise Gold Cir.#10
Rancho Cordova, CA 95742
(916) 852-8557

Date Reported 11/11/15
Date Submitted 11/04/15

To: Nate Majerus
Crawford & Associates, Inc.
4030 S.Land Park Dr. Ste C
Sacramento, CA, 95822

From: Gene Oliphant, Ph.D. \ Randy Horney 
General Manager \ Lab Manager

The reported analysis was requested for the following:
Location : PROJECT-15-245.1 Site ID: B2 AT 4-7FT
Thank you for your business.

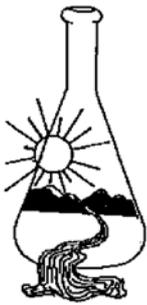
* For future reference to this analysis please use SUN # 70795 - 147733

EVALUATION FOR SOIL CORROSION

Soil pH	5.22		
Minimum Resistivity	7.77	ohm-cm (x1000)	
Chloride	15.5 ppm	0.0016	%
Sulfate-S	4.4 ppm	0.0004	%

METHODS:

pH and Min.Resistivity CA DOT Test #643 Mod.(Sm.Cell)
Sulfate CA DOT Test #417, Chloride CA DOT Test #422



Sunland Analytical
11419 Sunrise Gold Cir.#10
Rancho Cordova, CA 95742
(916) 852-8557

Date Reported 11/11/15
Date Submitted 11/04/15

To: Nate Majerus
Crawford & Associates, Inc.
4030 S.Land Park Dr. Ste C
Sacramento, CA, 95822

From: Gene Oliphant, Ph.D. \ Randy Horney 
General Manager \ Lab Manager

The reported analysis was requested for the following:
Location : PROJECT-15-245.1 Site ID: B2 AT 16-16.5FT
Thank you for your business.

* For future reference to this analysis please use SUN # 70795 - 147734

EVALUATION FOR SOIL CORROSION

Soil pH	5.49		
Minimum Resistivity	6.70	ohm-cm (x1000)	
Chloride	9.1 ppm	0.0009	%
Sulfate-S	36.1 ppm	0.0036	%

METHODS:

pH and Min.Resistivity CA DOT Test #643 Mod.(Sm.Cell)
Sulfate CA DOT Test #417, Chloride CA DOT Test #422



Sunland Analytical
11419 Sunrise Gold Cir.#10
Rancho Cordova, CA 95742
(916) 852-8557

Date Reported 11/11/15
Date Submitted 11/04/15

To: Nate Majerus
Crawford & Associates, Inc.
4030 S.Land Park Dr. Ste C
Sacramento, CA, 95822

From: Gene Oliphant, Ph.D. \ Randy Horney 
General Manager \ Lab Manager

The reported analysis was requested for the following:
Location : PROJECT-15-245.1 Site ID: B3 AT 8-9FT
Thank you for your business.

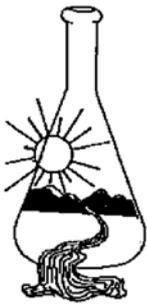
* For future reference to this analysis please use SUN # 70795 - 147735

EVALUATION FOR SOIL CORROSION

Soil pH	5.05		
Minimum Resistivity	12.33	ohm-cm (x1000)	
Chloride	16.0 ppm	0.0016	%
Sulfate-S	7.2 ppm	0.0007	%

METHODS:

pH and Min.Resistivity CA DOT Test #643 Mod.(Sm.Cell)
Sulfate CA DOT Test #417, Chloride CA DOT Test #422



Sunland Analytical
11419 Sunrise Gold Cir.#10
Rancho Cordova, CA 95742
(916) 852-8557

Date Reported 11/11/15
Date Submitted 11/04/15

To: Nate Majerus
Crawford & Associates, Inc.
4030 S.Land Park Dr. Ste C
Sacramento, CA, 95822

From: Gene Oliphant, Ph.D. \ Randy Horney 
General Manager \ Lab Manager

The reported analysis was requested for the following:
Location : PROJECT-15-245.1 Site ID: B3 AT 12-13FT
Thank you for your business.

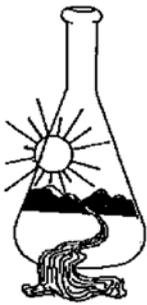
* For future reference to this analysis please use SUN # 70795 - 147736

EVALUATION FOR SOIL CORROSION

Soil pH	5.05		
Minimum Resistivity	5.90	ohm-cm (x1000)	
Chloride	12.8 ppm	0.0013	%
Sulfate-S	4.8 ppm	0.0005	%

METHODS:

pH and Min.Resistivity CA DOT Test #643 Mod.(Sm.Cell)
Sulfate CA DOT Test #417, Chloride CA DOT Test #422



Sunland Analytical
11419 Sunrise Gold Cir.#10
Rancho Cordova, CA 95742
(916) 852-8557

Date Reported 11/11/15
Date Submitted 11/04/15

To: Nate Majerus
Crawford & Associates, Inc.
4030 S.Land Park Dr. Ste C
Sacramento, CA, 95822

From: Gene Oliphant, Ph.D. \ Randy Horney 
General Manager \ Lab Manager

The reported analysis was requested for the following:
Location : PROJECT-15-245.1 Site ID: B3 AT 16-17FT
Thank you for your business.

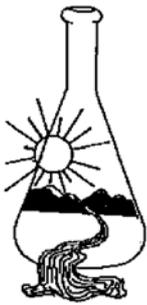
* For future reference to this analysis please use SUN # 70795 - 147737

EVALUATION FOR SOIL CORROSION

Soil pH	5.33		
Minimum Resistivity	4.96	ohm-cm (x1000)	
Chloride	24.8 ppm	0.0025	%
Sulfate-S	8.7 ppm	0.0009	%

METHODS:

pH and Min.Resistivity CA DOT Test #643 Mod.(Sm.Cell)
Sulfate CA DOT Test #417, Chloride CA DOT Test #422



Sunland Analytical
11419 Sunrise Gold Cir.#10
Rancho Cordova, CA 95742
(916) 852-8557

Date Reported 11/11/15
Date Submitted 11/04/15

To: Nate Majerus
Crawford & Associates, Inc.
4030 S.Land Park Dr. Ste C
Sacramento, CA, 95822

From: Gene Oliphant, Ph.D. \ Randy Horney 
General Manager \ Lab Manager

The reported analysis was requested for the following:
Location : PROJECT-15-245.1 Site ID: B4 AT 8-9.5FT
Thank you for your business.

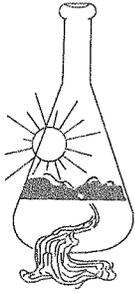
* For future reference to this analysis please use SUN # 70795 - 147738

EVALUATION FOR SOIL CORROSION

Soil pH	5.65		
Minimum Resistivity	2.95	ohm-cm (x1000)	
Chloride	19.2 ppm	0.0019	%
Sulfate-S	54.8 ppm	0.0055	%

METHODS:

pH and Min.Resistivity CA DOT Test #643 Mod.(Sm.Cell)
Sulfate CA DOT Test #417, Chloride CA DOT Test #422



Sunland Analytical

11419 Sunrise Gold Circle, #10
Rancho Cordova, CA 95742
(916) 852-8557

Date Reported 11/17/2017
Date Submitted 11/15/2017

To: Hailey Wagenman
Crawford & Associates, Inc.
1100 Corporate Way STE. 230
Sacramento, CA 95831-6120

From: Gene Oliphant, Ph.D. \ Randy Horney *RO*
General Manager \ Lab Manager

The reported analysis was requested for the following location:
Location : HBMWD 15-245.2 Site ID : B6@56-58FT.
Thank you for your business.

* For future reference to this analysis please use SUN # 75630-157823.

EVALUATION FOR SOIL CORROSION

Soil pH	8.88		
Minimum Resistivity	0.54 ohm-cm (x1000)		
Chloride	6.6 ppm	00.00066	%
Sulfate	67.8 ppm	00.00678	%

METHODS

pH and Min. Resistivity CA DOT Test #643
Sulfate CA DOT Test #417, Chloride CA DOT Test #422

POINT LOAD TEST RESULTS

Project Name: HBMWD Water Pipeline

CA Inc File No: 15-245.2

Date: 29-Nov

Technician: NBM

Boring	Top Hole Elevation		Core Run	Depth		Elevation		Core Diameter (inches)	Failure Load (P) (lbf)	Point Load Index (I _s) (psi)	Point Load Index (I _s) (MPa)	Correlated Uniaxial Compressive Strength (psi)	Correlated Uniaxial Compressive Strength (MPa)	Remarks/Notes
	(feet)	(m)		(feet)	(m)	(feet)	(m)							
B5	104.0	31.70	TBD	42.7	13.01	61.3	18.68	2.39	2533.59	444	3.1	10920	75.3	
B5	104.0	31.70	TBD	43.5	13.26	60.5	18.44	2.38	3924.92	693	4.8	17000	117.2	
B5	104.0	31.70	TBD	44.1	13.44	59.9	18.26	2.329	3145.73	580	4.0	14100	97.2	
B5	104.0	31.70	TBD	44.8	13.66	59.2	18.04	2.336	2686.23	492	3.4	12000	82.7	
B5	104.0	31.70	TBD	45.3	13.81	58.7	17.89	2.377	3033.21	537	3.7	13100	90.3	
B5	104.0	31.70	TBD	46.0	14.02	58.0	17.68	2.375	2961.39	525	3.6	12800	88.3	
B5	104.0	31.70	TBD	46.5	14.17	57.5	17.53	2.363	3186.87	571	3.9	13900	95.8	
Averages:										549	3.8	13403	92.4	

Uniaxial compressive strength values based on point load test data and correlations derived from Bieniawski (1975); "Rock Mechanics for Underground Mining", Brady & Brown, 1985 (page 98-99).

Equation to Determine Uniaxial Compressive Strength:

Uniaxial Compressive Strength = $\sigma_c = (14 + 0.175D)I_s$

Point Load Index = $I_s = P/D^2$

1 psi = 6.8948 kN/m² = 6.8948 kPa

1 psi = 0.0068948 Mpa

Appendix C
Horizontal Directional Drilling (HDD) Surface Spill and
Hydrofracture Contingency Plan
(Bennett Trenchless Engineers; December 2017)

**Horizontal Directional Drilling (HDD)
Surface Spill and Hydrofracture
Contingency Plan**

Humboldt Bay Municipal Water District
BLFG CSD Water Transmission Pipeline Replacement
Mad River HDD Crossing

December 20, 2017



Prepared for: GHD and Humboldt Bay Municipal Water District

Introduction

This Surface Spill and Hydrofracture Contingency Plan was prepared by Bennett Trenchless Engineers for the Horizontal Directional Drilling (HDD) Crossing for the Humboldt Bay Municipal Water District (District) BLFG CSD Water Transmission Pipeline Replacement Project. The plan is applicable to HDD construction methods and addresses the potential sources of risks of surface spills and hydrofracture during HDD construction, as well as preventative measures, monitoring, and mitigation measures. The plan also establishes the roles and responsibilities of the parties for monitoring, prevention, containment, cleanup, mitigation, and documentation of events and response actions. The Contractor shall be responsible for implementing this plan. Any changes to the plan that the Contractor proposes shall be submitted in writing for the Engineer's review and approval. HDD construction methods are briefly described below.

Horizontal Directional Drilling (HDD)

HDD is a surface launched process for installing pipelines beneath natural or man-made obstacles. Since the bore begins and ends at the ground surface, shafts are not needed. Excavation at the surface is limited to small pits that are dug at each end to contain drilling fluids. The process consists of drilling a pilot bore from the entry to the exit location, and enlarging the pilot hole through one or more successive reaming passes to a final size that is large enough to accept the product pipe. Drilling fluids are used in directional drilling to cool the cutting tools, stabilize the bore, and transport the soil cuttings from the bore to a slurry separation plant. The slurry separation plant separates the solids from the slurry after which the slurry is recycled and pumped down to the bit once again. The drilling fluids typically consist of water and bentonite (a naturally occurring clay), and may contain polymers to aid in the required functions of the fluid. HDD typically requires a large volume of drilling fluid that can reach high pressures depending upon borehole length, alignment, soil conditions, and construction methods. Therefore, hydrofracture is a potential risk associated with HDD pipe installation.

The slurry separation plant used with directional drilling to separate the solids from the slurry should be properly monitored to avoid surface spills. Surface spills at the separation plant could lead to fluids coming into contact with biological, cultural, or environmental resources that must be protected. An HDD rig and separation plant with silt fence and straw wattles for containment of surface spills is shown in Figure 1.



Figure 1. Drill rig placed on timber mats and plastic ground covering with silt fences in the background (left). Separation plant surrounded by straw wattles (right).

To reduce the risks of hydrofracture and surface spills, the following paragraphs describe the HDD Surface Spill and Hydrofracture Contingency Plan that will be implemented on the HDD crossing of the Mad River.

Scope and Objectives of the Plan

The potential sources or causes of surface spills and fluid losses from the bore, commonly referred to as “inadvertent fluid returns,” “hydrofracture,” or “frac-outs,” are described. The design approach and measures specified to reduce or eliminate the risks of spills or inadvertent fluid returns are discussed. Monitoring measures that will be used for early detection of any surface spills or inadvertent fluid returns are also described, and contingency measures are detailed for containment and cleanup, should a spill or inadvertent return occur. Finally, this plan establishes the roles and responsibilities of the parties for monitoring, prevention, containment, cleanup, notification, and documentation.

Elements of the Plan

Specific elements of this plan have been developed to:

- Minimize the risks of spills or inadvertent returns entering the Mad River or coming into contact with sensitive cultural, environmental, or biological resources.
- Ensure vigilant observation and inspection to rapidly detect any spills or inadvertent returns.
- Ensure prompt and complete containment and cleanup of any accidental spills or inadvertent returns that may occur, in spite of good drilling practices and these precautions.

Objectives of the Plan

The specific objectives of this plan are:

- Minimize the potential for an inadvertent return or spill associated with HDD activities.
- Provide for the timely detection of inadvertent returns or surface spills that could enter the Mad River or impact sensitive cultural, environmental, or biological resources, surface facilities or features.
- Ensure an organized, timely, and minimum-impact response in the event a frac-out or spill occurs.
- Ensure that all appropriate notifications are made to the agencies within 24 hours, and that incidents are documented.

Roles and Responsibilities

In the event of a release, ultimately the District has the responsibility of impacts to Waters of the United States, sensitive species, etc.; however, the overall responsibility for implementing this plan lies with the Contractor, with oversight from the District and its representatives.. The Contractor, shall be responsible for monitoring, detection, containment, cleanup, and documentation of any spills or inadvertent fluid returns, and shall be responsible for prompt notification of the District and their designated representative. The District shall be responsible for notifying all permitting and regulatory agencies and stakeholders. The District's representatives and the Contractor shall be jointly responsible for communication and coordination of Contractor's efforts during any containment and clean-up operation. The District's representative shall regularly visit the site to ensure compliance. During these routine inspections, the District's representative should inspect for situations to minimize the potential for a spill or inadvertent drilling fluid release to the environment.

The Contractor shall also regularly monitor and inspect work areas to detect any spills or inadvertent returns. If the Contractor observes spills or inadvertent fluid returns the District representative should be notified as soon as possible by the Contractor. The District's representative will be responsible for coordinating with response, cleanup, and regulatory personnel to ensure proper containment, cleanup, and disposal of recovered material and the timely reporting of the incident.

To be effective in a response to an uncontrolled release of slurry or drilling mud, the District's representative will be familiar with HDD activities, including:

- Implementation of good practices to avoid potential spills or inadvertent returns
- Proximity of HDD activities to sensitive areas (i.e., the Mad River, cultural resources, and other environmentally sensitive areas)
- Location and condition of spill or inadvertent return response equipment. Equipment shall be onsite or capable of being onsite within one (1) hour of detection and notification

The District's representative will be knowledgeable regarding the implementation of this plan and have the authority to direct Contractor's work and commit resources (personnel and equipment) necessary to implement this plan. The Contractor will ensure that a copy of this plan is available onsite to all construction crews, and shall ensure that all workers are informed about the environmentally sensitive areas before any construction is started.

Sources or Causes of Surface Spills and Inadvertent Fluid Returns

The sources of spills or inadvertent fluid returns on HDD projects are:

1. Slurry losses from the bore to the surface
2. Surface spills from the slurry separation plant, recirculation pits, or bentonite mixing tanks.

The potential causes of spills and inadvertent returns are:

1. Slurry losses from the directional drill bore to the surface may occur if the slurry becomes so viscous and thick that pumping pressures exceed the critical pressure required to cause soil hydrofracture. This can occur in sticky plastic clays or any cohesive soil material where the rate of progress for the HDD bore/backream exceeds the rate at which drilling fluid can efficiently remove cuttings from the bore. Fluid losses to the surface may also occur if the bore intersects existing voids, desiccation cracks, tree roots, or wooden piles, or HDD operations create voids through over-excavation. Over-excavation can occur in clean sands, gravels, and soils with cobbles and boulders, if the slurry flow to the drill bit and reamer are not carefully controlled.
2. Surface spills of slurry may occur if the separation plant screens become clogged or blinded by polymers or debris, or if the Contractor fails to use good

housekeeping practices, or fails to maintain trucks or tanks beneath separation plant discharge chutes. Surface spills from the separation plant, bentonite mixing tanks, and recirculation pits represent the most significant spill risks for HDD projects.

Criteria and Measures to Reduce Risks of Spills and Inadvertent Fluid Returns

For this project, the approach adopted for design has been to select pipeline depth, work areas, and specify requirements to be addressed by Contractor submittals, to avoid or reduce risks of spills or inadvertent fluid returns. Contract documents also specify appropriate measures that must be implemented by the Contractor to avoid spills or inadvertent returns. Specific measures are summarized below.

1. To reduce the risks of inadvertent drilling fluid returns from the HDD bore, the pipeline has been sited at least forty (40) feet below the bottom of the Mad River.
2. To reduce the risks of spills from the mixing tanks and separation plant that could enter the marsh, come into contact with cultural or biological resources, or exit the approved work area, buffer areas have been set back a sufficient distance from the edge of approved work area to allow contingency measures to be implemented before any spill can enter sensitive environmental areas or exit the approved work area identified in permits and surveys. Importantly, the work areas are on uplands, so the areas between the entry/exit locations and river channel allow containment and clean-up and essentially preclude spills from reaching the river or exiting the approved work area. The specifications require that all slurry will be contained, transported, and disposed of at an approved offsite location. No stockpiling or dumping of spoils or slurry will be allowed onsite.

Construction activities have been designed to minimize potential for adverse impacts to sensitive features. During construction, measures that will be implemented include:

1. Frequent monitoring of potential sources and locations of spills and hydrofracture to provide early warning of potential releases. The Contractor's onsite foreman will be trained and experienced and will closely monitor the slurry separation plant and lubrication plant operations, and will observe the river basin, as well as slurry and lubricant composition and pumping pressures and flow rates. The Contractor's onsite foreman shall be vigilant in monitoring and detecting spills or inadvertent fluid returns.
2. Containment and cleanup equipment will be onsite or available within one (1) hour if offsite. Equipment shall include the following:

- Heavy weight plastic gravel-filled and sealed bags (minimum of 40 bags)
 - Splash board: three layers of a heavy plastic
 - Several 5-gallon hard plastic pails
 - One or two wide heavy-duty push broom
 - Three flat blade shovels
 - Silt fence and T-posts or straw bales, as appropriate
 - Two bundles of absorbent pads to use with plastic sheeting for placement beneath motorized equipment while in operation.
 - Straw logs (wattles of fiber rolls); at least six 10-foot rolls
 - Portable pumps (2 minimum)
 - A minimum of 200 feet of hose
 - Vacuum trailers or trucks (800 to 3,000-gallon) will be available for response within one (1) hour of the incident's detection
 - Siltation screens to contain returns in waterways
 - 55-gallon barrels with both ends removed, and plates or tabs with 0.5-inch holes drilled through plates, and No. 4 rebar to anchor the barrels to the ground through the holes in the plates, (2 each minimum).
3. Contractor personnel will be familiar with the containment and cleanup equipment and procedures for using the equipment to avoid release to the river channel or contact with sensitive features.
 4. The District's representative will brief the Contractor on roles and responsibilities and ensure that Contractor personnel understand their roles and responsibilities for good drilling and housekeeping practices, monitoring, containment, cleanup, and documentation of incidents. The District's representative will also brief Contractor personnel on locations of sensitive resources, and will flag all such features. Flagging will remain in place for the duration of the construction.
 5. The Contractor shall be required to monitor and adjust operations if problems occur.
 6. All members of the Contractor's staff and the Water District's onsite inspection staff shall be responsible and alert to spills and inadvertent fluid returns and shall report any incident immediately upon detection.
 7. If any incident is detected, the containment, cleanup, notification, and documentation measures described below shall be immediately implemented.

Containment, Cleanup, and Documentation

In the event of an inadvertent fluid return, the District and its representatives will conduct an appropriate evaluation of the situation. If the inadvertent fluid return is minor, easily contained, and not threatening to sensitive resources, HDD operations may continue with close scrutiny of the situation. If sensitive resources are threatened, an appropriate response plan will be implemented. Emergency actions will be taken to the extent determined by the District's representative to be necessary to alleviate the threat to the sensitive resource without imposing additional threats to the environment associated with the cleanup activities. The District's representative will notify the appropriate permitting and regulatory agencies within 24 hours and additional follow-up response actions may be developed in coordination with agency representatives. The Contractor will coordinate the mobilization of equipment (e.g., portable pumps and vacuum trucks) as needed.

In implementing an emergency response action, the Contractor will ensure that:

1. Access to the worksite will be via approved routes, unless otherwise approved by the permitting agencies.
2. Temporary construction fencing will be used to identify the agreed to limits of disturbance and to exclude equipment from sensitive areas. This shall be done at every location where sensitive features exist prior to beginning the emergency response.
3. All equipment or vehicles driven or operated within or adjacent to environmental sensitive areas shall be checked and maintained daily to prevent leaks of hazardous materials.
4. No permanent fill will occur on this project unless a permit has been obtained from the US Army Corps of Engineers.

Should a cultural resource be impacted by a spill or inadvertent return, an expert consultant shall be consulted to minimize impacts to the resource.

The response of the Contractor's field crew to a drilling fluid release will be immediate and in accordance with procedures identified in this plan. The Contractor shall work without interruption until the emergency situation no longer poses a threat. All appropriate emergency actions that do not pose additional threats to sensitive resources will be taken, as follows:

1. The District's representative will be notified before clean up begins to ensure adequate response actions are taken and notifications are made.

2. Small releases which do not impact sensitive resources will be cleaned up using onsite equipment.
3. A sandbag dike/berm may be constructed, or a barrel placed around the spill or inadvertent return to entrap released drilling fluid.
4. Any existing berms, barriers, or silt fence established to protect sensitive resources will be strengthened, as necessary, to contain drilling fluids and prevent their encroachment on sensitive biological and cultural resources and divert drilling fluid from entering the river.
5. Off-site response equipment in readily accessible locations (e.g. portable pumps and fully-equipped 800 to 3,000-gallon vacuum trailers or trucks) will be mobilized to recover larger releases of drilling fluid.
6. Berms and other fills, including placement of other material that acts as fill in waters of the United States may not be placed in waters without approval from the US Army Corps of Engineers or the CA Department of Fish and Game.

Inadvertent Return in Mad River

If an inadvertent fluid return is detected in the river, the slurry will be contained and removed by constructing a ring dike around the inadvertent return using sand bags or an open-ended barrel, and extending the dike above the water surface. The slurry inside the dike wall will then be removed using a vacuum pump and tank. The dike may remain in place after all slurry has been removed, until the bore is completed, or until there is no further risk of inadvertent returns at that location. The dike will be completely removed before demobilization. The containment and cleanup will be closely coordinated with the all applicable agencies by the District's Representative.

Actions that would require encroachment on riparian zones, wetlands, or other exclusion areas will not be undertaken without concurrence of a California Department of Fish and Wildlife representative unless such action is deemed by a District Representative as essential to prevent significant impact to a sensitive resource, and then only in a manner that protects the environment. Access to the inadvertent return release area will be via existing roads and temporary work easements approved by the District Representative. Additional access needed to perform cleanup activities will be coordinated with and require the approval of the California Department of Fish and Wildlife.

The cause of the spill or fluid loss will be identified and any and all corrective actions shall be immediately undertaken by the Contractor to avoid recurrence.

Notification Contacts

In the event that an inadvertent fluid return threatens biological resources identified on-site, the following agencies will be immediately notified by one of the following LAVWMA representatives:

District Project Representatives:

1. Dale Davidsen, cell 707-496-1378
2. John Friedenbach, cell 707-616-4900
3. Patrick Kaspari, cell 707-599-5123

Permitting Agency Representatives:

1. California Office of Emergency Services (24 hr) 1-800-825-7550
2. California Fish & Wildlife (6 am to 7 pm) 916-341-6957
3. California Fish & Wildlife (24 hr) 916-358-1312

Summary

This Surface Spill and Hydrofracture Contingency Plan establishes the planning and operational procedures as well as roles and responsibilities for the prevention, containment, and cleanup of spills or inadvertent fluid returns associated with HDD operations during the HDD Crossing of the Mad River. Contractors and Subcontractors must adhere to this plan during all HDD operations.

Appendix D
Site Photos



Figure D1. Facing southeast, railroad grade construction access (left) off Warren Creek Road (right).



Figure D2. Facing northeast along the access railroad grade



Figure D3. Facing north along the access railroad grade near the exit pit location.



Figure D4. Facing northeast off the access railroad grade, towards exit pit location.



Figure D5. Facing east off the access railroad grade towards the exit pit location.



Figure D6. Facing east on Warren Creek Road towards the exit pit location.



Figure D7. Facing southeast on Warren Creek Road at connection to the existing water line.



Figure D8. Facing northwest on Warren Creek Road towards the location of the modification of the existing river crossing, detail 3 sheet C-401.



Figure D9. Facing north on Warren Creek Road showing the existing valve boxes at the location of the modification of the existing river crossing.



Figure D10. Facing southeast from the staging/laydown area on the east side of the river showing the construction access road towards Glendale Road.



Figure D11. Facing northwest showing the staging/laydown area on the east side of the river.



Figure D12. Facing northeast showing the Ford water service connection path (the service will traverse up the dirt road on the right and through the open grass on the left)



Figure D13. Facing northeast from Sundberg property towards the new Sundberg connection alignment and Glendale Drive, detail 4, sheet G-101.



Figure D14. Facing southwest from Glendale Drive towards the new Sundberg connection alignment.

PART 6
DRAWINGS