CITY OF ORLAND GLENN COUNTY, CALIFORNIA

CONTRACT DOCUMENTS

FOR

WALKER STREET WELL

NOVEMBER 2022

PREPARED BY:

GEI CONSULTANTS

GEI Consultants

SET NO._____

TABLE OF CONTENTS

1.00 NOTICE INVITING BIDS

Sealed bids will be received at City Hall, City of Orland, 815 Fourth Street, Orland, California, 95963 until 2:00 p.m., Tuesday December 6, 2022. At that time, all bids will be publicly opened, examined and declared for construction of:

CITY OF ORLAND
WALKER STREET WELL

2.00 GENERAL WORK DESCRIPTION

The work to be done under this Contract consists of drilling a pilot exploration borehole, geophysical logging, reaming of the borehole, well construction and testing, and disinfection, and related work, complete.

Work shall be completed within 100 WORKING DAYS from the issuance of the Notice To Proceed by the Owner.

The Engineer's Estimate is approximately $600,000 not including Bid Items 23 and 24.

The contractor shall possess either a Class A license or a combination of Class C licenses which constitutes a majority of the work at the time this contract is awarded. Well drillers performing work on this project must have a C57 license. The Contractor must be properly licensed as a contractor from contract award through contract acceptance.

A contractor or subcontractor shall not be qualified to bid on, be listed in a bid proposal, subject to the requirements of Section 4104 of the Publi--c Contract Code, or engage in the performance of any contract for public work, as defined in Division 2, Part 7, Chapter 1 of the Labor Code, unless currently registered and qualified to perform public work pursuant to Section 1725.5 of the Labor Code. It is not a violation of Section 1771.1 for an unregistered contractor to submit a bid that is authorized by Section 7029.1 of the Business and Professions Code or by Section 10164 or 20103.5 of the Public Contract Code, provided the contractor is registered to perform public work pursuant to Section 1725.5 at the time the contract is awarded.

The contractor is to carefully examine the site of the proposed work, and is to make his or her own determination of the scope of the work to be performed, including but not limited to the soil conditions and/or groundwater conditions to be encountered in performing the work, and he or she is to carefully examine these Contract Documents.

Inquiries or questions based on alleged patent ambiguity of the plans, specifications or estimate must be communicated as a bidder inquiry prior to bid opening. Any such inquiries or questions, submitted after bid opening, will not be treated as a bid protest. Bidders' inquiries may be presented to the City's city Engineer by phone at (530) 895-1422 or by U.S. Mail at Walker Street Well, c/o Rolls Anderson & Rolls, 115 Yellowstone Drive, Chico, CA 95973.

3.00 BID SUBMITTAL REQUIREMENTS

Bids are required for the entire work described herein and no bid will be accepted unless it is made on forms furnished by the City of Orland. **To ensure consideration, the Bid must be enclosed in a sealed envelope, clearly marked BID which also bears the name of the project and the date and time set for opening of Bids.** Each Bid must be accompanied by cash, certified or cashier's check, or bidder's bond made payable to the City of Orland for an amount equal to ten percent (10%) of the amount bid, such guaranty to be forfeited should the bidder to whom the Contract is awarded fail to execute the Contract.

No Bid will be accepted from a Contractor who is not currently licensed in accordance with the provisions of Chapter 9, Division III of the Business and Professions Code. Subcontractors shall also be licensed as required by said code.

4.00 PREVAILING WAGES

Pursuant to Section 1773 of the Labor Code of the State of California, the general prevailing wage rates in the county, or counties, in which the work is to be done have been determined by the Director of the California Department of Industrial Relations. These wages are set forth in the General Prevailing Wage Rates for this project, available at the City of Orland address and available from the California Department of Industrial Relations' Internet web site at http://www.dir.ca.gov/DLSR/PWD. Future effective general prevailing wage rates, which have been predetermined and are on file with the California Department of Industrial Relations are referenced but not printed in the general prevailing wage rates.

5.00 APPRENTICESHIP STANDARDS

In accordance with the provisions of Part 7, Chapter 1, Article 2, Section 1777.5 of the Labor Code of the State of California, the prime contractor shall be responsible for fully complying with the provisions of this Section, as well as any regulations adopted by the Director of Industrial Relations, for all apprenticeable crafts or trades, and shall also assure compliance by his or her sub-contractors with respect to such apprenticeable crafts or trades.

6.00 INSURANCE AND BONDS REQUIRED

The successful bidder to whom the Contract is awarded will be required to furnish appropriate insurance certificates as required by Section 4.00 of the General Conditions and the Special Conditions. He or she shall also furnish a Payment Bond in an amount equal to the total Contract amount and a Faithful Performance Bond in the amount equal to the total Contract amount, with a corporate surety approved by the City of Orland.

7.00 PAYMENT OF RETENTION AND SUBSTITUTION OF SECURITIES

Five percent (5%) will be withheld from each progress payment made to the Contractor for work performed and will be held until completion of the work, its acceptance and the expiration of the period provided by law for filing of liens by laborers or materialmen. In accordance with the provisions of Public Contract Code Section 22300, securities may be substituted for any monies which the City may withhold pursuant to the terms of the Contract to insure performance.

8.00 BIDDER'S INFORMATION

Contract Documents, including Plans and Specifications, are available for inspection on the City of Orland's website: www.cityoforland.com ; at the Valley Contractors Exchange at 951 E. 8th Street, Chico, California; and Shasta Builders Exchange at 2990 Innsbruck Drive, Redding, California. Copies are available for purchase at the Public Works Department located in the City Hall, City of Orland, 815 Fourth Street, Orland, California; and GEI Consultants, 2868 Prospect Park Drive, Rancho Cordova CA, 95670, for a **NON-REFUNDABLE PAYMENT** of $40.00 per set, plus $10.00 mailing charge if mailing is requested.

9.00 BID AWARD

The Contract, if awarded, will be awarded within 30 days after the opening of Bids, to the lowest responsible bidder as determined by the City of Orland. The City reserves the right, in its sole discretion,

to reject any and all bids for any reason whatsoever, or to waive minor irregularities in any bid, and to accept any bid.

/s/ Ed Vonasek Date: 11/10/2022
Ed Vonasek
Public Works Director City of Orland

Publish Date: November 14, 2022

1.00 INTRODUCTION

Each Bid shall be in accordance with the Contract Documents prepared by GEI Consultants, 2868 Prospect Park Drive, Rancho Cordova CA, 95670. Contract Documents are available as specified in the Notice to Bidders.

2.00 DEFINITION OF TERMS

2.01 CONTRACT DOCUMENTS

The Contract Documents consist of the Notice to Bidders, Instructions to Bidders, Bidder's Signature, Contract, General Conditions, Supplemental General Conditions, Special Conditions, Technical Specifications, Appendices, Plans, and any Addenda.

2.02 CONTRACT

The Contract is the written agreement covering the performance of the work and the furnishing of labor, materials, tools, and equipment in the construction of the work. It includes supplemental agreements amending or extending the work contemplated and which may be required to complete the work agreements covering alterations, amendments or extensions to the Contract and includes Contract Change Orders.

2.03 OWNER, CONTRACTOR AND ENGINEER

The Owner, the Contractor, City's city Engineer and the Engineer are those mentioned and defined as such in the Special Conditions. They are treated throughout the Contract Documents as if each were of the singular number and the masculine gender.

2.04 BIDDER

Any individual, firm, partnership, or corporation submitting a Bid for the work contemplated, acting directly or through a duly authorized representative.

2.05 BID

The offer of a Bidder for the work when made out and submitted on the prescribed Bid form, properly signed and guaranteed.

2.06 BID GUARANTEE

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 Owner for the performance of the work if the Contract is awarded to him.

2.07 EFFECTIVE DATE OF THE CONTRACT

The date on which the governing body or an authorized representative of the Owner awards the Contract.

2.08 DATE OF EXECUTION OF THE CONTRACT

The date on which the Contract is signed by the Owner's authorized representative.

2.09 DAYS

Unless otherwise specifically stated, the term "days" will be understood to mean calendar days.

2.10 WORK

The term "work" means all the work specified, indicated, shown or contemplated in the Contract Documents, including all alterations, amendments or extensions thereto made by Contract Change Order or other written orders of the Engineer.

2.11 SPECIFICATIONS

The term "specifications" refers to the terms, provisions and requirements contained herein and referred to as General Conditions, Special Conditions and Technical Specifications. Where Standard Specifications such as those of ASTM, AASHTO, etc., have been referred to, the applicable portions of

such Standard Specifications shall become a part of these Contract Documents.

2.12 PLANS

The term "Plans" 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.

3.00 PREPARATION AND SUBMISSION OF BIDS

Bids must be submitted on the forms bound in the Contract Documents and must be “wet signed” by the Bidder or his authorized representative. Any corrections to the entries made on the Bid forms must be initialed by the person signing the Bid.

Bidders must bid on all items appearing on the Bid Item List, unless specific directions allow for partial bids. Failure to bid all items may disqualify the Bid. If bids on all items are not required, Bidders shall insert the words "No Bid" where appropriate. Alternate bids will not be considered unless specifically called for in the Bid.

Telegraphic Bids or facsimile Bids will not be considered. Modifications to Bids already submitted will be allowed if received in writing, by facsimile or by telegram prior to the time fixed in the Notice to Bidders for opening of Bids. Modifications shall be submitted as such, and shall not reveal the total amount of either the original or revised Bid.

In conformance with Public Contract Code Section 7106, a Noncollusion Affidavit is included in the Contract Documents. Signing the Bid shall also constitute signature of the Noncollusion Affidavit.

To insure consideration, the Bid should be enclosed in a sealed envelope, clearly marked **BID** which also bears the name of the project and the date and time set for opening Bids. The sealed envelope containing the Bid should be filed at the place and before the time set for opening of Bids. Bids received after the time indicated will be returned unopened.

4.00 WITHDRAWAL OF BIDS

Any bidder may withdraw his Bid, either personally or by facsimile, telegraphic or written request at any time prior to the scheduled closing time for receipt of bids. No bidder may withdraw his bid for a period of 30 days after the date set for opening. Negligence on the part of the bidder in preparing his bid shall not constitute a right to withdraw his bid subsequent to the bid opening.

5.00 BID GUARANTEE

Bids shall be accompanied by cash, certified check, cashier's check or "wet signed" Bidder's Bond made payable to the Owner. The bidder's bond shall conform to the bond form in these Contract Documents and shall be properly filled out and executed. The bidder’s bond form included in these documents may be used. Facsimile copies of checks or executed Bidder's Bonds will not be accepted. The Bid Guarantee must be enclosed in the same envelope with the Bid. The amount of the Bid Guarantee shall not be less than 10 percent of the total amount of the Bid.

6.00 ADDENDA AND EXPLANATIONS TO BIDDERS

Any request for explanation or interpretation of the Contract Documents must be made in writing at least seven (7) days before the time set for opening of Bids. Any explanation or interpretation will be made in the form of Addenda to the Contract Documents and shall be furnished to all Bidders. Bidders shall submit signed copies of all Addenda with their Bids. Oral explanations and interpretations will not be binding.

7.00 DISCREPANCIES

In case of discrepancies between unit prices and totals, unit prices will prevail. In case of discrepancy between words and figures, words will prevail.

8.00 ACCEPTANCE OR REJECTION OF BIDS

The Owner reserves the right to reject any or all Bids and to waive any informality in any Bid.

The award of Contract, if made, will be to the lowest responsible Bidder whose Bid complies with the requirements of the Contract Documents. The award, if made, will be made within 30 days after the opening of Bids. If the lowest responsible Bidder fails to sign and return the Contract with acceptable bonds and certificates of insurance, the Owner may award the Contract to the next lowest responsible Bidder.

9.00 CONTRACT BONDS

The successful Bidder shall furnish a Performance Bond in the amount of 100 percent of the total Contract amount and a Payment Bond in the amount of 100 percent of the total Contract amount.

10.00 EXECUTION OF CONTRACT

The effective date of the Contract shall be the date on which the governing body or an authorized representative of the Owner awards the Contract.

The Bidder whose Bid is accepted, and to whom the Contract is awarded, shall sign and return the Contract with acceptable bonds and certificates of insurance within 14 calendar days after receiving notice that the Contract has been awarded to him. Failure to do so shall be just cause for annulment of the award and for forfeiture of the Bid Guarantee.

Within seven (7) days after receiving the signed Contract with acceptable bonds, and evidence of satisfactory insurance, from the successful Bidder, the Owner's authorized agent will sign the Contract. Signature by both parties constitutes execution of the Contract.

11.00 RETURN OF BID GUARANTEES

Within 15 days after the award of the Contract, the Owner will return the Bid Guarantees, other than Bidder's Bonds, to all Bidders whose Bids are not to be further considered in awarding the Contract. Retained Bid Guarantees will be held until the Contract has been finally executed, after which all Bid Guarantees, other than Bidder's Bonds and any guarantees which have been forfeited, will be returned to the respective Bidders whose Bids they accompanied.


CITY OF
ORLAND
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CALIFORNIA

BID SCHEDULE

Item No.	Description	Approx. Quantity	Unit Price	Total Price
1.	Mobilization/demobilization of equipment and site cleanup, complete (maximum 10% of total bid)	Lump Sum	Not Applicable	$
2.	Temporary security fencing	Lump Sum	Not Applicable	$
3.	Conductor casing and sanitary seal	50 LF	$	$
4.	18-inch Diameter Pilot Borehole Drilling, complete	450 LF	$	$
5.	Gyro/direction borehole survey	Lump Sum	Not Applicable	$
6.	Geophysical surveys	Lump Sum	Not Applicable	$
7.	30-inch diameter reaming, complete	450 LF	$	$
8.	Caliper Survey	Lump Sum	Not Applicable	$
9.	Furnish and install 16-inch diameter 0.2% copper bearing steel casing, complete in place	423 LF	$	$
10.	Furnish and install 16-inch diameter 0.2% copper bearing steel louvered well screen, complete in place	30 LF	$	$
11.	Furnish and install 3-inch diameter gravel pack fill pipe, complete	165 LF	$	$
12.	Furnish and install gravel pack, complete in place	300 LF	$	$
13.	Furnish and install cement grout annular and transition seals, complete in place	160 LF	$	$
14.	Well development with drill rig	10 Hours	$	$
15.	Furnish, install and remove test pump, complete	200 LF	$	$
16.	Pump development	48 Hours	$	$
17.	Aquifer testing, complete	36 hours	$	$
18.	Plumbness and alignment tests, complete	Lump Sum	Not Applicable	$
19.	Video survey	Lump Sum	Not Applicable	$
20.	Well disinfection	Lump Sum	Not Applicable	$
21.	Disposal of drilling fluids	Lump Sum	Not Applicable	$
22.	Disposal of drill cuttings	Lump Sum	Not Applicable	$
23.	Borehole or well abandonment	500 LF	$	$
24.	Standby time	8 Hours	$	$
			TOTAL BID AMOUNT	**$**

Each Unit Price includes an amount considered by BIDDER to be adequate to cover BIDDER'S overhead and profit for each separately identified item. BIDDER acknowledges that quantities are not guaranteed and final payment will be based on actual quantities used.

Print Company Name:_____
Print Name: _____

Date:_____
Signature: _____

Each Bidder shall list below the name and business address of each subcontractor who will perform work under this Contract in excess of one-half of one percent of the total amount shown in the Bid or $10,000, whichever is greater, and shall also list the portion of the work which will be done by such subcontractor.

PORTION OF WORK (Bid Item No.) **SUBCONTRACTOR'S NAME AND ADDRESS**

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Each Bidder shall list below the name and business address of each subcontractor who will perform work under this Contract in excess of one-half of one percent of the total amount shown in the Bid or $10,000, whichever is greater, and shall also list the portion of the work which will be done by such subcontractor.

PORTION OF WORK (Bid Item No.) **SUBCONTRACTOR'S NAME AND ADDRESS**

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[LABOR CODE SECTION 1861]

STATE OF CALIFORNIA)
) ss COUNTY OF_____)

I, the undersigned, do hereby certify:

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

Executed at _

_____

On_

_____

.

I certify under penalty of perjury that the foregoing is true and correct.

_____

Contractor-Employer

NONCOLLUSION DECLARATION TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID

The undersigned declares:

I am the_____of_____, the party making the foregoing bid.

The bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation. The bid is genuine and not collusive or sham. The bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid. The bidder has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or to refrain from bidding. The bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder. All statements contained in the bid are true. The bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof, to effectuate a collusive or sham bid, and has not paid, and will not pay, any person or entity for such purpose.

Any person executing this declaration on behalf of a bidder that is a corporation, partnership, joint venture, limited liability company, limited liability partnership, or any other entity, hereby represents that he or she has full power to execute, and does execute, this declaration on behalf of the bidder.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that this declaration is executed on_____[date], at Orland, California.

Note: The above Noncollusion Affidavit is part of the bid. Signing this Bid on the signature portion thereof shall also constitute signature of this Noncollusion Affidavit. Bidders are cautioned that making a false certification may subject the certifier to criminal prosecution.

Accompanying this Bid is , (cash, cashier's check, certified check or Bidder's Bond) in the amount equal to at least 10 percent of the total amount of the Bid.

The names of all persons interested in the foregoing bid as principals are as follows:

IMPORTANT NOTICE
If Bidder is a corporation, the legal name of the corporation shall be set forth below, together with the signature of the officer or officers authorized to sign Contracts on behalf of the corporation. If Bidder is a copartnership, the true name of the firm shall be set forth below, together with the signature of the partners authorized to sign Contracts in behalf of the copartnership; and if Bidder is an individual, his signature shall be placed below. 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 Bids or submitted with the Bid; otherwise, the Bid will be disregarded as irregular and unauthorized.

_____

_____

_____

The undersigned further declares that he is a licensed Contractor in the State of California, and that the license which he holds is of the class required to perform the specified work.

License No.____Classification(s) _____

ADDENDA - This Bid is submitted with respect to the changes to the contract documents included in addenda number(s) ___
(Fill in addenda numbers if addenda have been received and insert, in this Bid, any Engineer's Estimate sheets that were received as part of the addenda.)

By my signature on this Bid I certify that I have read and understand the clauses and certifications which are a part of this bid and that my signature shall constitute an endorsement and execution of those clauses and certifications. I further agree that in case of default in signing and returning the required Contract with necessary bonds within 14 days after receiving notice of award, the proceeds of the cash, check or bond accompanying the Bid shall be forfeited to the Owner.

Date: _

_____

_____

_____

Signature and Title of Bidder

Business Address: ____ Place of Business: _____
Place of Residence: ___

KNOW ALL MEN BY THESE PRESENTS, THAT WE, THE UNDERSIGNED ____

_____ as Principal;

And___as Surety, are hereby

held and firmly bound unto ____

hereinafter called the Owner, in the sum of ____

_____ dollars ($ _____), which sum is equal to at least 10 percent of the total amount of the Bid, payment of which sum, well and truly to be made, we hereby, jointly and severally bind ourselves, our heirs, executors, administrators, successors, and assigns.

The condition of the above obligation is such that whereas the Principal has submitted to the Owner a certain Bid, attached hereto and hereby made a part thereof, to enter into a Contract in writing, for the construction of:

CITY OF ORLAND

WALKER STREET WELL

THEREFORE,

If said Bid shall be rejected, or in the alternate,

If said Bid shall be accepted and the Principal shall sign and deliver a Contract, in the Form of Contract attached hereto and shall execute and deliver Performance and Payment Bonds in the forms attached hereto (all completed in accordance with said Bid), 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 default of the Principal hereunder shall be the amount of this obligation as herein stated.

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

IN WITNESS THEREOF, the above-bounded parties have executed this instrument under their several seals this_____day of__, 20_, the name and corporate seal of each corporate party being hereto affixed and those presents duly signed by its undersigned representative pursuant to authority of its governing body.

IN PRESENCE OF:

Individual Principal

Address Business Address

Individual Principal

Address Business Address

Corporate Principal

Business Address

By

Affix Corporate Seal

ATTEST:

Corporate Surety

Business Address

Corporate Seal

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

Total amount of premium charged is $.

THIS AGREEMENT, made and entered into on the date below written, by and between, **CITY OF ORLAND, CALIFORNIA, A MUNICIPAL CORPORATION**, 815 Fourth Street, Orland, California, 95963, hereinafter called the **OWNER**, and____, hereinafter called the **CONTRACTOR**.

WITNESSETH, that, for the considerations hereinafter mentioned, the Owner and Contractor agree as follows:

ARTICLE I. The Contractor agrees to furnish all labor, materials, tools, and equipment and to perform all the work required to construct and complete in a good and workmanlike manner, and in strict accordance with the Contract Documents entitled:

CONTRACT DOCUMENTS FOR

WALKER STREET WELL

The Contract Documents have been prepared by GEI Consultants, 2868 Prospect Park Drive, Rancho Cordova CA, 95670 hereinafter called the Engineer, and are hereby incorporated in and made a part of this Contract.

ARTICLE II. The Owner agrees to pay the Contractor for the performance of the Contract, subject to additions and deductions provided therein, the following prices, and the Contractor agrees to receive and accept said following prices as full compensation for furnishing all materials and for doing all the work contemplated and embraced in this agreement, and for all loss or damage arising out of the nature of the aforesaid work or from the action of the elements and from any unforeseen difficulties or obstructions which may arise or be encountered in the prosecution of the work until its acceptance by the Owner, and for all risks of every description connected with the work, and for all expenses incurred by or in consequence of the suspension or discontinuance of the work, and for well and faithfully completing the work and the whole thereof in the manner and according to the Contract Documents and the requirements of the Engineer under it, to wit:

As shown on the Bid attached hereto and incorporated herein.

ARTICLE III. The Owner shall make payments on the account of the Contractor as specified in Article 6.00 of the General Conditions.

ARTICLE IV. The Contractor shall commence work within 15 days and shall diligently prosecute the same to completion within 100 working days after receipt of a Notice to Proceed from the Owner.

ARTICLE V. The Contractor shall guarantee all of his work against defective material or faulty workmanship for a period of one year after the date of acceptance of the work by the Owner.

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 within that period, ordinary wear and tear and unusual abuse or neglect excepted, together with any other work which may be damaged or displaced in so doing.

In the event of failure to comply with the above-mentioned conditions within a reasonable time after being notified in writing, the Owner is authorized to have the defects repaired and made good at the expense of the Contractor who will pay the cost and charges therefore immediately upon demand.

The signing of the Contract by the Contractor shall constitute execution of the above guarantees.

ARTICLE VI. The Contractor specifically obligates himself and hereby agrees to protect, hold free and harmless, defend and indemnify the Owner, the Engineer and his consultants, and each of their officers, employees and agents, from any and all liability, penalties, costs, losses, damages, expenses, causes of actions, claims or judgments, including attorney's fees, which arise out of or are in any way connected with the Contractor's performance of his work under this Contract. 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 his agents, employees, representatives, or subcontractors, or his 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 have also been a contributing factor to the liability.

As a further precaution toward this end, the Contractor shall procure and maintain, in full force and effect during the performance of the work contemplated hereunder, insurance in his favor and also in favor of the Owner, with an insurance carrier approved by the Owner, as specified in Article 4.00 of the General Conditions and in the Special Conditions.

ARTICLE VII. Contractor acknowledges that State Labor Law requires the payment of prevailing wages and the maintenance of certain payroll records and other requirements as specified in Article 5.00 of the General Conditions and the Labor Code. Contractor agrees that these requirements shall be incorporated into all of his subcontracts.

ARTICLE VIII. Neither party of the Contract shall assign the Contract or sublet it as a whole without the written consent of the other, nor shall the Contractor assign any monies due, or to become due to him hereunder, nor utilize any subcontractors, other than those set forth in the List of Subcontractors, without the previous written consent of the Owner.

ARTICLE IX. Contractor is an independent contractor in the performance of this contract and is not an employee or agent of the Owner. The Owner has no direct obligation to any officers, agents, employees or subcontractors of the Contractor and such individuals shall not be entitled to claim direct payment of salaries nor seek employment benefits from the Owner.

ARTICLE X. Contractor warrants that he is duly and properly licensed to perform and provide the services contemplated by this Contract. Contractor shall possess all required licenses, including a local business license and shall require subcontractors and suppliers to be similarly licensed with regard to performance under this Contract.

ARTICLE XI. The Contractor shall maintain records relating to his performance of this Contract which shall be available for audit and/or inspection for a period of three (3) years after Contractor completes performance of the Contract or the Contract is otherwise terminated.

ARTICLE XII. Any Notices given pursuant to this Contract must be in writing and given either by personal delivery or by United States Mail, postage prepaid, addressed as follows:

OWNER: CONTRACTOR:

City of Orland
Attn.: Pete Carr
City Manager
815 Fourth Street
Orland, CA 95963

_____
_____
_____
_____

ARTICLE XIII. The Owner may terminate this Contract, without cause, upon giving of five (5) days written notice to Contractor. In the event of termination without cause, Contractor shall be compensated for services performed and materials furnished on an equitable basis through the date of termination.

ARTICLE XIV. California Law governs the interpretation and enforcement of this Contract.

ARTICLE XV. This Contract embodies the entire agreement between the parties. There are no oral agreements. No amendment to this Contract shall be valid unless in writing, executed by both parties to this Contract. The language of this Contract governs against any conflicting language or terms contained in any attachment, exhibit or scope of work.

ARTICLE XVI. Neither the acceptance of work nor payment for that work shall constitute a waiver of any provisions of this Contract. A waiver of any breach shall not constitute a waiver of any other provision or subsequent breach.

IN WITNESS WHEREOF, the parties to these presents have hereunto set their hands on the date below written.

OWNER

Date Pete Carr
City Manager City of Orland

(City Seal)

Attest:

Jennifer Schmitke, City Clerk, City of Orland

CONTRACTOR

Date *name*

title
Approved as to Form:

company

Greg Einhorn, City Attorney
City of Orland


CITY OF
ORLAND
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Bright Future
INC 1909
CALIFORNIA

Whereas, The City Council of the City of_____, State of California, and_____(hereinafter designated as “principal”) have entered into an agreement whereby principal agrees to install and complete certain designated public improvements, which said agreement, dated_____, 20___, and identified as project_____, is hereby referred to and made a part hereof; and

Whereas, Said principal is required under the terms of said agreement to furnish a bond for the faithful performance of said agreement.

Now, therefore, we, the principal and _____, as surety, are held and firmly bound unto the City of _____(hereinafter called "City"), in the penal sum of _____ _____dollars ($ _____) lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, successors, executors and administrators, jointly and severally, firmly by these presents.

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

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

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

The surety’s obligations to the City arise immediately upon the default of the principal, without demand or notice.

In the event the principal defaults in the performance of its obligations, the surety may elect, either directly or through appropriate contractors to perform in the place of the principal. If the surety elects to proceed in this fashion, it shall provide written notice of such election to the City within thirty (30) days after surety becomes aware of the principal's default. If the surety elects to complete the obligations of the principal (as opposed to paying money damages to the City occasioned by such breach) the surety shall cause the obligations of the principal to the performed as soon as is reasonably possible, but in no event later than nine (9) months following knowledge of the breach by the principal. In the event the surety elects to perform the principal's obligations, the City shall be entitled to compel the surety, by way of specific performance, to perform such obligations.

If the surety does not elect to perform the principals' obligations, the surety shall deposit with the City a sum equal to the cost of the uncompleted portion of the work which comprises the principal's obligation. The City's city engineer shall determine the estimated cost of the uncompleted portion of the work and the surety shall make such deposit with the City within five (5) days of receipt of the city engineer's estimate. The City shall not be required to expend any of its own funds to complete the work nor to incur "out-of-pocket" damages inasmuch as the City's damages are measured by the value of its unfulfilled right, namely the cost of completing the obligations of the principal by installing the bargained-for improvements. Upon deposit of the estimated cost of completion with the City, the City may proceed to bid the remainder of the work as a public project pursuant to the Public Contracts Code and the surety shall be obligated to continue to deposit such additional sums as may be necessary from time-to-time until the improvements are complete and accepted by the City or until the surety has exhausted the penal sum of the bond. Should the surety deposit more funds than are necessary to satisfy the principal's obligation, then the City shall refund any balance remaining upon final acceptance of the improvements. No interest shall be paid on any deposits made with the City.

Underwriting assumptions and cost estimates of the Surety shall not have any bearing, whatsoever, on the Surety's liability under this bond. By way of example, if, when making underwriting decisions regarding issuing this bond, a cost estimate was prepared regarding the principal's obligations to the City, the fact that an item was omitted from the cost estimate (which item was an obligation of the principal to the City), shall in no way defeat or diminish the Surety's obligation to the City with respect to this omitted item. By way of further example, if the underwriting decision to issue this bond included a cost estimate of items and a particular item was estimated at a cost significantly less than the amount actually required to perform such item, this fact shall in no way defeat or diminish the Surety's obligation to the City. Namely, the Surety shall be obligated, to the full amount of the penal sum of the bond, with respect to all matters which are the principal's obligation to the City, whether such items are actually included in any cost estimate (or if so included, are estimated at a cost far less than the actual cost to perform such items). Likewise, the adequacy and amount of any premium (and whether or not such premium was sufficient for

the risk assumed by Surety) shall have no bearing on Surety's absolute and unconditional obligation to the City upon the principal's default of its obligations under this bond.

In witness whereof, this instrument has been duly executed by the principal and surety above named, on

_____ , 20___.

ATTEST:

_____
Principal

_____ By _____

(Principal Secretary)

_____ _____
(Witness as to Principal) (Address)

_____ _____
(Address)

ATTEST:

_____
Surety

By _____

_____ _____
(Surety Secretary) Attorney-in-Fact

_____ _____
(Witness as to Surety) (Address)

_____ _____

NOTE: If Contractor is a Partnership, all partners should execute the bond.

Whereas, The City Council of the City of _____, State of California, and _____ _____ (hereinafter designated as “principal”) have entered into an agreement whereby principal agrees to install and complete certain designated public improvements, which said agreement, dated ___ _____, 20 ___, and identified as project _____, is hereby referred to and made a part hereof; and

Whereas, Under the terms of the agreement, the principal is required before entering upon the performance of the work, to file a good and sufficient payment bond with the City of _____to secure the claims to which reference is made in Title 3 (commencing with Section 9000) of Part 6 of Division 4 of the Civil Code.

Now, therefore, the principal and the undersigned as corporate surety, are held firmly bound unto the City of and all contractors, subcontractors, laborers, material suppliers, and other persons employed in the performance of the agreement and referred to in Title 3 (commencing with Section 9000) of Part 6 of Division 4 of the Civil Code in the sum of _____dollars ($ _____), for materials furnished or labor thereon of any kind, or for amounts due under the Unemployment Insurance Act with respect to this work or labor, that the surety will pay the same in an amount not exceeding the amount hereinabove set forth, and also in case suit is brought upon this bond, will pay, in addition to the face amount thereof, costs and reasonable expenses and fees, including reasonable attorney's fees, incurred by county (or city) in successfully enforcing this obligation, to be awarded and fixed by the court, and to be taxed as costs and to be included in the judgment therein rendered.

It is hereby expressly stipulated and agreed that this bond shall inure to the benefit of any and all persons, companies, and corporations entitled to file claims under Title 3 (commencing with Section 9000) of Part 6 of Division 4 of the Civil Code, so as to give a right of action to them or their assigns in any suit brought upon this bond.

Should the condition of this bond be fully performed, then this obligation shall become null and void, otherwise it shall be and remain in full force and effect.

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

In witness whereof, this instrument has been duly executed by the principal and surety above named, on

_____, 20___.

ATTEST:

_____
Principal

By _

_____ _____
(Principal Secretary)

_____ _____
(Witness as to Principal) (Address)

_____ _____
(Address)

_____

ATTEST:

_____
Surety

By

_____ _____
(Surety Secretary) Attorney-in-Fact

_____ _____
(Witness as to Surety) (Address)

_____ _____

NOTE: If Contractor is a Partnership, all partners should execute the bond

1.00 SCOPE OF THE WORK

1.01 INTENT

The intent of the Plans and Specifications 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 Documents. Where the Plans or Specifications 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 executing the Contract in a satisfactory and workmanlike manner.

1.02 CHANGES IN THE WORK

The Owner reserves the right to make changes in the work, including alterations, additions, deductions and omissions, and to require extra work, all as may be deemed necessary by the Engineer. All such changes will be done under Contract Change Order which shall set forth the work to be done or the changes to be made, the value of the work or the method by which it will be determined and the change, if any, in the time of completion of the work.

The value of any such extra work or change shall be determined in one or more of the following ways:

(a) By unit prices named in the Contract or subsequently agreed upon.
(b) By estimate and acceptance in an agreed upon lump sum.
(c) By Force Account as provided for in Section 6.04.

If none of the above methods is agreed on, or if the work is to be done by Force Account, the Contractor shall keep and present in the form prescribed in Section 6.05 a correct account of the net cost of the labor and materials actually incorporated in the work.

Upon receipt of a Contract Change Order, the Contractor shall proceed with the ordered work. If ordered in writing by the Engineer, the Contractor shall proceed with the work so ordered prior to actual receipt of a Contract Change Order. A Contract Change Order executed by the Contractor and approved by the Engineer is an executed Contract Change Order as that term is used in Section 1.03 through 1.05.

A Contract Change Order may be issued to the Contractor at any time. Should the Contractor disagree with any terms or conditions set forth in a Contract Change Order which he has not executed, he shall submit a written protest to the Engineer within 15 days after the receipt of such Contract Change Order. The protest shall state the points of disagreement, Specification references, and, if possible, the quantities and cost involved. If a written protest is not submitted, payment will be made as set forth in the Contract Change Order and such payment shall constitute full compensation for all work included therein or required thereby. Such unprotested Contract Change Orders will be considered as executed Contract Change Orders as that term is used in Section 1.03 through 1.05.

Where the protest concerning a Contract Change Order relates to compensation, the compensation payable for all work specified or required by said Contract Change Order to which such protest relates will be determined as provided in Section 1.03 through 1.05. The Contractor shall keep full and complete records of the cost of such work and shall permit the Engineer to have access thereto as may be necessary to assist in the determination of the compensation payable for such work.
Where the protest concerning a Contract Change Order relates to the adjustment of time of completion of the work, the time to be allowed therefore will be determined as provided in Section 2.03.

1.03 INCREASED OR DECREASED QUANTITIES

Increases or decreases in the quantity of a Contract item of work will be determined by comparing the total pay quantity of such item of work with the quantity shown in the Proposal for the same item of work.
If the total pay quantity of any item of work required under the Contract varies from the Proposal quantity

therefore by 25 percent or less, payment will be made for the quantity of work performed at the Contract unit price, unless eligible for adjustment pursuant to Section 1.04.

If the total pay quantity of any item of work required under the Contract varies from the Proposal quantity therefore by more than 25 percent, in the absence of an executed Contract Change Order specifying the compensation to be paid, the compensation payable to the Contractor will be determined in accordance with Section 1.03A, 1.03B, or 1.03C herein, as the case may be.

1.03A INCREASE OF MORE THAN 25 PERCENT
Should the total pay quantity of any item of work under the Contract exceed the Proposal quantity by more than 25 percent, the work in excess of 125 percent of the Proposal quantity (if not covered by an executed Contract Change Order specifying the compensation) will be paid for by adjusting the Contract unit price, or at the option of the Engineer, payment for the work involved in such excess will be made on the basis of Force Account as provided in Section 6.04.

The Contractor's fixed costs which have been distributed over the Proposal quantity will be deemed to have been recovered by the Contractor from the payments made for 125 percent of the Proposal quantity, and will be excluded from the adjusted unit price.

1.03B DECREASES OF MORE THAN 25 PERCENT
Should the total pay quantity of any item of work under the Contract be less than 75 percent of the Proposal quantity, the quantity performed (unless covered by an executed Contract Change Order specifying the compensation) will be paid for by adjusting the Contract unit price, or at the option of the Engineer, payment for the quantity of the work of such item performed will be made on the basis of Force Account as provided in Section 6.04.

The Contractor's fixed costs which have been distributed over the Proposal quantity will be redistributed over the pay quantity in determining the adjusted unit price.

The total payment for the final quantity of such item of work will in no case exceed the payment which would be made for the performance of 75 percent of the Proposal quantity at the original Contract unit price.

1.03 C DELETED ITEMS
Should any Contract item of work be deleted in its entirety (in the absence of an executed Contract Change Order covering the deletion), payment will be made to the Contractor for actual and direct costs, excluding overhead and profit, incurred prior to the date of notification in writing by the Engineer of the deletion, except as provided for costs of handling materials.

If acceptable material is ordered by the Contractor for the deleted item prior to the date of notification of the deletion by the Engineer, and if orders for such material cannot be canceled, it will be paid for at the actual cost to the Contractor, excluding overhead and profit. In such case, the material paid for shall become the property of the Owner and the cost of any further handling will be paid for as extra work as provided in Section 1.05. If the material is returnable to the vendor and if the Engineer so directs, the material shall be returned and the Contractor will be paid for charges made by the vendor for returning the material, excluding any markup for overhead and profit to the Contractor. The cost of handling returned material will be paid for as extra work as provided in Section 1.05.

1.04 CHANGES IN CHARACTER OF WORK
If an ordered change in the Plans or Specifications materially changes the character of the work of a Contract item from that on which the Contractor based his Proposal price, and increases or decreases the actual unit cost of the changed item, an adjustment in compensation therefore will be made. Any such adjustment will apply only to the portion of the work of said item actually changed in character. At the option of the Engineer, the work of said item or portion of said item which is changed in character will be paid for by Force Account as provided in Section 6.04.

Failure of the Engineer to recognize a change in character of the work at the time the Contract Change Order is issued shall in no way be construed as relieving the Contractor of his duty and responsibility of filing a written protest within the 15-day limit.

1.05 HAZARDOUS MATERIALS

Contracts for excavations deeper than four feet are subject to the provisions of Public Contracts Code Section 7104, which addresses the discovery of hazardous materials in connection with any excavation which may be required. That section provides:

1.05A That the Contractor shall promptly, and before the following conditions are disturbed, notify the Owner, in writing, of any:

1.05A(1) Material that the Contractor believes may be material that is hazardous waste, as defined in Section 25117 of the Health and Safety Code, that is required to be removed to a Class I, Class II, or Class III disposal site in accordance with provisions of existing law.

1.05A(2) Subsurface or latent physical conditions at the site differing from those indicated.

1.05A(3) Unknown physical conditions at the site of any unusual nature, different materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract.

1.05B That the Owner shall promptly investigate the conditions, and if it finds that the conditions do materially so differ, or do involve hazardous waste, and cause a decrease or increase in the Contractor's cost of, or the time required for, performance of any part of the work shall issue a Contract Change Order under the procedures described in the Contract.

1.05 C That, in the event that a dispute arises between the Owner and the Contractor whether the conditions materially differ, or involve hazardous waste, or cause a decrease or increase in the Contractor's cost of, or time required for, performance of any part of the work, the Contractor shall not be excused from any scheduled completion date provided for by the Contract, but shall proceed with all work to be performed under the Contract. The Contractor shall retain any and all rights provided either by contract or by law which pertain to the resolution of disputes and protests between the contracting parties.

1.06 EXTRA WORK

New and unforeseen work will be classed as extra work when determined by the Engineer that such work is not covered by any of the various items for which there is a Contract price or by combinations of such items. In the event portions of such work are determined by the Engineer to be covered by some of the various items for which there is a Contract price or combination of such items, the remaining portion of such work will be classed as extra work. Extra work also includes work specifically designated as extra work in the Plans or Specifications.

The Contractor shall do such extra work and furnish material and equipment therefore upon receipt of a Contract Change Order or other written order from the Engineer, and without a Contract Change Order or other written order of the Engineer, he shall not be entitled to payment for such extra work. Where such extra work is ordered by a written order other than a Contract Change Order, the Engineer will, as soon as practicable, issue a Contract Change Order. The provisions in Section 1.02 shall be fully applicable to the subsequently issued Contract Change Order. Payment for extra work required to be performed pursuant to the provisions of this section, in the absence of an executed Contract Change Order, will be made by Force Account as provided in Section 6.04, or as agreed to by the Contractor and the Engineer.

1.07 GUARANTEE

The Contractor shall guarantee all of his work against defective material or faulty workmanship for a period of one year after the date of acceptance of the work by the Owner.

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 within that period, ordinary wear and tear and unusual abuse or neglect excepted, together with any other work which may be damaged or displaced in so doing.

In the event of failure to comply with the above-mentioned conditions within a reasonable time after being notified in writing, the Owner is authorized to have the defects repaired and made good at the expense of the Contractor who will pay the cost and charges therefore immediately upon demand.

The signing of the Contract by the Contractor shall constitute execution of the above guarantees. The Contract Performance Bond shall remain in full effect during the guarantee period and will not be released until the expiration of such period.

2.00 PROGRESS AND COMPLETION OF THE WORK

2.01 PROGRESS OF THE WORK AND TIME OF COMPLETION

The Contractor shall begin work within 15 days after the issuance of the Notice to Proceed by the Owner. He shall diligently prosecute the same to completion within the number of days set forth in the Special Conditions.

2.02 LIQUIDATED DAMAGES

It is agreed by the parties of the Contract that in case all work called for under the Contract is not completed within the number of days specified in the Special Conditions, damage will be sustained by the Owner; and it is further agreed that it is, and will be, impractical and extremely difficult to ascertain and determine the actual damage which the Owner will sustain by the delay. It is therefore agreed that the Contractor will pay to the Owner the sum specified in the Special Conditions for each and every day's delay in finishing the work. The Contractor agrees to pay said liquidated damages and further agrees that the Owner may deduct the amount thereof from the monies due or to become due the Contractor under this Contract.

It is further agreed that if the work called for under the Contract is not completed within the number of days specified in the Special Conditions, the Owner shall have the right to increase the number of days or not, as he decides will best serve his interest. If the Owner decides to increase the number of days, he shall further have the right to charge the Contractor, his heirs, assigns, or sureties, and to deduct from the final payment for the work, all or any part, as he may deem proper, of the actual cost of engineering, inspection, superintendence, and other overhead expenses which are directly chargeable to the Contract and which accrue during the period of such extension, except that the cost of final surveys and preparation of the final estimate shall not be included in such charges.

2.03 DELAYS AND EXTENSIONS OF TIME

The Contractor will be granted an extension of time and will not be assessed with liquidated damages or the cost of engineering, inspection, superintendence and other overhead expenses during any delay beyond the time named for the completion of the work caused by an act of God or by the public enemy, acts of the Owner, fire, floods, epidemics, quarantine restrictions, strikes, unusual shortage of materials and freight embargoes. In the event of such delay, the Contractor shall notify the Engineer in writing of the causes of delay within 10 days from the beginning of such delay, and his findings thereon shall be final.

2.04 PROGRESS SCHEDULE AND ORDER OF COMPLETION

Within 10 days after execution of the Contract, the Contractor shall submit to the Engineer a progress schedule showing a breakdown of the work into at least all of its major items, and showing the proposed dates of starting and completing these items of work. This schedule shall also conform to the requirements for completion of portions of the work as may be specified in the Special Conditions. The Contractor shall review and, if necessary, revise the progress schedule at least once a month and in any event shall submit a current schedule to the Engineer at his request at any time during the Contract period.

3.00 CONTROL OF THE WORK

3.01 ASSIGNMENT
Neither party of the Contract shall assign the Contract or sublet it as a whole without the written consent of the other, nor shall the Contractor assign any monies due, or to become due to him hereunder, without the previous written consent of the Owner.

3.01 A ANTITRUST CLAIMS ASSIGNMENT
To the extent this Contract constitutes a contract or a subcontract to supply goods, services, or materials pursuant to a public works contract, the Contractor or subcontractor offers and agrees to assign to the Owner all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Section 15) or under the Cartwright Act (Chapter 2 [commencing with Section 16700] of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, services, or materials pursuant to the public works contract or the subcontract. This assignment is made and becomes effective at the time the Owner tenders final payment to the Contractor, without further acknowledgment by the parties.

3.02 RIGHTS OF VARIOUS INTERESTS
Wherever work being done by the Owner's forces or by other contractors is contiguous to work covered by this Contract, the respective rights of the various interests involved shall be established by the Engineer, to secure the completion of the various portions of the work in general harmony.

3.03 SEPARATE CONTRACTS
The Owner 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 his work with theirs.

If any part of the Contractor's work depends 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. His failure to so inspect and report shall constitute an acceptance of the other contractor's work as fit and proper for the reception of his work except as to defects which may later develop in the other contractor's work. In addition, the Contractor shall measure work already in place and shall immediately report to the Engineer any discrepancy between the executed work and that shown on the Plans.

3.04 SUBCONTRACTS
No subcontractor will be recognized as such, and all persons engaged in the work will be considered as employees of the Contractor and he will be held responsible for their work, which shall be subject to the provisions of the Contract Documents. Nothing contained in the Contract Documents shall create any contractual relation between any subcontractor and the Owner.

3.05 CONTRACT DOCUMENTS
The various parts of the Contract Documents, as defined in the Instructions to Bidders, are complementary and a requirement stated in one is as binding as though stated in all. They are intended to be cooperative and to describe and provide for a complete work.

In the event of conflict between the Instructions to Bidders and the Special Conditions, the Special Conditions shall govern. In the event of conflict between the General Conditions and the Special Conditions, the Special Conditions shall govern. 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.

3.06 ENGINEER'S AUTHORITY
The Engineer is the representative of the Owner and has full authority to interpret the Contract Documents, to enforce the requirements thereof and to decide questions which arise during the course of the work. He has authority to stop the work whenever such stoppage may be necessary to insure the

proper execution of the Contract. He shall also have authority to reject all work and materials which do not conform to the Contract Documents.

If at any time before the commencement or during the progress of the work, tools, plant or equipment appear to the Engineer to be insufficient, inefficient, or inappropriate to secure the quality of work required or the proper rate of progress, the Engineer may order the Contractor to increase their efficiency, or to improve their character, or to augment their number, or to substitute new tools, plant or equipment as the case may be, and the Contractor must conform to such order; but the failure of the Engineer to demand such increase of efficiency, number, or improvement shall not relieve the Contractor of his obligation to secure the quality of work and the rate of progress necessary to complete the work in accordance with the Contract Documents.

In giving instructions, the Engineer shall have authority to make minor changes in the work, not involving extra cost, and not inconsistent with the purpose of the work.

3.07 INSPECTION OF WORK

The Engineer and his representatives shall at all times have access to the work wherever it is in preparation or progress and the Contractor shall provide proper facilities for such access and for inspection. If the Specifications or the Engineer's instructions require any work to be specially tested or approved, the Contractor shall give the Engineer a minimum of 48 hours' notice of its readiness for inspection. Inspection by the Engineer will be made promptly. If any work should be covered up without approval or consent of the Engineer, it must, if required by the Engineer, be uncovered for examination at the Contractor's expense.

The inspection of the work or materials shall not relieve the Contractor of any of his obligations to fulfill his Contract as prescribed. Work and materials not meeting such requirements shall be made good and unsuitable work or materials may be rejected, notwithstanding that such work or materials may have been previously inspected by the Engineer or that payment therefore has been included in a progress estimate.

Re-examination of questioned work may be ordered by the Engineer and if so ordered, the work must be uncovered by the Contractor. If such work is found to be in accordance with the Contract Documents, the Owner will pay the cost of re-examination and replacement. If such work is not found to be in accordance with the Contract Documents, the Contractor shall pay such cost.

Projects financed in whole or in part with State or federal funds shall be subject to inspection at all times by the State or federal agency involved. Where any part of the work is being done under an encroachment permit or building permit, or is subject to State, County or municipal codes, laws or ordinances, representatives of the governing 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 or ordinances. 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.

3.08 SUPERINTENDENCE

The Contractor shall designate in writing before starting work, an authorized representative who shall have complete authority to represent and to act for the Contractor. Said authorized representative shall be present at the site of the work at all times while work is actually in progress on the Contract. During periods when work is suspended, arrangements acceptable to the Engineer shall be made for any emergency work which may be required.

Whenever the Contractor or his 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.

Any order given by the Engineer, not otherwise required by the Contract Documents to be in writing will, on request of the Contractor, be given or confirmed by the Engineer in writing.

3.09 CHARACTER OF WORKMEN

If any subcontractor or person employed by the Contractor shall fail or refuse to carry out the directions of the Engineer or shall appear to the Engineer to be incompetent or to act in a disorderly or improper manner, he shall be removed immediately on the requisition of the Engineer, and such person shall not again be employed on the work.

The Contractor shall at all times enforce strict discipline and good order among his employees, and shall not employ on the work any unfit person or anyone not skilled in the work assigned to him.

Neither party shall employ or hire any employee of the other party without his consent.

3.10 PLANS, SPECIFICATIONS AND INSTRUCTIONS

Unless otherwise provided in the Special Conditions, the Engineer will furnish to the Contractor, free of charge, all copies of Plans and Specifications reasonably necessary for the execution of the work. He will also furnish with reasonable promptness additional instructions, either as supplemental drawings or otherwise, as may be necessary for the proper execution of the work. The Contractor shall keep one copy of all Plans and Specifications, including any Addenda and Contract Change Orders, on the work in good order available to the Engineer and his representatives.

Should the Contractor be in doubt as to the meaning of any provision in the Plans and Specifications, or should he find any errors or omissions therein, or should he find any errors or omissions in the layout or staking, he shall immediately notify the Engineer. The Engineer will promptly investigate and will furnish the Contractor with any additional instructions as may be required.

Unless otherwise noted in the Special Conditions, upon completion of all Contract work, the Contractor shall provide the Engineer with one complete set of Plans and Specifications with all "As Built" changes or modifications marked and annotated.

3.11 CONSTRUCTION STAKING

Unless otherwise noted in the Special Conditions, the Engineer will set such construction stakes and marks as he determines are necessary to establish the lines and grades required for the completion of the work specified in the Contract Documents. Whenever the Contractor requires construction stakes, he shall notify the Engineer of his requirements at least five days in advance of starting operations that require such stakes.

Property corners, bench marks, reference points and stakes shall be carefully preserved by the Contractor. In case such stakes or marks are destroyed or damaged, they will be replaced at the Engineer's earliest convenience. The Contractor shall be charged for the cost of replacing or restoring stakes and marks which are destroyed or damaged by his operations. This charge will be deducted from any monies due or to become due to the Contractor under the Contract.

3.12 PERMITS AND REGULATIONS

Permits and licenses of a temporary nature necessary for the prosecution of the work shall be obtained by the Contractor at his expense. Unless otherwise specified in the Special Conditions, permits and licenses for permanent structures or permanent changes in existing facilities will be secured and paid for by the Owner. Copies of any permits and licenses which are obtained by the Owner will be on file at his office and will be available for inspection by the Contractor. The Contractor shall acquaint himself with, and abide by, any requirements of these documents. The Contractor shall obtain any supplemental agreements or bonds required by any encroachment permit, and he shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the work. If the Contractor observes that the Plans and Specifications are at variance therewith, he shall promptly notify the Engineer in writing, and any necessary changes shall be adjusted as provided in the Contract Documents 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, he shall bear all costs arising therefrom.

3.13 LANDS FOR WORK

The Owner shall provide the lands, easements and rights-of-way upon which the work under this Contract is to be done. Unless he specifically makes other arrangements, the Contractor shall confine his operations to the limits of the Owner's land and to the limits of the easements and rights-of-way. The Contractor shall provide land required for the erection of temporary construction facilities and storage of his material. The Contractor is advised that if additional working space is required outside the limits of the rights-of-way provided, such additional area must be obtained directly from the property owners by the Contractor for use during the construction period. The Owner shall be furnished with copies of **written** agreements or otherwise notified **in writing** if additional working space is acquired.

3.14 SUSPENSION OF WORK

The Owner may at any time suspend the work, or any part thereof, by giving one day's notice to the Contractor in writing. The work shall be resumed by the Contractor within 10 days after the date fixed in the written notice from the Owner to the Contractor to do so. The Owner will reimburse the Contractor for expense incurred by the Contractor in connection with the work under this Contract as a result of such suspension, except that no reimbursement will be made if the suspension is due to non-conformance with the Contract Documents on the part of the Contractor. If the work or any part thereof shall be stopped by notice in writing, and if the Owner does not give notice in writing to the Contractor to resume work within 30 days of the date fixed in written notice to suspend, the Contractor may abandon the suspended portion of the work and will be entitled to payment for all work acceptably done on the abandoned portions.

3.15 THE OWNER'S RIGHT TO DO WORK

If the Contractor should neglect to prosecute the work properly or fail to perform any provision of the Contract, the Owner, after 3 days' written notice to the Contractor, may, without prejudice to any other course of action he may have, perform or have performed by other forces, all or any portion of the work and may deduct the cost thereof from the monies due or to become due the Contractor under this Contract.

3.16 THE OWNER'S RIGHT TO TERMINATE CONTRACT

If the Contractor should be adjudged bankrupt, or should make a general assignment for the benefit of his creditors, or if a receiver should be appointed because of his insolvency, or if he should persistently or repeatedly refuse or should fail to supply enough properly skilled workmen or proper materials, or if he should fail to make prompt payment to subcontractors or for materials or labor, or persistently disregard laws, ordinances or the instructions of the Engineer, or otherwise be guilty of a substantial violation of any provision of the Contract, then the Owner, upon the certification of the Engineer that sufficient cause exists to justify such action, may, without prejudice to any other right or remedy and after giving the Contractor 7 day's written notice, terminate the employment of the Contractor and take possession of the premises and of all materials, tools, and appliances thereon and finish the work by whatever method he may deem expedient. In such case, the Contractor shall not be entitled to receive any further payment until the work is finished. If the unpaid balance of the Contract price exceeds the expenses of finishing the work, including compensation for all attributable administrative costs and for damages incurred through the Contractor's default, such excess shall be paid to the Contractor. If such expenses exceed such unpaid balance, the Contractor shall pay the difference to the Owner. The expenses incurred by the Owner as herein provided, and the damage incurred through the Contractor's default, shall be certified by the Engineer.

3.17 REMOVAL OF EQUIPMENT

In the case of annulment of this Contract before completion for any cause, the Contractor, if notified to do so by the Owner, shall promptly remove any part or all of his equipment and supplies from the Owner's property. If not promptly done, the Owner shall have the right to remove such equipment and supplies at the expense of the Contractor.

3.18 CORRECTION OF WORK

The Contractor shall promptly remove from the premises all materials condemned by the Engineer as failing to conform to the Contract Documents whether incorporated in the work or not. The Contractor shall, at his own expense, promptly replace such materials and perform all work made necessary by such

replacement, including making good all work of others destroyed or damaged by such removal or replacement.

If the Contractor does not remove such condemned work and materials within a reasonable time, fixed by written notice, the Owner may remove and store the material at the expense of the Contractor. If the Contractor does not pay for the expense of the removal within 10 days' time thereafter, the Owner may, upon 10 days' written notice, sell such materials at auction or at private sales and shall account for the net proceeds thereof, after deducting all the costs and expenses that should have been borne by the Contractor.

3.19 DEDUCTIONS FOR UNCORRECTED WORK

If the Engineer deems it inexpedient to correct work injured or done not in accordance with the Contract, an equitable deduction from the Contract price shall be made therefore.

3.20 USE OF COMPLETED PORTIONS

The Owner shall have the right to take possession of and use any completed or partially completed portions of the work, notwithstanding the time for completing the entire work or such portions may not have expired, but taking possession and use shall not be deemed an acceptance of any work not completed in accordance with the Contract Documents. If such prior use increases the cost of or delays the work, the Contractor shall be entitled to extra compensation, or extension of time or both, as the Engineer may determine.

3.21 CONTRACTOR CLAIMS

Appropriate claims shall be submitted and reviewed in accordance with Section 20104 of the Public Contracts Code. For any claim subject to this Section, the following requirements apply:

3.21A The claim shall be in writing and include the documents necessary to substantiate the claim. Claims must be filed on or before the date of final payment. Nothing in this subdivision is intended to extend the time limit or supersede notice requirements otherwise provided in the Contract for the filing of claims.

3.21B(1) For claims of less than fifty thousand dollars ($50,000), the Owner shall respond in writing to any written claim within 45 days of receipt of the claim, or may request, in writing, within 30 days of receipt of the claim, any additional documentation supporting the claim or relating to defenses to the claim the Owner may have against the Contractor.

3.21B(2) If additional information is thereafter required, it shall be requested and provided pursuant to this subdivision, upon mutual agreement of the Owner and the Contractor.

3.21B(3) The Owner's written response to the claim, as further documented, shall be submitted to the Contractor within 15 days after receipt of the further documentation or within a period of time no greater than that taken by the Contractor in producing the additional information, whichever is greater.

3.21C(1) For claims of over fifty thousand dollars ($50,000) and less than or equal to three hundred seventy-five thousand dollars ($375,000), the Owner shall respond in writing to all written claims within 60 days of receipt of the claim, or may request, in writing, within 30 days of receipt of the claim, any additional documentation supporting the claim or relating to defenses to the claim the Owner may have against the Contractor.

3.21C(2) If additional information is thereafter required, it shall be requested and provided pursuant to this subdivision, upon mutual agreement of the Owner and the Contractor.

3.21C(3) The Owner's written response to the claim, as further documented, shall be submitted to the Contractor within 30 days after receipt of the further documentation, or within a period of time no greater than that taken by the Contractor in producing the additional information or requested documentation, whichever is greater.

3.21D If the Contractor disputes the Owner's written response, or the Owner fails to respond within the time prescribed, the Contractor may so notify the Owner, in writing, either within 15 days of receipt of the Owner's response or within 15 days of the Owner's failure to respond within the time prescribed, respectively, and demand an informal conference to meet and confer for settlement of the issues in dispute. Upon a demand, the Owner shall schedule a meet and confer conference within 30 days for settlement of the dispute.

3.21E Following the meet and confer conference, if the claim or any portion remains in dispute, the Contractor may file a claim as provided in Chapter 1 (commencing with Section 900) and Chapter 2 (commencing with Section 910) of Part 3 of Division 3.6 of Title 1 of the Government Code. For purposes of those provisions, the running of the period of time within which a claim must be filed shall be tolled from the time the Contractor submits his or her written claim pursuant to subdivision (a) until the time that claim is denied as a result of the meet and confer process, including any period of time utilized by the meet and confer process.

3.21 F This article does not apply to tort claims and nothing in this article is intended nor shall be construed to change the time periods for filing tort claims or actions specified by Chapter 1 (commencing with Section 900) and Chapter 2 (commencing with Section 910) of Part 3 of Division 3.6 of Title 1 of the Government Code.

It is hereby mutually agreed that the Contractor shall not be entitled to payment of additional compensation for any cause, including any act or failure to act by the Engineer, or of any event, thing or occurrence, unless he shall have given the Engineer due written notice of potential claim, provided however, that compliance with this Section shall not be a prerequisite as to matters within the scope of the protest provisions in Section 1.02, nor to any claim which is based on differences in measurements or errors of computation of Contract quantities.

The written notice of potential claim shall set forth the reasons 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. The required notice must have been given to the Engineer prior to the time the Contractor performed the work giving rise to the potential claim for additional compensation, if based on an act or failure to act by the Engineer, or in all other cases within 15 days after the event, thing or occurrence giving rise to the potential claim.

In the event of an emergency endangering life or property, the Contractor shall act as stated in Section 4.04, 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 1.02.

The Engineer shall, within a reasonable time after their presentation to him, state his decisions in writing on all claims of the Owner or the Contractor. All such decisions of the Engineer shall be final.

It is the intention of this Section that 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 so that such matters may be settled, if possible, or other appropriate action promptly taken. The Contractor hereby agrees that he 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 was filed.

3.22 CLEANING UP

The work area shall be kept in a neat and orderly condition during construction. The Contractor shall remove and dispose of all trash, debris and waste material resulting from his operations. The Contractor shall, at his own expense, promptly remove from the Owner's property, and from all other lands affected by his work, all temporary structures, rubbish and waste materials resulting from his operations. He shall leave such lands in a neat and orderly condition which is at least as good as the condition prior to his operations.

4.00 INSURANCE AND LIABILITY

4.01 CONTRACTOR'S LIABILITY INSURANCE

The Contractor shall maintain insurance to protect him from claims under workman's compensation acts and from any other claims for damages for personal injury, including death, which may arise from operations under this Contract, whether such operations are controlled by him, a subcontractor or by anyone directly or indirectly employed by either of them. The Owner shall be named as coinsured in all such insurance policies and the coverage shall include concurrent negligence of the Owner or his agents, employees, or representatives whether such concurrent negligence be active or passive, including specifically any liability based upon a violation of any non-delegable duties. Certificates of insurance and the certificate required by Labor Code Section 1861 shall be filed with the Engineer prior to commencing the work, and shall be subject to his approval for adequacy of protection.

The Contractor specifically obligates himself and hereby agrees to protect, hold free and harmless, defend and indemnify the Owner, the Engineer and his consultants, and each of their officers, employees and agents, from any and all liability, penalties, costs, losses, damages, expenses, causes of actions, claims or judgments, including attorney's fees, which arise out of or are in any way connected with the Contractor's performance of his work under this Contract. 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 his agents, employees, representatives, or subcontractors, or his 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 have also been a contributing factor to the liability.

As a further precaution toward this end, the Contractor shall procure and maintain, in full force and effect during the performance of the work contemplated thereunder, insurance in his favor and also in favor of the Owner, with an insurance carrier approved by the Owner, as follows:

Liability for Personal Injury or Property Damage in the amount of $1,000,000.00 for any occurrence.

The Contractor shall, before the commencement of the work, take out and maintain in full force and effect, compensation insurance with an insurance carrier or carriers under an insurance policy or policies, satisfactory to the Owner covering his full liability under the "Worker's Compensation Insurance and Safety Act" of the State of California to any employee who may be injured during the course of said work and to the dependents of any employee who may be killed during the course of said work.

Such policy or policies shall expressly provide therein that they shall not be canceled by the insurer until 10 days after written notice of the intended cancellation thereof shall have first been given to the Owner by the insurer.

The Contractor shall file with the Owner, immediately after the signing of the Contract, certificates of all insurance. These certificates shall be fully executed and shall state that the policies cannot be canceled until 10 days after written notification of such intent of cancellation has been given to the Owner. All policies shall be with Insurance Companies acceptable to the Owner.

In case of the breach of any provision of this Section, the Owner may take out and maintain at the expense of the Contractor such insurance as the Owner may deem proper and may deduct the cost of such insurance from any monies which may be due or become due the Contractor under this Contract.

4.02 FIRE INSURANCE

The Contractor shall take out and maintain fire insurance on the entire structure on which work under this Contract is to be done. This insurance will be in the amount of 100 percent of the insurable value of the structure, including items of labor and materials during construction, and 100 percent of the insurable value of the completed structure. The coverage shall be maintained by the Contractor until final acceptance of the work by the Owner.

The loss, if any, is to be made adjustable with and payable to the Owner as Trustee for whom it may concern, except in cases which require payment of all or a portion of said insurance to be made to a mortgagee as his interest may appear.

The Contractor, on his written request, shall be named jointly with the Owner in all policies, all of which shall be open to his inspection. If the Owner fails to show them on request, or if he fails to effect or maintain as above, the Contractor may insure his own interests and charge the cost thereof to the Owner. If the Contractor is damaged by failure of the Owner to maintain such insurance, he may recover as stipulated in the Contract for recovery of damages.

The Trustee shall deposit any money received from insurance in an account separate from all his other funds and he shall distribute it in accordance with such agreement as the parties in interest may reach. If after loss no special agreement is made, replacement of injured work shall be ordered and executed as provided for under changes in the work.

The Trustee shall have power to adjust and settle any loss with the insurers unless the Contractor shall object in writing within 3 days of the occurrence of loss, and thereupon arbitrators shall be chosen. The Trustee shall in that case make settlement with the insurers in accordance with the directions of the arbitrators, who shall also, if distribution by arbitration is required, direct such distribution.

EXCLUSION: This insurance does not cover any tools owned by mechanics, any tools, equipment, scaffoldings, stagings, towers, or supplies, and any temporary structures erected for the Contractor's operations.

4.03 PRESERVATION OF PROPERTY

The Contractor shall take whatever precautions necessary to prevent damage to all existing improvements, including aboveground and underground utilities, trees and shrubbery that are not specifically shown to be removed, fences, signs, mail boxes, survey markers and monuments, building and structures, the Owner'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 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 prior to the start of the Contractor's operations.

The Contractor shall examine all bridges, culverts, and other structures over which he will move his materials and equipment, and before using them, he shall properly strengthen such structures, where necessary. The Contractor will be held responsible for any and all injury or damage to such structures caused by his operations.

The fact that any pipe or other underground facility is not shown, or not accurately shown on the Plans, shall not relieve the Contractor of his responsibility under this Section. It shall be the Contractor's responsibility to ascertain the existence of any underground improvements or facilities which may be subject to damage by his operations.

4.04 PROTECTION OF WORK

The Contractor shall continuously maintain adequate protection of all his work from damage. He shall make good any such damage, injury or loss, except as may be directly due to errors in the Contract Documents or caused by agents or employees of the Owner. He shall adequately protect adjacent property as provided by law and the Contract Documents. He shall provide and maintain all passage-ways, guard fences, lights and other facilities for protection required by public authority or local conditions.

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 his discretion to prevent such threatened loss or injury, and he shall so act without appeal if so instructed or authorized. Any compensation claimed by the Contractor for emergency work shall be determined as specified under Section 1.02.

4.05 PUBLIC SAFETY
The Contractor shall be responsible for furnishing and maintaining all flagmen, warning signs, barricades, emergency lighting, shoring, etc. necessary to protect the public and workmen employed on the project. Safety provisions shall conform to all applicable federal, State, County and local laws, ordinances and codes and, in particular, to the rules and regulations established by OSHA and the California Division of Industrial Safety.

4.06 ACCIDENTS
The Contractor shall provide at the site such equipment and medical facilities as are necessary to give first-aid service to anyone who may be injured.

The Contractor must promptly report in writing to the Engineer all accidents arising from or in connection with the performance of the work on or adjacent to the site, giving full details and statements of witnesses. 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 Owner.

If any claim is made against the Contractor or any subcontractor because of any accident, the Contractor shall promptly report the facts in writing to the Engineer, giving full details of the claim.

5.00 LABOR AND MATERIALS

5.01 HOURS OF LABOR
The Contractor shall forfeit, as penalty to the Owner, $25.00 for each workman employed in the execution of the Contract by him, or by any subcontractor under him, for each calendar day any workman is required or permitted to labor more than 8 hours in violation of the provisions of the Labor Code and in particular, Section 1810 to Section 1817 thereof, inclusive.

5.02 EMPLOYMENT OF APPRENTICES
The Contractor's attention is directed to Section 1777.5 of the Labor Code; provisions of said section pertaining to employment of indentured apprentices are hereby incorporated by reference into these Specifications. As applicable, the Contractor or any subcontractor employed by him in the performance of the Contract work shall take such actions as necessary to comply with the provisions of said Section 1777.5.

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

"No discrimination shall be made in the employment of persons upon public works because of the race, color or religion of such persons and every contractor for public works violating this section is subject to all the penalties imposed for a violation of this chapter."

5.04 PREVAILING WAGE
The Contractor shall forfeit as penalty to the Owner, $50.00 for each calendar day or portion thereof, for each workman paid less than stipulated prevailing rates for any work done under the Contract by him or by any subcontractor under him, in violation of the provisions of the Labor Code and in particular, Section 1770 to Section 1780 thereof, inclusive.

The Owner will not recognize any claim for additional compensation because of the payment by the Contractor of any wage rate in excess of the Prevailing 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 his Bid, and will not be considered as the basis of a claim against the Owner on the Contract.

The Contractor and each Subcontractor shall keep an accurate record showing the name, address, social security number, work classification, 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 by him or her in

connection with the work. These payroll records shall be certified and made available for inspection at all reasonable hours at the principal office of the Contractor and furnished by the Contractor to the Owner and others upon request in accordance with the provisions of Labor Code Section 1776. The Contractor's attention is called to the penalties provided for in Section 1776 for the failure to comply with its provisions.

5.05 MATERIALS

Unless otherwise specifically stated in the Special Conditions, the Contractor shall furnish all materials 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 furnish satisfactory evidence as to the kind and quality of materials.

Where materials are to be furnished by the Owner, the type, size, quantity and location at which they are available will be stated in the Special Conditions.

In certain instances, the Owner may have available power, water or other utilities or materials which the Contractor may wish to use. If the Owner intends to furnish these free of charge, it will be so stated in the Special Conditions. In the absence of such specific statement, the Contractor shall furnish all utilities and materials at his own expense.

5.06 RECORDS OF MATERIALS PURCHASED

If required by the Engineer, the Contractor shall furnish duplicate invoices to the Engineer for all materials furnished to the project.

5.07 PATENTS

The Contractor shall assume all costs arising from the use of patented materials, equipment, devices, or processes used on or incorporated in the work, and agrees to indemnify and save harmless the Owner and the Engineer from all suits at law, or actions of every nature for, or because of the use of any patented materials, equipment, devices, or processes.

5.08 OWNERSHIP OF REMOVED MATERIALS

Unless otherwise specifically stated in the Special Conditions or Technical Specifications, any existing equipment or material removed by the Contractor during the course of the work shall remain the property of the Contractor.

5.09 SUBSTITUTION OF MATERIALS

Where materials and equipment are specified in the Technical Specifications or are shown on the Plans as similar and equal to a certain proprietary brand, the intent is to establish the minimum quality and performance acceptable. If the Contractor proposes to substitute materials or equipment of another proprietary brand but of equal quality, he may submit a request to the Engineer for approval of the proposed substitution. No substitution may be made without prior approval and the Engineer shall be the final judge of equality.

If any tests are necessary for evaluation of the proposed substitution by the Engineer, the Contractor shall furnish all necessary test materials and shall pay the cost of the tests.

5.10 SHOP DRAWINGS AND MATERIAL DATA

Unless otherwise specifically stated in the Special Conditions or Technical Specifications, the Contractor shall submit a minimum of four separately bound copies of shop drawings and material data to the City Engineer for approval. A complete submittal shall include all drawings and data sheets for all bid item materials and all necessary appurtenances to provide a complete installation of each material. These drawings shall show any necessary details in fabrication or erection, which are not shown on the Plans furnished by the Owner and shall verify details and dimensions of equipment. **Facsimile submittals will not be accepted.** Material and/or equipment shall not be fabricated, assembled, or shipped until the shop drawings or material data have been approved by the City Engineer. The Contractor shall verify these dimensions before starting any work dependent on or affected by them.

The City Engineer will retain three copies of the shop drawings and material data, and will return one copy to the Contractor. If the Contractor desires additional copies, more than four copies must be submitted.

5.11 TESTS

Unless otherwise specified in the Special Conditions, the Owner will pay for the required testing of materials. The Contractor will furnish all samples at no cost to the Owner. In the event samples are submitted which fail to pass the specified tests, the Contractor will pay for all subsequent tests. The cost of such re-testing will be deducted from payments due the Contractor.

6.00 MEASUREMENT AND PAYMENT

6.01 MEASUREMENT OF QUANTITIES

Where the Contract provides for payment on a lump sum price basis, no measurement of quantities will be made. 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, and these measurements shall be final and binding.

All work computed under the Contract shall be measured by the Engineer according to United States Measurements and Weights. Methods of measurement are specified in the Special Conditions and in the Technical Specifications.

6.02 SCOPE OF PAYMENT

The Contractor shall accept the compensation, 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, 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 Owner 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; and for completing the work according to the Contract Documents. Neither the payment of any estimate nor any retained percentage shall relieve the Contractor of any obligation to make good any defective work or material.

No compensation will be made for loss of anticipated profits. Increased or decreased work involving supplemental agreements will be paid for as provided in such agreements.

6.03 CHANGES IN THE WORK

The value of changes in the work, including extra work, shall be determined in accordance with Section 1.02 through 1.05.

6.04 FORCE ACCOUNT PAYMENT

Where work is to be paid for by Force Account, the Contractor shall be paid on the basis of the actual cost of labor, material, and equipment, furnished by him as shown on paid vouchers, plus 15 percent. However, the Owner reserves the right to furnish such materials and equipment as he deems expedient, and the Contractor shall have no claim for overhead and profit on the cost or such material and equipment.

The cost of labor as referred to above shall include the cost of the base wages paid to workmen, plus any additional payment paid to, or on behalf of, workmen as required by State or federal laws plus any benefits, subsistence and travel allowance as may be required by collective bargaining agreements.

The cost of material as referred to above shall be the net cost to the purchaser, whether Contractor, subcontractor or other forces, from the supplier thereof.

The cost of equipment as referred to above, shall conform to current equipment rental rates as determined by the California State Transportation Agency's Department of Transportation, Division of Construction. This applies to both rental equipment and equipment owned by the Contractor.

6.05 RECORDS OF FORCE ACCOUNT WORK

The Contractor shall maintain his records in a manner to provide a clear distinction between the direct costs of extra work paid for on a Force Account basis and the costs of other operations. The Contractor shall furnish the Engineer report sheets in duplicate of each day's extra work no later than the working day following the performance of the work. The daily report sheets shall itemize the materials used, and shall cover the direct cost of labor and the charges for equipment rental, whether furnished by the Contractor, subcontractor, or other forces. The daily report sheets shall provide names or identifications and classifications of workmen, the hourly rate of pay and hours worked, and also the size, type and identification number of equipment and hours operated.

Material charges shall be substantiated by valid copies of vendor's invoices. Such invoices shall be submitted with the daily report sheets, or if not available, they shall be submitted with subsequent daily report sheets. Should vendor's invoices not be submitted within 15 days after acceptance of the work, the Owner reserves the right to establish the cost of such material at the lowest current wholesale prices at which the materials are available in the quantities concerned delivered to the location of the work.

Said daily report sheets shall be signed by the Contractor or his authorized agent.

The Engineer will compare his records with the daily report sheets furnished by the Contractor, make any necessary adjustments, and compile the costs of work paid for on a Force Account basis on daily extra work report forms. When these daily extra work reports are agreed upon and signed by both parties, they shall become the basis of payment for the work performed.

6.06 PAYMENTS WITHHELD

The Owner may withhold or, because of subsequently discovered evidence, nullify the whole or a part of any payment to such extent as may be necessary to protect himself from loss due to:

a. Defective work not remedied.
b. Claims filed or reasonable evidence indicating probable filing of claims.
c. Failure of the Contractor to make payments properly to subcontractors or for material or labor.
d. A reasonable doubt that the Contract can be completed for the balance then unpaid.
e. Damage to another Contractor.

When the above grounds are removed, payment shall be made for amounts withheld because of them.

The Contractor may, in accordance with the provisions of Public Contracts Code Section 22300, substitute securities for any monies which the Owner may withhold to insure performance under this Contract.

6.07 PROGRESS PAYMENTS

Once each month, the Engineer will make an estimate in written form of the total amount of work done and of the acceptable materials furnished and delivered by the Contractor on the site and not used to the time of such estimate, and the value thereof. To assist the Engineer in determining the value of acceptable materials which are on hand but not used, the Contractor shall furnish the Engineer with copies of invoices for all such materials. The Owner shall retain 5 percent of such estimated value of work done, and 50 percent of the value of materials so estimated to be on hand but not used.

This retention will serve as part security for the fulfillment of the Contract by the Contractor. The Owner shall pay monthly to the Contractor the balance not retained of the aforesaid, after deducting there from all previous payments and all sums to be retained.

When in the judgment of the Engineer, the work is not proceeding in accordance with the provisions of the Contract, or when in his judgment the total amount of the work done since the last estimate amounts to less than $1,000.00, no pay estimate will be prepared and no progress payment will be made.

No estimates or payment shall be construed to be an acceptance of any defective work or improper materials.

The Contractor may, in accordance with the provisions of Government Code Section 4590, substitute securities for any monies which the Owner may withhold to insure performance under this Contract.

6.08 FINAL PAYMENT

Within 10 days after the completion of the work and its acceptance by the Owner, the Engineer will make a final estimate in writing of the quantities of work done and the value thereof, and will prepare a Notice of Completion to be filed by the Owner. At this time, a semi-final payment will be made to the Contractor provided that such payment is warranted under the terms of Section 6.07. The amount of this payment shall be based on the total value of work acceptably performed under the Contract, subject to the same conditions and retentions as payments previously made under the monthly estimates.

Within 20 days after the date of the final estimate, the Contractor shall submit to the Engineer either his written approval of the final quantities, and value of work as determined by the Engineer, or a written statement of any and all claims for additional compensation claimed to be due under the Contract. No claim for which a notice of potential claim is required will be considered unless the Contractor has complied with the notice provisions of Section 3.21, nor will any claim be considered that was not included in said written statement of claims.

Failure of the Contractor to submit claims within the specified 20-day period, regardless of whether or not he files written approval, shall constitute his acceptance of the quantities and value of work determined by the Engineer in the final estimate. No claim will be considered if filed after the specified 20-day period.

In the event the Contractor files claims within the specified 20-day period, the Engineer will, within 10 days after receipt of said claims, consider and investigate the Contractor's claims and make his final determination. Should he find any revision to be warranted as a result of his investigation, the Engineer will immediately notify the Owner and the final pay estimate will be revised accordingly.

Thirty-five days after the date of filing the Notice of Completion, the Owner will pay the entire sum found to be due, after deducting all previous payments and all amounts to be retained under the provisions of the Contract. As a condition of such payment, the Owner may require the Contractor to furnish a release of all claims against the Owner arising by virtue of the Contract. Payment will be withheld for any contract items for which a release is not furnished.

All prior partial estimates and payments shall be subject to correction in the final estimate and payments.

6.09 PAYMENT OF TAXES

The Contract prices paid for the work include full compensation for payment of federal, State or local taxes.

1.00 SCOPE OF THE WORK

1.01 GENERAL WORK DESCRIPTION

The work to be done under this Contract consists of drilling a pilot exploration borehole, geophysical logging, reaming of the borehole, well construction and testing, and disinfection, and related work, complete.

All construction shall conform to the requirements of the Contract Documents entitled:

CONTRACT DOCUMENTS FOR
WALKER STREET WELL

The intent of these contract documents is to provide for a completed work, and all items incidental and appurtenant to the specified items shall be included in the prices bid for the specified items.

1.02 DEFINITION OF TERMS

Wherever the words “City” or “Owner” appear in these documents, they shall be understood to mean the City of Orland, California.

Wherever the word "Contractor" appears in these documents, it shall be understood to mean the party or parties constructing the improvements for acceptance by the Owner.

Wherever the word "City Engineer" appears in these documents, it shall be understood to mean Rolls, Anderson & Rolls, Chico, California.

Wherever the word "Engineer" appears in these documents, it shall be understood to mean GEI Consultant, Rancho Cordova CA, acting either directly or through duly authorized agents.

1.03 SPECIFICATIONS AND PLANS

The work embraced herein shall be done in accordance with the City of Orland Public Works Construction Standards, Standard Specifications dated May 2010 and any amendments issued thereto, the Standard Plans dated May 2010 and any amendments issued thereto and these Special Conditions. References to the State Standard Specifications include material and workmanship specifications only. All measurement and payment sections of the State Standard Specifications are specifically **NOT** included in these Specifications.

In case of conflict between the City of Orland Public Works Construction Standards, the Standard Specifications and these Special Conditions, the Special Conditions shall take precedence over and be used in lieu of the conflicting portions.

Where Standard Specifications or testing methods have been referred to, such as ASTM or AASHTO, the intent is to refer to the latest applicable issue or revision of such specifications or testing methods.
The work embraced herein shall be done in accordance with the City of Orland Land Division Standards and Improvement Standards, State of California Standard Specifications dated 2015, the State of California Standard Plans dated 2015, and these Special Conditions. References to the State of California Standard Specifications include material and workmanship specifications only. All measurement and payment sections of the State of California Standard Specifications are specifically **NOT** included in these Specifications.

Should a conflict arise between the General Conditions and the Special Conditions, the Special Conditions shall govern.

Where Standard Specifications or testing methods have been referred to, such as ASTM or AASHTO, the intent is to refer to the latest applicable issue or revision of such specifications or testing methods.

2.00 PROGRESS AND COMPLETION OF THE WORK

2.01 AWARD OF CONTRACT
Refer to Section 8.00 of the Instructions to Bidders. The Award of Contract, if made, will be made within 30 days of the opening of Bids.

2.02 TIME OF COMPLETION
The Contractor shall diligently prosecute the work to completion within 100 WORKING DAYS from the issuance of the Notice to Proceed by the Owner.

2.03 LIQUIDATED DAMAGES
The Contractor shall pay to the Owner the sum of $1,100.00 per day, for each and every calendar day's delay in finishing the work in excess of the number of calendar days prescribed above.

3.00 CONTROL OF THE WORK

3.01 PREVAILING WAGE
The successful bidder shall post a copy of the applicable wage rates on the job site during the construction period. Contractors and subcontractors shall submit certified payrolls to the Department of Industrial Relations in accordance with State of California requirements.

3.02 PERMITS AND LICENSES
No permits will be issued by the Owner for this work. It shall be the responsibility of the Contractor to secure all permits and licenses necessary, as well as pay all fees required for the completion of the work. The Contractor shall comply with all laws and regulations applicable to the work.

3.03 COORDINATION
The Owner and public utility companies reserve the right to enter upon the work for the purpose of making changes necessitated by the improvements being constructed under this Contract. The Owners of the public utilities will coordinate such work with the Contractor and all parties shall cooperate to the fullest extent possible.

The Contractor shall protect from damage all utilities and other facilities that are to remain in place, be installed, relocated or otherwise rearranged.

3.04 SHOP DRAWINGS AND MATERIAL DATA
The Contractor shall provide shop drawings and material data, in accordance with the General Conditions, to the City Engineer within 15 days of the execution of the contract. Complete submittal packages shall be reviewed and approved prior to the issuance of the Notice to Proceed.

For this project submittals shall include, but not be limited to, mix designs, pipe materials, pipe joint details, special fittings or adaptors, pre-cast concrete structures, imported bedding and backfill materials, bypass pumping provisions, and all technical design data required by the Engineer to verify product compliance with the Contract Documents.

3.05 UNDERGROUND SERVICE ALERT (USA)
The Contractor shall notify the Underground Service Alert at least 72 hours before excavating.

3.06 EXISTING UTILITIES
Existing underground utilities are indicated on the drawings, based upon record information. The depths of existing utilities are unknown. The Contractor shall verify the exact locations in the field to avoid damage to existing facilities.

The Contractor shall cooperate with utility companies in locating facilities and shall exercise care in working adjacent to or crossing such facilities to avoid damage. Any damage to existing facilities caused by the Contractor's operation shall be repaired by the Contractor at his expense.

3.07 RIGHTS OF WAY

The Contractor shall confine his operations to the limits of the rights-of-way provided. The Contractor is advised that if additional working space is required outside the limits of the rights-of-way provided, such additional area must be obtained directly from the property owners by the Contractor for use during the construction period. The Owner shall be furnished with copies of **written** agreements or otherwise notified **in writing** if additional working space is acquired.

3.08 HOURS OF OPERATION

The Contractor shall restrict his activities to the hours between 7:00 a.m. and 5:00 p.m. Monday through Friday, unless otherwise approved by the Owner. Contractor will not perform work on a Saturday, Sunday, or any legal holiday. No work shall be performed between November 23 and November 27, 2022 and December 23, 2022 through January 2, 2023. The Contractor is allowed to work 24-hours and on Saturdays, Sundays during pilot hole drilling, reaming, well construction, preliminary well development, dual swab/airlift development and during the constant rate aquifer testing.

3.09 NOISE CONTROL

All equipment used by the Contractor shall have noise muffling devices approved for use in residential areas. Sound proofing at the well site is not required. Should the Owner receive a noise complaint from nearby neighbors the Contractor shall attempt to mitigate the noise and shall furnish residents with alternative housing during the construction period if the noise cannot be mitigated to the resident's satisfaction, at no additional cost to the Owner.

3.10 DUST CONTROL

Where dust is created, either by the Contractor's vehicles or other vehicles, it shall be controlled by the Contractor through watering or preferably by cleaning up the material causing the dust. Dust control shall be continued as necessary until the work is accepted by the Owner.

3.11 CONSTRUCTION WATER

The Owner will furnish water for dust control and drilling operations from the Owner's existing system. No charge will be made for such water. However, it shall not be used wastefully, and it shall be the Contractor's responsibility to see that it is delivered to the place it is needed. The Contractor shall make a written request to the City of Orland Public Works Department for the installation of a hydrant meter prior to beginning work. The Contractor shall only use water from hydrants that have been fitted with hydrant meters. The Contractor shall furnish and use only proper hydrant wrenches when obtaining water from fire hydrants. No fire hydrant shall be obstructed in case of fire in the area served by the hydrant.

The Owner is installing a new municipal fire hydrant adjacent to the Walker Street well site for use by the Contractor for the Walker Street Well. The Contractor shall provide a suitable backflow preventor to any water connection.

3.12 WATER DISPOSAL

The Contractor shall prevent any drilling fluids from entering the storm drain system other than for effluent produced during thin-down, development and testing the well. The Contractor shall supply one temporary storage tank (this can be the above ground tank for cutting separation used during the drilling process) to remove solids from the water and provide temporary piping to discharge the to the stormwater system. A solids separation tank will not be required during discharge of test water. The pipeline used during production well development and testing will be capable of carrying a flow of 700 gallons per minute (gpm).

The Owner is installing a new storm drain and will place a manhole on the property. The Contractor shall provide temporary public safety measures for pipelines and open manholes during the discharges.

3.13 STORM WATER POLLUTION PREVENTION

The work area is less than 1-acre and therefore does not require a storm water pollution prevention plan. The Contractor shall at a minimum provide perimeter controls including straw waddles surrounding the

perimeter of the work area and stockpiles, all stockpiles shall be covered if chance of rain is predicted at greater than 50 percent, and storm drain inlet protection (closest inlet).

3.14 SANITATION

The Contractor shall provide temporary sanitation facilities (prior to the start of work) at the work site, and maintain such facilities (cleaned a minimum of twice per week) throughout the period of work on the project.

3.15 ELECTRICAL POWER

The Contractor shall provide, at his own expense, all electric power required for construction, testing, general and security lighting, and all other purposes whether supplied through temporary or permanent facilities. The Contractor may arrange with the local utility to provide adequate temporary electrical service at a mutually agreeable location or provide his own generating equipment provided it meets the conditions of the County Noise Ordinance.

3.16 LIGHTING

The Contractor shall provide temporary lighting in all work areas sufficient to maintain a lighting level during working hours not less than the lighting level required by California OSHA standards. When used, lighting shall be shielded so that adjacent property owners and drivers on the adjacent freeway are not adversely impacted.

3.17 TESTING

All required testing of materials and construction methods will be provided by the Owner. Should tests show materials or methods to be unacceptable, however, and re-testing of the same material is required, the cost of such re-testing will be deducted from payments due the Contractor.

3.18 PROJECT MATERIALS

All project components that will come into contact with drinking water must be certified under NSF/ANSI Standard 61. Materials shall also be lead-free, as applicable, in accordance with Health and Safety Code Section 116875.

3.19 OWNERSHIP OF REMOVED OR SURPLUS MATERIAL

Excavated soils and drilling muds shall become the property of the Contractor and removed from the site.

3.20 CLEANUP

The work area shall be kept in a neat and orderly condition during construction. The Contractor shall remove and dispose of all trash, debris and waste material resulting from his operations.

Upon completion of the work, the Contractor shall remove all debris, surplus material, equipment and supplies, and shall leave the entire work area in a neat, orderly condition. Upon completion of the contract work, the Contractor shall remove sanitary facilities and disinfect the premises in the event of a spill or leakage.

4.00 WORK ZONE SAFETY

4.01 POLICY

The Contractor shall be **solely** responsible for safety on the job. Inspection of the work being performed or acceptance of work completed does not imply any approval or acceptance by the Owner of safety measures used by the Contractor.

The Contractor shall furnish, erect, and maintain at all times, temporary fencing surrounding the work area.

The work shall be carried out in an orderly and systematic manner to present as little inconvenience as possible to public traffic. A minimum of one traffic lane shall be maintained on adjacent streets at all times.

5.00 INSURANCE REQUIREMENTS

5.01 GENERAL

Fire Insurance, as specified in Section 4.02 of the General Conditions is not required for this project.

The Contractor shall procure and maintain for the duration of the Contract insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the work hereunder by the Contractor, his agents, representatives, employees or subcontractors. The cost of such insurance shall be included in the Contractor's bid.
A completed Certificate of Insurance form contained in Appendix A shall be submitted by the Contractor within 15 days after issuance of the Notice of Award.

5.02 MINIMUM SCOPE OF INSURANCE

Coverage shall be at least as broad as:

General Liability and Umbrella or Excess Liability Insurance covering all operations by or on behalf of the Contractor providing insurance for bodily injury liability, and property damage liability for the limits of liability indicated below and including coverage for premises, operations and mobile equipment; products and completed operations; broad form property damage (including completed operations); explosion, collapse and underground hazards; personal injury; and contractual liability.

Automobile Liability Insurance, including coverage for all owned, hired and non-owned automobiles.

Workers' Compensation Insurance as required by the State of California and Employer’s Liability insurance.

5.03 MINIMUM LIMITS OF INSURANCE

The Contractor shall maintain no less than:

1. General Liability:
   a) $1,000,000.00 per occurrence (combined a single limit for bodily injury and property damage).
   b) $2,000,000.00 aggregate for products-completed operations.
   c) $2,000,000.00 general aggregate. This general aggregate limit shall apply separately to the Contractor’s work under this Contract.
   d) $5,000,000.00 umbrella or excess liability. Umbrella or excess policy shall include products liability and completed operations coverage. Further, the umbrella or excess policy shall contain a clause stating that it takes effect (drops down) in the event the primary limits are impaired or exhausted.

2. Automobile Liability: $1,000,000.00 combined single limit each accident for bodily injury and property damage. The umbrella or excess liability coverage required above shall also apply to automobile liability.

3. Employers Liability:
   a) $1,000,000.00 per accident for bodily injury by accident.
   b) $1,000,000.00 policy limit for bodily injury by disease.
   c) $1,000,000.00 for each employee for bodily injury by disease.

5.04 DEDUCTIBLES AND SELF-INSURED RETENTIONS

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

5.05 OTHER INSURANCE PROVISIONS

The general liability and automobile liability policies are to contain, or be endorsed to contain, the following provisions:

1. The City, its officers, officials, employees, agents and volunteers are to be covered as insureds as respects: liability arising out of activities performed by or on behalf of the Contractor; products and completed operations of the Contractor; premises owned, leased or used by the Contractor; or automobiles owned, leased, hired or borrowed by the Contractor. The coverage shall contain no special limitations on the scope of protection afforded to the City, its officers, officials, employees, agents or volunteers.

2. For any claims related to this project, the Contractor's insurance coverage shall be primary insurance as respects the City, its officers, officials, employees, agents and volunteers. Any insurance or self-insurance maintained by the City, its officers, officials, employees, agents or volunteers shall be excess of the Contractor's insurance and shall not contribute with it.

3. Any failure to comply with reporting or other provisions of the policies including breaches of warranties shall not affect coverage provided to the City, its officers, officials, employees, agents or volunteers.

4. Coverage for such additional insureds shall not extend to liability:
   a) arising from any defective or substandard condition of a City roadway which existed prior to the time the Contractor commenced work, unless such condition has been changed by the work or the scope of the work requires the Contractor to maintain existing City roadway facilities and the claim arises from the Contractor's failure to maintain; or,
   b) for claims occurring after the work is completed and accepted unless these claims are directly related to alleged acts or omissions of the Contractor which occurred during the course of the work; or,
   c) to the extent prohibited by Section 11580.04 of the Insurance Code.

5. 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.

6. Each insurance policy required by this clause shall be endorsed to state that coverage shall not be suspended, voided, canceled by either party, reduced in coverage or in limits except after thirty (30) days prior written notice by certified mail, return receipt requested, has been given to the City of Orland.

5.06 WORKERS COMPENSATION AND EMPLOYERS LIABILITY COVERAGE

The insurer shall agree to waive all rights of subrogation against the City, its officers, officials, employees, agents and volunteers for losses arising from work performed by the Contractor for the City.

5.07 ACCEPTABILITY OF INSURERS

Insurance is to be placed with insurers that are acceptable to the City of Orland.

5.08 VERIFICATION OF COVERAGE

Contractor shall furnish the City with original endorsements affecting coverage required by this clause. The endorsements are to be signed by a person authorized by that insurer to bind coverage on its behalf. The endorsements are to be on forms provided by the City and all endorsements are to be received and approved by the City before work commences. As an alternate to the City's forms, the Contractor's insurer may provide complete, certified copies of all required insurance policies, including endorsements affecting the coverage required by these specifications.

5.09 SUBCONTRACTORS

Contractor shall include all subcontractors as insureds under its policies or shall furnish separate certificates and endorsements for each subcontractor. All coverages for subcontractors shall be subject to all of the requirements stated herein.

If the Contractor fails to maintain such insurance, the City may take out such insurance to cover any damages, for which the City might be held liable on account of the operations under this contract, and deduct and retain the amount of the premiums for such insurance from any sums due the Contractor under this contract. Nothing herein contained shall be construed as limiting in any way the extent to which the Contractor may be held responsible for payment of damages resulting from his operations, or those of any subcontractor under him.

5.10 NO PERSONAL LIABILITY

Contractor shall indemnify and hold harmless City and its officers, officials, employees, agents and volunteers from and against claims, damages, losses and expenses including attorney fees arising out of the performance of the work described herein, caused in whole or in part by any negligent act or omission 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, except where caused by the active negligence, sole negligence, or willful conduct of the City.

TECHNICAL SPECIFICATIONS

SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. This section includes a description of bid items, measurement and payment.

B. Related Sections:

1. All

1.02 Measurement and Payment

1. All measurements will be based on completed work performed in strict accordance with the specifications. Payment will be made for bid items only. Bid item amounts shall include items such as site preparation, drilling, well construction, well development, materials, equipment and labor necessary to complete the Work. All quantities for materials placed in the well are measured from the ground surface.

1.03 Bid Item Descriptions

Bid Item No. 1 – Mobilization/Demobilization

Description: Move to and from site, all weather access, provide temporary security, facilities, and site clean-up. Includes permits and fees; pre-construction documentation, submittals, mobilization and demobilization of personnel, administrative cost, equipment, supplies, and incidentals to and from the project sites, and construction photography; preparation of as-built construction drawings per Section 01507, Mobilization/Demobilization.

Measurement: Shall be lump sum (LS) for the completed work described above. The maximum amount shall be no greater than 10 percent of total bid.

Payment: Based upon the LS amount.

Bid Item No. 2 -Temporary Security Fencing

Description: Furnish, install and remove 472 linear feet of 6-foot tall temporary security fencing.

Measurement: Shall be LS for the completed work described above.

Payment: Based upon the LS amount.

Bid Item No. 3 - Conductor Casing and Sanitary Seal

Description: Drill 48-inch borehole; furnish and install a 36-inch-diameter conductor a sand-cement sanitary seal per Section 331113-120, Conductor Casing.

Measurement: Shall be based on lineal footage (LF) measured by the Engineer.

Payment: Based on the unit price/LF of conductor installed.

Bid Item No. 4 – 18-inch Diameter Pilot Borehole Drilling

Description: Drill by the reverse circulation method 18-inch-diameter pilot hole to a depth of 500 feet per Section 331113-141, Pilot Borehole and Reaming Drilling.

Measurement: Shall be based on LF measured by the Geophysical Survey from the bottom of the conductor casing to the bottom of the borehole.

Payment: Based on the unit price/LF of pilot hole completed and certified in conformance by the Engineer.

Bid Item No. 5 – Gyro/direction Borehole Survey

Description: Conduct a survey of the pilot borehole and if directed by the Engineer of the reamed borehole per Section 331113-201, Gyro/Directional Survey.

Measurement: Shall be based on completion of pilot borehole survey and if directed by the Engineer of the reamed borehole.

Payment: Based upon the LS amount.

Bid Item No. 6 - Geophysical Surveys

Description: Conduct electric log survey using guard type tools, including spontaneous potential and resistivity curves per Section 331113-180, Geophysical Surveys.

Measurement: Shall be based on completion of geophysical survey performed as directed by the Engineer.

Payment: Based upon the LS amount.

Bid Item No. 7 – 30-inch Diameter Reaming

Description: Ream the pilot borehole to 30-inch diameter per Section 331113-141, Pilot Borehole and Reaming Drilling.

Measurement: Shall be based on LF measured from the caliper survey from the bottom of the conductor casing to the bottom of the reamed borehole.

Payment: Based on the unit price/LF of borehole reamed.

Bid Item No. 8 - Caliper Survey

Description: This item includes all work associated with the caliper survey of the 30-inch borehole, per Section 331113-200, Caliper Survey.

Measurement: Shall be based on completion of the downhole logging performed as directedby the Engineer for the borehole.

Payment: Based upon the LS amount.

Bid Item No. 9 - 16-inch Diameter Casing, 0.2% Copper Bearing Steel

Description: Furnish and install 16-inch-diameter, 0.2% copper bearing steel, well casing, 5/16-inch-thick wall and appurtenances per Section 331113-280, Well Casing and Screen.

Measurement: Shall be based on LF measured by the Engineer from ground surface.

Payment: Based on the unit price/LF of casing installed and certified in conformance by the Engineer.

Bid Item No. 10 - 16-inch Diameter Louvered Screen, 0.2% Copper Bearing Steel

Description: Furnish and install 16-inch-diameter, 0.2% copper bearing steel, louvered well screen 0.050-inch slot per Section 331113-280, Well Casing and Screen.

Measurement: Shall be based on LF measured by the Engineer.

Payment: Based on the unit price/LF installed and certified in conformance by the Engineer.

Bid Item No. 11 – 3-inch Gravel Pipe Black Iron Steel

Description: Furnish and install 3-inch diameter, black iron steel, gravel fill pipe and appurtenances per Section 331113-300, Gravel and Sounding Pipes.

Measurement: Shall be based on LF measured by the Engineer.

Payment: Based on the unit price/LF installed and certified in conformance by the Engineer.

Bid Item No. 12 – Filter Pack

Description: Furnish and install a natural filter pack per Section 331113-320, Filter Pack.

Measurement: Shall be based on LF measured by the Engineer from the bottom of the borehole to the top of the filter pack.

Payment: Based on the unit price/LF installed and certified in conformance by the Engineer.

Bid Item No. 13 – Annular and Transition Seals

Description: Furnish and install sand-cement grout seal and sand-bentonite seal between 34-inch borehole/conductor casing and well casing, including 10-foot transition seal per Section 331113-330, Annular and Transition Seals.

Measurement: Shall be based on LF measured by the Engineer from the top of the filter pack to ground surface.

Payment: Based on the unit price/LF installed and certified in conformance by the Engineer.

Bid Item No. 14 - Well Development with Drill Rig

Description: This item includes, but is not necessarily limited to, all work and material associated with 10 hours of bailing, swabbing and airlift pumping the well per Section 331113-340, Development. Includes furnish and placement of AquaClear and 12-hours of idle time.

Measurement: Shall be based on the hours (HR) of development completed starting after the equipment is installed and operational and upon completion development.

Payment: Based on the unit price/HR at well development work

certified by the Engineer.

Bid Item No. 15 - Install/Remove Test Pump

Description: Furnish and install temporary engine-driven, 700 gpm well turbine pump, discharge piping, flow meters per Section 331113-340, Development and Section 331113-360, Aquifer Testing.

Measurement: Shall be LF of column pipe installed.

Payment: Based upon the LF amount certified by the Engineer.

Bid Item No. 16 – Pump Development

Description: Pump development including all labor and fuel per Section 331113-340, Development.

Measurement: Shall be based on the HR of development completed as certified by the Engineer.

Payment: Based on the unit price/HR of well development work and certified in compliance by the Engineer.

Bid Item No. 17 – Aquifer Testing

Description: Perform a 10-hour step-drawdown and 24-hour constant rate aquifer test, including all labor, fuel, and materials per Section 331113-360, Aquifer Testing.

Measurement: Shall be based on the HR of pumping completed.

Payment: Based on the unit price/HR of testing completed and certified in compliance by the Engineer.

Bid Item No. 18 – Plumbness and Alignment Tests

Description: Perform a well alignment and plumbness test, including all materials and labor per Section 331113-260.

Measurement: Shall be based on survey completed as certified by the Engineer.

Payment: Based on the LS amount which includes both tests.

Bid Item No. 19 – Video Survey

Description: Perform a video camera survey of the entire well per Section 331113-400, Video Survey.

Measurement: Shall be based on survey completed as certified by the

Engineer.

Payment: Based on the LS amount.

Bid Item No. 20 – Well Disinfection

Description: This item includes, but is not necessarily limited to, all work associated with the disinfection work per Section 331113-380, Disinfection.

Measurement: Shall be LS for the completed work.

Payment: Based upon the LS amount certified by the Engineer.

Bid Item No. 21 - Disposal of Drilling Fluids

Description: Transport and properly dispose of drilling fluids per Section 331113-160, Drilling Fluid.

Measurement: Shall be LS for the completed work.

Payment: Based upon the LS amount certified by the Engineer.

Bid Item No. 22 - Disposal of Drill Cuttings

Description: Transport and properly dispose all drill cuttings off-site per Section 331113-160, Drilling Fluid.

Measurement: Shall be LS for the completed work.

Payment: Based upon the LS amount certified by the Engineer.

Bid Item No. 23 – Borehole or Well Abandonment

Description: Destroy all or portion of the pilot borehole per Glenn County well ordinances per Section 331113-430, Rejection of Borehole or Well.

Measurement: Shall be LF for the completed work as certified by the Engineer.

Payment: Based on the LF amount.

Bid Item No. 24 – Standby Time

Description: As specified by Engineer (not for time while awaiting final design, performing surveys) per Section 01508, Standby.

Measurement: Shall be based on HR of standby time as certified by the Engineer.

Payment: Based on the unit price/HR of time passed as certified by the Engineer.

PART 2 PRODUCTS

2.01 Not used in this section.

PART 3 EXECUTION

3.01 Not used in this section.

END OF SECTION

SECTION 01110

SUMMARY OF WORK

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. The work to be performed under this Contract shall consist of furnishing all tools, equipment, materials, supplies, and manufactured articles, and for furnishing all transportation and services, including fuel, power, water, and essential communications, and for the performance of all labor, work, or other operations required for the fulfillment of the Contract in strict accordance with the Contract Documents.

   The work shall be complete and all work, materials, and services not expressly shown or called for in the Contract Documents which may be necessary for the complete and proper construction of the work in good faith shall be completed and performed, furnished, and installed by the **Contractor** as though originally so specified or shown, at no increase in cost to the **Owner**.

2. Work covered by Contract Documents:

   a. The work required for the construction of Walker Street Well, down hole portion, intended for municipal potable water supply will include but not be limited to the following items:

      1) Mobilize to, provide temporary facilities, and demobilize from site. This includes all required permits. The **Contractor** shall mobilize to the Walker Street Well site after receipt of the Notice to Proceed from the **Owner**.

      2) Furnish and install temporary construction fencing and stormwater pollution prevention measures.

      3) Drill a borehole to the depth as described in the Technical Specifications and shown on the Drawing, Sheet CG-01; furnish and install conductor casing as described in the Technical Specifications and shown on the Plans, and place sealing material as required in annulus.

      4) Borehole Drilling and Geophysical Surveys:

         (a) Drill an 18-inch diameter pilot borehole using the reverse circulation method to 500 feet below ground surface, collect the drill cuttings at 10-foot intervals and when changes in sediment type are detected,

            (1) Conduct geophysical surveys of the pilot borehole.
            (2) Conduct a gyro/directional borehole survey of the pilot borehole.

         (b) Ream the pilot borehole to 30-inch diameter borehole to the full depth of the pilot borehole or as specified by the **Engineer**, using a reverse circulation method.

            (1) Conduct a caliper survey of well borehole.

(2) If directed, by the **Engineer**, conduct a gyro/directional borehole survey of the reamed borehole.

(c) Drill cuttings are to be removed from the site and properly disposed of by the **Contractor.**

(d) Drilling fluids are to be removed from the site properly disposed of by the **Contractor**.

5) Furnish and install well casing and screen as described in the Technical Specifications and shown on the Plans.

6) Furnish and install the gravel fill piping in the annulus between the borehole wall and casing as described in the Technical Specifications and shown on the Plans.

7) Furnish and install filter pack and seals in the annular space to depths as described in the Technical Specifications and shown on the Plans.

8) Install annular seal, including a 10-foot transition seal, from the top of the filter pack to the ground surface.

9) Furnish and install temporary discharge piping from the production well to the storm drain drop inlet.

10) Develop the well for approximately 15 minutes per foot of well screen using swabbing, airlift pumping, and surging techniques. Development water shall be disposed to the sanitary sewer and clear water shall be disposed to the storm drain system.

11) Furnish and install a temporary deep well turbine pump for well development and test pumping.

12) Discharge the development and test pumping water to storm drain.

13) Perform short constant rate tests (step drawdown) for 10 hours.

14) Perform a long-term constant rate pumping test for 24 hours.

15) Perform plumbness and alignment surveys.

16) Perform a video camera survey of the well.

17) Disinfect the well.

18) Provide and install ¼" minimum thickness steel plate welded to top of the well casing, gravel and sounding pipes.

19) Return the site to its approximate original condition.

1.02 BACKGROUND

A. The 8th Street well is located about ¼ mile from the Walker Street well site. The well encountered clay, sand and gravel. **Appendix B** contains the well completion report.

1.03 PROJECT CONDITIONS

A. Activities By Others

1. The **Contractor** shall cooperate fully with all utility forces, regulating agencies, the ingress/egress landowner, and personnel of the **Owner** and the **Engineer**.

B. Contractor Use of the Project Site

1. The **Contractor's** use of the project site shall be limited to the construction operations, including on-site storage of materials, sanitary facilities, and field offices.

PART 2 MATERIALS (NOT USED

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01330

SUBMITTALS

PART 1 GENERAL

1.01 SUBMITTAL REQUIREMENTS

A. Description

1. This section covers the submittal requirements. The **Contractor** shall provide submittals as described in this section. The types of submittals are listed in the Submittal Register, contained in Section 3.01.

2. General

a. Neither the review nor lack of review of submittals shall waive the requirements of the contract or relieve the **Contractor** of any obligations thereunder.

b. The **Contractor** shall check, correct and sign submittals prior to submission, whether they are prepared by the **Contractor** or others.

B. Identification of Submittals

1) Submittals, including each drawing shall be plainly identified by the Contract number, the **Contractor's** name, project name and location, specification number and description and location of applicable portions of the project. Submittals shall be in English and units shall be in the English system of units, as used in the United States.

2) The features shall be referenced to the specification number, bid item numbers and contract drawing number.

3) Resubmittals shall also include the contract number, modified to distinguish revision number.

C. Time of Submittals

1. The **Contractor** shall furnish submittals as specified and in such a manner and sequence that they may be inspected in an orderly manner prior to performance of the work.

2. The **Contractor** shall furnish submittal related information necessary for such inspection.

D. Method of Transmittal

1. Submittals shall be sent to the **Engineer** electronically, except for samples.

2. The **Engineer** will return submittals electronically as "No Apparent Defects", "Defects Noted, Resubmittal Waived", or "Rejected". If Rejected the **Contractor** shall resubmit the transmittal. The work shall not proceed to incorporate the Rejected submittal item until it is approved.

1.02 MEASUREMENT AND PAYMENT

A. The contract prices shall include full compensation for all costs incurred under this section.

PART 2 PRODUCTS

(Not Used.)

PART 3 EXECUTION

3.01 SUBMITTAL REGISTER

A. The **Contractor** shall coordinate the Submittal Register with the requirements of the specification and the listing of the submittals in the listing of the submittals in the Submittal Register shall not relieve the **Contractor** from providing additional submittals specified.

SUBMITTAL REGISTER

SUBMITTAL NO.	SECTION NAME AND DESCRIPTION OF SUBMITTAL	TYPE OF SUBMITTAL				CONTRACTOR SCHEDULED DATES	REMARKS
		PERMIT	SAMPLE	DESCRIPTION	OTHER		
	01110 - Summary of Work						
	Overall project schedule				X		At Pre-construction Meeting
	2-week detailed schedule				X		At Pre-construction Meeting
	01507 - Mobilization/Demobilization						
	Well Construction Permit with County assigned permit number	X					At Pre-construction Meeting
	01561 - Temporary Fencing						
	Engineering report identifying depth of embedment of support beams				X		At Pre-construction Meeting
	331113-120 - Conductor Casing						
	Delivery reciepts for commerically prepared and delivered concrete				X		Provide at the end of installation day
	331113-141 Pilot Borehole and Reaming						
	Well Completion Report for submittal to DWR, Sacramento County and Engineer				X		Within 30 days of completion of Aquifer Testing
	Daily Drilling Reports				X		Provided at the end of each day
	331113-160 - Drilling Fluid						
	Drilling additives Saftey Data Sheets				X		At Pre-construction Meeting
	Technical data sheets for lost circulation material and Safety Data Sheets				X		At Pre-construction Meeting
	331113-180 - Geophysical Suveys						
	Three field paper copies				X		Provide at the end of the survey
	Electronic copies				X		Provide within 4 hours of the end of the survey
	331113-201 - Gyro/Deviation Survey						
	Three field paper copies				X		Provide at the end of the survey
	Electronic copies				X		Provide within 4 hours of the end of the survey
	331113-200 - Caliper Survey						
	Three field paper copies				X		Provide at the end of the survey
	Electronic copies				X		Provide within 4 hours of the end of the survey
	331113-280 - Well Casing and Screens						
	As a minimum the mill test reports, certificate of compliance, calculations used to determine collapse strength and safe hanging weight, and a description of the cleaning process used on the casing and screen				X		Prior to installation
	Welding certifcates of employees for shielded arc electordes inaccordance to AWS standards for the tyes and positions of welding equipment				X		At Pre-construction Meeting

SUBMITTAL REGISTER

SUBMITTAL NO.	SECTION NAME AND DESCRIPTION OF SUBMITTAL	TYPE OF SUBMITTAL				CONTRACTOR SCHEDULED DATES	REMARKS
		PERMIT	SAMPLE	DESCRIPTION	OTHER		
	331113-320 - Filter Pack						
	Approved NSF-61 certification for the filter pack.				X		At Pre-construction Meeting
	Sample of filter pack		X				At Pre-construction Meeting
	Estimate of filer pack volume				X		Provide at the end of the caliper survey
	Bentonite manufactuer's product sheet and Safety Data Sheets						At Pre-construction Meeting
	331113-330 - Annular Seals						
	Bentonite type and Safety Data Sheets						At Pre-construction Meeting
	Delivery reciepts for commerically prepared and delivered concrete				X		Provided at the end of each day.
	331113-340 - Well Development						
	Manufacturer’s pump curve for development and aquifer test pump						At Pre-construction Meeting
	Traffic control plans for discharge piping, if necessary						At Pre-construction Meeting
	Daily Drilling Reports for preliminary well development.				X		Provided at the end of each day
	Field development logs along with time, pumping duration, gpm, sand production tests, field observations of clarity, and turbidity.				X		Provided at the end of each day
	331113-360 -Well and Aquifer Testing						
	Field development logs along with time, pumping duration, gpm, sand production tests, field observations of clarity, and turbidity.				X		Provided at the end of each day
	331113-260 - Plumbness and Alignment						
	Three field paper copies				X		Provide at the end of the survey
	Electronic copies				X		Provide within 4 hours of the end of the survey
	331113-400 - Video Camera Survey						
	Electronic copies				X		Provide within 4 hours of the end of the survey
	331113-380 - Disinfection						
	Provide description and photos of typical method to distribute chlorine compound into the well				X		At Pre-construction Meeting
	Manufacture’s product sheet and Safety Data Sheet of the disinfectant				X		At Pre-construction Meeting
	Estimate of chlorine volume to create 100 mg/L residual				X		At Pre-construction Meeting
	Chlorine solution purchase date				X		Prior to use.
	331113-430 - Rejection of Borehole or Well						
	Copy of borehole or well destruction permit				X		Provide prior to start of destruction work
	Delivery reciepts for commerically prepared and delivered concrete				X		Provide at the end of each day

END OF SECTION

SECTION 01507

MOBILIZATION/DEMOBILIZATION

PART 1 GENERAL

1.01 SUMMARY

A. This section includes:

1. Site Mobilization

a. Shall include the obtaining of all permits; the transportation of personnel, equipment; materials, temporary facilities, site cleanup, and/or operating supplies, all as required for the proper performance and completion of the work; mobilization shall include but not be limited to the following principal items:

1) Furnish and install temporary security fencing.

2) Transportation and set up of the **Contractor's** equipment.

3) Installing, operating, maintaining, and removing temporary facilities including but not limited to discharge piping for well development and testing, construction water, electrical power, communications (telephone), traffic control, portable sanitary facilities, and lighting.

4) Obtaining all required permits and posting all OSHA required notices and establishment of safety programs in the performance of all work.

5) Have a designated **Contractor's Superintendent** and/or foreman at the job site full time.

6) Submit updated Projected Construction Schedule as directed by the **Owner or Engineer.**

7) Site cleanup per site in conjunction with demobilization from that site.

B. RELATED SECTIONS:

1. Section 01501: Temporary Facilities

C. MEASUREMENT AND PAYMENT

1. MEASUREMENT

a. The unit for this work is Lump Sum (LS) for all work associated with Site Mobilization/Demobilization.

2. PAYMENT

a. Unit price shall be as set forth in the BID SCHEDULE for Item No. 1 Mobilization/Demobilization.

b. Progress payments and final payment for this Item.

PART 2 PRODUCTS

2.01 Not used in this section.

PART 3 EXECUTION

3.01 MOBILIZATION SEQUENCE

A. The **Contractor** shall perform Site Mobilization as follows:

1. Contractor shall mobilize and commence work at Walker Street well site.
2. Upon substantial completion of work at Walker Street Well Site and authorization from the **Owner**, the **Contractor** shall commence project demobilization.

3.02 PROJECT STAGING AREA

A. The **Contractor** shall maintain all equipment, and materials within the work area as shown on **Drawing G-001**.

B. The **Contractor** shall restore the work area to pre-existing conditions.

END OF SECTION

SECTION 01508

STANDBY TIME

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. Standby Time – It may be necessary for the **Owner** to perform work that will require the drilling crew and equipment to stand idle. In such an event, the **Owner** shall request of the **Contractor** in writing to cease operations and shall state the anticipated extent or duration thereof. The **Contractor** shall promptly furnish assistance, and cease operations. This idle time shall be considered Standby Time.

B. Related Sections:

1. Section 331113.120: Conductor Casing and Sanitary Seal
2. Section 331113.180: Geophysical Surveys
3. Section 331113.330: Annular Seals
4. Section 331113.360: Well and Aquifer Testing

C. Measurement and Payment

1. Measurement

a. The unit for this work is hours of time as recorded by the **Engineer** in intervals not less than ½ hour.

2. Payment

a. Unit prices for Standby Time shall be as set forth in the BID SCHEDULE, Item No. 24 - Standby Time.

b. Progress payments and final payment for this Item.

PART 2 PRODUCTS

2.01 Not used in this section.

PART 3 EXECUTION

3.01 Not used in this section.

END OF SECTION

SECTION 331113.120

CONDUCTOR CASING AND SANITARY SEAL

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. This work includes all materials, labor, tools, and equipment required to drill a conductor casing borehole, install a conductor casing, and place sealing material for the sanitary seal.

B. Related Sections:

1. Section 01507: Mobilization/demobilization

C. Measurement and Payment

1. Measurement

a. Measurement for this item shall be in Linear (vertical) Feet as successfully installed.

b. No standby time will be paid for the 24-hour period following the placement of the sanitary seal.

2. Payment

a. Unit prices shall be as set forth in the BID SCHEDULE, Item No. 3 – Conductor Casing and Sanitary Seal.

b. Final payment for this Item.

1.02 REFERENCES

A. American Water Works Association, A100-20

B. Water Well Standards, State of California, Bulletin 74-90 (Supplement to Bulletin 74-81), June 1991 or latest applicable edition/revision

C. American Welding Society Standards (AWS)

D. American Society of Testing and Materials (ASTM)

1.03 DEFINITIONS

A. Conductor Casing—A conductor casing is a tubular retaining structure installed in the upper portion of a well between the wall of the drilled borehole and the inner well casing. The conductor casing is installed to stabilize the upper borehole while drilling, provide containment for a permanent sanitary seal, and create a permanent foundation for well casing and screen sections.

B. Sanitary Seal—A seal made from an impervious (low permeability) sealing material in the annular space between the borehole and the outside of the conductor casing.

C. Sealing Material—Sealing materials consist of sand cement grout.

1.04 SUBMITTALS

A. Quality Assurance

1. Test Reports

a. Certified test reports to show compliance with both the physical and chemical properties of the steel proposed to be installed for the conductor casing and delivery tickets shall be submitted to the **Owner** for approval prior to installation by the **Contractor.**

b. Delivery receipts for commercially prepared and supplied sealing material placed for the sanitary seal shall be provided to the **Owner** or **Engineer** at the time of delivery to the site and for approval prior to installation by the **Contractor**. In order to avoid rejection of trucks the cement suppliers are required to show on each batch slip: 10.3 sack sand cement, sand cement ration less than or equal to 2:1, by weight and the water content (between 4.5 and 7 gallons per sack).

c. If the **Contractor** intends to use any additives to the sealing material they shall be submitted to the **Owner** or **Engineer** and **Glenn County, Environmental Health Department (EHD)** prior to Mobilization.

PART 2 PRODUCTS

2.01 MATERIALS

A. Conductor Casing

1. The steel plate used in the fabrication of the conductor casing shall be new and shall meet the requirements of ASTM A-139 or A-53, Grade B.

2. **No** hydrostatic testing of the conductor casing is required for this project.

3. The steel conductor casing shall have the following dimensions and/or properties:

a. The conductor casing for the well shall be 36-inch O.D. with a minimum thickness of 3/8-inch.

b. The conductor casing shall be in lengths of not less than 20 feet unless a short piece is required to obtain the specified casing amount.

c. Welding during casing construction shall be done with shielded arc electrodes of the proper composition for the material and shall be performed in accordance with American Welding Society Standards.

d. All casing ends shall be machined flat and perpendicular to the axis of the sections. Joints shall be round such that neither the largest or smallest outer diameter differs from that specified by more than one eighth (1/8) inches. The ends of all sections shall not vary more than ten one-thousandth (0.010) inches at any point from a true plane perpendicular to the casing, as specified and certified by the manufacturer.

B. Casing Centralizers

1. Casing centralizers shall be provided as specified below:

a. Centralizers shall be of the same chemical and physical properties as the conductor casing.

b. Centralizers shall be welded to the conductor casing. There shall be a minimum of **two** (2) sets of centralizers for the conductor casing.

c. The centralizers shall be constructed of 3/8-inch thick by 2-inch wide steel strips with a minimum height of 4-inches from the conductor casing. Each centralizer shall provide at least one (1) linear foot of bearing surface to interface with the borehole wall.

d. A minimum of three (3) centralizers shall be provided at each specified location.

C. Sealing Material

1. Sand-Cement Sealing Material: A sand-cement sealing material shall be used for the sanitary seal.

a. Sand-Cement "grout": Sand-cement shall be mixed at a ratio of not more than 188 pounds of sand to one 94-pound sack of Portland cement (2 parts sand to 1 part cement, by weight) to about 7 gallons of clean water, where Type I or Type II Portland cement is used. This is equivalent to a "10.3 sack mix".

b. Cement: Cement used shall meet the requirements of American Society for Testing and Materials C150, Standard Specification for Portland Cement, including the latest revisions thereof.

c. Water: Water used to prepare sealing mixtures or added on site should generally be of drinking water quality, shall be compatible with the type of sealing material used, be free of petroleum and petroleum products, and be free of suspended matter. The quality of water to be used for sealing mixtures shall be determined if not commercially prepared and delivered.

d. Mixing: Cement-based sealing materials shall be mixed thoroughly to provide uniformity and ensure that no lumps exist.

2. Variations: Special cement setting accelerators and retardants and other additives may be used in some cases. Additives for Portland cement mixtures shall meet the requirements of ASTM C494, Standard Specification for Chemical Admixtures for Concrete, including the latest revisions thereof. ASTM C150 Type I cement is equal to API Class A cement. **Owner** and **Environmental Health Department** approval of any variations must be received prior to Mobilization.

PART 3 EXECUTION

3.01 INSTALLATION

A. Conductor Casing and Borehole

1. The **Contractor** shall not start drilling without the **Engineer** or **Resident Project Representative** on site to confirm the location of the well.

2. The **Contractor** shall drill a hole not less than 48-inches in diameter, to the depths as shown on the Plans.

3. The conductor casing will be set at depths as shown on the Plans.

4. The **Contractor** shall arrange for a EHD inspector to observe installation of the sanitary seal. A minimum of one (1) business day is required for scheduling an inspection by a Registered Environmental Health Specialist.

    a. EHDS – Environmental Health Department for Water Well Construction Inspection: **(530) 934-6102**.

B. Conductor Casing

1. When the drilling operation has been completed to the satisfaction of the **Engineer**, the steel conductor casing shall be installed as specified per plan.
2. All joints shall be properly lap-welded during installation with a minimum of two passes per circumference.
3. Welders shall be certified in accordance with AWS B2.1:2000, Specification for Welding Procedure and Performance Qualification (supersedes AWS 010.9-80) for level AR-1 and shall be qualified in the 2G and 5G positions or the 6G position.
4. All joints shall be watertight. Special care shall be exercised to ensure that the casing is straight and plumb.
5. A minimum of two (2) sets of steel centralizers (bottom and top) consisting of three (3) centralizers at 120 degrees apart horizontally and shall be welded in the same vertical plane to the exterior of the conductor casing. The centralizers shall be fabricated and placed:

    a. The first set of centralizers shall be placed 5 feet from the bottom of the conductor casing.

    b. The second set shall be placed 5 feet below the top of the conductor casing.

6. The conductor casing shall be held in a plumb position and shall be placed on the bottom of the borehole.

C. Sealing Material

1. After the conductor casing has been installed and aligned properly, the annular space between the conductor casing and the respective conductor casing borehole shall be filled with sealing material from the bottom of the hole to the ground surface to form a sanitary seal. Upon completion of the sanitary seal, sealing material shall be visible and slightly above the ground surface.
2. When sealing material is supplied to the project site via commercial vendor, all onsite water additions to the mixture shall be metered, documented, and submitted to the **Owner** or **Engineer** prior to or during placement. Water quantities for sealing material mixed onsite shall be metered, documented, and submitted to the **Owner** or **Engineer**.
3. The sealing material shall be pumped or injected into the annular spaced through a tremie-pipe set within five (5) feet of the bottom of the borehole at the start of the placement. The tremie pipe shall be gradually raised during seal placement to avoid excessive pump pressures. The end of the tremie pipe must remain submerged in the sealing material and the tremie pipe shall be kept full of sealing material at all times during placement. The Contractor shall take all precautions to prevent the collapse of the conductor casing during placement of the sealing

material. Prior to placement of the sealing material the contractor may place some fill within the bottom of the casing, weld a plate over the top of the conductor casing or fill the casing with water to limit sealing material intrusion into the conductor casing during seal placement.

4. The **Contractor** shall not perform any work on the well during the 24-hour period after the sanitary seal is installed.
5. In the event the casing or the borehole collapses prior to completion of the sanitary seal, the **Contractor** shall take whatever steps are necessary to reopen the hole and reinstall a conductor casing and sanitary seal as specified. Any such remedial action shall be conducted at the **Contractor's** expense and in accordance with these Specifications.

END OF SECTION

SECTION 331113.141

PILOT BOREHOLE AND REAMING DRILLING

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. This section includes the products, materials, and procedures associated with the drilling of a pilot borehole with subsequent reaming operations or single pass borehole drilling, collecting formation samples, and maintaining circulation, for Walker Street Well to depth below ground surface as shown on Sheet CG-01.

2. The method of drilling shall be by reverse circulation rotary drilling in which the uncased wall of the drill hole is held in place at all times with a circulating drilling fluid.

B. Related sections:

1. Section 331113.160: Drilling Fluid
2. Section 331113.180: Geophysical Surveys
3. Section 331113.200: Caliper Survey
4. Section 331113.201: Gyro/Directional Borehole Survey

C. Measurement and Payment

1. Measurement

a. The unit for this work is Linear (vertical) Feet of either pilot borehole drilled or reamed. The value for payment shall be as measured to the nearest foot. Measurement shall be as taken from the bottom of the conductor casing to the bottom of the borehole as specified and as verified by the geophysical or caliper survey and shall include all incidentals.

2. Payment

a. Unit price for payment shall be as set forth in the BID SCHEDULE for Item No. 4, 18-inch Pilot Borehole Drilling.

b. Unit price for payment shall be as set forth in the BID SCHEDULE for Item No.7, Reaming.

c. Progress payments and final payment for these Items will be made.

1.02 SUBMITTALS

A. The **Contractor** shall submit Daily Reports detailing the footage drilled and mud properties measurements to the **Engineer** daily.

B. The **Contractor** shall submit a copy of the Water Well Driller's Report to the **Engineer** within 30 days of completion and testing of the well.

C. The **Contractor** shall submit a copy of the Water Well Driller's Report to the California Department of Water Resources within 30 days of completion and testing of the well.

PART 2 PRODUCTS

2.01 MATERIALS

A. Drilling Fluid

1. The **Contractor** shall maintain controlled drilling fluid material characteristics per Section 331113.160: Drilling Fluid.
2. The **Contractor** will record these measurements on their daily drilling report.

2.02 EQUIPMENT

A. Drill Rig:

1. The **Contractor** shall provide a complete reverse circulation rotary drilling unit of sufficient size and capacity to conduct the drilling operations required in these Specifications.
2. The drilling unit(s) and associated equipment shall be in good condition and of sufficient capacity to lower the specified casing assemblies to the specified depths without the use of flotation devices or "float plugs".

Borehole	**Capacity**
Pilot	Initial 18-inch diameter (nominal) pilot borehole from the bottom of the conductor casing to a depth below ground surface as shown per Plans, Sheet CG-01.
Production	Reaming pilot or drilling final borehole to 30-inch diameter from the bottom of the conductor casing to a depth below ground surface as shown per Plans, Sheet CG-01.

3. The drilling pipe shall be of adequate size to conduct drilling, shall be in good condition, and shall be connected by standard tool or flanged-type joints. Each pipe shall be measured and recorded in a tally book available for review at all times by the **Owner or Engineer**. Mast capacity should be at least 150% of the casing load anticipated and the rig capacity shall not be limited by insufficient power train components (engine and clutch).
4. The **Contractor** shall supply and use equipment necessary for:
    a. Reading the weight of the drill string assembly and casing loads using a dial weight indicator.
    b. Reading and charting the drill penetration rate.
5. Provide tools, accessories, power, lighting, water, other equipment, and experienced personnel necessary to conduct efficient drilling operations at the project site at all times.

B. Mud Tanks/ Mud Pits

1. Above ground mud tank(s) shall be of a volume and shape to allow proper settlement and removal of cuttings from the drilling operations and return a

drilling fluid suitable for reverse circulation drilling. If required, the above ground tanks shall be cleaned to maintain proper drilling fluid characteristics.

C. Drift Survey

1. The use of mechanical drift indicator equipment is recommended during drilling. Eastman mechanical drift indicator available from the Eastman Oil Well Survey Company or equivalent is recommended, a 3-degree unit shall be used with the indicator. This equipment is recommended but not required.
2. The **Contractor** is shall a use a geophysical logging firm to perform a plumbness survey of the pilot borehole and at the direction of the **Owner** or **Engineer** perform a survey of the reamed hole, Section 331113.201: Gyro/Directional Borehole Survey.
3. The **Contractor** is solely responsible for constructing a well that meets the plumbness and alignment tolerances of Section 331113.260: Plumbness & Alignment Tests.

PART 3 EXECUTION

3.01 PREPARATION

A. Equipment Disinfection

1. All equipment used down hole or that comes into contact with materials or equipment down hole shall be thoroughly cleaned and pressure washed prior to use.

3.02 CONSTRUCTION

A. Pilot Borehole

1. Pilot Borehole
   a. Drill an 18-inch diameter pilot borehole from bottom of the conductor casing to depths below ground surface as shown per the Plans, Sheet CG-01. Collect the drill cuttings at 10-foot intervals and of changes in sediment type.
   b. Conduct geophysical surveys of the pilot borehole.
   c. Perform a gyro/Direction survey of the pilot borehole.
2. Reamed Borehole
   a. Ream the pilot borehole to 30-inch diameter from bottom of the conductor casing to depths below ground surface as shown per Plans, Sheet CG-01 or as directed by the **Engineer**.
   b. Perform a caliper survey of the reamed borehole.

B. Sequences of Operations

1. Borehole Drilling or Reaming
   a. The 18-inch diameter pilot and 30-inch final borehole shall be drilled with diligence and without undue delay in a continuous operation to depths below ground surface as shown per plan, or other depth as directed by the **Engineer**.

1) Drilling fluid properties must conform to those specified in Section 331113.160: Drilling Fluid.

2) Formation samples shall be collected as specified in this Section.

b. The **Engineer** will be onsite at the times necessary during the drilling operations to direct the **Contractor** as to the exact drilling depth. The exact depth will be dependent upon cuttings and lithology from the borehole.

c. The **Contractor** shall not drill below a depth of 500 feet below ground surface unless directed by the **Engineer**.

d. The **Contractor** shall maintain a record indicating the time and depth when drilling fluid additives are mixed. The **Contractor** shall also record the approximate amount of water added to the drilling fluid during each shift.

e. Upon completion of the pilot borehole, a gyro/direction survey and geophysical survey shall be conducted per Section 331113.180: Geophysical Surveys; Section 331113.201, and; Gyro/Direction Borehole Survey.

f. Upon completion of the reaming for borehole acceptance, a caliper survey shall be conducted per Section 331113.200: Caliper Survey. The **Owner** may require a second Gyro/Direction Borehole Survey of the reamed borehole.

2. Upon completion of the caliper survey and on the **Owner's** direction/approval, the **Contractor** shall proceed with well construction without delay.

C. Formation Sampling

1. The **Contractor** shall collect representative formation samples during the drilling of the borehole. Samples will be collected at each formation change in addition to samples taken at ten (10) foot intervals.

a. The **Contractor** shall provide a sample collection splitter box in the discharge pipe to the mud tanks or approved other methods to obtain representative samples as approved by the Owner's representative.

b. The **Contractor** shall place each sample in a quart-size zip-lock freezer plastic bag. All containers will be labeled to indicate the well number, date, time, drilling rate, and depth interval of the collected sample, and stored in a manner so as to prevent breakage or loss. The **Contractor** will furnish containers. The **Contractor** shall prepare a "drillers log" of the formation samples indicating the type of soils encountered and the associated formation changes.

c. The **Contractor** shall lay out separate samples on the ground in a sequential manner and in a location that is easily accessible for inspection and in an area that will not be susceptible to damage from construction activity or site traffic.

3.03 FIELD QUALITY CONTROL

A. Reports

1. A daily report with a drilling log including shift records of construction activities shall be prepared by the **Contractor** for the **Engineer**. The report shall include but shall not be limited to:

a. The drill penetration rate for each stem of drill pipe or a continuous chart showing the drilling penetration rate shall be kept by the **Contractor** and shall be submitted to the **Engineer** upon request and shall be made part of the daily report.

b. Results of any optional drift survey shall be recorded on the daily report and furnished to the **Engineer.**

c. The **Contractor** will record all drilling fluid measurements as discussed in section 331113.160, Drilling Fluid, on the daily report.

END OF SECTION

SECTION 331113.160

DRILLING FLUID

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. This section includes the products, materials, and procedures associated with the drilling fluid used throughout the construction of the well to facilitate the removal of formation cuttings and to stabilize the borehole wall. This work includes all materials, labor, tools, and equipment to maintain and utilize the drilling fluid.

B. Measurement and Payment

1. Measurement:

a. No measurement shall be made for Drilling Fluid.

b. Measurement for disposal of Drilling Fluids will be the volume contained in the above groundwater mud tanks, the volume in the borehole and the volume of water used to thin down the mud prior to placement of the filter pack.

c. Measurement for disposal of Drill Cutting shall be the volume cuttings from the pilot and reamed borehole.

2. Payment:

a. No payment for Drilling Fluid will be made in this contract. For any Drilling Fluid work or costs shall be included under work specified in Section 331113.141: Pilot Borehole Drilling and Reaming.

b. Unit price for payment shall be Lum Sum as set forth in the BID SCHEDULE for Item No. 21, Disposal of Drilling Fluid.

c. Unit price for payment shall be Lum Sum as set forth in the BID SCHEDULE for Item No. 22, Disposal of Drill Cuttings.

C. Related Section

1. Special Conditions 3.11, Construction Water
2. Section 01507: Mobilization/Demobilization
3. Section 331113.141: Pilot Borehole Drilling and Reaming
4. Section 331113.180: Geophysical Surveys
5. Section 331113.201: Gyro/Directional Survey
6. Section 331113.200: Caliper Survey

1.02 REFERENCES

A. Standard 13-A, Drilling Fluid Materials, American Petroleum Institute, API.

B. Standard 13-B, —Recommended Practice Standard Procedure for Field Testing Oil-Based Drilling Fluids, API.

1.03 SUBMITTALS

A. Drilling Fluids Program

1. The **Contractor** shall submit to the **Owner** for approval prior to the preconstruction meeting, a Drilling Fluids Program that will include but not be limited to:

   a. Technical data sheets for all additives other than potable water that are proposed or anticipated to be used to stabilize the borehole or otherwise aid in drilling operations. Safety Data Sheets (SDS) shall be submitted for each proposed additive.

   b. Technical data sheets and SDSs for lost circulation material and for removal of the material from production zones.

PART 2 PRODUCTS

2.01 MATERIALS

A. Drilling Fluid

1. Only potable water shall be used in drilling fluids whether employed alone or in combination with drilling additives. The **Owner** will provide a point-of-connection near the site for potable water for drilling fluid purposes. See Special Conditions 3.11, Construction Water.

2. Drilling additives, when approved to be used by the **Owner**, shall meet or surpass Standard 13-A, Drilling Fluid Materials, API.

3. All drilling fluid additives used will comply with industry standards (NSF approved) and practices for use in the construction of a municipal water supply well. The additives shall be applied and used as prescribed by the manufacturer and shall be reviewed with respect to the impact they may impose on the successful development of the well.

2.02 EQUIPMENT

A. Drilling Fluid Control Equipment

1. To maintain drilling fluid density and viscosity, the **Contractor** shall employ the necessary equipment to facilitate a relatively rapid dropout or removal of cuttings. Shale shakers, desanders/desilters, and other equipment used to remove cuttings from the drilling fluid to maintain drilling fluid properties may be required if the contract cannot meet the required drilling weight parameters.

2. A Marsh Funnel shall be supplied by the **Contractor** to measure the drilling fluid viscosity.

3. A mud balance shall be supplied by the **Contractor** to measure the fluid density.

PART 3 EXECUTION

3.01 CONSTRUCTION

A. Drilling Fluid

1. The **Contractor** shall maintain controlled drilling fluid characteristics during the entire operation of well drilling and construction.
2. If proper control of the drilling fluid is not maintained to the satisfaction of the **Engineer**, the **Contractor** shall be required to retain or employ, at his own expense, an experienced qualified mud engineer on the job during all operations to design, supervise and maintain drilling fluid characteristics to the satisfaction of the **Owner**.
3. During the pilot borehole drilling or reaming operations the **Contractor** shall maintain the drilling fluid properties as follows:

Parameter	Criteria	Units
Weight (Fluid Density)	8.6 to 9.1	Pounds per gallon, lb./gal.
Viscosity, Marsh Funnel	32 to35	Seconds per quart, sec./qt.
Sand Content	Less than 1	Percent (%) by Volume

4. The **Contractor** is cautioned to maintain the minimum viscosity of the drilling fluid that will raise cuttings and adequately condition the wall of the hole. The **Contractor** shall remove all mud cake on the wall of the borehole during the development of the well.
5. Prior to well casing installation, the **Contractor** shall reduce the fluid weight below 9.1 lb./gal. and reduce the fluid viscosity to a maximum of 30 sec./qt.

B. Drill Cuttings

1. Containment
   a. The use of excavated pits is not allowed. Only above ground mud tanks will be allowed for the collection and settlement of drill cuttings.
2. Disposal
   a. All drilling fluids and thin down water shall be disposed of by the **Contractor** in accordance with the applicable ordinances and regulations of governmental agencies having jurisdiction.
   b. Drill cuttings are to be transported off-site by the **Contractor** and disposed of in accordance with the applicable ordinances and regulations of governmental agencies having jurisdiction. The cuttings that are to be neatly piled, shall be surrounded by straw baffles. The cuttings shall be covered with tarps and weighted down with sand bags if there is predicted to be a greater than 50 percent chance of rain.

3.02 FIELD QUALITY CONTROL

A. Drilling Fluid Properties Records

1. Drilling fluid properties shall be tested, measured, and recorded during pilot borehole drilling or reaming every 8 to 12 hours of circulation time, whichever is more frequent. The recorded results shall be included in the daily report.
2. Failure by the **Contractor** to test, measure, record, or provide such drilling fluid data to the **Owner** or the **Engineer** in accordance with this specification may result in delay of work at no cost to the **Owner**.

END OF SECTION

SECTION 331113.180

GEOPHYSICAL SURVEYS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. This section includes the products, materials, and procedures/services associated with geophysical surveys proposed in the borehole(s). The **Contractor** shall secure the services of a geophysical logging firm, approved by the **Owner** to conduct the geophysical survey (using guard tools to provide better resolution) including Gyro/Directional, Caliper, and Video surveys.

2. The **Owner** or **Engineer** shall be present to witness the geophysical logging of the borehole. It is the **Contractor's** responsibility to notify the **Owner** and **Engineer** 12 hours before logging commences.

B. Related Sections:

1. Section 331113.141: Pilot Borehole and Reaming Drilling
2. Section 331113.160: Drilling Fluid
3. Section 331113.200: Caliper Survey
4. Section 331113.201: Gyro/Directional Borehole Survey

C. Measurement and Payment

1. Measurement

a. The unit for this work/service is Lump Sum and includes any incidentals thereof.

b. Measurements of the service provided shall consist of all surveys completed as recorded by the **Engineer**. If more or less logging is completed than stated in this specification, measurement for payment shall be proportioned accordingly; proportion shall be as agreed upon by the **Contractor** and **Owner** or **Engineer**.

c. There will be no additional payment for rig time or idle time while logging is being run. No standby time will be paid for an additional 2-working days after all surveys are received by the **Owner or Engineer**.

2. Payment

a. Unit price for payment shall be as set forth in the BID SCHEDULE for Item No. 6, Geophysical Survey.

b. Progress payments and final payment for this Item.

1.02 SUBMITTALS

A. The **Contractor** shall provide, immediately upon completion, three (3) paper field copies of the log upon completion of the survey to the **Engineer** for interpretation.

B. The **Contractor** shall provide, a copy of the survey results in DXF format and a pdf on a thumb drive or emailed within 4 hours of upon completion of logging to the **Engineer** for interpretation.

PART 2 PRODUCTS

2.01 PRE-APPROVED FIRMS

A. The following firms are pre-approved by the **Owner** to conduct geophysical and other borehole surveys; no other firm shall be used unless approved by the **Owner**. The **Contractor** shall show the approved firm in the Subcontractor's list provided as part of the Bid Package:

1. Pacific Surveys, LLC. 4456 Via St. Ambrose, Claremont CA, 95741, (800) 919-7555, located in Grass Valley, CA.
2. Dewey Data Inc, 1634 W Alpine Ave, Stockton, CA 95204, (209) 942-0480
3. NorCal Geophysical Consultants Inc., 321 Blodgett Street, Suite A, Cotati, CA, 94931, (707) 796-7170
4. Or Approved Equal.

B. The **Contractor** may list another subcontractor on the Bid Package other than that listed above provided:

1. The **Contractor and proposed subcontractor** provides the **Owner** with the documentation that clearly shows that the proposed firm will provide equivalent services, products, and equipment for all the surveys specified in this and related technical specifications.

2.02 COMPONENTS

A. Electric Logs

1. The electric logs shall consist of a spontaneous potential, single point, 16-inch normal, and 64-inch normal resistivity curves.
2. The anticipated horizontal scale for the printed plots of the spontaneous potential shall be 20 millivolts per inch. The anticipated horizontal scale for the plot of the 16-inch normal, 64-normal is 40 ohmmeter^2/meter per inch.
3. The vertical scale for all printed plots of logs shall be 20 feet per inch.

2.03 EQUIPMENT

A. Guard tools shall be used at Site to capture greater resolution of potentially thin sand and gravel beds.

B. The logging shall be run using digital logging equipment recording both real time and on analog paper. Analog paper copies will be produced after the actual logging.

C. Digital information is to be stored on a thumb-drive or emailed to the **Engineer**.

2.04 SOURCE QUALITY CONTROL

A. Calibration

1. The well surveying Company is required to present proof of the last equipment calibration. This calibration must be printed on each log at the time of run. The

calibration date should not be greater than fourteen days prior to the date of the surveying.

B. Logging Reports

1. All logs and heading shall comply with the API RP-38 standards for format and log scales. All pertinent well data is to be recorded on log headings.
2. The electric conductivity of the mud and mud filtrate shall be measured and entered onto each log.

PART 3 EXECUTION

3.01 PROCEDURES

A. Geophysical Logging

1. Upon completion of the borehole, digital geophysical logs shall be run by a firm specializing in Geophysical Logging retained by the **Contractor** and approved by the **Owner**.
2. Before running geophysical logs, the **Contractor** shall cease drilling and circulate fluid for not less than one hour.
3. The logs will be run in the presence of the **Owner or Engineer**. The geophysical logs shall become the property of the **Owner** at the time the logging is completed.
4. The maximum logging speed for all logs shall be 40 feet per minute.
5. The logging run may be repeated for 10% to 50% of any portion of the logged hole as directed by the **Owner** or **Engineer** or **Resident Project Representative**. If run, the repeat section shall be shown on the final log.
6. The **Contractor** shall be required to provide whatever assistance may be necessary to accomplish the geophysical logs; this includes reaming the borehole should logging equipment fail to reach the bottom.
7. The **Contractor** shall perform necessary measures during the geophysical logging to insure the stability and preservation of the bore hole.
8. If logging information indicates that the completion of a particular well is not warranted, the **Owner** reserves the right to terminate further work on the well.

END OF SECTION

SECTION 331113.200

CALIPER SURVEY

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. This section describes the Caliper Survey to be completed by the geophysical logging firm retained by the **Contractor** and approved by the **Owner** to accurately measure the diameter of the borehole and the conductor casing over their entire lengths. The firm retained by the **Contractor** for Caliper Surveying shall be listed in the BID PACKAGE as a **Subcontractor** and shall be the same as that used to conduct geophysical surveys per Section 331113.180: Geophysical Surveys.

B. Purpose

1. The caliper survey is to measure the borehole diameter for the purpose of evaluating whether the borehole is acceptable or unacceptable, for being under or oversized, and to determine final gravel pack and/or annular sealing material volumes.

C. Related Sections:

1. Section 331113.141: Pilot Borehole and Reaming Drilling
2. Section 331113.160: Drilling Fluid
3. Section 331113.180: Geophysical Surveys
4. Section 331113.201: Gyro/Directional Survey

D. Measurement and Payment

a. The unit for this work/service is Lump Sum and includes any incidentals thereof.

b. Measurements of the service provided shall consist of all surveys completed as recorded by the **Engineer**. If more or less logging is completed than stated in this specification, measurement for payment shall be proportioned accordingly; proportion shall be as agreed upon by the **Contractor** and **Owner** or **Engineer**.

2. Payment

a. Unit price for payment shall be as set forth in the BID SCHEDULE for Item No. 8, Caliper Survey.

b. Progress payments and final payment for this Item.

c. There will be no additional payment for rig time or idle time while logging is being run. No standby time will be paid for an additional 3-hour period after all surveys are received by the **Owner or Engineer**.

1.02 SUBMITTALS

A. The **Contractor** shall provide, immediately upon completion, three (3) paper field copies of the log upon completion of the survey to the **Engineer** for interpretation.

B. The **Contractor** shall provide, a copy of the survey results in DXF format and a pdf on a thumb drive or emailed within 4 hours of upon completion of logging to the **Engineer** for interpretation.

PART 2 PRODUCTS

2.01 EQUIPMENT

A. Caliper

1. The caliper used to perform the survey shall have a minimum of three arms and be capable of measuring a borehole diameter of at least 48 inches.

2. The horizontal scale for the caliper plot shall be 4-inches diameter per inch and the vertical scale shall be 20 feet per inch.

PART 3 EXECUTION

3.01 CONSTRUCTION

A. Sequences of Operations

1. Survey (general)

a. Upon completion of the final reamed borehole, a caliper survey shall be conducted.

b. The caliper survey shall become the property of the **Owner** at the time the logging is completed. The log will be run in the presence of the **Engineer or Resident Project Representative**.

c. The **Contractor** shall provide, immediately upon completion, three (3) field copies of the log to the **Owner or Engineer** for interpretation upon completion of logging.

d. The logging speed for the caliper survey shall be a maximum of 30 feet per minute.

2. Survey Evaluation

a. The **Owner** shall evaluate the caliper survey as given below:

1) Undersized Borehole

(a) If at any point in the borehole the minimum annular space between the proposed well casing and/or screen sections and the borehole wall is less than four (4) inches, the borehole will be considered unacceptable for completion.

(b) If the borehole is determined to be undersized by the **Engineer**, the **Contractor** shall ream the borehole at no additional cost to the **Owner** to achieve an acceptable borehole diameter at all locations.

(i) At the completion of the reaming or re-reaming, a caliper survey shall be conducted and the borehole evaluated once again by the **Engineer**.

(ii) Reaming and caliper surveying shall continue, at no additional cost to the **Owner**, until the borehole has been deemed either acceptable or permanently unacceptable to the **Engineer**

2) Oversized Borehole

(a) If after assessment by the **Engineer** of any caliper survey and with the concurrence from **Owner** the borehole is judged to be oversized, which could jeopardize successful filter pack placement or well development, the borehole may be considered permanently unacceptable.

(b) The borehole shall be considered oversized if the caliper survey shows the diameter to be greater than the diameter of the borehole as shown on the Plans plus ten (10)-inches in the screened portions of the well.

3) Permanently Unacceptable Borehole

(a) If in the judgement of the **Owner**, a borehole is deemed permanently unacceptable, the **Owner** shall be required to drill a replacement well at a new location on the site.

(b) The **Contractor** shall bear all additional costs for the proper abandonment of the permanently unacceptable borehole and the drilling of the new borehole.

b. The **Contractor** shall be required to provide whatever assistance may be necessary to the firm conducting the survey to accomplish the caliper survey.

END OF SECTION

SECTION 331113.201

GYRO/DIRECTIONAL BOREHOLE SURVEY

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. This section describes the gyro/direction borehole survey to be completed by the firm retained by the **Contractor** and shall be the same as that used to conduct geophysical surveys per Section 331113.180 Geophysical Surveys. The survey is to accurately measure the pilot and reamed borehole plumbness from the bottom to the top of the borehole.

B. PURPOSE

1. The purpose of the plumbness survey is to see that the borehole generally conforms to the AWWA Standard A100-20. It is understood that the final plumbness and alignment tests of the well may produce different results than the results of the borehole. This borehole plumbness survey does not replace the final well plumbness and alignment tests to be completed following the construction of the well. It is understood that the final plumbness and alignment tests of the well may produce different results than the survey results of the borehole.

C. RELATED SECTIONS

1. Section 331113.141 Pilot Borehole Drilling and Reaming
2. Section 331113.180 Geophysical Surveys
3. Section 331113.260 Plumbness and Alignment Tests

D. MEASUREMENT AND PAYMENT

1. MEASUREMENT
   a. The unit for this work/service is lump sum and includes any incidentals thereof.
   b. Measurements of the service provided shall be per completed log, from within 10 feet of the bottom of the borehole to the top of the borehole.
   c. There will be no additional payment for rig time or idle time while logging is being run. No standby time will be paid for an 8-hour period after the logs are received by the **Engineer** and he interprets the logs.
2. PAYMENT
   a. Payment shall be LUMP SUM as set forth in the Bid Schedule for Item No. 5, Gryo/Deviation Borehole Survey.

1.02 SUBMITTALS

A. The **Contractor** shall provide, immediately upon completion, three (3) paper field copies of the log and a DXF format and pdf copy on a thumb drive or emailed within 4 hours of completion to the **Engineer** for interpretation upon completion of logging.

PART 2 PRODUCTS

2.01 EQUIPMENT

A. GYRO/DIRECTION SURVEY

1. The caliper used to perform the survey shall be a 4-Arm deviation tool and be capable of indicating a borehole diameter to 48 inches.
2. The horizontal scale for the caliper plot shall be 4 inches in diameter per inch and the vertical scale shall be 20 feet per inch.

PART 3 EXECUTION

3.01 SEQUENCES OF OPERATIONS

A. SURVEY (general)

1. Upon completion of the pilot borehole, a gyro/direction survey shall be conducted, logged out from bottom.
2. The gyro/direction survey shall become the property of the **Owner** at the time the logging is completed. The log will be run in the presence of the **Engineer**.
3. The **Contractor** shall provide, immediately upon completion, three (3) field copies of the log and a copy of the survey results in DXF format and a pdf on a thumb drive or emailed within 4 hours of upon completion of logging to the **Engineer** for interpretation upon completion of logging.
4. The logging speed for all logs shall be not greater than 40 feet per minute, unless otherwise approved by the **Engineer**.

B. Survey Evaluation

1. The **Engineer** will evaluate the gyro/direction survey as given below:
   a. Out of Plumb Borehole
      1) If at any point in the borehole, the plumbness shall not exceeds two thirds (2/3) the borehole diameter per 100 feet, the remainder of the borehole is considered unacceptable for completion.
      2) When the borehole has been assessed and found to be out of plumb by the **Engineer**, the **Contractor** shall take action to straighten the borehole at no additional cost to the **Owner** to achieve an acceptable deviation.
         (a) At the completion of the straightening the hole, a second gyro/direction survey shall be conducted and the borehole evaluated once again by the **Engineer**.
         (b) Borehole straightening shall be completed at no additional cost to the **Owner** and shall end when the borehole has been deemed either acceptable or *permanently unacceptabl*e to the **Engineer**.

b. *Permanently Unacceptable Borehole*

1) If, in the judgement of the **Engineer**, and based on the geometry survey, a borehole is deemed *permanently unacceptable,* the **Contractor** shall be required to drill a replacement boring at a new location on the site.

2) The **Contractor** shall bear all additional costs for the proper abandonment of the *permanently unacceptable borehole* and the drilling of the new borehole.

2. The **Contractor** shall be required to provide whatever assistance may be necessary to the firm conducting the survey to accomplish the gyro/direction survey.

END OF SECTION

SECTION 331113.260

PLUMBNESS AND ALIGNMENT TESTS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes

1. This section includes the products, materials, and procedures/services associated with plumbness and alignment tests, reporting, and evaluation for the constructed well. The **Contractor** shall secure the services of a firm approved by the **Owner** to conduct the surveys.

2. The **Engineer** shall be present to witness the plumbness and alignment tests of the well. The **Contractor** shall notify the **Engineer** at least 48 hours prior to performing the plumbness and alignment tests.

B. Purpose

1. The general purpose for the plumbness and alignment test is to ensure that the well will permit the proper installation and long-term operation of permanent pumping equipment installed in the well.

C. Measurement and Payment

1. Measurement

a. The unit for this work/service is Lump Sum and includes any incidentals thereof.

b. There will be no payment for rig time or idle time while tests are being run.

2. Payment

a. Unit price for payment shall be as set forth in the BID SCHEDULE for Item No. 18 Plumbness and Alignment, full length of pump chamber.

b. Progress payments and final payment for this Item.

1.02 SUBMITTALS

A. The **Contractor** shall provide, immediately upon completion, three (3) paper field copies of the gyroscopic survey log upon completion of the survey to the **Engineer** for interpretation. The log shall provide a display of the misalignment and effective diameter at 190 feet below ground surface, or as specified by the **Engineer**.

B. The **Contractor** shall provide, a copy of the survey results in DXF format and a pdf on a thumb drive or emailed within 4 hours of upon completion of logging to the **Engineer**.

1.03 REFERENCES

1. ANSI/AWWA A100-20, Standard for Water Wells; Section 4.7.9 Well Construction

1.04 QUALITY ASSURANCE

A. The completed well shall be constructed round, plumb, and true to line as defined in AWWA A100-20 Standard for Water Wells and/or as specified herein.

B. Testing Tolerances

1. Plumbness Tolerance:

a. For the entire well, from ground surface to the total depth of the well, the maximum allowable horizontal deviation (drift) of the well from vertical shall not exceed 6-inches per 100 feet.

b. Determination of drift shall be as specified in ANSI/AWWA A100-20, Standard for Water Wells, Appendix D, Section D4.

2. Alignment Tolerances:

a. The maximum misalignment, or "dogleg," permissible is one that will allow a 40-foot long section of pipe or a dummy, to pass freely through it. The outside diameter of the pipe or dummy shall be no smaller than 1/2-inch less than the inside diameter of the casing being tested.

b. Pipe or dummy outside diameter shall be no less than 15-inches.

3. Depth of Applied Tolerances:

a. The depth for the alignment test shall be the total length of the well pump chamber, i.e. to the top of the first screened interval of the well, the depth for the plumbness test shall be the full depth of the well.

4. Failure to Meet Tolerances:

a. Should the pipe or dummy fail to move freely through the length of the casing or should the well vary from the vertical in excess of 6-inches per 100 feet, it shall be corrected by the Contractor at his expense and, should he fail to correct such faulty alignment or plumbness, the Owner may refuse to accept the well.

PART 2 PRODUCTS

2.01 EQUIPMENT

A. Digital Gyroscopic Deviation Probe for Plumbness Testing:

1. The **Contractor** shall provide a digital gyroscopic deviation probe to measure casing inclination and direction of drift. The equipment, service, and subsequent calculation shall be provided by the same subcontractor used for geophysical logging, or approved equal.

B. Pipe or Dummy for Alignment Testing:

1. Pipe section when used for testing shall have an outside diameter of no less than 15-inches, and a length no less than 40 feet.

2. Dummy pipe section, when used for testing, shall have a minimum of three (3) rings, each 12 inches wide, located at the top, bottom, and center on a rigid frame.

3. The dummy shall be made of a rigid spindle of 4-inch diameter extra heavy pipe with three rings rigidly fixed to the pipe so that they cannot move longitudinally along the pipe. The rings shall be truly cylindrical. The rings shall consist of

suitable material which will not harm the interior of the casing while being lowered or raised.

PART 3 EXECUTION

3.01 CONSTRUCTION

A. Sequences of Operations

1. Alignment Test:

   a. The **Contractor** shall lower a pipe or dummy section down the entire length of the blank casing up to the top of the first screen. Should the dummy fail to move freely throughout the entire length of the blank casing up to the top of the first screen; the **Contractor** shall undertake corrective measures at his own expense.

2. Plumbness:

   a. The test for plumbness shall be made with a digital gyroscopic deviation probe:

      1) The logging firm shall provide station depth, inclination, azimuth, true vertical depth, departures and plane of closure (displacement) calculations per methods approved by API.

      2) Reports of the logging shall include plan, vertical, three-dimensional views of the casing in color, an effective diameter plot at 190 feet or as specified by the Engineer, and at any doglegs and be provided in electronic format for viewing.

      3) The survey shall be completed to the entire depth of the well.

3. The **Contractor** shall guarantee that the well, when completed, shall be sufficiently aligned and plumb for the free installation and operation of a vertical line shaft turbine pump with 10-inch diameter bowls.

END OF SECTION

SECTION 331113.280

WELL CASING AND SCREEN

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. This work includes all materials, labor, tools, and equipment to furnish and install well casing and screen as specified for a gravel packed well concentric within the drilled and accepted borehole for the constructed well.

B. Related Sections

1. Section 331113.141: Pilot Borehole and Reaming Drilling
2. Section 331113.260: Plumbness and Alignment Tests

C. Measurement and Payment

1. Measurement

a. The unit for this work is Linear (vertical) feet of blank or screen casing installed. The value for payment shall be as measured to the nearest foot. Measurement shall be as taken of each type of casing installed from the top to bottom.

2. Payment

a. Unit prices for payment of blank and screen sections shall be as set forth in the Bid Schedule for Items:

Item No.	Item
9	16-inch O.D. x 1/4-inch Wall 0.2% Copper Bearing Blank Well Casing
10	16-inch O.D. x 1/4-inch Wall 0.2% Copper Bearing Louvered Well Screen

b. Progress payments and final payment for these Items.

1.02 REFERENCES

A. ASTM - American Society of Testing and Materials

B. AWS - American Welding Society Standards

1.03 SUBMITTALS

A. The **Contractor** shall submit cut sheets from the well casing manufacturer for the well casing and screen as specified in this specification and as shown on the Plans, Sheet CG-01, for the approval by the **Owner**.

B. The **Contractor** shall provide documentation that the screen meets the material specification described below. As a minimum the mill test reports, certificate of compliance, calculations used to determine collapse strength and safe hanging weight, and a description of the cleaning process used on the casing and screen shall be submitted for the approval by the **Owner**.

C. The **Contractor** shall submit the welding certifications for their employees who will weld the casing and screen together for shielded arc electrodes in accordance with an approved American Welding Society (AWS) Standards for the types and positions of welding proposed.

PART 2 PRODUCTS

2.01 MATERIALS

A. Blank Casing (Corrosion Resistant Copper Bearing Steel)

1. All steel casing, plate, and caps shall be new, and shall be manufactured by the Roscoe Moss Company, 4360 Worth Street, Los Angeles, Ca. 90063, (323) 263-4111 or approved equal.

2. The well casing and cover plate shall be manufactured in accordance with ASTM A 139 Grade B applicable parts with the following additions.

   a. Requirements for hydrostatic testing shall be waived.

   b. The steel from which the casing is manufactured shall contain not less than 0.20% copper (Cu) by ladle analysis.

3. Casing joints shall be machined perpendicular to the casing axis and furnished with a collar for field welding. Collars shall be welded to the top of each section at the factory:

   a. Welding collars shall be the same thickness and have the same chemical and physical properties as the corresponding casing section, shall be a minimum of five (5) inches in width with all collars being the same width, rolled to fit the outside diameter, and welded to the casing section. Three alignment holes shall be drilled or punched in each collar to insure proper joining of the sections.

   b. The inside edge of the collars and the outside edge of the adjacent casing length shall be ground or sufficiently scarfed to remove sharp edges or burrs.

   c. Section ends shall be machined flat perpendicular to the axis of the casing and shall not vary more than 0.010-inches (10 thousands of an inch) at any point from the true plane at right angles to the axis of the casing.

   d. Diametrical clearance (out of roundness) between casing O.D. and collar I.D. shall be 1/16 inch plus or minus 1/32-inch.

4. A SE type (bull nose) end cap shall be provided on the bottom of the well. The end cap shall be of the same thickness and material as the well casing it is welded to.

B. Well Screen (Louvered Slot)

1. All screens and material shall be new and shall be manufactured by the Roscoe Moss Company, 4360 Worth Street, Los Angeles, Ca 90063, (323) 263-4111 or approved equal.

2. The screen shall:

   a. be 16-inch outside diameter with 1/4-inch wall thickness.

   b. have a 0.050-inch slot size with a Ful Flo perforation pattern.

   c. The steel from which the casing is manufactured shall contain not less than 0.2% copper (Cu) by ladle analysis and shall meet ASTM A 139 Grade B.

3. Well screen joints shall be machined perpendicular to the casing axis and furnished with a collar for field welding. Collars shall be welded to the top of each section at the factory:

   a. Welding collars shall be the same thickness and have the same chemical and physical properties as the corresponding casing section, shall be a minimum of five (5) inches in width with all collars being the same width, rolled to fit the outside diameter, and welded to the casing section. Three alignment holes shall be drilled or punched in each collar to insure proper joining of the sections.

   b. The inside edge of the collars and the outside edge of the adjacent casing length shall be ground or sufficiently scarfed to remove sharp edges or burrs.

   c. Section ends shall be machined flat perpendicular to the axis of the casing and shall not vary more than 0.010-inches (10 thousands of an inch) at any point from the true plane at right angles to the axis of the casing.

   d. Diametrical clearance (out of roundness) between screen O.D. and collar I.D. shall be 1/16 inch plus or minus 1/32-inch.

C. Centralizers

1. Arrangement/Alignment: three (3) centralizers (steel guides) shall be welded to casing sections, 120 degrees apart and each guide shall lie within the same horizontal plane and vertical alignment.

2. Fabrication: The centralizers shall be 2-inches wide by a ¼ inch thick by minimum 12-inch long (bearing surface) with a minimum 3-inch distance from the well casing.

3. Materials: The centralizers shall be fabricated from same material as the adjoining casing.

PART 3 EXECUTION

3.01 GENERAL

A. The well casing assembly shall be installed as shown on the Plans or as directed by the **Owner**. Each casing joint shall be welded water-tight.

3.02 SCHEDULE

A. Within 2 days of completion of the geophysical survey, the **Engineer** will provide the **Contractor** with a written schedule for the final positioning and depths of the screen, blank sections, gravel feed pipe, and seals.

3.03 JOINTS

A. All joints for the casing shall be properly lap-welded during installation with a minimum of two continuous passes per circumference.

B. All other joints shall be welded with a minimum of two passes.

C. All alignment holes shall be completely filled by welding.

D. Welders shall be certified in accordance with AWS B2.1:2000, Specification for Welding Procedure and Performance Qualification (supersedes AWS 010.9-80) for level AR-1 and shall be qualified in the 2G and 5G positions or the 6G position.

3.04 SEQUENCES OF OPERATIONS

A. Upon completion of the drilling and/or reaming, evaluation of the geophysical and caliper surveys, and approval from the **Owner or Engineer** that the borehole is acceptable, the **Contractor** may proceed with the construction of the well.

B. The **Contractor** shall reduce the drilling fluid viscosity to below 31 second per quart (sec./qt.) by Marsh funnel and density to less than 8.9 pounds per gallon (lbs./gal).

   a. Fluid properties shall be changed by the addition of fresh water. Care should be exercised to avoid setting up a density inversion in the borehole between the drilling fluid and the fresh water.

   b. Circulation shall be commenced using fluid from the mud tanks having the same viscosity as the conditioned fluid.

   c. Circulation shall be maintained for at least 30 minutes following the measured change in the drilling fluid.

   d. This fluid property change may precede or follow the required caliper survey.

C. Prior to running casing, the **Contractor** shall install a tremie pipe below the total depth of the casing assembly to be installed. The **Contractor** shall then establish circulation through the tremie pipe with a pump. Installation of the casing and appurtenances shall proceed with circulation through the tremie pipe continuing during the installation. The installation shall be by methods that will ensure no damage to casing, screen, borehole, or other appurtenances will occur.

D. The permanent gravel feed pipe shall be installed and properly located in the borehole as shown in the Plans prior to the installation of any well casing. The gravel fill pipe shall remain empty at all times. The **Contractor** shall **not** add filter pack or any other material through the fill pipe until approval is given by the **Engineer** — see Section 331113.340: Well Development.

E. Placement: Centralizers shall typically be placed as follows along the casing string:

   a. Above and below each well screen section and not more than every 80 feet.

   b. Centralizers shall not be placed onto the louvered well screen.

   c. Centralizers shall be placed above and below each well screen section.

F. The use of floatation plugs to land and set the well string will not be permitted.

G. The well casing string shall be suspended in tension from the surface by means of an appropriate hanger or clamp. The bottom of the casing shall be at a sufficient distance above the bottom of the borehole as to ensure that none of the casing will be supported from the bottom of the hole.

H. The **Contractor** shall verify that the total weight of the casing string is supported by the drill rig and have the **Owner** or **Engineer** observe the dial weight indicator.

I. The casing clamp or appropriate hanger shall remain as part of the well securely welded to the well casing and conductor casing.

J. If, for any reason, the casing cannot be landed in the correct position or at a depth acceptable to the **Owner,** the **Contractor** shall remove the casing and ream the borehole. In no event shall the **Contractor** attempt to drive or "spud" the well string.

K. The well casing shall be completed to a height of three (3)-feet above ground surface. The gravel feed pipe shall be completed to a height of two (2)-feet above ground surface.

L. If for any reason the casing cannot be placed in the correct position, or at a depth acceptable to the **Owner**, the **Contractor** shall construct another well immediately adjacent to the original location and complete this well in accordance with the plans and specifications at no additional cost to the **Owner**. The abandoned hole shall be properly sealed in accordance with all local and State Standards at the **Contractor's** expense.

M. If any of the casings should collapse prior to well completion, they shall be withdrawn and replaced at the **Contractor's** expense, or the **Contractor** shall replace the well.

N. All work required to be repeated, and all additional materials, labor, and equipment required, shall be furnished at the expense of the **Contractor** and no claim for additional compensation shall be made or be allowed therefore, except as specifically provided herein.

3.05 FIELD QUALITY CONTROL

A. Preliminary Plumbness and Alignment Survey

1. Preliminary test to assess the plumbness and alignment of the well string are recommended. The **Contractor** may elect to perform such test prior to the installation of the gravel pack to determine if the well is within the tolerances for plumbness and alignment; thus allowing for correction to occur before gravel installation. No additional payment shall be made for preliminary plumbness and/or alignment surveys.

2. Such tests shall not be a substitute for final test required under Section 331113.260: Plumbness and~~&~~ Alignment Tests.

END OF SECTION

SECTION 331113.300

GRAVEL FILL PIPE

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. This work includes all materials, labor, tools, and equipment to install the gravel fill as specified.

B. Related Sections:

1. Section 331113.280: Well Casing and Screen

C. Measurement and Payment

1. Measurement

a. The unit for this work is Linear Feet (vertical) of gravel fill pipe installed. The value for payment shall be measured to the nearest foot. Measurement shall be as taken on installed pipe from the top to bottom.

2. Payment

a. Unit prices for payment gravel fill pipe shall be as set forth in the BID SCHEDULE for item:

1) Item No. 11 – 3-inch Dia. Gravel Fill Pipe, Sch. 40 Black Steel Pipe.

b. Progress payments and final payment for these Items.

1.02 REFERENCES

A. AWS - American Welding Society Standards

B. ASTM - American Society of Testing and Materials

1.03 SUBMITTALS

A. The **Contractor** shall provide manufacturer's data showing compliance to both the physical and chemical properties specified for the new gravel fill pipe for approval by the **Owner**.

B. The **Contractor** shall submit the welding certifications for shielded arc electrodes in accordance with an approved American Welding Society (AWS) Standards for the types and positions of welding proposed.

PART 2 PRODUCTS

2.01 MATERIALS

A. Gravel Fill Pipe

1. The gravel fill pipe shall be three (3) inches in diameter (nominal). The gravel fill pipe shall be black carbon steel pipe conforming to ASTM A53, Type E or S, or ASTM A135. Pipe shall be standard weight (Schedule 40) per ANSI B36.10.
2. The gravel fill pipe sections may be fitted with welding collars or field butt-welded per the AWS standards.
3. All joints shall be free of burrs inside and out and be water-tight.

PART 3 EXECUTION

3.01 INSTALLATION

A. Welders shall be certified in accordance with AWS B2.1:2000, Specification for Welding Procedure and Performance Qualification (supersedes AWS 010.9-80) for level AR-1 and shall be qualified in the 2G and 5G positions or the 6G position.

B. The gravel fill pipe shall be installed per Section 331113-280: Well Casing and Screen and shall be keep clear at all time.

C. All pipe joints shall be properly lap-welded or butt-welded during installation with a minimum of two continuous passes per circumference and be welded to be water-tight.

D. The gravel fill shall be positioned (orientated) as shown on the Plans, Sheet CG-01 or as directed by the **Owner** or **Engineer**.

END OF SECTION

SECTION 331113.320

FILTER PACK

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. This work includes all materials, labor, tools, and equipment to install and maintain the filter envelope (pack) as specified until the well is acceptable by the **Owner**.

B. Related Sections:

1. Section 331113.160: Drilling Fluid
2. Section 331113.200: Caliper Survey
3. Section 331113.340: Well Development

C. Measurement and Payment

1. Measurement

a. The unit for this work is Linear (vertical) Feet of filter pack installed and shall be based on measurement from the bottom of the borehole up and shall include payment. Measurement for payment shall be rounded to the nearest foot.

2. Payment

a. Unit prices for payment the filter envelope shall be as set forth in the BID SCHEDULE for Item No. 12 – Filter Pack.

b. Progress payments and final payment for this Item.

1.02 SUBMITTALS

A. Prior to filter packing operation:

1. A copy of the approved NSF-61 certification for the filter pack must be submitted to the **Engineer** at the preconstruction conference.
2. A sample of the filter pack must be submitted to the **Engineer** at the preconstruction conference.
3. The **Contractor** shall submit a written estimate of the volume of filter pack material to be installed in the well annulus based on a 30-inch diameter borehole, and adjusted at the completion of the caliper survey.

1.03 DELIVERY, STORAGE, AND HANDLING

A. The filter pack material, if stockpiled on site, shall be separated from the adjacent ground and kept free of all foreign matter at all times.

PART 2 PRODUCTS

2.01 MATERIALS

A. Filter Pack

1. All filter pack shall be hard, water worn sand or gravels, washed clean of shale, mica, clay, dirt, loam and organic impurities of any kind (crushed gravel will not be accepted). The materials shall be mostly siliceous with a limit of five-percent by weight of calcareous material. It shall be well rounded and graded.

2. All gravel is subject to approval by the **Engineer** prior to use in the packing process. For bidding purposes:

3. The gravel pack material shall be:

   a. #6 gravel or approved equal based on sieve analyses performed on sediments obtained during drilling.

4. Upon delivery to the well site, the **Engineer** shall inspect and verify the gravel before it is installed in the well.

2.02 EQUIPMENT

A. A gravel pump or gravity feed system will be required to install the filter pack. A gravel hopper as part of an approved filter pack installation system shall be employed to measure the material placed downhole.

B. A device approved by the **Engineer** shall be used to sound the level of the filter pack throughout the placement of the filter pack.

PART 3 EXECUTION

3.01 PROCEDURES

A. Filter Pack Placement

1. The **Contractor** shall supply the devices required to measure the volume of material placed in the well as submitted and approved in the filter pack installation system.

2. Prior to placement of the filter pack, the drilling fluid shall be thinned with clean water. Initial circulation of fluid will be accomplished through the tremie pipe. The drilling fluid viscosity must be 26 to 30 sec./qt. Marsh funnel viscosity and the drilling fluid density must be below 9.1 lbs./gal. before gravel packing commences. Refer to Section 02523-160: Drilling Fluid.

3. Filter Pack Sterilization:

   a. The filter pack shall be sterilized by continuously mixing at least one (1) gallon of liquid five and one-half percent (5½%) sodium hypochlorite per 100 cubic feet of gravel as it is placed in the well. Regular household bleach, or liquid pool chlorine may be used, but the use of "ultra" or fragranced bleach will not be allowed.

4. The filter pack shall be installed in the annular space between the borehole wall and the casing through a tremie pipe from the bottom of the borehole.

   a. At no time shall the bottom of the tremie pipe be greater than 40 feet above the top of the gravel during gravel installation.

5. The filter pack placement shall continue uninterrupted until the height of the envelope reaches the depth of the transition seal.
6. The quantities of filter pack initially placed around the casing and screen assembly shall not be less than the computed volume of the annular space as determined by the **Contractor** and **Engineer** from the caliper survey.
    a. A quantity less than the computed value may be judged as an indication of voids and corrective measures may be required by the **Contractor**.
    b. If a difference between the estimated and actual volume of filter pack installed is found to exist, the discrepancy may be grounds for rejection of the well by the **Owner**.
7. After placement of the filter pack and upon permission from the **Engineer**, the **Contractor** may continue with the placement of the transition and annular seals as specified.

END OF SECTION

SECTION 331113.330

ANNULAR SEALS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. This work includes all materials, labor, tools, and equipment to install annular seals as specified.

B. Related Sections

1. Section 331113.160: Drilling Fluid

C. Measurement and Payment

1. Measurement

a. The unit for this work is Linear (vertical) Feet of annular seal and transition seal installed and shall be based on measurement from the bottom of the seal to the top of the seal, respectively for any given annular seal. Measurements for payment shall be rounded to the nearest foot.

b. No standby time will be paid for the 24-hour period following placement of the annular seal.

2. Payment

a. Unit prices for payment for the annular seals shall be as set forth in the BID SCHEDULE for:

1) Item No. 13 – Annular and Transition Seals

b. Progress payments and final payment for this Item.

1.02 DEFINITIONS

A. Annular Seal - Seals the annular space between the well casing and the borehole and the space between the well casing and the surface casing.

B. Transition Seal - Used to prevent intrusion of sealing material into the filter pack.

1.03 SUBMITTALS

A. The Contractor shall submit the positive placement technique which will be employed to place the annular seal for approval. The submittal shall include the equipment, appurtenances, and techniques proposed for placement of the seal under positive pressure.

B. Bentonite manufacturer's product sheet and Safety Data Sheet.

C. Delivery receipts for commercially prepared and supplied sealing material placed for the sanitary seal shall be provided to the **Owner** or **Engineer** at the time of delivery to the site and for approval prior to installation by the **Contractor**. In order to avoid rejection of trucks the cement suppliers are required to show on each batch slip: 10.3 sack sand cement, sand cement ration less than or equal to 2:1, by weight and the water content (between 4.5 and 7 gallons per sack).

PART 2 PRODUCTS

2.01 MATERIALS

A. Sealing Material

1. Sand-Cement Sealing Material: A sand-cement sealing material shall be used for the annular seal.

a. Sand-Cement "grout": Sand-cement shall be mixed at a ratio of not more than 188 pounds of sand to one 94-pound sack of Portland cement (2 parts sand to 1 part cement, by weight) to 7 gallons of clean water, where Type I or Type II Portland cement is used. This is equivalent to a "10.3 sack mix."

b. Cement: Cement used shall meet the requirements of American Society for Testing and Materials C150, Standard Specification for Portland Cement, including the latest revisions thereof.

c. Water: Water used to prepare sealing mixtures or added on site should be of drinking water quality, shall be compatible with the type of sealing material used, be free of petroleum and petroleum products, and be free of suspended matter. The quality of water to be used for sealing mixtures shall be determined where unknown.

d. Mixing: Cement-based sealing materials shall be mixed thoroughly to provide uniformity and ensure that no lumps exist.

2. Variations: Special cement setting accelerators and retardants and other additives may be used in some cases. Additives for Portland cement mixtures shall meet the requirements of ASTM C494, Standard Specification for Chemical Admixtures for Concrete, including the latest revisions thereof. ASTM C150 Type I cement is equal to API Class A cement. **Owner** and **Environmental Health Department Services** approval of variations must be received prior to Mobilization.

B. Transition Seal

1. The transition seal shall consist of a 1 to 1 ratio of sand and bentonite.

2. The bentonite shall be Holeplug, Quik-Grout or Benseal by Baroid or approved equal.

PART 3 EXECUTION

3.01 CONSTRUCTION

A. Transition Seal

1. Transition seal shall be composed of a ten (10) foot thick bentonite and sand mixture and shall be placed on top of the filter pack as shown on the Plans, Sheet CG-01.

3.02 PROCEDURES

A. After approval from the **Engineer** to proceed with the gravel envelope placement, the **Contractor** shall construct a transition seal prior to placement of the annular seal.

B. Placement of the Transition Seal:

1. Transition seals shall be installed using a tremie pipe.
2. The top of the transition seal shall be sounded to ensure that no bridging occurred during placement. Sounding shall occur before and after placement of transition seal.
3. The transition seal shall be allowed to hydrate for a minimum of 1-hour before placement of the annular sealing material.

C. Annular Seal Placement

1. The **Contractor** shall request inspection of the annular seal from the Environmental Management Department inspector at least 1 working day in advance of setting the annular seal.
2. After placement of the transition seal, sounding of the seal's top, and approval by the **Engineer**, the **Contractor** shall place the annular seal from the top of the transition seal to the existing ground surface. The tremie pipe must be within 10 feet of the transition seal at the beginning of the annular seal placement.
3. The annular seals will be placed in lifts if deemed necessary by the **Contractor**. The top of each lift shall be measured and documented before starting the next lift.
4. The **Contractor** shall employ a positive placement technique.
5. The tremie pipe shall be gradually withdrawn as the sealing material is placed to prevent excessive pressures against the well casing. The end of the tremie pipe must remain submerged in sealing material during placement. Between lifts the tremie pipe shall be raised above the placed cement.
6. After the sealing material is placement, including time between placement of lifts, no work shall be conducted on the well for 24 hours.

END OF SECTION

SECTION 331113.340

WELL DEVELOPMENT

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. This work includes all materials, labor, tools, and equipment to conduct well development of the constructed well.

B. Purpose

1. The purpose of well development is to remove drilling fluids and residues and to develop the gravel pack and aquifer to maximize the yield and efficiency of each well.
2. The process shall consist of wire-line single swabbing and bailing; dual swabbing and airlift; the installation of an engine driven deep well turbine test pump; and pumping and surging of the well until the well is fully developed and meets the requirements of minimum sand production and maximum hydraulic efficiency.

C. Related Sections:

1. Section 331113.320 - Gravel Envelope
2. Section 331113.330 - Annular Seals

D. Measurement and Payment

1. Measurement
   a. The unit for Test Pump materials, installation and removal is Linear Feet (L.F.).
   b. The unit for Well Development and Pump Development is per HOUR of time as recorded by the **Engineer** in intervals of not less than one-half hour. The time recorded for well and pump development payment shall commence when the equipment installed in the well is placed in operation and shall end when the operation is stopped.
2. Payment
   a. Unit prices for well development shall be as set forth in the BID SCHEDULE for Items:

Item No.	Item
14	Well Development with Drill Rig
15	Install/Remove Test Pump
16	Pump Development

   b. Progress payments and final payment for these Items.
   c. No separate payment will be made for Aqua Clear PFD, should it be required for removal of lost circulation materials or drilling mud. Costs shall be distributed amongst the bid items above.

d. No payment will be made for running equipment into or out of the well during initial or preliminary development, other than for the test pump. No additional payment shall be made for filer pack added to the annulus if the filer pack envelope settles and requires that more filer pack be placed prior to final acceptance of well.

1.02 SUBMITTALS

A. The **Contractor** shall provide, the manufacturer's pump curve for the proposed pump to be used for pump development and aquifer testing to the **Engineer** at the pre-construction meeting.

B. The **Contractor** shall provide a traffic control plan, approved by the **Owner**, to the **Engineer** at the pre-construction meeting should the discharge pipes affect traffic lanes.

PART 2 PRODUCTS

2.01 EQUIPMENT AND MATERIALS

A. The **Contractor** shall provide a single swab and bailer on a wire line to preliminarily develop the well and remove any accumulated solids from the bottom of the well.

B. The **Contractor** shall provide sufficient drill pipe and mechanical combination a double rubber packer swab and air-lift assembly designed to be operated in the screen casing of the well. The equipment will be assembled in a manner that will allow simultaneous air-lifting and swabbing processes to occur. The pumping, swabbing, will be done between a double rubber disk packer assembly with the closet packers no more than 10 feet apart.

C. The outside diameter of the swab rubbers shall not be more than ¼-inch less than the ID of the well screen.

D. Discharge Line and Meter

1. The **Contractor** shall provide all the necessary valves, flow meters, sand testing equipment, and other incidental equipment required to accurately measure the flow rate, water levels in the well, sand production and time of pumping during well development including:

a. Furnish and install an in-line meter with a 6-digit straight reading totalizer, register in units of 100 gallons together with a rate of flow indicator dial, which reads in gallons per minute (gpm), and is suitable for a flow range of 0 to 700 gpm. A valving device shall be provided downstream of the flow meter to throttle the discharge to ensure an adequate water level for meter accuracy at low flow rates.

b. The installation of the flow meter and other appurtenance shall be per the manufacturer's recommendations; the meter shall be set at recommended minimum distances from elbows and valves.

c. The discharge line shall also include a tap with a valve for taking water samples not more than 20 feet from the well.

d. The **Contractor** shall provide a Rossum-type tester for measuring sand content.

e. Water level measurements shall be made with an electric water sounder marked on the cable to the nearest 0.01 foot.

E. Test Pump

1. The **Contractor** shall furnish a deep-well turbine type pump. The pump must be capable of pumping in excess of 500 gpm against an estimated 260 feet of head not including friction and other losses, and the bowl setting shall be at 290 feet below the ground surface. A satisfactory throttling device shall be provided so that the discharge can be reduced to 350 gpm.

F. Bariod "Aqua Clear PFD"

1. The **Contractor** shall furnish "Aqua Clear PFD", or approved equal, at a volume sufficient to remove drilling mud for the section for the total length between the top and bottom of the well screen interval.

PART 3 EXECUTION

3.01 PROCEDURES

A. Upon Approval of the **Engineer**, and not less than 24 hours or more than 48 hours after the placement of the annular seal, the **Contractor** shall initiate well development.

B. All water generated during development shall be placed into one temporary storage tank to remove solids and then disposed of to the storm drain system.

C. General Development Methods

1. Development is required to clean all drilling fluids, mud wall cake, and other substances from the envelope area to prevent any impairment of flow into the well.

a. Initial Development: The **Contractor** shall remove the drilling fluid from the well by using a swab and bailer to initiate flow into the well and to disperse "Aqua Clear PFD" or approved equal, to help break-down any drilling muds, if used.

b. Swab/Airlift Development: Cleaning shall be accomplished by airlift pumping and swabbing opposite the entire screened sections of the well until the filter pack has been cleaned and consolidated.

c. Pump Development: Final development will be performed with a deep well turbine pump with pump and surge techniques.

2. Initial Development

a. Bailing and swabbing (wire-line) shall be used within 48 hours after placement of the annular seal.

b. The water produced during the preliminary well development shall be placed into two temporary settling tanks prior to discharge.

c. Initial development shall be considered completed when water levels in the casing are similar to static groundwater levels in the area. This is proven by repeat water level measurement within one foot.

d. Upon completion of the initial development, “Aqua Clear PFD” or approved equal, shall be introduced into the well and swabbed to disperse into the filter pack and native formation to help break-down any lost circulation materials or drilling muds, if used. Aqua Clear PFD shall be placed into the well and allowed the remain for a minimum of 12-hours and a maximum of 24-hours, during which period the swab/airlift tools can be inserted into the well, and raised and lowered to provide further mixing of the solution with the well water.

e. Upon completion of the initial development, dual-swabbing and pumping can commence.

3. Swab/Airlift Development with Drill Rig

   a. During installation of the swabbing and air-lift pumping operations will be conducted from the bottom screen section to the top, but no more than the length of one (1) joint of drill pipe. Screen sections will be swabbed and air-lifted for a minimum of ten (10) minutes per foot of well screen.

   b. Swabbing and air-lift pumping operations shall then be conducted from the top screen section to the bottom, alternately over no more than the length of one (1) joint of drill pipe. Screen sections will be swabbed, pumped for a minimum of five (5) minutes per foot of well screen or until cleaned of all drilling fluids, and the clarity of the water and the amount of sediments in the water does not improve with time.

   c. During pumping, the drill pipe shall move slowly, up and down, to achieve a swabbing action and uniform pumping across the screen section.

   d. The **Contractor** shall check the filter pack level every four (4) hours during air-lift development.

   e. All water generated during swab/air-lift development shall be disposed to the storm drain after passing through a settling tank.

   f. Following completion of the swab/airlift development, the total depth of the well shall be gauged and any accumulated sediments or other materials shall be removed from the well.

4. Pump Development

   a. After the completion of swab/airlift development, the deep well turbine pump and piping assembly shall be installed. Development by pumping shall commence on a full-time basis within seven (7) days after completion of air-lift development.

      1) No foot valve shall be installed on the column pipe.

      2) No non-reverse ratchet shall be installed on the pump driver.

   b. The quantity of water being pumped from the well at commencement of development pumping shall be approximately 30% of the design capacity of the well and gradually increased as the water clears. The design capacity of the well is 350 gpm.

   c. Throughout development pumping, the well shall be frequently surged to achieve maximum consolidation of the gravel envelope.

d. Development pumping of the well shall continue until the specific capacity has been maximized, there is no appreciable settlement of the filter pack, and the well meets the sand production requirements.

e. In no case shall development pumping-time be less than 20 hours.

f. Development pumping shall continue to increase in increments until flow of 200% of the well's design capacity is reached unless otherwise directed by the **Engineer**.

g. All water shall be disposed to the storm drain system.

h. Filter Pack Level

1) The **Contractor** shall run clean water continuously down the gravel feed tube during the operation and check the level every four (4) hours pump development.

2) The **Contractor** shall prove to the **Engineer** that the gravel feed tube is open, clear, and accepting water.

3) If there is any indication of settlement of the filter pack, additional filter pack shall be added to bring the pack level back to the bottom of the gravel fill pipe. The quantity of filter pack added shall be recorded and reported to **Engineer**.

i. A centrifugal sand sampler shall be furnished by the **Contractor.**

1) During the pump test, the rate of sand production shall be measured by the **Contractor** using a Rossum Centrifugal Sand Sampler as specified Section E.2.3 of the AWWA A100-97 Standard for Water Well and in the article "Control of Sand in Water Systems, Journal of American Water Works Association, Volume 46, No. 2, February, 1954.

2) The final sand production test shall be conducted in the presence of the **Engineer**.

j. Development records shall be maintained at a minimum frequency of 30 minutes showing:

1) Production rate

2) Pumping water level,

3) Water surface drawdown to the nearest 0.01 foot.

4) Calculated specific capacity.

5) Sand production

6) And all other pertinent information concerning well development, quality of water, presence of gases, color or other information.

D. Final Development Criteria and Well Performance Criteria

1. It is the **Contractor's** responsibility to meet the criteria in this Section at the conclusion of the well development pumping and testing. Development pumping shall continue until the following criteria have been met:

a. The specific capacity (gallons per minute per foot of drawndown) no longer increases in value.

b. The turbidity shall be less than 5 NTUs.

c. The sand testing and content criteria is given below:

   1) The sand content testing shall be conducted at the end of pump development and prior to starting aquifer testing at the design capacity of the well. The design capacity of the well is 350 gpm.

   2) The well shall produce less than 5 parts per million (ppm) of sand by volume within 2 hours of pumping at the design pumping capacity of 350 gpm. No fewer than 10 measurements shall be taken at equal intervals with the sand content recorded on 5-minute intervals for the first ten minutes.

END OF SECTION

SECTION 331113.360

AQUIFER TESTING

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. This section includes the products, materials, and procedures associated with the well and aquifer testing and includes but is not limited to:

a. Step-drawdown tests at various discharge rates.

b. Long-term continuous constant rate pumping test.

c. Recovery test.

d. Sand production test.

B. Purpose

1. The objective of the well testing is to obtain aquifer characteristics and well yield information.

C. Measurement and Payment

1. Measurement

a. The unit for this work is hours of time as recorded by the **Engineer** in intervals not less than ½ hour.

b. The time recorded for payment shall commence when the equipment installed and the well is placed in operation and shall end when the operation is stopped at the direction of the **Engineer**.

2. Payment

a. Unit prices for Aquifer Testing shall be as set forth in the BID SCHEDULE for:

1) Item No. 17 - Aquifer Testing

b. Progress payments and final payment for this Item.

c. No payment will be made for running equipment into or out of the well. No additional payment shall be made for gravel added to the annulus if the gravel envelope settles and requires placement of more gravel prior to final acceptance of well.

d. No payment will be made for delays resulting from:

1) Equipment stuck in the hole;

2) Equipment breakdown;

3) Arranging major drilling, pumping, or testing apparatus; or

4) Failure to conduct the operations in a diligent and workmanlike manner by which the desired results could ordinarily be expected.

1.02 QUALITY ASSURANCE

A. Sand Content Performance Criteria:

1. Sand production shall average less than or equal to 5 parts per million (ppm) when measured over any 5-minute interval over a 30 minute test period from the commencement of pumping at the design capacity of the well.

2. The design capacity of the well is 350 gpm

3. Sand production shall be measured using a Rossum Centrifugal Sand Sampler as specified Section E.2.3 of the AWWA A100-97 Standard for Water Well and in the article "Control of Sand in Water Systems, Journal of American Water Works Association, Volume 46, No. 2, February, 1954.

B. Failure of Pump Operation

1. In the case of failure of the pump operation for a period greater than one (1) percent of the elapsed pumping time from t=0, the test shall be suspended until the static water level has been attained. Should the test be aborted as a result of a deficiency on the part of the **Contractor's** equipment or personnel, all time consumed in waiting for complete water level recovery and in resuming the pump test to the point where it was aborted shall be at no cost to the owner.

PART 2 PRODUCTS

2.01 EQUIPMENT

A. The equipment shall be the same as provided in Section 331113.340 - Well Development.

B. Water Level Probe and Sounding Tube

1. The **Contractor** shall furnish an electrical water level sounder capable of indicating changes in the well water level to the nearest 0.01-foot. The **Contractor** shall provide whatever assistance may be required by the **Engineer** to conduct the tests.

C. **Contractor** shall provide enough temporary discharge piping to convey aquifer testing water to nearby facilities as shown on **Sheet G-001**. All facilities and piping shall be sized to accommodate flow requirements during the testing operation.

1. It is anticipated that the use of approximately 600 lineal feet of discharge piping shall be used to convey the aquifer test water to the new storm water manhole located in Walker Street.

PART 3 EXECUTION

3.01 PROCEDURES

A. At least 12 hours after, but within 60 hours after, the completion of well development with a test pump, the **Contractor** shall commence the well production and aquifer tests. Prior to beginning each test, the **Contractor** shall measure and record the static water level in the well.

B. All water generated during testing, shall be conveyed to storm drain system.

C. The **Contractor** shall schedule all tests a minimum of 48 hours in advance so that the **Engineer** can be on site during each testing period.

D. Step-Drawdown Tests

1. The well shall be tested for 3 hours each at rates of approximately ¾, 1, and 1 ¼ times the design capacity of the well, unless otherwise specified by the **Engineer**. The pump will be shut off and allowed to recover for ½ hour between the tests.
2. The complete test for the well is estimated to require approximately 10 hours.
3. The **Contractor** shall operate the pump and change the discharge as specified by the **Engineer**.
4. Discharge rate from the pump shall be controlled by both a gate valve and engine throttle. The discharge shall be controlled and maintained at the desired discharge for each step with an accuracy of at least plus or minus five (5%) percent.
5. The rate of sand production will be measured by the **Contractor** using a centrifugal sand separating meter as described in the Journal of American Water Works Association, Volume 46, No. 2, February, 1954.
    a. The centrifugal sand-separating meter shall be furnished and installed by the **Contractor**.
    b. Sand production will be measured as stated in Section 1.02.A.1.
6. Prior to beginning the test, the **Contractor** shall measure and record the static water level in the well. During the test, the **Contractor** will record the time, pumping level, discharge rate, and rate of sand production at the intervals described in Section 3.01 D 3.

E. Long-Term Pumping Test

1. A long-term, continuous, constant rate, time-draw-down test shall commence not less than 12 hours and not more than 60 hours after completion of the step draw-down test.
2. The rate of pumping shall be at design capacity of the well or as specified by the **Engineer**.
    a. The **Contractor** shall ensure that the pumping rate selected remains constant throughout the test not varying more than 5% of the designated pumping rate.
    b. The test duration is anticipated to be between 12 and 48 hours.
    c. Prior to beginning the test, the **Contractor** shall measure and record the static water level in the well. When the test is completed and the pump stopped, the **Contractor** will measure recovery of the water level until water levels have recovered to 90% of their static water level and 24 hours after the test stops or as directed by the **Engineer**.
3. During the draw-down and recovery tests, the **Engineer** and/or the **Contractor** will record the time, pumping rate, and measure the water level in the pumped well on the following schedule:

Pump Test Schedule							
First 10 minutes				---	once each	1	minute
10	-	30	minutes	---	once each	2	minutes
30	-	60	minutes (1 hr)	---	once each	5	minutes
60	-	240	minutes (4 hrs)	---	once each	30	minutes
240	-	1,440	minutes (4-24 hrs)	---	once each	60	minutes (each hour)

4. The **Contractor** shall record the totalizer and flow meter at the same interval as groundwater level measurements. Any adjustments to the discharge rate shall also be recorded.
5. The **Engineer** will collect a water sample near the end of the drawdown test for water quality analyses.
6. The **Contractor** shall not operate or remove the pump for a period of 24-hours after completion of the constant rate test to allow for the final recovery water level measurement. No standby time will be paid during this time.
7. The **Contractor** will furnish copies of all test data to the **Engineer**.
8. The **Contractor** shall provide qualified personnel on a full time basis during both the short constant rate tests and the long-term pumping test to assure proper operation of the pumping test equipment and to measure water levels. The **Engineer** will be present during start-up of each test to assist in measuring water levels.
9. No payment will be made to the **Contractor** for an aborted pumping test interrupted by the malfunctioning or failure of pumping equipment. If a test is interrupted, the water levels will be allowed to fully recover, after which the test will be restarted.
10. When the production tests are complete, the **Contractor** shall remove the pump and clean the well of all accumulated sediment and foreign material, including test pump lubricating oil. The **Contractor** shall demonstrate that the well has been properly cleaned by measuring the depth of the well in the **Engineer's** presence prior to well disinfection.

END OF SECTION

SECTION 331113.380

WELL DISINFECTION

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. This work includes all materials, labor, tools, and equipment required to disinfect, remove bacteriological contamination, that may cause the well-water supply to be unsafe for human consumption for Walker Street Well.
2. The **Contractor** shall provide for disinfection as soon as development, test pumping, plumbness and alignment surveying, and video surveying work has been completed.
3. The **Contractor** is responsible for removing or mitigating the effects of all materials introduced into the wells during drilling, construction, development, testing, and video camera survey.

B. Measurement and Payment

1. Measurement
   a. The unit for this work is Lump Sum for all work associated with well disinfection.
2. Payment
   a. Unit prices for well development shall be as set forth in the BID SCHEDULE for:
      1) Item No. 20 - Well Disinfection
   b. Final payment will be made for this Item.

1.02 REFERENCES

A. ANSI/AWWA C654

B. ANSI/AWWA A100-20

1.03 SUBMITTALS

1. The **Contractor** shall submit a description of the method to distribute the disinfection product in the well to the **Engineer** for approval at the Pre-construction meeting.
2. The **Contractor** shall submit manufacture's product sheet and Safety Data Sheet of the disinfectant to be used and the volume to create 100 mg/L residual chlorine to the **Engineer** for approval at the Pre-construction meeting.
3. Chlorine solution purchase date shall be provided to the **Engineer** prior to placement of the solution**.**

PART 2 PRODUCTS

2.01 MATERIALS

A. Disinfectant

1. Sodium Hypochlorite, Perchloron or Sterilene or equal dry powder, 70 percent free chlorine, or approved equal.
2. The disinfectant shall be delivered to the site of the work in original closed containers bearing the original label indicating the percentage of available chlorine.
3. The disinfectant shall be recently purchased.
4. Sodium Hypochlorite shall not be stored for more than 60 days prior to use. During storage, disinfectants shall not be exposed to the atmosphere or to direct sunlight.

PART 3 EXECUTION

3.01 PREPARATION

A. Cleaning

1. The **Contractor** shall carry out adequate cleaning procedures immediately preceding disinfection where evidence indicates that normal well construction and development work have not adequately cleaned the well.
2. All oil, grease, soil, and other materials, which could harbor and protect bacteria from disinfectants, shall be removed from the well.
3. The quantity of chlorine-based compounds used to make the chlorine solution for disinfecting the well shall be of such a volume and strength and shall be so applied that a concentration of at least 100 mg/l (parts per million) of available chlorine shall remain in the well for a period of at least 24 hours.
4. The **Contractor** shall note that a calculated concentration of chlorine in solution is different than the available chlorine concentration due to chlorine consuming constituents present in the well water.

3.02 PROCEDURES

A. Final Disinfection

1. At the conclusion of all work to be conducted in the well structure, the **Contractor** shall perform a final disinfection.
2. As directed by the **Engineer,** the **Contractor** shall uniformly distribute the chlorine in the well
3. Gently swab the well to distribute the solution into the filter pack.
4. The chlorinated water shall remain in the well.

B. A residual chlorine level of not less than 2 parts per million should remain in the well at the completion of disinfection and shall be verified by the **Contractor** to the satisfaction of the **Engineer**.

END OF SECTION

SECTION 331113.400

VIDEO CAMERA SURVEY

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. This work includes all materials, labor, tools, and equipment required for a color video camera survey over the full depth of the well. The firm utilized for video surveying shall be the same firm as used for Geophysical Surveys and listed on the Subcontractor's list in the Bid Package.

B. Related Sections

1. Section 331113.260: Plumbness and Alignment
2. Section 331113.380: Well Disinfection

C. Measurement and Payment

1. Measurement
   a. The unit for this work is Lump Sum for all work associated with the Video Camera Survey and delivery of such survey to the **Engineer**.
2. Payment
   a. Unit prices for the Video Camera Survey shall be as set forth in the BID SCHEDULE for:
      1) Item No. 19 - Video Camera Survey
   b. Progress payments and final payment for this Item.
3. There will be no additional payment for rig time or idle time while the survey is being run.

1.02 SUBMITTALS

A. The **Contractor** shall provide the **Engineer** with two thumb drives containing electronic copies of the camera survey immediately at the completion of the survey.

PART 2 PRODUCTS

2.01 MATERIALS

A. Video Camera

1. The camera used for the survey shall be equipped with centralizers. The equipment used by the firm for the video survey shall produce a tape with an automatic depth indication.
2. Survey shall be in color and provide for the use of a focusing side scan lens.

B. THUMB DRIVES

1. The surveying firm shall use new thumb drives to document the camera survey.

PART 3 EXECUTION

3.01 PROCEDURES

A. Survey

1. Prior to running the survey, the **Contractor** shall add sufficient potable water to the well to allow for clear viewing.
2. Upon review of the video survey, if the **Engineer** determines that any portion of the video record is incomplete or of inadequate quality, i.e. clarity, to allow visual inspection of the inside of the well, the **Contractor** shall rerun the survey at his expense. Clarity should be of sufficient quality to evaluate the integrity of all joints, screen openings, the sounding port and the entire inside surface of the casing assembly.
3. During the downward pass, the entire depth of the well shall be surveyed using the down view mode. The maximum speed of this survey shall not exceed 30 feet per minute. The depth of any anomalies shall be thoroughly viewed in the downward position and be noted for detailed inspection on the upward side scan pass.
4. On the upward pass, the entire depth of well shall be surveyed using the side scan mode. For the well screen the camera must be rotated while the survey continues upward in order to allow for complete viewing of all perforated sections. At each casing joint, upward motion of the camera shall be stopped, and a 360 degree inspection of the joint shall be conducted. At the depth of any anomalies noted in the downward pass, upward motion of the camera shall be stopped and the anomaly shall be completely inspected.
5. Following the **Engineer's** acceptance of the video survey, the **Contractor** shall disinfect the well as described in Section 331113.380.

END OF SECTION

SECTION 331113.430

REJECTION OF BOREHOLE OR WELL

PART 1 GENERAL

1.01 SUMMARY

A. In this Section

1. The work includes all materials, labor, tools, and equipment required to properly destroy borehole(s), well(s), or portions thereof, as directed by the **Owner** in writing after such work completed under this Contract has been deemed unacceptable in the judgement of the **Owner**.

B. Measurement and Payment

1. Measurement - no measurement shall be made for Destruction work unless otherwise agreed upon in writing by the **Owner**.
2. Payment - no payment for Destruction work shall be made unless otherwise agreed upon in writing by the **Owner**.

1.02 DEFINITIONS

A. Unacceptable Borehole, Well or Portion Thereof:

1. Any borehole, well, or portion thereof which after review by the **Owner** has not met the intent of these specifications, may be declared unacceptable for purposes of constructing a municipal supply well.
2. A written notice will be issued to the **Contractor** by the **Owner** upon determination of any such work or portion thereof, if deemed unacceptable.

PART 2 PRODUCTS

(NOT USED)

PART 3 EXECUTION

3.01 CONSTRUCTION

A. Destruction

1. Destruction of Drilled Hole

a. Destruction Due To Actions Of The **Contractor**

1) If destruction of the drilled hole is by reason of any actions of the **Contractor**, including but not limited to such causes as losing tools, damaging the well, misalignment, or any other cause attributed to careless or poor workmanship, the hole shall be completely filled with sand/cement grout in accordance with applicable State and County Standards. No payment will be made for drilling and abandoning the hole, or for mobilization and demobilization. The **Contractor** shall drill a new hole within 50 feet of the same location. Upon successful completion of the new borehole, the **Contractor** will be paid for mobilization, demobilization, and drilling as specified in those sections.

b. Destruction At Request Of **Owner:**

1) If destruction of the drilled hole is specifically requested by the **Owner**, including, but not limited to such causes as total lack of potential aquifers, insufficient number of potential aquifers, or unacceptable water quality, the borehole shall be completely filled as directed by the **Owner**.

2) Payment for such work stemming from a request by the **Owner** will be by agreement with the **Contractor** prior to any completion of work for such destruction. In this event, the **Contractor** will be paid for mobilization and demobilization at this site, as well as for the footage of drilling completed, and any geophysical surveys run.

2. Destruction During Or After Installation of Casing And/Or Well Screen

a. Destruction Due To Actions Of The **Contractor**

1) If the Destruction of the borehole is caused by reason of any action of the **Contractor** including **Contractor** negligence, the **Contractor** shall pull the casing and the borehole shall be abandoned in accordance with applicable State and County standards. The **Contractor** may salvage as much casing and screen from the well as possible and may use it in the new well, subject to acceptance by the **Owner**. Salvaged material, if not used in the new well, will remain the property of the **Contractor**, and will not be compensated for. If the casing cannot be removed, the well structure shall be abandoned by the **Contractor** in a means acceptable to the **Owner** and in accordance with all Local and State standards. No payment will be granted for lost or damaged casings and/or their installation in a well abandoned by reason of any action of the **Contractor**. The **Contractor** shall be required to drill a new well within 50 feet of the original site, and will be paid for this new work in accordance with these specifications, if the new work is acceptable.

b. Destruction At Request Of Owner and/or Owner's Representative

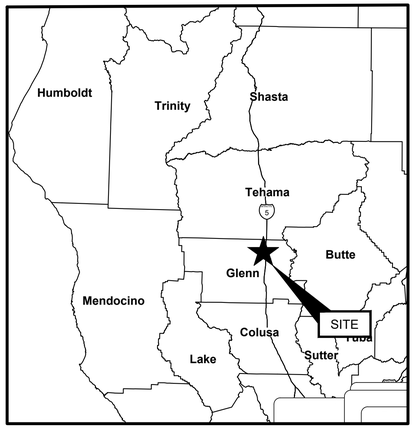
1) If destruction of the well or any portion thereof is specifically requested by the **Owner** and is not from actions caused by the **Contractor** including, but not limited to such causes as total lack of potential aquifers, insufficient number of potential aquifers, unacceptable water quality, or other reasons as determined by the **Owner** such work shall be properly abandon as directed by the **Owner**.

2) The **Contractor** may salvage as much casing and screen from the well as possible and may use it in the new well, subject to acceptance by the **Owner**. Salvaged material, if not used in another well, will remain the property of the **Contractor**.

3) Payment for such work stemming from a request by the **Owner** will be by agreement with the **Contractor** prior to any completion of work for such destruction. In this event, the **Contractor** will be paid for mobilization and demobilization at this site, as well as for the footage of drilling completed, and additional work completed and materials used during construction. Materials salvaged by the Contractor and not reused in the new well will not be paid for by the **Owner**.

END OF SECTION

PLANS

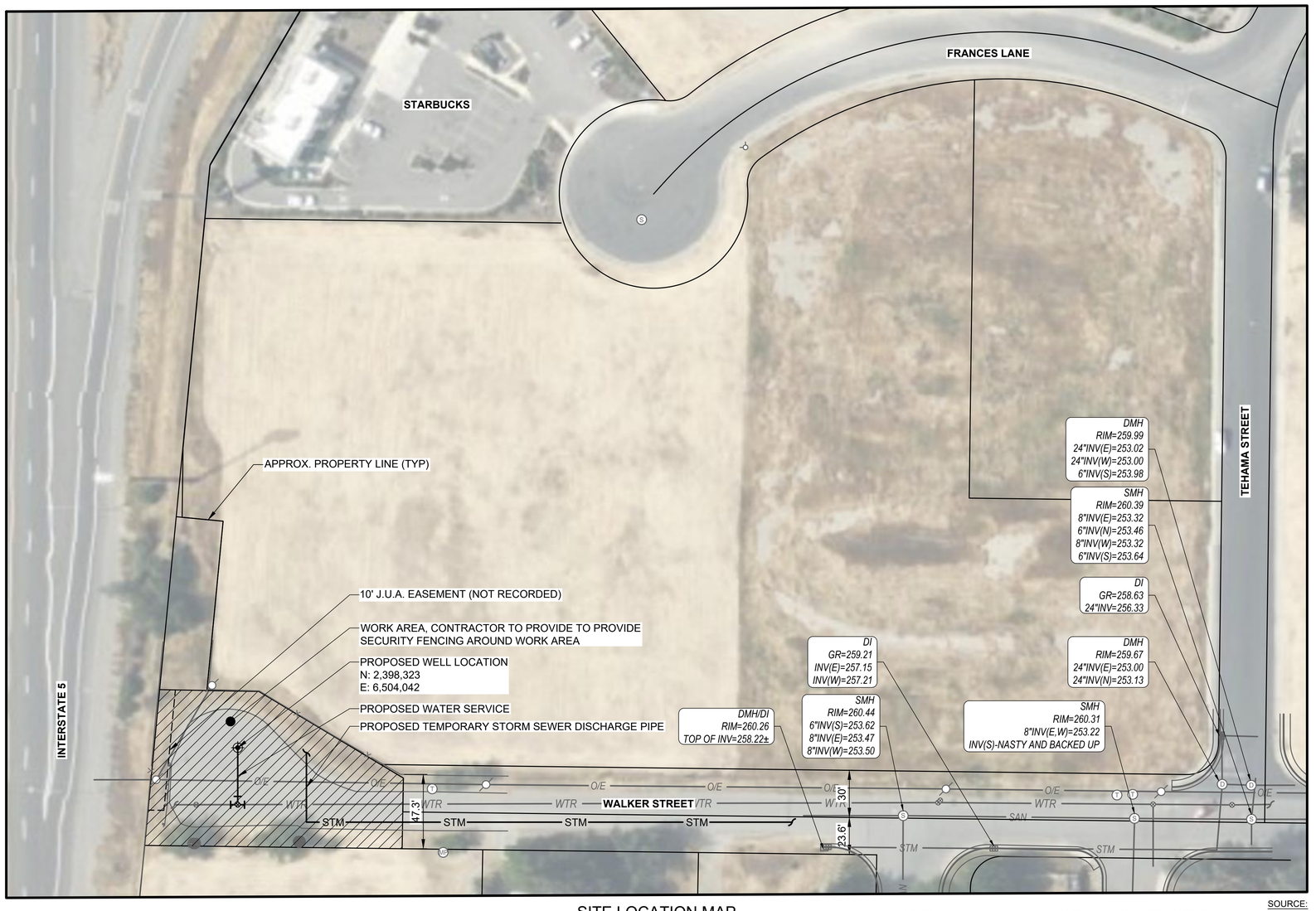


STATE MAP
(NOT TO SCALE)

STATE OF CALIFORNIA
CALIFORNIA NATURAL RESOURCES AGENCY

DEPARTMENT OF WATER RESOURCES
DIVISION OF ENGINEERING

DIVISION OF INTEGRATED REGIONAL WATER MANAGEMENT
DROUGHT EMERGENCY PREPAREDNESS AND RESPONSE PROGRAM
CITY OF ORLAND
WATER SUPPLY SYSTEM PHASE 3
NEW WATER SUPPLY WELL
SPECIFICATION NO. 17-13



SITE LOCATION MAP
1" = 40'

SOURCE:
{© 2022 Microsoft Corporation © 2022 Maxar © CNES (2022) Distribution Airbus DS}

SCOPE OF WORK:

THIS IS AN EMERGENCY CONTRACT TO INSTALL A WATER SUPPLY WELL. THE WORK DOES NOT INCLUDE INSTALLATION OF A PERMENANT PUMP, PROPOSED WATER SERVICE CONNECTION, OR TEMPORARY STORM SEWER DISCHARGE PIPE..

WORK INCLUDES THE FOLLOWING PRINCIPAL ITEMS:

- INSTALL A NEW WATER SUPPLY WELL APPROXIMATELY 500 FT BELOW EXISTING GROUND.

PREPARED FOR:

STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF ENGINEERS
715 P STREET
SACRAMENTO, CA 95814
(916)653-5791

PREPARED BY:

GEI CONSULTANTS, INC.
2868 PROSPECT PARK DRIVE
SUITE 400
RANCHO CORDOVA, CA 95670
(916)631-4500

GEI Consultants

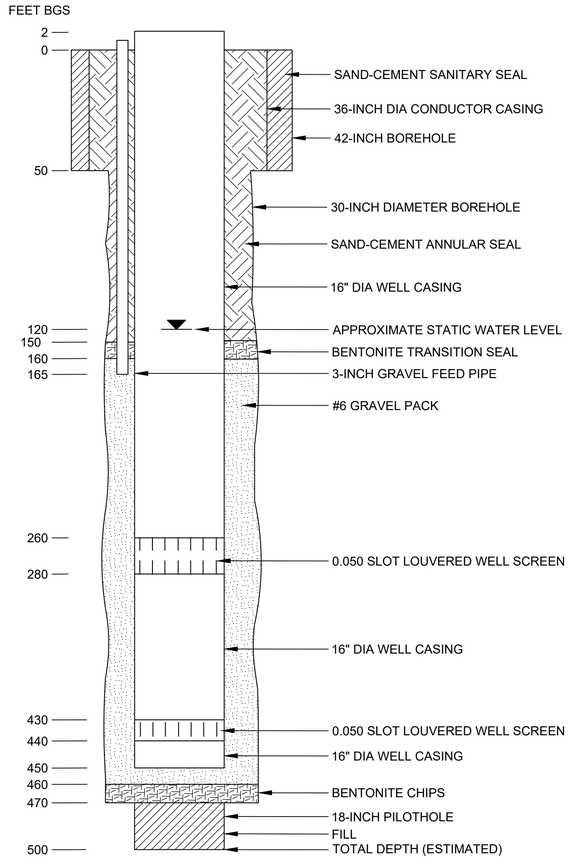
GEI PROJECT NO. 1408520
SEPTEMBER, 2022

PROGRESS 90%

DRAFT

DWG. NO. G-001

SHEET NO. 1 OF 2

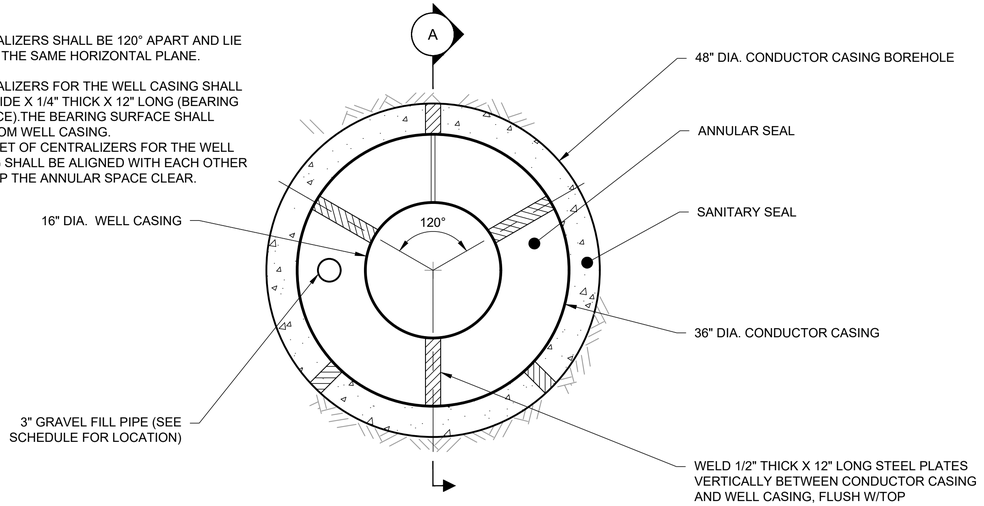


WELL CONSTRUCTION DETAILS

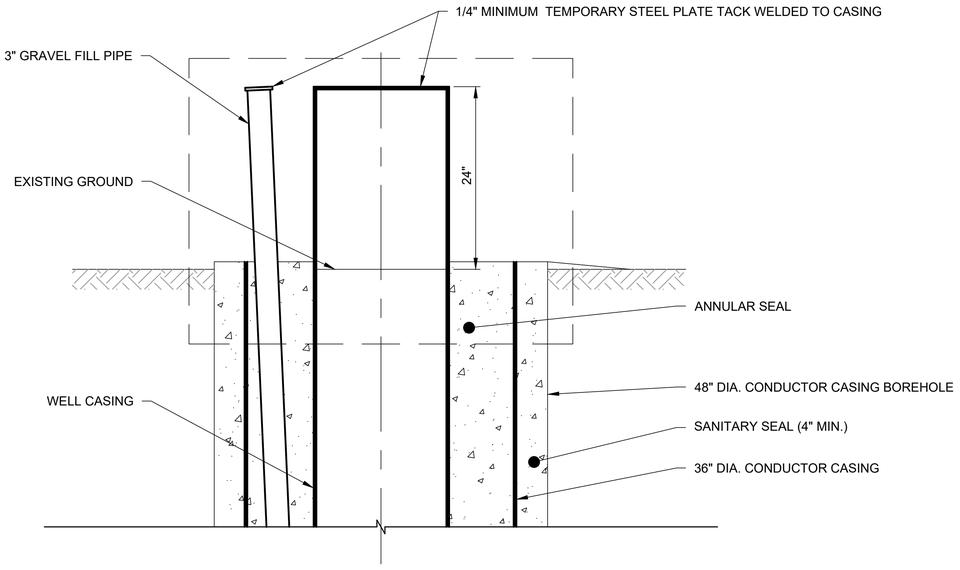
WALKER STREET PRELIMINARY NOT TO SCALE

NOTES:

1. CENTRALIZERS SHALL BE 120° APART AND LIE WITHIN THE SAME HORIZONTAL PLANE.
2. CENTRALIZERS FOR THE WELL CASING SHALL BE 2" WIDE X 1/4" THICK X 12" LONG (BEARING SURFACE).THE BEARING SURFACE SHALL BE 3" FROM WELL CASING.
   EACH SET OF CENTRALIZERS FOR THE WELL CASING SHALL BE ALIGNED WITH EACH OTHER TO KEEP THE ANNULAR SPACE CLEAR.



PLAN



SECTION

CASING, PIPES & CENTRALIZERS

SCALE: NTS

GRAVEL FILL PIPE ORIENTATION
WEST

Progress 90%

Attention: 0 1" — If this scale bar does not measure 1" then drawing is not original scale.

DIGALERT

DRAFT

Designed:	R. SHATZ
Drawn:	T. PENNALA
Checked:	M. MARTIN
Approved:	S. GALA
P.E. No:	
GEI Project	1408520

GEI Consultants
GEI CONSULTANTS, INC.
2868 PROSPECT PARK DRIVE
SUITE 400
RANCHO CORDOVA, CA 95670
(916)631-4500

CITY OF ORLAND
815 FOURTH ST.
ORLAND, CA 95963

ORLAND EMERGENCY GROUNDWATER RESOURCE PROJECT PHASE 3
815 FOURTH STREET
ORLAND, CA

NO	DATE	ISSUE/REVISION	APP
0	9/26/2022	90% DESIGN	SSG

SHEET NAME: **REFERENCE STANDARD DETAILS 1**

DWG. NO.: **CG-01**

APPENDICES

APPENDIX A
CITY OF ORLAND CERTIFICATE OF INSURANCE

Return Completed Certificate to
City of Orland
815 Fourth Street
Orland, CA 95963

CERTIFICATE OF INSURANCE
TO
CITY OF ORLAND
CALIFORNIA ("the City")
A Municipal Corporation

Only this Certificate of Insurance form will be accepted

This certifies to the City that the following described policies have been issued to the Insured named below are in force at this time.

Insured _____

Address _____

_____

Description of operation/locations/products insured (shown contract name and/or number, if any): _____

_____

POLICIES AND INSURERS	LIMITS Bodily Injury Property Damage	POLICY NUMBER	EXPIRATION DATE
Worker's Compensation _____ (Name of Insurer) Best's Rating _____	Employer's Liability $ _____		
Check policy type: Comprehensive General Liability ___ or Commercial General Liability ___ _____ (Name of Insurer) Best's Rating _____	"Claims Made" ___ "Occurrence" ___ Each Occurrence $ _____ Each Occurrence $ _____ Or Combined Single Limit $ $ _____ Aggregate $ _____		
Business Auto Policy Liability Coverage Symbol _____ ~~(Name of Insurer)~~ Best's Rating _____	Each Person $ _____ Each Accident $ _____ $ _____ or Combined Single Limit $ _____		
Umbrella Liability _____ (Name of Insurer) Best's Rating _____	"Claims Made" ___ "Occurrence" ___ Occurrence/ Aggregate $ _____ Self-Insured Retention $ _____		

The following coverage or conditions are in effect:	Yes	No
The City, its officials, and employees are named on all liability policies described above as insureds as respects: (a) activities performed for the City by or on behalf of the named insured, (b) products and completed operations of the Named Insured, and (c) premises owned, leased or used by the Named Insured.		
Products and Completed Operations		
The undersigned will mail to the City 30 days' written notice of cancellation or reduction of coverage or limits.		
Cross Liability Clause (or equivalent wording)		
Personal injury, Perils A, B, and C		
Broad Form Property Damage		
X, C, U Hazards included		
Contractual Liability Coverage applying to this Contract		
Liquor Liability		
Coverage afforded the City, its officials, employees and volunteers as Insureds applies as primary and not excess or contributing to any insurance issued in the name of the City.		
Waiver of subrogation from Workers' Compensation Insurer.		
Environmental Liability Insurance		

All of the above policies expressly provide therein that they shall not be canceled by the insurer until 30 days written notice of the intended cancellation thereof has first been given to the City of Gridley by the insurer.

Agency or Brokerage

Address

Name of Person to be Contacted

Telephone Number

Insurance Company

Home Office

Authorized Signature Date

Note: Authorized signatures may be the agent's if agent has placed insurance through an agency agreement with the insurer. If insurance is brokered, authorized signature must be that of official of insurer.


CITY OF
ORLAND
Proud History
Bright Future
INC. 1909
CALIFORNIA

APPENDIX B
8th STREET WELL COMPLETION REPORT

22N/3W-21M

ORIGINAL

File with DWR

Notice ~~I~~ntent No.__________

Local ~~P~~ermit No. or Date__________

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES

WATER WELL DRILLERS REPORT

Do not fill in

No. 176756

State Well No.__________

Other Well No.__________

(2) LOCATION OF WELL (See instructions):

County Glenn Owner's Well Number 5415

Well address if different from above 8th st. Between Rd 14&5

Township 22N Range ~~13W~~ 3W Section 21 M

Distance from cities, roads, railroads, fences, etc.__________

WELL LOCATION SKETCH

(3) TYPE OF WORK:

New Well ☐ Deepening ☒

Reconstruction ☐

Reconditioning ☐

Horizontal Well ☐

Destruction ☐ (Describe destruction materials and procedures in Item 12)

(4) PROPOSED USE:

Domestic ☐

Irrigation ☐

Industrial ☐

Test Well ☐

Stock ☒

Municipal ☒

Other ☐

(5) EQUIPMENT:

Rotary ☒ mud Reverse ☐

Cable ☐ Air ☐

Other ☐ Bucket ☐

(6) GRAVEL PACK:

Yes ☐ No ☒ Size_____

Diameter of bore_____

Packed from_____ to_____ ft.

(7) CASING INSTALLED:

Steel ☒SS Plastic ☐ Concrete ☐

(8) PERFORATIONS:

Type of perforation or size of screen_____

From ft.	To ft.	Dia. in.	Gage or Wall	From ft.	To ft.	Slot size
~~6~~	~~62~~					
0	287	10	.188	SEE WELL LOG-BOTTOM		

(9) WELL SEAL:

Was surface sanitary seal provided? Yes ☒ No ☐ If yes, to depth 62 ft.

Were strata sealed against pollution? Yes ☐ No ☐ Interval_____ ft.

Method of sealing cement

(10) WATER LEVELS:

Depth of first water, if known_____ ft.

Standing level after well completion_____ ft.

(11) WELL TESTS:

Was well test made? Yes ☐ No ☐ If yes, by whom?_____

Type of test Pump ☐ Bailer ☐ Air lift ☐

Depth to water at start of test_____ ft. At end of test_____ ft

Discharge_____ gal/min after_____ hours Water temperature_____

Che~~mical an~~alysis made? Yes ☐ No ☐ If yes, by whom?_____

Was electric log made? Yes ☐ No ☐ If yes, attach copy to this report

(12) WELL LOG: Total depth 494 ft. Depth of completed well 287 ft.

from ft. to ft. Formation (Describe by color, character, size or material)

0- 6 - soil
6- 16 - clay/gravel
16- 24 - gravel
24- 48 - clay
48- 68 - clay/gravel
68- 85 - clay
85- 95 - gravel
95-112 - clay
112-120 - dirty gravel
120- 128 - clay/gravel
128-180 - clay
180-185 - sand
185-198 - clay
198-200 - gravel
200-220 - clay
220-222 - clay/gravel
222-240 - clay
240-270 - clay-brown
270-282 - pea gravel-small
282-432 - clay-brown, little sand layers
432-440 - gravel-white, round, brown/sand
440-460 - clay-brown
460-494 - clay-blue

PERFORATIONS:

~~112~~ - ~~120~~ .050 slot

~~180~~ - ~~187~~ "

177 ~~200~~ - ~~220~~ 187 "

262 ~~264~~ - ~~284~~ 282 "

DEEPENING

Refer to previous DWR Report

#605583 [redacted] 5/1/74

Work started April 22 1988 Completed May 22 1988

WELL DRILLER'S STATEMENT: 00024

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

FEB 3 1989

SIGNED_____ (Well Driller)

NAME Eaton Drilling Company (Person, firm, or corporation) (Typed or printed)

Address P.O. Box 975

City Woodland, California Zip 95695

License No. 133783 c57 Date of this report May 24, 1988