

**CITY OF PETALUMA  
PETALUMA, CALIFORNIA**

**CONTRACT DOCUMENTS FOR  
ADOBE ROAD RECYCLED WATER PIPELINE  
PROJECT  
C66501936**

(Notice Inviting Bids, Instructions to Bidders, Bid Forms, General Conditions,  
Special Provisions, Technical Specifications, Construction Agreement,  
Bond Forms, Project Drawings)

**CITY OF PETALUMA - SONOMA COUNTY - CALIFORNIA**

Questions concerning interpretation of improvement plans, special provisions,  
contract documents and bid items shall be directed to:

***Department of Public Works and Utilities  
202 N. McDowell Boulevard  
Petaluma, CA. 94954  
Phone: (707) 778-4546 Fax: (707) 206-6034***

Attention: Lucas Pereira

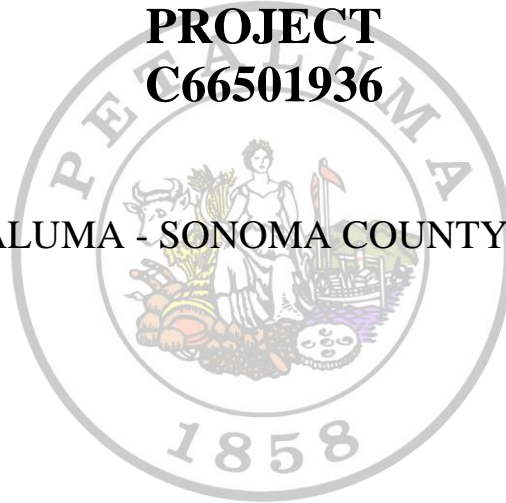
Office Hours: Monday thru Thursday - 8:00 to 5:00 p.m.  
Friday – 8:00 to 4:00 p.m.

**Bid Opening: Thursday, September 19, 2024 at 2:00 p.m.**

CITY OF PETALUMA  
PETALUMA, CALIFORNIA

**ADOBE ROAD RECYCLED WATER PIPELINE  
PROJECT  
C66501936**

CITY OF PETALUMA - SONOMA COUNTY - CALIFORNIA



Prepared by:

A handwritten signature in black ink, appearing to read 'Dan Herrera', is written over a horizontal line.

Dan Herrera, P.E. #C77596

8/22/2024

Date

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Adobe Road Recycled Water Pipeline Project C66501936

## NOTICE INVITING BIDS

1. **RECEIPT OF BIDS:** Sealed Bids will be received at the office of the City Clerk of the City of Petaluma located at 11 English Street, Room 4, Petaluma, CA 94952-2610, until 2:00 PM (enter time) on Thursday, September 19, 2024, for the Adobe Road Recycled Water Pipeline Project. Any Bids received after the specified time and date will not be considered. Fax and other electronically transmitted Bids will not be accepted.
2. **OPENING OF BIDS:** The Bids will be publicly opened and read at 2:00 PM (enter time) on Thursday, September 19, 2024 at the above-mentioned office of the CITY. The CITY reserves the right to postpone the date and time for opening of Bids at any time prior to the aforesaid date and time.
3. **COMPLETION OF WORK:** The WORK must be completed with 80 working days after the commencement date stated in the Notice to Proceed.
4. **DESCRIPTION OF WORK:** The WORK includes installation of a new 16-Inch recycled water pipeline via open cut trenching and horizontal directional drilling, unimproved and asphalt surface restoration, and installation of new irrigation services.
5. **SITE OF WORK:** The site of the WORK is located: along Frates Road and Adobe Road, approximately between 1901 Frates Road and 3795 Adobe Rd in Petaluma, CA.
6. **OBTAINING CONTRACT DOCUMENTS:** The Contract Documents are entitled "Adobe Road Recycled Water Pipeline Project (C66501936)".

The Contract Documents may be obtained by 4:00 P.M., Monday through Thursday at the office of Public Works & Utilities, 202 North Mc Dowell Boulevard, Petaluma, CA 94954.

If you would like to receive the bid document via the CITY's website, at no cost, please go to:

- <https://cityofpetaluma.org/bid-opportunities-2/>
- Fill out the Plan Holder's form by clicking on the Plan Holder's form link
- Fill in all fields
- Click on the submit button at the end of the form

Submit the Plan Holder's form on-line automatically puts you on the CITY's Bidders List and you will be notified of any Addendums or information pertaining to the bis by email.

If you would like to purchase bid documents, please call Phone No. 707-778-4585, Attention: Tiffany Avila, upon payment of \$50 (non-refundable) for each set of Contract Documents (including technical specification and accompanying reduced scale drawings). The scale of the reduced drawings is about one-half of the original scale. At the Bidder's request and expense, the Contract Documents may be sent by overnight mail.

Full-scale drawings are not available.

- If full-scale drawings are available and desired, they may be purchased at reproduction cost from .

7. **BID SECURITY:** Each Bid shall be accompanied by a certified or cashier's check or Bid Bond executed by an admitted surety in the amount of 10% percent of the Total Bid Price payable to the City of Petaluma as a guarantee that the Bidder, if its Bid is accepted, will promptly execute the Agreement. A Bid shall not be considered unless one of the forms of Bidder's security is enclosed with it. Upon acceptance of the Bid, if the Bidder refuses to or fails to promptly execute the Agreement the Bidder's security shall be forfeited to the CITY.
8. **CONTRACTOR'S LICENSE CLASSIFICATION:** In accordance with the provisions of California Public Contract Code Section 3300, the CITY has determined that the CONTRACTOR shall possess a valid Class A license at the time that the Contract is awarded. Failure to possess the specified license shall render the Bid as non-responsive and shall act as a bar to award of the Contract to any bidder not possessing said license at the time of award pursuant to labor Code Section 1725.5, subject to limited legal exceptions.
9. **PREFERENCE FOR MATERIAL:** Any specification designating a material, product, thing, or service by specific brand or trade name, followed by the words "or equal" or "or equivalent" is intended only to indicate quality and type of item desired. Substitute products will be considered prior to award of the Contract in accordance with Section 3400 of the California Public Contract Code. The Bidder will submit data substantiating its request for a substitution of "an equal" item within 14 days following submission of its Bid. Substantiation date will conform to the requirements of the instructions for Proposed Substitutions of "or equal" items contained in the bid Forms. The ENGINEER will make a determination of approval or rejection of the proposed substitution prior to the award of the Contract. No request for substitution of "an equal" items will be considered by the ENGINEER after award of the Contract. This provision does not apply to materials, products, things, or services that may lawfully be designated by a specific brand or trade name under Public Contract Code Section 3400(c).
10. **REJECTION OF PROPOSALS:** The CITY reserves the right to reject all or any part of all bids submitted, waive informalities and irregularities, and will not, to the extent allowed by law, be bound to accept the lowest bid.
11. **BIDS TO REMAIN OPEN:** The Bidder shall guarantee the total bid price for a period of 90 calendar days from the date of bid opening.
12. **CALIFORNIA PREVAILING WAGE RATE REQUIREMENTS:** In accordance with the provisions of California Labor Code Sections 1770, 1773, 1773.1, and 1773.7 as amended, the Director of the Department of Industrial Relations has determined the general prevailing rate of per diem wages in accordance with the standards set forth in Section 1773 for the locality in which the WORK is to be performed. A copy of said wage rates is on file at the office of the

City Clerk and is available to any interested party upon request. A copy of the prevailing rate of per diem wages are also online at <http://www.dir.ca.gov/DLSR>. Each Contractor and Subcontractor must pay no less than the specified rates to all workers employed to work on the Project. The schedule of per diem wages is based upon a working day of eight hours. The rate for holiday and overtime work must be at least time and one-half. It shall be mandatory upon the CONTRACTOR to whom the WORK is awarded and upon any subcontractor under the CONTRACTOR to pay not less than said specified rates to all workers employed by them in the execution of the WORK. The Contract will be subject to compliance monitoring and enforcement by the Department of Industrial Relations under labor Code Section 1771.4. Additionally, CONTRACTOR shall post job sit notices s required by Labor Code section 1771.4.

**13. LABOR COMPLIANCE PURSUANT TO CALIFORNIA LABOR CODE**

**§1771.1:** A contractor of subcontractor shall not be qualified to bid on, be listed in a bid proposal, subject to the requirement of Section 4104 of the Public 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. It is not a violation of this section 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 contract is awarded.

**14. RETAINAGE FROM PAYMENTS:**

The CONTRACTOR may elect to receive 100 percent of payments due under the Contract Documents from time to time, without retention of any portion of the payment by the CITY, by depositing securities of equivalent value with the CITY in accordance with the provisions of Section 22300 of the Public Contract Code. Alternatively, the CONTRACTOR may request, and the CITY shall make payment of retentions earned directly to the escrow agent at the expense of CONTRACTOR. At the expense of the CONTRACTOR, the CONTRACTOR may direct the investments of the payments into securities and the CONTRACTOR shall receive the interest earned on the investments upon the same terms as provided in Section 22300 of the Public Contract Code for securities deposited by the CONTRACTOR. The CONTRACTOR shall be responsible for paying all fees for the expense incurred by the escrow agent in administering the escrow account and all expenses of the CITY. These expenses and payment terms shall be determined by the CITY's Finance Director or their designee and the escrow agent. Upon satisfactory completion of the WORK, the CONTRACTOR shall receive from the escrow agent all securities, interest, and payments received by the escrow agent from the CITY, pursuant to the terms of Section 22300 of the Public Contract Code. Such securities, if deposited by the CONTRACTOR, shall be valued by the CITY, whose decision on valuation of the securities shall be final. Securities eligible for investment under this provision shall be limited to those listed in Section 16430 of the Government Code, bank or savings and loan certificates of deposit, interest-bearing demand deposit accounts, standby letters or credit, or any other security mutually agreed to by the CONTRACTOR and the CITY.



**15. PAYMENT BOND:** Pursuant to and in accordance with California Civil Code Section 9550, a payment bond must be filed if the expenditure for the WORK is in excess of Twenty-Five Thousand Dollars (\$25,000.00).

**16. PRE-BID CONFERENCE VISITS:** [At least one box below MUST be checked]

- Check if no pre-bid conference/site is to be held.
- Mandatory pre-bid conference/site visit to be held: Prospective bidders are required to attend a mandatory pre-bid conference/site visit at *(enter time)* on \_\_\_\_\_, at the \_\_\_\_\_, offices at \_\_\_\_\_. Prospective bidders that fail to attend the mandatory pre-bid conference/site visit will be ineligible to bid on the project. Following the conference at City offices, City staff and prospective bidders will meet at the project Site.

Transportation to the project site will be the responsibility of prospective bidders. The purposes of the conference/site visit are to discuss the scope of the project and bidding requirements and to acquaint bidders with Site conditions.

No information communicated at the pre-bid conference/site visit may amend the project bidding requirements. Project bidding requirements may only be amended by addenda issued by authorized City officials. Following the pre-bid conference/site visit, prospective bidders may submit detailed technical questions in writing. If warranted, the City may respond to such questions by addenda.

- Non-Mandatory pre-bid conference/site visit to be held: Prospective bidders are invited to attend a non-mandatory pre-bid conference/site visit at 10:00 AM *(enter time)* on Tuesday, September 10<sup>th</sup>, 2024 at the virtual meeting invite sent to bidders on the plan holders list. Following the conference City offices, City staff and prospective bidders will meet at the project Site.

Transportation to the project site will be the responsibility of prospective bidders. The purposes of the conference/site visit are to discuss the scope of the project and bidding requirements, and to acquaint bidders with Site conditions.

No information communicated at the pre-bid conference/site visit may amend the project bidding requirements. Project bidding requirements may only be amended by addenda issued by authorized City officials. Following the pre-bid conference/site visit, prospective bidders may submit detailed technical questions in writing. If warranted, the CITY may respond to such questions by addenda.

**17. PROJECT ADMINISTRATION:** All communications relative to the WORK shall be directed to the ENGINEER prior to opening of the Bids.

**18. FINDING OF SUBSTANTIAL COMPLEXITY:** Pursuant to Public Contract Code Section 7201(b)(3) the CITY's Public Work's Director has found that the WORK is substantially complex due to: the amount of technical and scientific knowledge needed to complete the project; the amount of resources needed to complete the project including amount of days, workers, and labor; the urgency for project completion; the amount of tasks needed to complete the project; the number of organizational stakeholders needed to satisfy; the environmental complexity of the conditions; and in particular the specialized scope of work and therefore this is a unique project that is not regularly performed and requires a higher retention amount than 5 percent.

Notwithstanding Public Contract Code Section 7201 or any other law or regulation that purports to provide otherwise, public contracting is a quintessential municipal affair, subject to charter cities' home rule power, and the California Constitution grants charter cities supreme authority over municipal affairs, which include public Works, procurement, and the mode of municipal contracting (See, Public Contract Code Section 1100.7 and e.g., *Bishop v. City of San Jose* (1969) 1 C3rd 56), and it is the courts, not the legislature, that determines which matters are municipal affairs (see, e.g., *California Federal Savings and Loan v. City of Los Angeles* (1991) 54 C3d 1): and

Article X, Section 67 of the Petaluma Charter provides in pertinent part:

...no progressive payments can be provided for or made at any time which, with prior payments, if there have been such, shall exceed in amount at that time ninety percent of the value of the labor done and the materials used up to that time, and no contract shall provide for or authorize or permit or permit the payment of more than ninety percent of the contract price before the completion of the work done under said contract and the acceptance thereof...; and

City charters are documents of limitation and a restriction on the City Council's powers imposed by the voters (see, e.g., *City of Glendale v. Trondsen* (1957) 48 C2d 93) and, as a result, the City Council's contracting power is limited by the retention requirement in Article X, Section 67, and the City Council and City Council and City staff lack the power to provide for public works contract retention other than as specified in the City Charter.

**19. GOVERNMENT CODE SECTION 1090:** The successful Bidder may be precluded from competing for, or participating in, subsequent contracts that result from or relate to the WORK performed pursuant to this Bid. The ethics laws that apply to the City and all its consultants, contractors, and vendors include California Government Code Section 1090 and following, which prohibits government officials, employees, and contractors from participating in making government contracts in which the official, employee or contractor has a financial interest. Because City contractors always have a financial interest in their City contracts, the Section 1090 prohibition regarding City contractors focuses on whether a contractor

is or would be “making a government contract” in a quasi-governmental capacity for purposes of Section 1090. Section 1090 prohibits City contractors from using their role as a contractor to influence how the City spends the public’s funds in a way that benefits the contractor. Penalties for violating Section 1090 are severe, and may include felony criminal penalties, permanent disqualification from holding public office in California, disgorgement of any benefit received by the financially interested contractor, civil and administrative penalties, and voiding of the prohibited contract.

NAME: Lucas Pereira  
ADDRESS: 1318 Redwood Way, Suite 120  
Petaluma, CA  
94954  
PHONE: 707-778-4585

**20. CITY’S RIGHTS RESERVED:** The CITY reserves the right to reject any or all bids, to waive any minor irregularity in a bid, and to make awards to the lowest responsive, responsible bidder as it may best serve the interest of the CITY.

CITY: Petaluma

BY: 

DATE: August 14, 2024

END OF INVITING BIDS

## INSTRUCTIONS TO BIDDERS

1. **DEFINED TERMS.** Terms used in these Instructions to Bidders and the Notice Inviting Bids which are defined in the General Conditions have the meanings assigned to them in the General Conditions. The term “Bidder” means one who submits a Bid directly to CITY, as distinct from a sub-bidder, who submits a price or quote to a Bidder.
2. **LOCAL BUSINESS LICENSE.** All CONTRACTORS, including subcontractors, not already having a local business license for the work contemplated, will be required to secure the appropriate license before a Contract can be executed.
3. **INTERPRETATIONS AND ADDENDA.**
  - 3.1 All questions about the meaning or intent of the Contract Documents are to be directed to the ENGINEER. Additions, deletions, or revisions to the Contract Documents considered necessary by the ENGINEER in response to such questions will be issued by Addenda mailed or delivered to all parties recorded by the ENGINEER as having received the Contract Documents. Questions **are due September 13<sup>th</sup>, 2024**. Only answers to such questions issued by formal written Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.
  - 3.2 Addenda may also be issued to make other additions, deletions, or revisions to the Contract Documents.
  - 3.3 Bidders shall make no special interpretation or inference of intent from differing formats in the Technical Specifications.
4. **BIDDER’S EXAMINATION OF CONTRACT DOCUMENTS AND SITE.**
  - 4.1 It is the responsibility of each Bidder before submitting a Bid:
    - A. To examine thoroughly the Contract Documents and other related data identified in the Bidding Documents (including “technical” data referred to below);
    - B. To visit the site to become familiar with local conditions that may affect cost, progress, or performance of the WORK;
    - C. To consider federal, state, and local Laws and Regulations that may affect cost, progress, or performance of the WORK;
    - D. To study and carefully correlate the Bidder’s observations with the Contract Documents; and

- E. To notify the ENGINEER of all conflicts, errors, ambiguities, or discrepancies in or between the Contract Documents and such other related data.
- 4.2 Reference is made to the Supplementary General Conditions for identification of:
- A. Those reports of explorations and tests of subsurface conditions at the site which have been utilized by the ENGINEER in the preparation of the Contract Documents.
  - B. Those drawings of physical conditions in or relating to existing surface and subsurface conditions (except Underground Utilities) which are at or contiguous to the site which have been utilized by the ENGINEER in the preparation of the Contract Documents.
  - C. Those environmental reports or drawings relating to Asbestos, Hazardous Waste, PCBs, Petroleum, and/or Radioactive Materials identified at the site which have been utilized by the ENGINEER in the preparation of the Contract Documents.
  - D. The ENGINEER makes no representation as to the completeness of the reports or drawings referred to in Paragraphs 4.2A, 4.2B, and 4.2C. above or the accuracy of any data or information contained therein. The Bidder may rely upon the accuracy of the technical data contained in such reports and drawings. However, the Bidder may not rely upon any interpretation of such technical data, including any interpretation or extrapolation thereof, or any non-technical data, interpretations, and opinions contained therein.
- 4.3 Copies of reports and drawings referred to in Paragraph 4.2 will be made available by the CITY to any Bidder on request, if said reports and drawings are not bound herein. Those reports and drawings are not part of the Contract Documents, but the technical data contained therein upon which the Bidder is entitled to rely, are incorporated herein by reference.
- 4.4 Information and data reflected in the Contract Documents with respect to Underground Utilities at or contiguous to the site are based upon information and data furnished to the ENGINEER by the owners of such Underground Utilities or others, and the CITY does not assume responsibility for the accuracy or completeness thereof unless it is expressly provided otherwise in the Supplementary General Conditions.
- 4.5 Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders on subsurface conditions, Underground Utilities, and other physical conditions, and possible changes in the Contract Documents due to differing conditions appear in Paragraphs 4.2, 4.3, and 4.4 of the General Conditions.
- 4.6 Before submitting a Bid, each Bidder will, at Bidder's own expense, make or obtain any additional examinations, investigations, explorations, tests, and studies and obtain any

additional information and data which pertain to the physical conditions (surface, subsurface, and Underground Utilities) at or contiguous to the site or otherwise which may affect cost, progress, or performance of the WORK and which the Bidder deems necessary to determine its Bid for performing the WORK in accordance with the time, price, and other terms and conditions of the Contract Documents.

- 4.7 On request a minimum of 2 working days in advance, the ENGINEER will provide each Bidder access to the site to conduct such examinations, investigations, explorations, tests, and studies as each Bidder deems necessary for submission of a Bid. Location of any excavation or boring shall be subject to prior approval of ENGINEER and applicable agencies. Bidder shall fill all holes, restore all pavement to match existing structural section, and shall clean up and restore the site to its former condition upon completion of such explorations. ENGINEER reserves the right to require Bidder to execute an Access Agreement with the CITY prior to accessing the site.
- 4.8 The lands upon which the WORK is to be performed, rights-of-way, and easements for access thereto and other lands designated for use by the CONTRACTOR in performing the WORK are identified in the Contract Documents. All additional lands and access thereto required for temporary construction facilities or storage of materials and equipment are to be provided by the CONTRACTOR. Easements for permanent structures or permanent changes in existing structures are to be obtained and paid for by the CITY unless otherwise provided in the Contract Documents.
- 4.9 The submission of a Bid will constitute an incontrovertible representation by the Bidder that the Bidder has complied with every requirement of this Paragraph 4 and the following:
  - A. That the Bid is premised upon performing the WORK required by the Contract Documents without exception and such means, methods, techniques, sequences, or procedures of construction (if any) as may be required by the Contract Documents;
  - B. That Bidder has given the ENGINEER written notice of all conflicts, errors, ambiguities, and discrepancies in the Contract Documents and the written resolution thereof by the ENGINEER is acceptable to the Bidder; and
  - C. That the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance of the WORK.
5. **BID FORMS.** The Bid shall be submitted on the Bid Forms provided by the City. All blanks on the Bid Forms shall be completed in ink. All names must be printed below the signatures. The Bid shall be submitted in a sealed envelope which shall be plainly marked in the upper left hand corner with the name and address of the Bidder and shall bear the words "BID FOR" followed by the title of the Contract Documents for the WORK, the name of the CITY, the address where Bids are to be delivered or mailed to, and the date and hour of opening of Bids.

- 5.2 The Bid must set forth the name and location of the place of business of each subcontractor who will perform work or labor or render service to the prime contractor in or about the construction of the WORK, or a subcontractor licensed by the State of California who, under subcontract to the prime contractor, specially fabricates and installs a portion of the WORK according to detailed Drawings contained in the plans and specifications, in an amount in excess of one-half of 1 percent of the prime contractor's total bid or, in the case of bids or offers for the construction of streets and highways, including bridges, in excess of one-half of 1 percent of the prime contractor's total bid or ten thousand dollars (\$10,000), whichever is greater.
6. CERTIFICATES.
- 6.1 Bids by corporations must be executed in the corporate name by the president, a vice-president, or other corporate officer. Such Bid shall be accompanied by the enclosed Certificate of Authority to sign, attested by the secretary or assistant secretary, and with the corporate seal affixed. The corporate address and state of incorporation must appear below the signature.
- 6.2 Bids by partnerships must be executed in the partnership name and be signed by a managing partner, accompanied by the enclosed Certificate of Authority to sign, and his/her title must appear under the signature and the official address of the partnership must appear below the signature.
- 6.3 Bids by joint venture must be executed in the joint venture name and be signed by a joint venture managing partner, accompanied by the enclosed Certificate of Authority to sign, and his/her title must appear under the signature and the official address of the joint venture must appear below the signature.
7. DISQUALIFICATION OF BIDDERS. More than one Bid from an individual, firm, partnership, corporation, or association under the same or different names will not be considered. If the CITY believes that any Bidder is interested in more than one Bid for the WORK contemplated, all Bids in which such Bidder is interested will be rejected. If the CITY believes that collusion exists among the Bidders, all Bids will be rejected. A party who has quoted prices to a bidder is not hereby disqualified from quoting prices to other Bidders, or from submitting a Bid directly for the WORK. If a Bidder is not registered with the Department of Industrial Relations pursuant to Labor Code Section 1725.5 and Section 1771.1, then the Bid may be rejected as non-responsive.
8. QUANTITIES OF WORK. The quantities of work or material stated in unit price items of the Bid are supplied only to give an indication of the general scope of the WORK; the OWNER does not expressly or by implication agree that the actual amount of work or material will correspond therewith, and reserves the right after award to increase or decrease the quantity of any unit price item of the WORK by an amount up to and including 25 percent of any Bid item in its entirety, or to add additional Bid items up to and including an aggregate total amount not to exceed 25 percent of the Bid price.

9. **SUBSTITUTE OR “OR EQUAL” ITEMS.** Whenever materials or equipment are specified or described in the Contract Documents by using the name of a particular manufacturer and the name is followed by the words “or equal”, the Bidder may write the name of a substitute manufacturer (which the Bidder considers as an “or equal”) in the List of Proposed Substitutions in the Bid Forms. The ENGINEER will make a determination of approval or rejection of the proposed substitution prior to award of the Contract. No request for substitution of an “or equal” item will be considered by the ENGINEER after award of the Contract. The procedure for the submittal of substitute or “or equal” products is contained in the Bid Forms. The Bidder shall not be relieved of any obligations of the Contract Documents or be entitled to an adjustment in the Contract Price in the event any proposed substitution is not approved.
10. **COMPETENCY OF BIDDERS.** In selecting the lowest responsive, responsible Bidder, consideration will be given not only to the financial standing but also to the general competency of the Bidder for the performance of the WORK covered by the Bid. To this end, each Bid shall be supported by a statement of the Bidder’s experience as of recent date including: (a) all projects worked on by the Bidder over the past three (3) years including the contract amount for each project; (b) all complaints made against the Contractor’s license in the past ten (10) years; and (c) all claims and lawsuits presented or filed in the last five (5) years, regardless of the form, regarding any public works project.
11. **SUBMISSION OF BIDS.** The Bid shall be delivered by the time and to the place stipulated in the Notice Inviting Bids. It is the Bidder’s sole responsibility to see that its Bid is received in proper time and at the proper place.
12. **BID SECURITY, BONDS, AND INSURANCE.** Each Bid shall be accompanied by a certified or cashier’s check or approved Bid Bond in the amount stated in the Notice Inviting Bids. Said check or bond shall be made payable to the CITY and shall be given as a guarantee that the Bidder, if awarded the WORK, will enter into an Agreement with the CITY and will furnish the necessary insurance certificates, Payment Bond, and Performance Bond. In case of refusal or failure to enter into said Agreement, the check or Bid Bond, as the case may be, shall be forfeited to the CITY. If the Bidder elects to furnish a Bid Bond as its Bid security, the Bidder shall use the Bid Bond form bound herein. Bid Bonds shall comply with the requirements applicable to payment and performance bonds in the General Conditions.
- 12.1 **BIDDING CAPACITY.** Each Bid shall be accompanied by a list of the projects currently being worked on by Bidder, their size, contract price, scheduled completion date, location, and owner. Additionally, Bidder shall provide certified evidence of its current bonding capacity.
13. **DISCREPANCIES IN BIDS.** In the event there is more than one Bid item in a Bid Schedule, the Bidder shall furnish a price for all Bid Items in the Schedule, and failure to do so will render the Bid non-responsive and shall cause its rejection. In the event there



are unit price Bid items in a Bidding schedule and the amount indicated for a unit price Bid item does not equal the product of the unit price and quantity, the unit price shall govern and the amount will be corrected accordingly, and the BIDDER shall be bound by said correction. In the event there is more than one Bid item in a Bid Schedule and the total indicated for the Schedule does not agree with the sum of the prices Bid on the individual items, the prices Bid on the individual items shall govern and the total for the Schedule will be corrected accordingly, and the BIDDER shall be bound by said correction.

14. MODIFICATIONS AND UNAUTHORIZED ALTERNATIVE BIDS. Unauthorized conditions, limitations, or provisos attached to the Bid shall render it informal and may cause its rejection as being non-responsive. The Bid forms shall be completed without interlineations, alterations, or erasures in the printed text. Alternative Bids will not be considered unless called for. Oral, telegraphic, or telephonic Bids or modifications will not be considered.
15. WITHDRAWAL OF BID. The Bid may be withdrawn by the Bidder by means of a written request, signed by the Bidder or its properly authorized representative. Such written request must be delivered to the place stipulated in the Notice Inviting Bids for receipt of Bids prior to the scheduled closing time for receipt of Bids.
16. BID PROTEST. Any Bid protest must be submitted in writing to the City Manager before 5:00 p.m. on the fifth (5<sup>th</sup>) working day following Bid opening.
  - A. The initial protest document must contain a complete statement of the basis for the protest, and all supporting documentation.
  - B. The party filing the protest must have actually submitted a Bid for the WORK. A subcontractor of a party submitting a Bid for the WORK may not submit a Bid protest. A party may not rely on the Bid protest submitted by another Bidder, but must timely pursue its own protest.
  - C. The protest must refer to the specific portion of the bid document which forms the basis for the protest.
  - D. The protest must include the name, address and telephone number of the person representing the protesting party.
  - E. The party filing the protest must concurrently transmit a copy of the initial protest document and any attached documentation to all other parties with a direct financial interest which may be adversely affected by the outcome of the protest. Such parties shall include all other Bidders who appear to have a reasonable prospect of receiving an award depending upon the outcome of the protest.

- F. The CITY will give the protested Bidder five (5) working days after the receipt of the protest to submit a written response. The responding Bidder shall transmit the response to the protesting Bidder concurrent with delivery to the CITY.
  - G. The procedure and time limits set forth in this paragraph are mandatory and are the Bidder's sole and exclusive remedy in the event of Bid protest. The Bidder's failure to comply with these procedures shall constitute a waiver of any right to further pursue the Bid protest, including filing a Government Code Claim or legal proceedings. A Bidder may not rely on a protest submitted by another Bidder, but must timely pursue its own protest.
  - H. If the CITY determines that a protest is frivolous, the protesting bidder may be determined to be non-responsible and that bidder may be determined to be ineligible for future contract awards.
17. **AWARD OF CONTRACT.** Award of the contract, if awarded, will be made to the lowest responsive, responsible Bidder whose Bid complies with the requirements of the Contract Documents. Unless otherwise specified, any such award will be made within the period stated in the Notice Inviting Bids that the bids are to remain open. Unless otherwise indicated, a single award will be made for all the Bid items in an individual Bid Schedule. In the event the WORK is contained in more than one Bid Schedule, the CITY may award Schedules individually or in combination. In the case of two Bid Schedules which are alternative to each other, only one of such alternative schedules will be awarded. The CITY may condition the award upon the Bidder's timely submission of all items required by the Contract Documents, including, but not limited to the executed Agreement, performance, labor and materials, and maintenance bonds, and required certificates of insurance and endorsements.
18. **RETURN OF BID SECURITY.** Within 14 days after award of the contract, the CITY will, if requested, return the Bid securities accompanying such Bids that are not being considered in making the award. All other Bid securities will be held until the Agreement has been finally executed. They will then be returned, if requested, to the respective Bidders whose Bids they accompany.
19. **EXECUTION OF AGREEMENT.** The Bidder to whom award is made shall execute a written Agreement with the CITY on the form of agreement provided, shall secure all insurance, and shall furnish all certificates and bonds required by the Contract Documents within five (5) working days after receipt of Notice of Award from the CITY. Failure or refusal to enter into an Agreement as herein provided or to conform to any of the stipulated requirements in connection therewith shall be just cause for annulment of the award and forfeiture of the Bid security. If the lowest responsive, responsible Bidder refuses or fails to execute the Agreement, the CITY may award the Contract to the second lowest responsive, responsible Bidder. If the second lowest responsive, responsible Bidder refuses or fails to execute the Agreement, the OWNER may award the contract to the third lowest responsive, responsible Bidder. On the failure or refusal of such second or third

lowest Bidder to execute the Agreement, each such Bidder's Bid securities shall be likewise forfeited to the CITY.

20. LIQUIDATED DAMAGES. Provisions for liquidated damages, if any, are set forth in the Agreement.
21. WORKERS' COMPENSATION REQUIREMENT. The Bidder should be aware that in accordance with Section 3700 of the California Labor Code it will, if awarded the Contract, be required to secure the payment of compensation to its employees and execute the Workers' Compensation Certification in the form contained in these Contract Documents.
22. NON-COLLUSION AFFIDAVIT. Bidders must execute the following affidavit and submit the same with his/her bid:
23. MATERIALS SUPPLIERS LIST. Bidders and their subcontractors must complete the List of Materials Suppliers and Material Guarantee form provided with the Bid Forms and must submit the completed form with the Bid.

END OF INSTRUCTIONS TO BIDDERS

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**SECTION I**

**BID FORMS**

**(TO BE SUBMITTED WITH BIDS)**

**BIDDER'S AFFIDAVIT OF NON-COLLUSION SUBMITTED WITH BID**

\_\_\_\_\_, [Contractor] hereby declares that:

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

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

Dated: \_\_\_\_\_

\_\_\_\_\_  
Signature

Public Contract Code section 7106  
Code of Civil Procedure section 2015.5

END OF BIDDER'S AFFIDAVIT OF NON-COLLUSION SUBMITTED WITH BID











# PROPOSAL

To the City Council of the City of Petaluma:

The undersigned declares that he/she has carefully examined the location of the proposed work, that he/she has examined the plans and specifications, and read the accompanying instructions to bidders, and hereby proposes to furnish all materials and do all the work required to complete the said work in accordance with said plans, specifications, and special provisions for the unit or lump sum prices set forth in the attached Bid Schedule.

It is understood and agreed that the undersigned shall complete the work of the contract within the time provided for in the Contract Documents and Specifications governing said work.

If awarded the contract, the undersigned hereby agrees to sign said contract and to furnish the necessary bonds, insurance certificates and agreements within five (5) working days after receipt of Notice of Award of said contract from the City.

The undersigned has examined the location of the proposed work and is familiar with the plans, specifications and other contract documents and the local conditions at the place where the work is to be done.

The undersigned has checked carefully all the figures on the attached Bid Schedule and understands that the City will not be responsible for any errors or omissions on the part of the undersigned in making up the bid.

Enclosed find bidder's bond, certified check, or cashier's check no. \_\_\_\_\_ of the \_\_\_\_\_ (Company) (Bank) for \_\_\_\_\_ Dollars (\$\_\_\_\_\_).

This project requires a Class \_\_\_\_\_ California State Contractor's License.

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

Expiration Date of Contractor's License \_\_\_\_\_

This project requires registration with the California State Department of Industrial Relations.

Public Works Contractor Registration No. \_\_\_\_\_

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

A bid submitted to a public agency by a contractor who is not licensed and not registered shall be considered non-responsive and shall be rejected by the public agency. The undersigned contractor declares that the contractor's license number, public work contractor registration number, and expiration dates stated herein are made under penalty of perjury under the laws of the State of California.

Contractor: \_\_\_\_\_

Signed by: \_\_\_\_\_

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

Address: \_\_\_\_\_

\_\_\_\_\_

Phone: \_\_\_\_\_

Fax: \_\_\_\_\_

Email: \_\_\_\_\_

Dated this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_.

END OF PROPOSAL

**BID SCHEDULE**

**ADOBE ROAD RECYCLED WATER PIPELINE PROJECT**

<b>Item No.</b>	<b>Description</b>	<b>Unit</b>	<b>Qty</b>	<b>Unit Price</b>	<b>Total Price</b>
1	Mobilization and Demobilization	LS	1		
2	Water Pollution Control	LS	1		
3	Temporary Traffic Control	LS	1		
4	Trench Sheet, Shoring and Bracing	LS	1		
5	16-Inch Recycled Water Main AC Pavement Surface Restoration	LF	160		
6	16-Inch Recycled Water Main Unimproved Surface Restoration	LF	2,309		
7	16-Inch FPVC or 20-Inch HDPE RW Main HDD (Crossing 1)	LF	663		
8	16-Inch FPVC or 20-Inch HDPE RW Main HDD (Crossing 2)	LF	1281		
9	16-Inch FPVC or 20-Inch HDPE RW Main HDD (Crossing 3)	LF	804		
10	16-Inch Butterfly Valve (Std. No. 879)	EA	7		
11	6-Inch Single Irrigation Service	EA	1		
12	6-Inch Dual Irrigation Service	EA	2		
13	Air-Vacuum Release Valve (Std. No. 883)	EA	5		
14	6-Inch Blow-off (Std. No. 858.01)	EA	1		

**Base Bid** \$ \_\_\_\_\_

\*Note: In case of error in extension of price into the total price column, the unit price will govern.

Total Amount of Bid (written in words) is: _____ _____ Dollars and _____ Cents. In the event of discrepancy between words and figures, the words shall prevail. \$ _____ _____ Figures
---

Note: **The award of the contract shall be awarded to the lowest price of the base bid.**

\_\_\_\_\_  
Address of Bidder

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

\_\_\_\_\_  
City

\_\_\_\_\_  
Name of Bidder (Print)

\_\_\_\_\_  
Telephone Number of Bidder

\_\_\_\_\_  
Fax Number of Bidder

\_\_\_\_\_  
Contractor's License Number

\_\_\_\_\_  
License's Expiration Date

**Addendum Acknowledgement**

Addendum No. 1    Signature Acknowledging Receipt: \_\_\_\_\_    Date: \_\_\_\_\_

Addendum No. 2    Signature Acknowledging Receipt: \_\_\_\_\_    Date: \_\_\_\_\_

Addendum No. 3    Signature Acknowledging Receipt: \_\_\_\_\_    Date: \_\_\_\_\_

Addendum No. 3    Signature Acknowledging Receipt: \_\_\_\_\_    Date: \_\_\_\_\_







**LIST OF MATERIAL SUPPLIERS AND MATERIAL GUARANTEE**

The bidder is required to name the make and supplier of the material items listed below to be furnished under these specifications. The bidder shall name a manufacturer for each item and the supplier of the item if the supplier is not the manufacturer. The naming of more than one supplier for a single item or naming a supplier followed by the words “or equal” will not be acceptable. Substitution of any listed supplier following submission of this form with the Bid shall only be permitted as authorized by the Engineer pursuant to Section 6.3 of the General Conditions.

Failure to complete this form and submit it with the bid proposal may cause the proposal to be rejected as being incomplete and not responsive to the solicitation.

<b>Item</b>	<b>Supplier &amp; Manufacturer</b>	<b>Address</b>

**MATERIAL GUARANTEE**

In addition to completion of the list of material suppliers on the Material Suppliers form, the bidder may be required to furnish prior to award of contract, a complete statement of the origin, composition and manufacturer of any or all materials to be used in the construction of the work, together with samples, which samples may be subjected to test, provided for in these specifications or in the Special Provisions to determine their quality and fitness for the work.

END OF  
LIST OF MATERIAL SUPPLIERS AND MATERIAL GUARANTEE

**QUESTIONNAIRE AND FINANCIAL ASSURANCE STATEMENT**

The following statements as to experience and financial qualifications of the Proposer are submitted in conjunction with the proposal as a part thereof, and the truthfulness and accuracy of the information is guaranteed by the Proposer.

The Proposer has been engaged in the contracting business under the present business for \_\_\_\_\_ years. Experience in work of a nature similar to that covered in the proposal extends over a period of \_\_\_\_\_ years.

The Proposer, as a contractor, has never failed to satisfactorily complete a contract awarded to contractor, except as follows:

---

---

---

List all claims and lawsuits presented or filed in the last five (5) years, regardless of the form, regarding any public works project:

---

---

---

The following contracts for work have been completed in the last three (3) years for the persons, firm or authority indicated and to whom reference is made:

Year	Type of Work-Size, Length and Contract Amount	Location and For Whom Performed
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

The following complaints have been made against the Proposer's contractor's license within the past ten (10) years:

Date: \_\_\_\_\_ Nature of Complaint \_\_\_\_\_

---

---

Reference is hereby made to the following bank or banks as to the financial responsibility of the proposer:

NAME OF BANK	ADDRESS

Reference is hereby made to the following surety companies as to the financial responsibility and general reliability of the proposer:

NAME OF SURETY COMPANY:

---

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

\_\_\_\_\_  
SIGNATURE OF PROPOSER

\_\_\_\_\_  
DATE

\_\_\_\_\_  
NAME OF PROPOSER

END OF  
QUESTIONNAIRE AND FINANCIAL STATEMENT FORM

**SITE VISIT AFFIDAVIT  
TO BE EXECUTED  
BY BIDDER, NOTARIZED AND SUBMITTED WITH BID**

(To Accompany Bid)

State of California     )  
  ) ss.  
County of                    )

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

she is

\_\_\_\_\_ of \_\_\_\_\_, the party making the foregoing  
(Title of Representative)                   (Contractor's Name)

bid, has visited the Site of the Work as described in the Contract and has examined and familiarized themselves with the existing conditions, as well as all other conditions relating to the construction which will be performed. The submitting of a bid shall be considered an acknowledgement on the part of the Bidder of familiarity with conditions at the site of Work. The Bidder further acknowledges that the site examination has provided adequate and sufficient information related to existing conditions which may affect cost, progress or performance of the Work.

Signature                   Name of Bidder

## STATEMENT OF QUALIFICATIONS

**The apparent low Bidder shall submit a Statement of Qualifications as specified herein as a submittal to the City within 24 hours of the bid opening.**

- A. The following are minimum requirements for the Bidder to be found responsible to perform the Work. Bidder's compliance with the minimum qualification requirements will be measured by the experience of the supervisory personnel who will have responsible charge of the various major components of the Work. If Bidder subcontracts portions of the Work, City, in its determination of whether the minimum qualification requirements have been met, will consider the qualifications of the Subcontractor's supervisory personnel.
1. Five years experience as a continuously operating entity engaged in the performance of similar work.
  2. Experience on public works projects, with no history of default termination.
  3. Sufficient financial strength, stability and resources as measured by Bidder's equity, debt-to-assets ratio, and capability to finance the Work to be performed.
  4. Provide a minimum of three projects with similar scope and value completed in the last five (5) years, including references from each project. Projects shall include installation of pipelines of similar size to this project.
  5. Contractor and/or its subcontractors shall be able to demonstrate experience performing horizontal directional drilling (HDD).
- B. Owner will notify Apparent Low Bidder in writing of any deficiencies found and will provide Bidder the opportunity to respond in writing with reasonable clarifications but will not allow any changes in the nature of Bidder as a business entity.

**BID BOND**

We, \_\_\_\_\_ as Principal, and \_\_\_\_\_ as Surety, jointly and severally, bind ourselves, our heirs, representatives, successors and assigns, as set forth herein, to the City of Petaluma (herein called "the Owner") for the payment of the penal sum of \_\_\_\_\_ Dollars (\$\_\_\_\_\_), lawful money of the United States, which is ten (10) percent of the total amount bid by bidder to the Owner. Principal has submitted the accompanying bid for the construction of the \_\_\_\_\_ project.

If the Principal is awarded the contract and enters into a written contract, in the form prescribed by the Owner, at the price designated by his bid, and files the bonds required by the Agreement with the Owner, and carries all insurance in type and amount which conforms to the contract documents and furnishes required certificates and endorsements thereof, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

Forfeiture of this bond, or any deposit made in lieu thereof, shall not preclude the Owner from seeking all other remedies provided by law to cover losses sustained as a result of the Principal's failure to do any of the foregoing.

Principal and Surety agree that if the Owner is required to engage the services of an attorney in connection with the enforcement of this bond, each shall pay the Owner's reasonable attorney's fees, witness fees and other costs incurred with or without suit.

Executed on \_\_\_\_\_, \_\_\_\_\_.

\_\_\_\_\_  
PRINCIPAL

By \_\_\_\_\_  
Signature

\_\_\_\_\_  
Title

Any claims under this bond may be addressed to:

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

(Name and address of Surety's agent for service of process in California, if different from above)

(Telephone number of Surety's agent in California)

(Attach Acknowledgment)

\_\_\_\_\_  
SURETY

By \_\_\_\_\_  
(Attorney-in-Fact)

**NOTICE:**

No substitution or revision to this bond form will be accepted. Be sure that all bonds submitted have a certified copy of the bonding agent's power of attorney attached. Also verify that Surety is an "Admitted Surety" (i.e., qualified to do business in California), and attach proof of verification (website printout from the California Department of Insurance website (<http://www.insurance.ca.gov/docs/index.html>) or certificate from County Clerk).

END OF BID BOND

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**SECTION II**  
**GENERAL CONDITIONS**

**CITY OF PETALUMA - GENERAL CONDITIONS**

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## ARTICLE 1 - DEFINITIONS

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

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

**Agreement** - The written contract between the CITY and the CONTRACTOR covering the WORK to be performed; other documents are attached to the Agreement and made a part thereof as provided therein.

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

**Asbestos** - Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.

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

**Bonds** - Bid, Performance, and Labor and Materials, and Maintenance Bonds and other instruments of security.

**Change Order** - A document recommended by the ENGINEER, which is signed by the CONTRACTOR and the CITY, and authorizes an addition, deletion, or revision in the WORK, or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.

**CITY** - The City of Petaluma.

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

**Contract Documents** - The Notice Inviting Bids, Instructions to Bidders, Bid Forms (including the Bid, Bid Schedule(s), Information Required of Bidder, Bid Bond, and all required certificates, affidavits and other documentation), Agreement, Performance Bond, Labor and Materials Bond, Maintenance Bond, General Conditions, any Supplementary General

Conditions, Special Provisions, Specifications, Drawings, all Addenda, and Change Orders executed pursuant to the provisions of the Contract Documents. Shop Drawings are not Contract Documents.

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

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

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

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

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

**Drawings** - The drawings, plans, maps, profiles, diagrams, and other graphic representations which indicate the character, location, nature, extent, and scope of the WORK and which have been prepared by the ENGINEER and are included and/or referred to in the Contract Documents. Shop Drawings are not Drawings as so defined.

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

**ENGINEER** - The City Manager or his/her designee.

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

**Hazardous Waste** - The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 U.S.C. Section 6906) as amended from time to time.

**Laws and Regulations; Laws or Regulations** - Any and all applicable laws, rules, regulations, ordinances, codes, and/or orders of any and all governmental bodies, agencies, authorities and courts having jurisdiction.

**Lien or Mechanic's Lien** - A form of security, an interest in real property, which is held to secure the payment of an obligation. When related to public works construction, Lien or Mechanic's Lien may be called Stop Notice.



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

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

**Notice of Completion** - A form signed by the ENGINEER and the CONTRACTOR recommending to the CITY that the WORK is Complete and fixing the date of completion. After acceptance of the WORK by the CITY Council, the form is signed by the CITY and filed with the County Recorder. This filing starts the 30 day lien filing period on the WORK.

**Notice to Proceed** - The written notice issued by the CITY to the CONTRACTOR authorizing the CONTRACTOR to proceed with the WORK for the purpose for which it is intended prior to completion of all the WORK.

**Partial Utilization** - Use by the CITY of a completed part of the WORK for the purpose for which it is intended prior to completion of all the WORK.

**Petroleum** - Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Wastes and crude oils.

**Project** - The total construction project of which the WORK to be provided under the Contract Documents may be the whole, or as part as indicated elsewhere in the Contract Documents.

**Record Drawings** - Drawings generated by marking a set of Drawings to reflect all of the changes that have occurred during construction of the Project.

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

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

**Shop Drawings** - All drawings, diagrams, illustrations, schedules, and other data which are specifically prepared by or for the CONTRACTOR and submitted by the CONTRACTOR to illustrate some portion of WORK.

**Site** - Lands or other areas designated in the Contract Documents as being furnished by the CITY for the performance of the construction, storage, or access.

**Special Provisions** - Specific clauses setting forth conditions or requirements peculiar to the work and supplementary to the Standard Specifications.

**Specifications** - The directions, provisions and requirements set forth in the Standard Specifications as supplemental and modified by the special provisions.

**Stop Notice** - A legal remedy for subcontractors and suppliers who contribute to public works, but who are not paid for their work, which secures payment from construction funds possessed by the CITY. In some states, for public property, the Stop Notice remedy is designed to substitute for a mechanic's lien.

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

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

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

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

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

**Working day** - Any day except Saturdays, Sundays and CITY holidays.

## **ARTICLE 2 – PRELIMINARY MATTERS**

### **2.1 DELIVERY OF BONDS AND INSURANCE CERTIFICATES**

- A. When the CONTRACTOR delivers the signed Agreement to the CITY, the CONTRACTOR shall also deliver to the CITY such Bonds and insurance policies and certificates as the CONTRACTOR may be required to furnish in accordance with the Contract Documents.

## 2.2 COPIES OF DOCUMENTS

- A. The CITY will furnish to the CONTRACTOR the required number of copies of the Contract Documents specified in the Supplementary General Conditions.

## 2.3 COMMENCEMENT OF CONTRACT TIMES; NOTICE TO PROCEED

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

## 2.4 STARTING THE WORK

- A. The CONTRACTOR shall begin to perform the WORK on the commencement date stated in the Notice to Proceed, but no work shall be done at the Site prior to said commencement date.
- B. Before undertaking each part of the WORK, the CONTRACTOR shall review the Contract Documents in accordance with Paragraph 3.3.

## 2.5 PRECONSTRUCTION CONFERENCE

- A. The CONTRACTOR is required to attend a preconstruction conference. This conference will be attended by the CITY, ENGINEER, and others as appropriate in order to discuss the WORK.
- B. The CONTRACTOR's initial schedule submittals for shop drawings, obtaining permits, and Plan of Operation and CPM Schedule will be reviewed and finalized. At a minimum, the CONTRACTOR's representatives shall include its project manager, project superintendent and schedule expert. If the submittals are not finalized at the end of the meeting, additional meetings will be held so that the submittals can be finalized prior to the submittal of the first Application for Payment. No Application for Payment will be processed prior to receiving acceptable initial submittals from the CONTRACTOR.

# ARTICLE 3 – INTENT AND USE OF CONTRACT DOCUMENTS

## 3.1 INTENT

- A. The Contract Documents comprise the entire agreement between the CITY and the CONTRACTOR concerning the WORK. The Contract Documents are complementary; what is called for by one is as binding as if called for by all. The Contract Documents will be construed in accordance with the law of the State of California .
- B. It is the intent of the Contract Documents to describe the WORK, functionally complete, to be constructed in accordance with the Contract Documents. Any

labor, documentation, services, materials, or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result will be provided whether or not called for specifically.

- C. When words or phrases which have a well-known technical or construction industry or trade meaning are used to describe work, materials, or equipment such words or phrases shall be interpreted in accordance with that meaning unless a definition has been provided in Article 1 of the General Conditions.

### 3.2 REFERENCE TO STANDARDS

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

### 3.3 REVIEW OF CONTRACT DOCUMENTS

- A. If, during the performance of the WORK, CONTRACTOR discovers any conflict, error, ambiguity or discrepancy within the Contract Documents or between the Contract Documents and any provision of any such Law or Regulation applicable to the performance of the WORK or of any such standard, specification, manual, or code, or of any instruction of any Supplier, CONTRACTOR shall report it to ENGINEER in writing at once, and CONTRACTOR shall not proceed with the work affected thereby (except in an emergency as authorized by Paragraph 6.13 until a Clarification, Field Order, or Change Order to the Contract Documents has been issued.

### 3.4 ORDER OF PRECEDENCE OF CONTRACT DOCUMENTS

A. Unless otherwise noted herein, conflicts or inconsistencies between parts of the Contract will be resolved by the ENGINEER with a Change Order or an Addendum, if required. Addenda and Change Orders bearing the most recent date shall prevail over Addenda or Change Orders bearing earlier dates. Any reference to addenda-changed specifications or drawings shall be considered to have been changed accordingly. In resolving conflicts resulting from errors or discrepancies in any of the Contract Documents, the order of precedence shall be as follows:

1. Change Orders/Addenda (most recent in time take precedence)
2. Agreement and Bond Forms
3. Referenced Standard Specifications
4. Special Provisions
5. Drawings
6. General Conditions
7. Instructions to Bidders
8. Contractor's Bid (Bid Form)
9. Notice Inviting Bids
10. Supplementary General Conditions (if any)
11. Permits from other agencies as may be required by law

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

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

### 3.5 AMENDING CONTRACT DOCUMENTS

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

### 3.6 REUSE OF DOCUMENTS

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

## ARTICLE 4 – SITE OF THE WORK

### 4.1 AVAILABILITY OF LANDS

- A. The CITY will furnish, as indicated in the Contract Documents, the lands upon which the WORK is to be performed, rights-of-way and easements for access thereto, and such other lands which are designated for the use of the CONTRACTOR. Easements for permanent structures or permanent changes in existing facilities will be obtained and paid for by the CITY, unless otherwise provided in the Contract Documents. Nothing contained in the Contract Documents shall be interpreted as giving the CONTRACTOR exclusive occupancy of the lands or rights-of-way provided. The CONTRACTOR shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment; provided, that the CONTRACTOR shall not enter upon nor use any property not under the control of the CITY until a written temporary construction easement agreement has been executed by the CONTRACTOR and the property owner, and a copy of said easement furnished to the ENGINEER prior to said use; and the CITY will not be liable for any claims or damages resulting from the CONTRACTOR's trespass on or use of any such properties. The CONTRACTOR shall provide the CITY with a signed release from the property owner confirming that the lands have been satisfactorily restored upon completion of the WORK.

### 4.2 REPORTS OF PHYSICAL CONDITIONS

- A. **Subsurface Explorations:** Reference is made to any Supplementary General Conditions for identification of those reports of explorations and tests of subsurface conditions at the Site that have been utilized by the ENGINEER in the preparation of the Contract Documents.
- B. **Existing Structures:** Reference is made to any Supplementary General Conditions for identification of those drawings of physical conditions in or relating to existing surface and subsurface structures (except underground Utilities referred to in Paragraph 4.3 herein) which are at or contiguous to the Site that have been utilized in the preparation of the Contract Documents.
- C. The CITY makes no representation as to the completeness of the reports or drawings referred to in Paragraph 4.2 A or B above or the accuracy of any data or information contained therein. The CONTRACTOR may rely upon the accuracy of the technical data contained in such reports and drawings. However, the CONTRACTOR may not rely upon any interpretation of such technical data, including any interpolation or extrapolation thereof, or any non-technical data, interpretations, and opinions contained therein.

#### 4.3 PHYSICAL CONDITIONS - UNDERGROUND UTILITIES

- A. **Indicated:** The information and data indicated in the Contract Documents with respect to existing underground Utilities at or contiguous to the Site are based on information and data furnished to the CITY or the ENGINEER by the owners of such underground Utilities or by others. Unless it is expressly provided in any Supplementary General Conditions the CITY will not be responsible for the accuracy or completeness of any such information or data, and the CONTRACTOR shall have full responsibility for reviewing and checking all such information and data, for locating all underground Utilities indicated in the Contract Documents, for coordination of the WORK with the owners of such underground Utilities during construction, for the safety and protection thereof and repairing any damage thereto resulting from the WORK, the cost of all of which are deemed to have been included in the Contract Price.
- B. **Not Indicated:** If an underground Utility is uncovered or revealed at or contiguous to the Site which was not indicated in the Contract Documents and which the CONTRACTOR could not reasonably have been expected to be aware of, the CONTRACTOR shall identify the owner of such underground Utility and give written notice thereof to that owner and shall notify the ENGINEER.

#### 4.4 DIFFERING SITE CONDITIONS

- A. The CONTRACTOR shall notify the ENGINEER, in writing, of the following unforeseen conditions, hereinafter called differing Site conditions, promptly upon their discovery (but in no event later than 14 days after their discovery) and before they are disturbed:
  - 1. Subsurface or latent physical conditions at the Site of the WORK differing materially from those indicated, described, or delineated in the Contract Documents, including those reports discussed in Paragraph 4.2, 4.3, and 4.5.
- B. The ENGINEER will review the pertinent conditions, determine the necessity of obtaining additional explorations or tests with respect thereto.
- C. If the ENGINEER concludes that because of newly discovered conditions a change in the Contract Documents is required, a Change Order will be issued as provided in Article 10 to reflect and document the consequences of the difference.
- D. In each such case, an increase or decrease in the Contract Price or an extension or shortening the Contract Times, or any combination thereof, will be allowable to the extent that they are attributable to any such difference. If the ENGINEER and the CONTRACTOR are unable to agree as to the amount or length thereof, a claim may be made therefor as provided in Articles 11 and 12.

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

#### 4.5 HAZARDOUS MATERIALS

- A. CITY shall be responsible for any Asbestos, Hazardous Waste, Petroleum, or Radioactive Material uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the WORK and which may present a substantial danger to persons or property exposed thereto in connection with the WORK at the Site. CITY will not be responsible for any such material brought to the Site by CONTRACTOR, Subcontractors, Suppliers, or anyone else for whom CONTRACTOR is responsible.
  - 1. Upon discovery of any Asbestos, Hazardous Waste, Petroleum, or Radioactive Material, the CONTRACTOR shall immediately stop all work in any area affected thereby (except in an emergency as required by Paragraph 6.13) and notify ENGINEER (and therefore confirm such notice in writing). CONTRACTOR shall not be required to resume any work in any such affected area until after CITY has obtained any required permits related thereto and delivered to CONTRACTOR special written notice. Such written notice will specify that such condition and any affected area is or has been rendered safe for the resumption of the work or specify any special conditions under which the work may be resumed safely. If ENGINEER and CONTRACTOR cannot agree as to entitlement to or the amount or extent of adjustment, if any, in Contract Price or Contract Times as a result of such work stoppage or such special conditions under which work is agreed by CONTRACTOR to be resumed, either party may make a claim therefor as provided in Articles 11 and 12.
  - 2. If, after receipt of such special written notice, CONTRACTOR does not agree to resume such WORK based on a reasonable belief it is unsafe, or does not agree to resume such WORK under special conditions, ENGINEER may order such portion of the WORK that is in connection with such hazardous condition or in such affected area to be deleted from the WORK. If ENGINEER and CONTRACTOR cannot agree as to entitlement to or the amount or extent of an adjustment, if any, in Contract Price or Contract Times as a result of deleting such portion of the WORK then either party may make a claim therefor as provided in Articles 11 and 12. CITY may have such deleted portion of the WORK performed by CITY's own forces or others in accordance with Article 7.
- B. The provisions of Paragraphs 4.2, 4.3, and 4.4 are not intended to apply to Asbestos, Petroleum, Hazardous Waste, or Radioactive Material uncovered or revealed at the Site.



#### 4.6 REFERENCE POINTS

- A. The ENGINEER will provide the location and elevation of one bench mark, near or on the Site of the WORK, for use by the CONTRACTOR for alignment and elevation control. Unless otherwise specified in any Supplementary General Conditions, the CONTRACTOR shall furnish all other lines, grades, and bench marks required for proper execution of the WORK.
- B. The CONTRACTOR shall preserve or replace any and all bench marks, section corners, witness corners, stakes, and other survey marks, and in case of their removal or destruction by any party, the CONTRACTOR shall be responsible for the accurate replacement of such reference points by surveyor licensed under the applicable state codes governing land surveyors.

### ARTICLE 5 – BONDS AND INSURANCE

#### 5.1 BONDS

- A. The CONTRACTOR shall furnish Performance and Labor and Materials Bonds, each in the amount of one hundred percent (100%) of the contract price, as security for the faithful performance and payment of all the CONTRACTOR's obligations under the Contract Documents. These Bonds shall remain in effect at least until one year after the date of completion, except as otherwise provided by Law or Regulation or by the Contract Documents. The CONTRACTOR shall also furnish such other Bonds as are required by the Supplementary General Conditions.
- B. The CONTRACTOR shall guarantee the WORK to be free of defects in material and workmanship for a period of one (1) year following the CITY's acceptance of the WORK. The CONTRACTOR shall agree to make, at the CONTRACTOR's own expense, any repairs or replacements made necessary by defects in material or workmanship which become evident within the one-year guarantee period. The CONTRACTOR's guarantee against defects required by this provision shall be secured by a Maintenance Bond, in the amount of ten percent (10%) of the contract price, which shall be delivered by the CONTRACTOR to the CITY prior to acceptance of the WORK. The Maintenance Bond shall remain in force for one (1) year from the date of acceptance of the contracted WORK. The CONTRACTOR shall make all repairs and replacements within the time required during the guarantee period upon receipt of written order from the ENGINEER. If the CONTRACTOR fails to make the repairs and replacements within the required time, the CITY may do the work and the CONTRACTOR and the CONTRACTOR's surety for the Maintenance Bond shall be liable to the CITY for the cost. The expiration of the Maintenance Bond during the one-year guarantee period does not operate to waive or void the one-year guarantee, as set forth herein and in paragraph 6.16 of these General Conditions.

- C. All Bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the current list of “Companies Holding Certificates of Authority as Acceptable Sureties on Federal bonds and as Acceptable Reinsuring Companies” as published in Circular 570 (amended) by the Audit Staff, Bureau of Government Financial Operations, U.S. Treasury Department. All Bonds signed by an agent must be accompanied by a certified copy of such agent’s authority to act.
- D. If the surety on any Bond furnished by the CONTRACTOR is declared a bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the WORK is located, the CONTRACTOR shall within 7 days thereafter substitute another Bond and surety, which must be acceptable to the CITY.
- E. All Bonds required by the Contract Documents to be purchased and maintained by CONTRACTOR shall be obtained from surety companies that are duly licensed or authorized in the State of California to issue Bonds for the limits so required. Such surety companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary General Conditions.

## 5.2 INSURANCE

Contractor and any subcontractor shall not commence work under this Agreement until Contractor shall have obtained all insurance required under this paragraph and such insurance shall have been approved by the City Attorney as to form and carrier and the City Manager as to sufficiency, nor shall Contractor allow any contractor or subcontractor to commence work on this contract or subcontract until all similar insurance required of the contractor and/or subcontractor shall have been so obtained and approved. All requirements herein provided shall appear either in the body of the insurance policies or as endorsements and shall specifically bind the insurance carrier.

CONTRACTOR shall procure and maintain for the duration of the contract all necessary insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the work hereunder by the Contractor, the Contractor’s agents, representatives, employees or subcontractors.

**A. Minimum Scope of Insurance**

Coverage shall be at least as broad as:

1. Insurance Services Office Commercial General Liability coverage.
2. Insurance Services Office form number CA covering Automobile Liability, code 1 (any auto).
3. Workers' Compensation insurance as required by the State of California and Employer's Liability Insurance.
4. [Optional] Such other insurance coverages and limits as may be required by the CITY as follows: \_\_\_\_\_.

**B. Minimum Limits of Insurance**

CONTRACTOR shall maintain limits no less than:

1. General Liability: \$2,000,000 per occurrence for bodily injury, personal injury and property damage. If Commercial General Liability Insurance or other form with a general aggregate liability is used, either the general aggregate limit shall apply separately to this project/location or the general aggregate limit shall be twice the required occurrence limit.
2. Automobile Liability: \$1,000,000 per accident for bodily injury and property damage.
3. Employer's Liability: Bodily Injury by Accident - \$1,000,000 each accident  
Bodily Injury by Disease - \$1,000,000 policy limit  
Bodily Injury by Disease - \$1,000,000 each employee

**C. 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 retentions as respects the CITY, its officers, officials, employees, and volunteers; or the CONTRACTOR shall procure a bond guaranteeing payment of losses and related investigations, claim administration and defense expenses.

**D. Other Insurance Provisions**

The required general liability and automobile 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, occupied 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. 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.
5. 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.

**E. Acceptability of Insurers**

Insurance is to be placed with insurers with a current A.M. Best's rating of no less than A:VII.

**F. Verification of Coverage**

CONTRACTOR shall furnish the CITY with original endorsements effecting 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. All endorsements are to be received and

approved by the CITY before work commences. As an alternative to the CITY's forms, the CONTRACTOR's insurer may provide complete, certified copies of all required insurance policies, including endorsements effecting the coverage required by these specifications.

## **ARTICLE 6 – CONTRACTOR'S RESPONSIBILITIES**

### **6.1 COMMUNICATIONS**

- A. Written communications with the CITY shall be only through or as directed by the ENGINEER.

### **6.2 SUPERVISION AND SUPERINTENDENCE**

- A. The CONTRACTOR shall supervise, inspect, and direct the WORK competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the WORK in accordance with the Contract Documents. The CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction and all safety precautions and programs incidental thereto. The CONTRACTOR shall be responsible to see that the completed WORK complies accurately with the Contract Documents.
- B. The CONTRACTOR shall designate in writing and keep on the Site at all times during the performance of the WORK a technically qualified, English-speaking superintendent, who is an employee of the CONTRACTOR and who shall not be replaced without written notice to the ENGINEER. The superintendent will be the CONTRACTOR's representative at the Site and shall have authority to act on behalf of the CONTRACTOR. All communications given to the superintendent shall be as binding as if given to the CONTRACTOR.
- C. The CONTRACTOR's superintendent shall be present at the Site at all times while work is in progress and shall be available by phone for emergencies 24 hours per day, 7 days per week. Failure to observe this requirement shall be considered suspension of the WORK by the CONTRACTOR until such time as such superintendent is again present at the Site.

### **6.3 LABOR, MATERIALS, AND EQUIPMENT**

- A. The CONTRACTOR shall provide competent, suitably qualified personnel to survey and lay out the WORK and perform construction as required by the Contract Documents. The CONTRACTOR shall furnish, erect, maintain, and remove the construction plant and any required temporary works. The CONTRACTOR shall at all times maintain good discipline and order at the Site. Except in connection with the safety or protection of persons or the WORK or property at the Site or adjacent thereto, and except as otherwise indicated in the

Contract Documents, all work at the Site shall be performed during regular working hours, and the CONTRACTOR will not permit overtime work or the performance of work on Saturday, Sunday, or any federally observed holiday without the CITY's written consent. The CONTRACTOR shall apply for this consent through the ENGINEER in writing a minimum of 24 hours in advance.

- B. Except as otherwise provided in this Paragraph, the CONTRACTOR shall receive no additional compensation for overtime work, i.e., work in excess of 8 hours in any one calendar day or hours in any one calendar week, even though such overtime work may be required under emergency conditions and may be ordered by the ENGINEER in writing. Additional compensation will be paid to the CONTRACTOR for overtime work only in the event extra work is ordered by the ENGINEER and the Change Order specifically authorizes the use of overtime work and then only to such extent as overtime wages are regularly being paid by the CONTRACTOR for overtime work of a similar nature in the same locality.
- C. All increased costs of inspection and testing performed during overtime work by the CONTRACTOR which is allowed solely for the convenience of the CONTRACTOR shall be borne by the CONTRACTOR. The CITY has the authority to deduct the cost of all such inspection and testing from any partial payments otherwise due to the CONTRACTOR.
- D. Unless otherwise specified in the Contract Documents, the CONTRACTOR shall furnish and assume full responsibility for all materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, lubricants, power, light, heat, telephone, water, sanitary facilities, and all other facilities, consumables, and incidentals necessary for the furnishing, performance, testing, start-up, and completion of the WORK.
- E. All materials and equipment incorporated into the WORK shall be of specified quality and new, except as otherwise provided in the Contract Documents. All warranties and guarantees specifically called for by the Specifications shall expressly run to the benefit of the CITY. If required by the ENGINEER, the CONTRACTOR shall furnish satisfactory evidence (including reports of required tests) as to the source, kind and quality of materials and equipment. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with the instructions of the applicable Supplier except as otherwise provided in the Contract Documents; but no provisions of any such instructions will be effective to assign to the CITY or any of its consultants, agents, or employees, any duty or authority to supervise or direct the furnishing or performance of the WORK or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.9 C.
- F. The work, unless otherwise permitted or approved by the ENGINEER, shall be completed with the incorporated use of equipment, materials, and/or products where such are specified. Substitutions and equal alternatives will be permitted as

provided in this article; however, neither the request for substitution nor the offer of alternatives shall in any way by their submittal obligate the CITY to assent to any request or offer. Failure of the CONTRACTOR awarded the work to either submit requests for substitutions or to offer alternatives within the required times provided in this General Condition will be considered as evidence that the work shall be accomplished with trade-named equipment, materials, and/or products as identified in the Specifications and/or the Drawings.

- G. Unless otherwise provided elsewhere in the Contract, all equipment, materials, and/or products incorporated into the work shall be new and, where not specified, shall be of the highest quality of the respective kinds for the intended use, and all workmanship shall meet or exceed applicable construction industry standards and practices. If equipment, materials, and/or products are designated by listing named manufacturers of particular equipment, materials, and/or products followed by the words "or equal," then the CONTRACTOR may furnish the named equipment, materials, and/or products or any equal equipment, materials, and/or products. The first-named manufacturer of particular equipment, materials, and/or products is the basis for the design shown on the Project Drawings. A subsequently named manufacturer or particular equipment, materials, and/or products has been determined to be an acceptable substitution but may require modifications in the Project's design and its ultimate construction to accommodate its use. If such subsequently named items are selected by the CONTRACTOR for incorporation into the work, the CONTRACTOR shall assume all costs required for modifications to the equipment, materials, and/or products, and Project design and construction as may be required for said items' use. Substitutions for an unnamed "equal" item of material shall be permitted upon compliance of the procedures set forth in Paragraph I of this article. If a CONTRACTOR makes use of an unnamed "equal" product as a substitute for a specifically named material or product, the CONTRACTOR shall assume all costs required to make the necessary revisions or modifications to accommodate the use of said unnamed product.
- H. Before beginning the work and within thirty-five (35) calendar days after award of the Contract, the CONTRACTOR shall submit a List of Materials to the ENGINEER for review. The List shall include all items of equipment, materials, and/or products to be incorporated into the work and the names of suppliers with whom purchase orders have been placed. The names on the List shall be arranged in the same order as in the specifications, and shall contain sufficient data to identify precisely the items of equipment, materials, and/or products the CONTRACTOR proposes to furnish. The List shall include Specifications or Drawing references. Once the submission is determined to be acceptable to the ENGINEER, it shall be returned to the CONTRACTOR.
- I. Substitution for those equipment, materials, and/or products specified shall only be permitted when the proposed unnamed "equal" product or material to be furnished is both equal in quality and utility and after the CONTRACTOR has

complied with the following provisions: (1) All substitutions shall be reviewed by the ENGINEER. (2) The ENGINEER must approve such substitution in writing prior to its incorporation into the work. (3) Unless otherwise authorized in writing by the CITY, the CONTRACTOR shall, within thirty-five (35) calendar days of award and prior to placing any purchase orders, but at least thirty (30) calendar days before it requires approval of any such alternative item, submit to the CITY sufficient data, drawings, samples, literature, or other detailed information as will demonstrate to the ENGINEER that the proposed substitute is equal in quality and utility to the equipment, materials and/or products specified.

1. Within thirty (30) calendar days following receipt of all requested information from the CONTRACTOR, the ENGINEER will determine whether the proposed alternative is equal in quality and utility and meets the requirements of the Contract and will inform the CONTRACTOR in writing of such determination. The burden of substantiating the quality and utility of alternatives shall be upon the CONTRACTOR, and the CONTRACTOR shall furnish all necessary information requested and required by the ENGINEER. The ENGINEER will be the sole judge as to the quality and utility of alternative equipment, materials, and/or products, and the ENGINEER's decision shall be final. An acceptance by the ENGINEER of a substitution shall not relieve the CONTRACTOR from complying with the requirements of the Drawings and Specifications. Acceptance by the ENGINEER shall not relieve the CONTRACTOR from full responsibility for the efficiency, sufficiency, and quality and performance of the substitute equipment, materials, and/or products, in the same manner and degree as the equipment, materials, and/or products specified by name.
2. Failure of the CONTRACTOR to submit proposed substitutions for review in the manner described above and within the time prescribed shall be sufficient cause for rejection by the CITY of any other proposed substitutions.
3. In determining whether a proposed product is equal in quality and utility, the ENGINEER is not restricted to such basic issues as performance and durability, but may consider any other issues that the ENGINEER, in the discretion of the ENGINEER, deems appropriate. Said issues may, but are not required to include, nor are they limited to, such additional factors as comparable performance, reliability, efficiency of operation, ease of operation, adaptability, ease of maintenance, capital costs, life-cycle costs, operational characteristics, costs of training personnel, maintenance history, warranties, problems created by the resulting overall warranty system, availability of qualified service, availability of parts, the history of any supplier and compatibility with existing facilities.



4. No one factor or group of factors, including such issues as savings on capital costs, shall be determinative of whether the proposed product or material is equal in quality and utility. The decision of the ENGINEER shall be based on those factors deemed by the ENGINEER to be relevant and any data, drawings, samples, literature, or other detailed information furnished by the CONTRACTOR with respect to the proposed substitution. Each decision as to whether a product or material is equal in quality and utility shall be made by the ENGINEER on a case-by-case basis.
  5. The CONTRACTOR shall be responsible for any and all costs, including consultant costs, incurred by the CITY with respect to the proposed substitution that exceed the costs inherent in the normal and reasonable review of drawings and other standard data, information, and documents concerning any proposed substitution. The CONTRACTOR shall be responsible for this cost, regardless of whether or not the substitution is approved by the ENGINEER.
- J. Unless otherwise provided in the Contract, the title and interest in the right to the use of all water, and the title to all soil, stone, gravel, sand, minerals, timber, and all other materials developed or obtained within the Project limits from operations by the CONTRACTOR or any of its subcontractors, of any of their representatives or employees, and the right to use or dispose of the same are hereby expressly reserved in the CITY; and neither the CONTRACTOR nor any of its subcontractors, nor any of their representatives or employees, shall have any right, title, or interest in or to any part thereof.
- K. All material used under the Contract after it has been attached or affixed to the work or soil and after partial payment has been made therefore shall become the property of the CITY.
- L. In the event that any Indian relics or items possessing archaeological or historical value are discovered by the CONTRACTOR or any of its subcontractors or any of their representatives or employees, the CONTRACTOR shall immediately notify the ENGINEER and await the ENGINEER's decision before proceeding with any work. The CONTRACTOR shall have no property right in such relics and items.
- M. The CONTRACTOR shall be satisfied as to the quantity of acceptable materials or products which may be produced or obtained at local sources, and the CITY will not assume any responsibility as to the quantities or quality of acceptable materials or products available.
- N. The CONTRACTOR, with the permission of the ENGINEER, may use in the proposed construction such stone, gravel, sand, or other material suitable in the opinion of the ENGINEER as may be found in excavation.

- O. Existing equipment, materials, and/or products to be salvaged shall remain the property of the CITY. Salvage to be reinstalled in the work shall be refurbished as required before reinstallation. Other work to be salvaged shall be carefully removed and handled in such a manner as to avoid damage and shall be delivered to storage at a location designated by the ENGINEER.

#### 6.4 SCHEDULE

- A. The CONTRACTOR shall comply with the schedule requirements in the Special Provisions or as otherwise provided in the Contract Documents.

#### 6.5 SUBSTITUTES OR “OR EQUAL” ITEMS

- A. The CONTRACTOR shall submit proposed substitutes or “or equal” items in accordance with the Bidding Requirements. No request for substitution of an “or equal” item will be considered by the ENGINEER after award of the Contract, except as provided in Paragraph 6.3I herein.

#### 6.6 CONCERNING SUBCONTRACTORS, SUPPLIERS, AND OTHERS

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

#### 6.7 PERMITS

- A. Unless otherwise provided in any Supplementary General Conditions, the CONTRACTOR shall obtain and pay for all constructions permits and licenses from the agencies having jurisdiction, including the furnishing of insurance and bonds if required by such agencies. The enforcement of such requirements shall not be made the basis for claims for additional compensation by CONTRACTOR. When necessary, the CITY will assist the CONTRACTOR, in obtaining such permits and licenses. The CONTRACTOR shall pay all charges of utility owners for inspection or connections to the WORK.

#### 6.8 PATENT FEES AND ROYALTIES

- A. The CONTRACTOR shall pay all license fees and royalties and assume all costs incident to the use in the performance of the WORK or the incorporation in the WORK of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design,

process, product, or device is specified in the Contract Documents for use in the performance of the WORK and if to the actual knowledge of the ENGINEER its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights will be disclosed by the ENGINEER in the Contract Documents. The CONTRACTOR's indemnification obligation under this Paragraph 6.8 A. for all claims and liabilities arising out of any infringement of patent rights or copyrights incident to the use in the performance of the WORK or resulting from the incorporation in the WORK of any invention, design, process, product or device not specified in the Contract Documents shall be in accordance with Paragraph 6.16 of these General Conditions.

## 6.9 LAWS AND REGULATIONS

- A. The CONTRACTOR shall observe and comply with all Laws and Regulations which in any manner affect those engaged or employed on the WORK, the materials used in the WORK, or the conduct of the WORK including, but not limited to, all applicable safety Laws and Regulations. If any discrepancy or inconsistency should be discovered between the Contract Documents and any such Laws or Regulations, the CONTRACTOR shall report the same in writing to the ENGINEER. Any particular Law or Regulation specified or referred to elsewhere in the Contract Documents shall not in any way limit the obligation of the CONTRACTOR to comply with all other provisions of federal, state, and local laws and regulations. The CONTRACTOR's indemnification obligations for all claims or liability arising from violation of any such law, ordinance, code, order, or regulation, whether by CONTRACTOR or by its employees, Subcontractors or Suppliers shall be in accordance with Paragraph 6.16 of these General Conditions.

## 6.10 TAXES

- A. The CONTRACTOR shall pay all sales, consumer, use, and other similar taxes required to be paid by the CONTRACTOR in accordance with the laws and regulations of the place of the Project which are applicable during the performance of the WORK.

## 6.11 USE OF PREMISES

- A. The CONTRACTOR shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site, the land and areas identified in and permitted by the Contract Documents, and the other land and areas permitted by Laws and Regulations, rights-of-way, permits, and easements. The CONTRACTOR shall assume full liability and responsibility for any damage to any such land or area, or to the owner or occupant thereof or of any land or areas contiguous thereto, resulting from the performance of the WORK. Should any claim be made against the CITY by any such owner or occupant because of the performance of the WORK, the CONTRACTOR shall

promptly attempt to settle with such other party by agreement or otherwise resolve the claim through litigation at the CONTRACTOR's sole liability expense. The CONTRACTOR's indemnification obligations for all claims and liability, arising directly, indirectly, or consequentially out of any action, legal or equitable, brought by any such owner or occupant against the CITY, its consultants, subconsultants, and the officers, directors, employees and agents of each and any of them to the extent caused by or based upon the CONTRACTOR's performance of the WORK shall be in accordance with Paragraph 6.16 of these General Conditions.

## 6.12 SAFETY AND PROTECTION

- A. The CONTRACTOR shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the WORK. The CONTRACTOR shall be responsible for the direction and control of the work assigned and for assuring that all workers on the project understand the hazards of the work involved and the safe work procedures required for each job. The CONTRACTOR shall assure that its subcontractors of all tiers shall, without expense to the CITY, comply with this safety responsibility. No work shall proceed until each worker and subcontractor understands the scope of the work and all safety rules and work procedures to be followed. The CONTRACTOR shall not allow a new employee or new subcontractor to begin work on CITY projects without a full and proper safety orientation. The CONTRACTOR shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage to prevent damage, injury or loss to:
1. All persons at the Site and other persons and organizations who may be affected thereby;
  2. All the WORK and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
  3. Other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of the performance of the WORK.
- B. The CONTRACTOR shall comply with all applicable Laws and Regulations relating to the safety of persons or property or to the protection of persons or property from damage, injury, or loss and shall erect and maintain all necessary safeguards for such safety and protection. The CONTRACTOR shall notify owners of adjacent property and utilities when prosecution of the WORK may effect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property. CONTRACTOR'S duties and responsibilities for safety and for protection of the WORK shall continue until such time as all the

WORK is completed and ENGINEER has issued a notice to the CONTRACTOR in accordance with Paragraph 14.7 B. that the WORK is acceptable.

- C. The CONTRACTOR shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.
- D. Materials that contain hazardous substances or mixtures may be required on the WORK. A Material Safety Data Sheet shall be made available at the Site by the CONTRACTOR for every hazardous product used.
- E. Material usage shall strictly conform to OSHA safety requirements and all manufacturer's warnings and application instructions listed on the Material Safety Data Sheet and on the product container label.
- F. The CONTRACTOR shall be responsible for the exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.
- G. The CONTRACTOR shall notify the ENGINEER if it considers a specified product or its intended use to be unsafe. This notification must be given to the ENGINEER prior to the product being ordered, or if provided by some other party, prior to the product being incorporated in the WORK.
- H. Before starting work, the CONTRACTOR shall submit a written safety program to the CITY. The objective of the safety program shall be accident prevention. Such program shall include, but not be limited to, the following:
  - 1. An organization chart and accompanying narrative which describes the responsibility for employee and public safety of those individuals who control each phase of operations and set forth in writing the policies and procedures to be followed by all personnel. The chart shall also show the CONTRACTOR's internal lines of communication (including subcontractors) for the program.
  - 2. A specific program for communication between the CONTRACTOR and CITY on safety matters. The CONTRACTOR shall also designate one person with whom official contact can be made by the CITY on safety matters.
  - 3. Evidence that the CONTRACTOR has become thoroughly familiar with the potential hazards of the work and applicable federal and state regulations.

4. Specific safety procedures and guidelines for conduct of the Work.
5. The CITY's review, comment upon, and/or acceptance of the CONTRACTOR's safety program and/or plan does not in any way negate the responsibilities of the CONTRACTOR for safety or place any responsibility upon the CITY for such safety. Such review comment and/or acceptance shall not be construed as limiting in any manner the CONTRACTOR's obligation to undertake any action which may be necessary or required to establish and maintain safe working conditions at the site.

#### 6.13 EMERGENCIES

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

#### 6.14 SUBMITTALS

- A. After checking and verifying all field measurements and after complying with applicable procedures specified in the Special Provisions, the CONTRACTOR shall submit to the ENGINEER for review all Shop Drawings and details of all structural and reinforcing steel, equipment, electrical controls, structural fabrications, pipe, pipe joints, special pipe sections, and other appurtenances in accordance with the accepted schedule of Shop Drawing submittals specified in the Special Provisions or as otherwise provided in the Contract Documents.
- B. The ENGINEER'S review will be only to determine if the items covered by the submittals will, after installation or incorporation in the WORK, generally conform to the Contract Documents and with the design concept of the completed Project. The ENGINEER's favorable review shall be obtained before any such items are manufactured or used in the work. The favorable review of Drawings by the ENGINEER shall apply in general design only and shall in no way relieve the CONTRACTOR from responsibility for errors or omissions contained therein. Favorable review by the ENGINEER shall not relieve the CONTRACTOR of its obligation to meet safety requirements and all other requirements of law. The ENGINEER will start reviewing the CONTRACTOR's submittals only after the

Notice to Proceed is issued by the CITY with the exception of some unusual long lead items which may require submittals prior to issuing the Notice to Proceed.

- C. The CONTRACTOR shall also submit to the ENGINEER for review all Samples in accordance with the accepted schedule of Sample submittals specified in the Special Provisions or as otherwise provided in the Contract Documents.
- D. Before submittal of each Shop Drawing or Sample, the CONTRACTOR shall have determined and verified all quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers, and similar data with respect thereto and reviewed or coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the WORK and the Contract Documents. The CONTRACTOR shall provide submittals in accordance with the requirements of the Special Provisions or as otherwise provided in the Contract Documents.
- E. Shop-drawing submittal and coordination are the responsibility of the prime contractor; this responsibility shall not be delegated in whole or in part to subcontractors or suppliers. Any designation of work "by others," shown on Shop Drawings, shall mean that the work will be the responsibility of the CONTRACTOR rather than the subcontractor or supplier who has prepared the Shop Drawings.

Submittals shall be prepared in such form that data can be identified with the applicable Specification paragraph. The data shall demonstrate clearly compliance with the Drawings and Specifications and shall relate to the specific equipment to be furnished. Where manufacturer's standard drawings are employed, they shall be marked clearly to show what portions of the data are applicable to this Project.

- F. Review of shop-drawing submittals by the ENGINEER has as its primary objective the completion for the CITY of a Project in full conformance with the Drawings and Specifications, unmarred by field corrections, and within the time provided. In addition to this primary objective, shop-drawing review as a secondary objective will assist the CONTRACTOR in its procurement of equipment that will meet all requirements of the Drawings and Specifications, will fit the structures detailed on the Drawings, will be complete with respect to piping, electrical, and control connections, will have the proper functional characteristics, and will become an integral part of a complete operating facility. Acceptance of Shop Drawings and submittals does not constitute a change order to the Contract requirements.
- G. Where the CONTRACTOR is required by these Specifications to make submittals, they shall be submitted to the ENGINEER with a letter of transmittal and in sufficient number of copies to allow a distribution of at least one (1) copy to all parties needing a copy to carry out the provisions of the Specifications, including three (3) copies to be retained by the ENGINEER. The ENGINEER

shall determine the appropriate number of such copies required at the time of the preconstruction conference.

H. Within twenty-five (25) calendar days of receipt by the ENGINEER of each of the CONTRACTOR's submissions and all appurtenant data required for their review, the appropriate number of copies will be returned to the CONTRACTOR with one of the following notations:

1. Resubmittal not required; correction, if any, noted.
2. Correct and resubmit; corrections noted.

Returned copies of Drawings marked with Notation "1" authorize the CONTRACTOR to proceed with the operations covered by such returned copies, provided that such operations be subject to the comments, if any, shown on such returned copies. Returned copies of Drawings marked with Notation "2" shall be corrected, as necessary and required, and shall be submitted in the same manner as before.

I. When submittals are favorably reviewed, the ENGINEER will retain three (3) copies and will return all other copies to the CONTRACTOR. When submittals are not favorably reviewed, the ENGINEER will retain only two (2) copies and will return all others to the CONTRACTOR. It is considered reasonable that the CONTRACTOR shall make a complete and acceptable submission to the ENGINEER at least by the second submission of data. The CITY reserves the right to deduct monies from payments due the CONTRACTOR to cover additional costs of the ENGINEER's review beyond the second submission.

J. Favorable review by the ENGINEER will not constitute acceptance by the ENGINEER of any responsibility for the accuracy, coordination, and completeness of the Shop Drawings or the items of equipment represented on the Drawings. Accuracy, coordination, and completeness of Shop Drawings shall be the sole responsibility of the CONTRACTOR, including responsibility to back check comments, corrections, and modifications from the ENGINEER's review before fabrication. Supplemental, specific requirements for Shop Drawings and details are contained in the applicable technical sections of these Specifications.

K. Copies of schedules and Shop Drawings submitted to the ENGINEER for review shall be such as to provide three (3) copies for the ENGINEER's files, and such additional copies as the CONTRACTOR may desire for its own office files and/or for distribution by it to subcontractors or vendors. Exceptions will be noted in specific sections of Specifications. All Shop Drawings and supporting data, catalogs, and schedules shall be submitted as the instruments of the CONTRACTOR, who shall be responsible for their accuracy and completeness. These submittals may be prepared by the CONTRACTOR, subcontractors, or suppliers, but the CONTRACTOR shall ascertain that submittals meet all of the



requirements of the Contract, while conforming to structural, space, and access conditions at the point of installation. The CONTRACTOR shall check all submittals before submitting them to the ENGINEER.

- L. The ENGINEER shall check and review schedules, drawings, etc., submitted by the CONTRACTOR only for general design conformance with the concept of the Project and compliance with the Contract. Shop Drawings shall not be used to order products' fabrication or delivery for construction or installation unless submitted to and favorably reviewed by the ENGINEER. Acceptance by the ENGINEER of any drawings, method of work, or any information regarding materials and equipment the CONTRACTOR proposes to furnish shall not relieve the CONTRACTOR of its responsibility for any errors therein and shall not be regarded as an assumption of risks or liability by the Design ENGINEER or the CITY, or any officer or employee thereof, and the CONTRACTOR shall have no recourse against the CITY under the Contract on account of the failure or partial failure or inefficiency or insufficiency of any plan or method of work or material and equipment so accepted. Such acceptance shall be considered to mean merely that the ENGINEER has no objection to the CONTRACTOR using, upon its own full responsibility, the plan or method of work proposed or furnishing the materials and equipment proposed.

#### 6.15 CONTINUING THE WORK

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

#### 6.16 CONTRACTOR'S GENERAL WARRANTY AND GUARANTEE

- A. CONTRACTOR warrants and guarantees that all WORK will be in accordance with the Contract Documents and will not be defective. The CONTRACTOR represents that the WORK performed pursuant to the Contract shall be of the quality specified or of the highest quality if no quality is specified, and shall conform to the Contract Documents. The CONTRACTOR warrants all equipment, material, products, and workmanship furnished and all work performed under the Contract against defects for a period of one (1) year after final acceptance regardless of whether the same were furnished or performed by the CONTRACTOR or by any of its subcontractors or suppliers of any tier.
- B. The CONTRACTOR shall make, at its own expense, all repairs and/or replacements necessitated by defects in the equipment, materials, and/or products and in the workmanship provided by the CONTRACTOR or any of its subcontractors that become evident within the warranty period.

- C. Upon receipt of written notice from the CITY of any breach of warranty during the applicable warranty period, the affected item shall be redesigned, repaired, or replaced by the CONTRACTOR and the CONTRACTOR shall perform such tests as the CITY may require to verify that such redesign, repair, and replacement comply with the requirements of the Contract. The CITY shall have the right to operate and use such equipment, materials, and/or products until they can, without damage to the CITY, be taken out of service for correction or replacement by the CONTRACTOR. As to the redesigned, repaired, or replaced work, the CONTRACTOR warrants such redesigned, repaired, or replaced work against defective design, equipment, materials, products, and workmanship for a period of one (1) year from and after the date of satisfactory completion of such redesigned, repaired, or replaced work. The CITY reserves the right to require that the CONTRACTOR performs such repair or replacement work.
- D. The CITY also reserves the right to make such repairs or replacements, if, within seven (7) calendar days after the mailing of a notice in writing to the CONTRACTOR and Surety, the CONTRACTOR shall neglect to make or undertake with due diligence the aforesaid repairs or replacements and that Surety within seven (7) calendar days after mailing of a notice in writing of such negligence of the CONTRACTOR shall neglect to make or undertake with due diligence the aforesaid repairs or replacements itself, provided, however, that in the case of an emergency where in the opinion of the CITY delay would cause hazard to health or serious loss or damage, repair may be made without notice being sent to the CONTRACTOR or Surety, and the CONTRACTOR shall pay the cost thereof.
- E. All costs including workforce and materials incidental to such redesign, repair, replacement, and testing, including the removal, replacement, and reinstallation of equipment necessary to gain access and all other costs incurred as the result of a breach of warranty shall be borne by the CONTRACTOR whether performed by the CITY or the CONTRACTOR.
- F. Nothing in this section shall be construed to limit, relieve, or release the CONTRACTOR, subcontractor's, and equipment, materials, and/or products suppliers, and other service providers' liability to the CITY for damages sustained as the result of latent defects in the workmanship, equipment, materials, and/or products done and/or furnished by the CONTRACTOR, its subcontractors, suppliers and/or other service providers.
- G. The Performance Bond shall extend for a period of one (1) year after acceptance of the Contract by the CITY and shall cover the CONTRACTOR's obligations resulting from the warranty requirements herein specified.
- H. CONTRACTOR's warranty and guarantee hereunder excludes defects or damage caused by:

1. Abuse, modification, or improper maintenance or operation by persons other than CONTRACTOR, Subcontractors, or Suppliers, or other individual or entity for whom CONTRACTOR is responsible;
  2. Normal wear and tear under normal usage.
- I. CONTRACTOR's obligation to perform and complete the WORK in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of WORK that is not in accordance with the Contract Documents or a release of CONTRACTOR's obligation to perform the WORK in accordance with the Contract Documents:
1. Observations by ENGINEER;
  2. Recommendation by ENGINEER or payment by CITY of any progress or final payment;
  3. The issuance of a Certificate of Completion by the CITY;
  4. Use or occupancy of the WORK or any part thereof by the CITY;
  5. Any acceptance by CITY or any failure to do so;
  6. Any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice or acceptability by ENGINEER pursuant to Paragraph 14.7 B.;
  7. Any inspection, test, or approval by others; or
  8. Any correction of Defective Work by CITY.

#### 6.17 INDEMNIFICATION

- A. Contractor shall indemnify, defend with counsel acceptable to City, and hold harmless to the full extent permitted by law, City and its officers, officials, employees, agents and volunteers from and against any and all liability, loss, damage, claims, expenses and costs (including, without limitation, attorney fees and costs and fees of litigation) (collectively, "Liability") of every nature arising out of or in connection with Contractor's performance of the WORK or its failure to comply with any of its obligations contained in this Agreement, except such Liability caused by the active negligence, sole negligence or willful misconduct of the City. Such indemnification by the CONTRACTOR shall include, but not be limited to, the following:
1. Liability or claims resulting directly or indirectly from the negligence or carelessness of the CONTRACTOR, its subcontractors, employees, or

agents in the performance of the WORK, or in guarding or maintaining the same, or from any improper materials, implements, or appliances used in its construction, or by or on account of any act or omission of the CONTRACTOR, its employees, or agents;

2. Liability or claims arising directly or indirectly from bodily injury, occupational sickness or disease, or death of the CONTRACTOR's, or Supplier's own employees, or agents engaged in the WORK resulting in actions brought by or on behalf of such employees against the CITY and/or the ENGINEER;
3. Liability or claims arising directly or indirectly from or based on the violation of any Laws or Regulations, whether by the CONTRACTOR, its subcontractors, employees, or agents;
4. Liability or claims arising directly or indirectly from the use or manufacture by the CONTRACTOR, its subcontractors, employees, or agents in the performance of this Agreement of any copyrighted or uncopyrighted composition, secret process, patented or unpatented invention, article, or appliance, unless otherwise specified stipulated in this Agreement;
5. Liability or claims arising directly or indirectly from the breach of any warranties, whether express or implied, made to the CITY or any other parties by the CONTRACTOR, its subcontractors, employees, or agents;
6. Liability or claims arising directly or indirectly from the willful misconduct of the CONTRACTOR, its subcontractors, employees, or agents;
7. Liability or claims arising directly or indirectly from any breach of the obligations assumed in this Agreement by the CONTRACTOR;
8. Liability or claims arising directly or indirectly from, relating to, or resulting from a hazardous condition created by the CONTRACTOR, Subcontractors, Suppliers, or any of their employees or agents, and;
9. Liability or claims arising directly, or indirectly, or consequentially out of any action, legal or equitable, brought against the CITY, the ENGINEER, their consultants, subconsultants, and the officers, directors, employees and agents of each or any of them, to the extent caused by the CONTRACTOR's use of any premises acquired by permits, rights of way, or easements, the Site, or any land or area contiguous thereto or its performance of the WORK thereon.

- B. The CONTRACTOR shall reimburse the CITY for all costs and expenses, (including but not limited to fees and charges of engineers, architects, attorneys, and other professionals and court costs of appeal) incurred by said CITY in enforcing the provisions of this Paragraph.
- C. The indemnification obligation under this Article 11 shall not be limited in any way by any limitation on the amount or type of insurance carried by CONTRACTOR or by the amount or type of damages, compensation, or benefits payable by or for the CONTRACTOR or any Subcontractor or other person or organization under workers' compensation acts, disability benefit acts, or other employee benefit acts.
- D. Pursuant to California Public Contract Code Section 9201, City shall timely notify Contractor of receipt of any third-party claim relating to this Agreement.

#### 6.18 CONTRACTOR'S DAILY REPORTS

- A. The CONTRACTOR shall complete a daily report indicating location worked, total manpower for each construction trade, major equipment on Site, each Subcontractor's manpower and equipment, weather conditions, and other related information involved in the performance of the WORK. These components will be decided by the ENGINEER.

#### 6.19 CONTRACT DOCUMENTS AND RECORD DRAWINGS

- A. The CONTRACTOR shall keep on the work site a copy of the Contract Documents and shall at all times give the ENGINEER access thereto. Any drawings included in the Specifications shall be regarded as part thereto and of the Contract. Anything mentioned in these Specifications and not shown on the Project Drawings, or shown on the Project Drawings and not mentioned in these Specifications, shall be of like effect as though shown or mentioned in both. The ENGINEER will furnish from time to time such detail drawings, plans, profiles, and information as he may consider necessary for the CONTRACTOR's guidance. It shall be the duty of the CONTRACTOR to see that the provisions of the Contract Documents are complied with in detail irrespective of the inspection given the work during its progress by the ENGINEER. Any failure on the part of the CONTRACTOR to observe the requirements contained in the Contract Documents will be sufficient cause for the rejection of the work at any time before its acceptance.
- B. The CONTRACTOR shall maintain, at the jobsite, one record set of Drawings in good order and clearly marked to show any deviations which have been made from the Drawings, including concealed construction and utility features which are revealed during the course of construction. Marked prints shall be updated at least once each week and shall be available to the ENGINEER for review as to

currency prior to developing partial payment estimates. Upon completion of the work, the marked set of prints shall be delivered to the ENGINEER.

- C. In the case of those drawings which depict the detail requirement for equipment to be assembled and wired in the factory, such as motor control centers and the like, the Record Drawings shall be updated by indicating those portions which are superseded by change order drawings or final shop drawings, and by including appropriate reference information describing the change orders by number and the shop drawings by manufacturer, drawing, and revision numbers.
- D. Requests for partial payments will not be approved if the updated set of Drawings is not in good order or is not kept current. Request for final payment will not be approved until the complete and correct Record Drawings are delivered to the ENGINEER.

## 6.20 CLEAN UP

The CONTRACTOR shall, at all times, keep the premises, occupied by it in relation to this Contract, in a neat, clean, and safe condition and at all times provide reasonable access thereto. The CONTRACTOR shall, as a minimum, conduct daily inspections to verify that requirements of this Article are being met.

- A. During the progress of the WORK, the CONTRACTOR shall:
  - 1. Retain all stored items in an orderly arrangement allowing maximum access, not impeding drainage or traffic, and providing the required protection of material.
  - 2. Provide adequate storage of all items awaiting removal from the jobsite, observing all requirements for fire protection and protection of the environment.
  - 3. Remove any accumulation of scrap, debris, waste material, and other items not required for construction of this work.
  - 4. Dispose of existing materials and equipment to be demolished and removed and all trash such as broken concrete, wood blocking, shipping containers, etc., resulting from the contract work off the premises occupied by the CONTRACTOR, including CITY property, at the CONTRACTOR's expense. CITY-leased dumpsters and other disposal containers on CITY's property, unless specifically provided by the CONTRACTOR, shall not be used by the CONTRACTOR.
  - 5. Maintain all excavation, embankments, haul roads, permanent access roads, Plant site, waste disposal areas, borrow areas, and all other work areas within contract work limits free from dust, as determined by the

ENGINEER. Industry-accepted methods of dust control suitable for the area involved, such as sprinkling, chemical treatment, light bituminous treatment, or similar methods, will be permitted. No separate payment will be made to the CONTRACTOR for dust control.

- B. If the CONTRACTOR fails to comply with any of the foregoing, the CITY will transmit written notification of noncompliance. If, within five (5) calendar days of the written notification, the CONTRACTOR fails to comply, cleanup may be undertaken by the CITY at the expense of the CONTRACTOR.
- C. Upon completion of any portion of any WORK, the CONTRACTOR shall promptly remove all of its equipment, temporary structures, and surplus construction and other materials not to be used at or near the same location during later stages of work. Upon completion of any WORK and before final inspection is made, the CONTRACTOR shall unless otherwise specifically directed by the ENGINEER:
  - 1. Remove from the job site all plant, buildings, tools, surplus materials, equipment, forms, rubbish, scrap, debris, and waste.
  - 2. Clean all paved areas on the site. Completely remove all resultant debris.
  - 3. Visually inspect all interior surfaces, and remove all traces of soil, waste material, smudges, and other foreign matter. Remove all traces of splashed materials from adjacent surfaces. Remove all paint droppings, spots, stains, and dirt from finished surfaces. Use only approved cleaning materials and equipment.
  - 4. Restore any improved area used for the CONTRACTOR's work or material storage to its condition at the time the CONTRACTOR moved onto the site or to the satisfaction of the ENGINEER.
  - 5. Schedule final cleaning and improvement restoration to enable the CITY to accept a completely clean and restored project.

## 6.21 STORM WATER POLLUTION PREVENTION

### A. General

- 1. Prevention - The CONTRACTOR shall prevent the pollution of storm drain systems and creeks on or near the construction project site(s) resulting from the construction operation. The CONTRACTOR shall keep pollution out of storm drains by reducing the possibility of accidental discharge of materials and wastes, by reducing erosion and sedimentation, and by any action as required. The CONTRACTOR shall train all employees and subcontractors on the storm water pollution prevention

requirements contained in these Specifications and ensure that all employees and subcontractors are aware of the consequences as described in subsection A.3. below. The CONTRACTOR shall include appropriate subcontract provisions to ensure that these requirements are met by all subcontractors.

2. Notification - If the CONTRACTOR causes or permits the spillage or overflow of any sewage, oil, or petroleum product, hazardous substance, contaminant, or waste that may result in the fluid or substance being discharged directly or indirectly into any storm drains, creeks, wetlands, or other manmade or natural waterways the CONTRACTOR shall notify the CITY as soon as possible to the extent notification can be provided without substantially impeding cleanup or other emergency measures. In no event shall such notification be later than one hour after knowledge of the occurrence.
3. Cleanup - Immediately upon gaining knowledge of such spillage, overflow, or discharge, the CONTRACTOR shall eliminate the cause of the spillage, overflow, or discharge and take action to minimize any damages. The CONTRACTOR shall also immediately implement a cleanup program. The cleanup, including sampling and testing required by regulatory agencies to determine the nature and level of contamination shall be performed and completed to the satisfaction of the various regulatory agencies involved and the CITY, at the expense of the CONTRACTOR. Any fines, penalties, and/or subsequent actions imposed upon the CITY and/or the CONTRACTOR by regulatory agencies related to the spillage, overflow, or discharge and any subsequent monitoring, testing, and reporting, as required by regulatory agencies, shall also be at the expense of the CONTRACTOR. The CONTRACTOR shall keep a stockpile of spill cleanup materials, such as rags or absorbents, readily accessible on site. The quantity of cleanup materials shall be appropriate in consideration of the risk of an occurrence of a spill, overflow or discharge.

B. Management of Nonhazardous Material and/or Waste

1. Designated Area - The CONTRACTOR shall propose designated areas of the project site, for approval by the ENGINEER, suitable for material delivery, storage, and waste collection that to the maximum extent practicable are near construction entrances and away from catch basins, gutters, drainage courses, and creeks.
2. Backfill or Excavated Material - The CONTRACTOR shall not allow backfill or excavated material to enter the storm drains or creeks. When rain is forecast within 24 hours or during wet weather, the



CONTRACTOR may be required to cover such material with a tarpaulin and to surround the material with sand bags.

3. Street Sweeping - At least once per week or more frequently as directed by the ENGINEER, the CONTRACTOR shall clean and sweep roadways and on-site paved areas of all materials attributed to or involved in the work. The CONTRACTOR shall not use water to flush down streets in place of street sweeping.
4. Disposal - At the end of each working day, the CONTRACTOR shall collect all scrap, debris, and waste material, and dispose of such materials properly. The materials may be stored in the CONTRACTOR's yard in stockpiles or placed in dumpsters. The CONTRACTOR shall inspect dumpsters for leaks and replace or repair dumpsters that leak. The CONTRACTOR shall not discharge water from cleaning dumpsters on site. The CONTRACTOR shall arrange for regular waste collection before dumpsters overflow.

C. Management of Hazardous Material and/or Waste

1. Storage - The CONTRACTOR shall label and store all hazardous materials, such as pesticides, paints, thinners, solvents, and fuels, and all hazardous wastes, such as waste oil and antifreeze in accordance with all applicable state and federal regulations. The CONTRACTOR shall store all hazardous materials and all hazardous wastes in accordance with secondary containment regulations. All such materials and wastes shall be covered, as needed, to avoid rainwater becoming polluted with hazardous constituents which could result in potential management of collected rain water as a hazardous waste. The CONTRACTOR shall keep an accurate, up-to-date inventory, including Material Safety Data Sheets (MSDSs), of hazardous materials and hazardous wastes stored on site.
2. Usage - When rain is forecast within 24 hours or during wet weather, the CONTRACTOR shall refrain from applying chemicals in outside areas. The CONTRACTOR shall follow material manufacturer's instructions regarding uses, protective equipment, ventilation, flammability, and mixing of chemicals. The CONTRACTOR shall post warning signs in areas treated with chemicals.
3. Disposal - The CONTRACTOR shall arrange for regular hazardous waste collection to comply with time limits on storage of hazardous wastes. The CONTRACTOR shall dispose of hazardous waste in accordance with all applicable local, state and federal regulations. The CONTRACTOR shall not wash any spilled material into streets, gutters, storm drains, or creeks and shall not bury spilled hazardous materials. The CONTRACTOR shall

report any hazardous materials spill to the CITY in accordance with Section A.2 above.

D. Vehicle/Equipment Cleaning, Maintenance, and Fueling

1. General - The CONTRACTOR shall inspect vehicles and equipment arriving on site for leaking fluids and shall promptly repair leaking vehicles and equipment. Drip pans shall be used to catch leaks until repairs are made.

The CONTRACTOR shall comply with federal, state, and city requirements for aboveground storage tanks.

2. Cleaning - The CONTRACTOR shall perform vehicle or equipment cleaning with water only in a designated, bermed area that will not allow rinse water to run off site into streets, gutters, storm drains, or creeks. Soaps, solvents, degreasers, steam-cleaning equipment, or equivalent methods shall not be allowed.
3. Maintenance and Fueling - The CONTRACTOR shall perform maintenance and fueling of vehicles or equipment in areas that will not allow run-on of storm water or runoff of spills to storm drains and provide for confined clean-up. Examples are working in bermed areas or utilizing drip pans. The CONTRACTOR shall not contaminate the soils or groundwater with such maintenance and fueling activities.

The CONTRACTOR shall use secondary containment, such as a drip pan, to catch leaks or spills any time that vehicle or equipment fluids are dispensed, changed, or poured, and shall clean up leaks and spills of vehicle or equipment fluids immediately and dispose of the waste and cleanup materials as hazardous waste, as described in Section C.3 above.

E. Dewatering Operations

1. Sediment Control - The CONTRACTOR shall route water through a control measure, such as a sediment trap, sediment basin, or Baker tank, to remove settleable solids prior to discharge to the storm drain system. Straw bales shall be placed in front of storm drain inlets as required. Filtration of the water following the control measure may be required on a case-by-case basis. Approval of the control measure shall be obtained in advance from the ENGINEER. If the ENGINEER determines that the dewatering operation would not generate an appreciable amount of settleable solids, the control measure requirement above may be waived.
2. Contaminated Groundwater - If the project is within an area of known groundwater contamination or if contamination is found, water from

dewatering operations shall be tested prior to discharge. If the water quality meets Regional Water Quality Control Board (RWQCB) standards, it may be discharged to a storm drain or creek. Otherwise, the water shall be hauled off site for proper disposal.

F. Paving or Oiling Operations

1. When rain is forecast within 24 hours or during wet weather, the ENGINEER may prevent the CONTRACTOR from paving or oiling the street. The ENGINEER may direct the CONTRACTOR to protect drainage courses by using control measures, such as earth dike, straw bale, and sand bag, to divert runoff or trap and filter sediment.
2. The CONTRACTOR shall prevent saw-cut slurry from entering catch basins and storm drains by limiting the area over which the slurry may spread.
3. The CONTRACTOR shall cover catch basins and manholes when paving or applying seal coat, tack coat, slurry seal, or fog seal.
4. The CONTRACTOR shall not sweep or wash down excess sand (placed as part of a sand seal or to absorb excess oil) into gutters, storm drains, or creeks. The CONTRACTOR shall either collect the sand and return it to the stockpile or dispose of it in a trash container.

G. Concrete, Grout, and Mortar Waste Management

1. Concrete Truck/Equipment Washout - The CONTRACTOR shall not wash out concrete trucks or equipment into streets, gutters, storm drains, or creeks. The CONTRACTOR shall perform washout of concrete trucks or equipment off site or in a designated area on site where the water will flow onto dirt or into a temporary pit in a dirt area. The CONTRACTOR shall let the water percolate into the soil and dispose of the hardened concrete in a trash container. If a suitable dirt area is not available, the CONTRACTOR shall collect the wash water and remove it off site.
2. Exposed Aggregate Concrete Wash Water - The CONTRACTOR shall avoid creating runoff by draining water from washing of exposed aggregate concrete to a dirt area. If a suitable dirt area is not available, the CONTRACTOR shall filter the wash water through straw bales or equivalent material before discharging to a storm drain. The CONTRACTOR shall collect sweepings from exposed aggregate concrete for disposal.

H. Paint Disposal and Clean-up

1. Disposal of Unused Paint - The CONTRACTOR shall carefully use, store and dispose of paint, solvents, chemicals, and waste materials in compliance with all applicable state and federal regulations. The CONTRACTOR shall not dispose of paint to sanitary sewer systems or storm drains. The CONTRACTOR shall utilize other recycling and disposal services as follows:

- a. "Recycling Centers" and "Waste Disposals" as may be listed in the yellow pages.
- b. Local household hazardous waste facility if appropriate.

The CONTRACTOR may dispose of small amounts of leftover latex (water-based) paint by applying the paint to the surface of an item to be discarded and allowing it to dry thoroughly, then disposing of it in a dumpster.

The CONTRACTOR shall store these materials and conduct cleaning of painting equipment and tools in a designated area that will not allow run-on of storm water or runoff of spills. The CONTRACTOR shall not allow wash water from cleaning of painting equipment and tools into streets, gutters, storm drains, or creeks.

2. Disposal of Paint Clean-up Waste - The CONTRACTOR shall remove as much excess paint as possible from brushes, rollers, and equipment before starting cleanup.

- a. The CONTRACTOR shall not discharge cleaning wastes from oil-based paints, buckets, brushes or tools to the sanitary sewer system. The CONTRACTOR shall retain a certified waste hauler to recycle or to dispose of cleaning wastes from oil-based paints at the CONTRACTOR's expense.
- b. The CONTRACTOR may discharge very small amounts of cleaning wastes from brushes, rollers, buckets, and tools contaminated with latex (water-based) paints to the sanitary sewer system provided they do not contain additives with pollutants of concern (e.g., mercury, tributyltin). Brushes, rollers, and tools containing latex paints may be washed over a sink with plenty of water. Buckets containing latex paints shall first be emptied into the original can or discarded as specified in paragraph 1 above. Should excessive amounts of paint or solvent be found in the wastewater discharged, the CONTRACTOR may be subject to

enforcement action by the CITY in accordance with the City Codes.

- c. The CONTRACTOR shall not discharge any of these paint clean-up wastes to storm drains, streets, gutters, or creeks.
  - d. Waste Disposal - The CONTRACTOR shall dispose of waste thinner, solvent, and sludge from cleaning of equipment and tools as hazardous waste, as described in Section C.3 above. The CONTRACTOR shall dispose of excess thinners, solvents, and oil- and water-based paint as hazardous waste.
- I. Contaminated Soil - If the project is within an area of known soil contamination or evidence of soil contamination is found, the CONTRACTOR shall comply with the requirements of all applicable local, state and federal regulations.

## **ARTICLE 7 – OTHER WORK**

### **7.1 RELATED WORK AT SITE**

- A. The CITY may perform other work related to the Project at the Site by the CITY's own forces, have other work performed by utility owners, or let other direct contracts for such other work. If the fact that such other work is to be performed was not noted in the Contract Documents, written notice thereof will be given to the CONTRACTOR prior to starting any such other work.
- B. The CONTRACTOR shall afford each person who is performing the other work (including the CITY's employees) proper and safe access to the Site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and shall properly coordinate the WORK with theirs. The CONTRACTOR shall do all cutting, fitting, and patching of the WORK that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. The CONTRACTOR shall not endanger any work of others by cutting, excavating, or otherwise altering their work and will not only cut or alter their work with the written consent of the ENGINEER and the others whose work will be affected.
- C. If the proper execution or results of any part of the CONTRACTOR's work depends upon such other work by another, the CONTRACTOR shall inspect and report to the ENGINEER in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for such proper execution and results. The CONTRACTOR's failure to report such delays, defects, or deficiencies will constitute an acceptance of the other work as fit and proper for integration with the CONTRACTOR's work except for latent or nonapparent defects and deficiencies in the other work.

## 7.2 COORDINATION

- A. If the CITY contracts with others for the performance of other work at the Site, CITY will have sole authority and responsibility in respect of such coordination, unless otherwise provided in the Supplementary General Conditions.

## ARTICLE 8 – CITY’S RESPONSIBILITIES

### 8.1 COMMUNICATIONS

- A. Except as may be otherwise provided in these General Conditions or the Supplementary General Conditions, the CITY will issue all its communications to the CONTRACTOR through the ENGINEER.

### 8.2 PAYMENTS

- A. The CITY will make payments to the CONTRACTOR as provided in Article 14.

### 8.3 LANDS, EASEMENTS, AND SURVEYS

- A. The CITY’s duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.1 and 4.6.

### 8.4 REPORTS AND DRAWINGS

- A. The CITY will identify and make available to the CONTRACTOR copies of reports of physical conditions at the Site and drawings of existing structures which have been utilized in preparing the Contract Documents as set forth in Paragraph 4.2.

### 8.5 CHANGE ORDERS

- A. The CITY will execute Change Orders as indicated in Article 10.

### 8.6 INSPECTIONS AND TESTS

- A. The CITY’S responsibility for inspections and tests is set forth in Paragraph 13.3.

### 8.7 SUSPENSION OF WORK

- A. The CITY’s right to stop work or suspend work is set forth in Paragraphs 13.4 and 15.1.

## 8.8 TERMINATION OF AGREEMENT

- A. The CITY's right to terminate services of the CONTRACTOR is set forth in Paragraphs 15.2 and 15.3.

## 8.9 LIMITATION ON CITY'S RESPONSIBILITIES

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

## 8.10 UNDISCLOSED HAZARDOUS ENVIRONMENTAL CONDITIONS

- A. CITY's responsibility in respect to an undisclosed hazardous environmental condition is set forth in Paragraph 4.5.

## ARTICLE 9 – ENGINEER’S STATUS DURING CONSTRUCTION

### 9.1 CITY’S REPRESENTATIVE

- A. The ENGINEER will be the CITY’S representative during the construction period. The ENGINEER shall decide any and all questions which may arise as to the quality or acceptability of materials furnished and work performed, and as to the manner of performance and rate of progress of the work; all questions which arise as to the interpretation of the plans and specifications, the proposal and the contract documents therefor; all questions as to the acceptable fulfillment of the contract on the part of the CONTRACTOR; and all questions as to claim and compensation.

### 9.2 OBSERVATIONS ON THE SITE

- A. The ENGINEER will make observations on the Site during construction to monitor the progress and quality of the WORK and to determine, in general, if the WORK is proceeding in accordance with the Contract Documents. The ENGINEER will not be required to make exhaustive or continuous inspections to check the quality or quantity of the WORK.

### 9.3 PROJECT REPRESENTATION

- A. The ENGINEER may furnish a Resident Project Representative to assist in observing the performance of the WORK. The duties, responsibilities, and limitations of authority of any such Resident Project Representative will be as provided in the Supplementary General Conditions.

### 9.4 CLARIFICATIONS

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

### 9.5 AUTHORIZED VARIATIONS IN WORK

- A. The ENGINEER may authorize variations in the WORK from the requirements of the Contract Documents. These may be accomplished by a Field Order and will require the CONTRACTOR to perform the WORK involved in a manner that minimizes the impact to the WORK and the Contract Times. If the CONTRACTOR believes that a Field Order justifies an increase in the Contract Price or an extension of the Contract Times, the CONTRACTOR may make a claim therefor as provided in Article 11 or 12.



## 9.6 REJECTING DEFECTIVE WORK

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

## 9.7 CONTRACTOR SUBMITTALS, CHANGE ORDERS, AND PAYMENTS

- A. In accordance with the procedures set forth in the General Requirements, the ENGINEER will review all CONTRACTOR submittals.
- B. The ENGINEER's responsibilities for Change Orders are set forth in Articles 10, 11, and 12.
- C. The ENGINEER's responsibilities for Applications for payment are set forth in Article 14.

## 9.8 DECISIONS ON DISPUTES

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

## 9.9 LIMITATIONS ON ENGINEER'S RESPONSIBILITIES

- A. Neither the ENGINEER's authority to act under this Article 9 or other provisions of the Contract Documents nor any decision made by the ENGINEER in good faith either to exercise or not exercise such authority shall give rise to any duty or responsibility of the ENGINEER to the CONTRACTOR, any Subcontractor, any Supplier, any surety for any of them, or any other person or organization performing any of the WORK.
- B. Whenever in the Contract Documents the terms "as ordered," "as directed," "as required," "as allowed," "as reviewed," "as approved," or terms of like effect or import are used, or the adjectives "reasonable," "suitable," "acceptable," "proper," or "satisfactory," or adjectives of like effect or import are used to describe a requirement, direction, review, or judgment will be solely to evaluate the WORK for compliance with the requirements of the Contract Documents, and conformance with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents, unless there is a specific statement indicating otherwise. The use of any such term or adjective shall not be effective to assign to the ENGINEER any duty or authority

to supervise or direct the performance of the WORK or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.9 C.

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

## **ARTICLE 10 – CHANGES IN THE WORK**

### **10.1 GENERAL**

- A. Without invalidating the Agreement and without notice to any surety, the CITY may at any time or from time to time, order additions, deletions, or revisions in the WORK. Such additions, deletions or revisions will be authorized by a Change Order or Field Order. Upon receipt of any such document, CONTRACTOR shall promptly proceed to implement the additions, deletions, or revisions in the WORK in accordance with the applicable conditions of the Contract Documents.
- B. The CONTRACTOR shall not be entitled to an increase in the contract Price nor an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented by Change Order, except in the case of an emergency and except in the case of uncovering work as provided in Paragraph 13.3.F and G.
- C. The CITY and the CONTRACTOR shall execute appropriate Change Orders covering:
  - 1. Changes in the WORK which are ordered by the CITY pursuant to Paragraph 10.1 A.;
  - 2. Changes required because of acceptance of Defective Work under Paragraph 13.6; and
  - 3. Changes in the Contract Price or Contract Times which are agreed to by the parties under Articles 11 and/or 12, respectively.
- D. If notice of any change in the WORK is required to be given to a surety, the giving of any such notice shall be the CONTRACTOR's responsibility. If the change in the WORK affects the Contract Price, the CITY may require an

adjustment to the amount of any applicable Bond and the amount of each applicable Bond shall be adjusted accordingly.

- E. If the CITY and CONTRACTOR agree as to the extent, if any, of an increase in the Contract Price or an extension or shortening of the Contract Times that should be allowed as a result of a Field Order, the CONTRACTOR shall proceed so as to minimize the impact on and delays to the WORK pending the issuance of a Change Order.
- F. If the CITY and the CONTRACTOR are unable to agree as to the extent, if any, of an increase in the Contract Price or an extension or shortening of the Contract Times that should be allowed as a result of a Field Order, the ENGINEER can direct the CONTRACTOR to proceed on the basis of time and materials so as to minimize the impact on and delays to the WORK, and the CONTRACTOR may make a claim as provided in Articles 11 and 12.

## 10.2 ALLOWABLE QUANTITY VARIATIONS

- A. In the event of an increase or decrease in the quantity of any bid item under a unit price contract, the total amount of work actually done or materials or equipment furnished will be paid for according to the unit price established for such work under the Contract Documents, wherever such unit price has been established; provided, that an adjustment in the Contract Price may be made for changes which result in an increase or decrease in excess of 25 percent of the estimated quantity of any unit price bid item of the WORK.
- B. In the event a part of the WORK is to be entirely eliminated and no lump sum or unit price is named in the Contract Documents to cover such eliminated work, the price of the eliminated work shall be agreed upon by the CITY and the CONTRACTOR by Change Order.

## ARTICLE 11 – CHANGE OF CONTRACT PRICE

### 11.1 GENERAL

- A. The Contract Price constitutes the total compensation payable to the CONTRACTOR FOR PERFORMING THE work. All duties, responsibilities, and obligations assigned to or undertaken by the CONTRACTOR to complete the WORK shall be at its expense without change in the Contract Price.
- B. The Contract Price may only be changed by a Change Order. The value of any work covered by a Change Order or of any claim for an increase or decrease in the Contract Price shall be determined in one of the following ways:

1. Where the work involved is covered by unit prices contained in the Contract Documents, by application of unit prices to the quantities of the items involved.
  2. By mutual acceptance of a lump sum, which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.4; or
  3. On the basis of the cost of work (determined as provided in Paragraph 11.3) plus the CONTRACTOR's overhead and profit (determined as provided in Paragraph 11.4).
- C. Any claim for an increase in the Contract Price shall be based on written notice delivered by the CONTRACTOR to the ENGINEER promptly (but in no event later than 10 days) after the start of the event giving rise to the claim and shall state the general nature of the claim. Notice of the amount of the claim with supporting data shall be delivered within 60 days after the start of such event (unless the ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim) and shall be accompanied by the CONTRACTOR's written statement that the amount claimed covers all known amounts (direct, indirect, and consequential) to which the CONTRACTOR is entitled as a result of such event. All claims for adjustment in the Contract Price will be determined by the ENGINEER. No claim for an adjustment in the Contract Price will be valid if not submitted in accordance with this Paragraph 11.1 C.

## 11.2 COSTS RELATING TO WEATHER

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

## 11.3 COST OF WORK (BASED ON TIME AND MATERIALS)

- A. **General:** The term "cost of work" means the sum of all costs necessarily incurred and paid by the CONTRACTOR for labor, materials, and equipment in the proper performance of extra work. Except as otherwise may be agreed to in writing by the CITY, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall include only the following items and shall not include any of the costs itemized in Paragraph 11.5.
- B. **Labor:** The costs of labor will be the actual cost for wages prevailing for each craft or type of workers performing the extra work at the time the extra work is

done, plus employer payments of payroll taxes, workers compensation insurance, liability insurance, health and welfare, pension, vacation, apprenticeship funds, and other direct costs resulting from federal, state or local laws, as well as assessments or benefits required by lawful collective bargaining agreements. Labor costs for equipment operators and helpers will be paid only when such costs are not included in the invoice for equipment rental. The labor costs for foremen shall be proportioned to all of their assigned work and only that applicable to extra work shall be paid. Nondirect labor costs including superintendence shall be considered part of the markup set out in Paragraph 11.4.

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

1. All trade discounts and rebaters shall accrue to the CITY, and the CONTRACTOR shall make provisions so that they may be obtained;
2. For materials secured by other than a direct purchase and direct billing to the purchaser, the cost shall be deemed to be the price paid to the actual supplier as determined by the ENGINEER. Except for actual costs incurred in the handling of such materials, markup will not be allowed;
3. Payment for materials from sources owned wholly or in part by the purchaser shall not exceed the price paid by the purchaser for similar materials from said sources on extra work items or the current wholesale price for such materials delivered to the Site, whichever price is lower; and
4. If in the opinion of the ENGINEER the cost of material is excessive, or the CONTRACTOR does not furnish satisfactory evidence of the cost of such material, then the cost shall be deemed to be the lowest current wholesale price for the quantity concerned delivered to the Site less trade discount. The CITY reserves the right to furnish materials for the extra work and no claim will be allowed by the CONTRACTOR for costs and profit on such materials.

D. **Equipment:** The CONTRACTOR will be paid for the use of equipment at the rental rate listed for such equipment specified in the current California Department of Transportation publication entitled "Labor Surcharge and Equipment Rental Rates." Such rental rate will be used to compute payments for equipment whether the equipment is under the CONTRACTOR's control through direct ownership, leasing, renting, or another method of acquisition. The rental rate to be applied for use of each item of equipment will be the rate resulting in the least total cost to the CITY for the total period of use. If it is deemed necessary by the CONTRACTOR to use equipment not listed in the above-

referenced publication, an equitable rental rate for the equipment will be established by the ENGINEER. The CONTRACTOR may furnish cost data which might assist the ENGINEER in the establishment of the rental rate. Payment for equipment shall be subject to the following:

1. All equipment shall, in the opinion of the ENGINEER, be in good working condition and suitable for the purpose for which the equipment is to be used;
2. Before construction equipment is used on the extra work, the CONTRACTOR shall plainly stencil or stamp an identifying number thereon at a conspicuous location, and shall furnish to the ENGINEER, in duplicate, a description of the equipment and its identifying number;
3. Unless otherwise specified, manufacturer's ratings and manufacturer approved modifications shall be used to classify equipment for determination of applicable rental rates. Equipment which has no direct power unit shall be powered by a unit of at least the minimum rating recommended by the manufacturer;
4. Individual pieces of equipment or tools having a replacement value of \$500 or less, whether or not consumed by use, will be considered to be small tools and no payment will be made therefore.

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

1. When hourly rates are listed, any part of an hour less than 30 minutes of operation will be considered to be half-hour of operation, and any part of an hour in excess of 30 minutes will be considered one hour of operation;
2. When daily rates are listed, any part of a day less than 4 hours operation will be considered to be half-day of operation. When owner-operated equipment is used to perform extra work to be paid for on a time and

materials basis, the CONTRACTOR will be paid for the equipment and operator, as set forth in Paragraphs 3, 4, and 5, following;

3. Payment for the equipment will be made in accordance with the provisions in Paragraph 11.3 D., herein;
4. Payment for the cost of labor and subsistence or travel allowance will be made at the rates paid by the CONTRACTOR to other workers operating similar equipment already on the Site, or in the absence of such labor, established by collective bargaining agreements for the type of workmen and location of the extra work, whether or not the operator is actually covered by such an agreement. A labor surcharge will be added to the cost of labor described herein accordance with the provisions of Paragraph 11.3 B., herein, which surcharge shall constitute full compensation for payments imposed by state and federal laws and all other payments made to or on behalf of workers other than actual wages; and
5. To the direct cost of equipment rental and labor, computed as provided herein, will be added the allowances for equipment rental and labor as provided in Paragraph 11.4, herein.

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

1. When the ENGINEER and the CONTRACTOR, determine that a special service or work is required which cannot be performed by the forces of the CONTRACTOR or those of any of its Subcontractors, the special service or work may be performed by an entity especially skilled in the work to be performed. After validation of invoices and determination of market values by the ENGINEER, invoices for special services or work based upon the current fair market value thereof may be accepted without complete itemization of labor, material, and equipment rental costs;
2. When the CONTRACTOR is required to perform work necessitating special fabrication or matching process in a fabrication or a machine shop facility away from the Site, the charges for that portion of the work performed at the off-site facility may, by agreement, be accepted as a special service and accordingly, the invoices for the work may be accepted without detailed itemization; and
3. All invoices for special services will be adjusted by deducting all trade discounts. In lieu of the allowances for overhead and profit specified in

Paragraph 11.4, herein, an allowance of 15 percent will be added to invoices for special services.

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

#### 11.4 CONTRACTOR'S OVERHEAD AND PROFIT

- A. Extra work ordered on the basis of time and materials will be paid for at the actual necessary cost as determined by the ENGINEER, plus allowances for overhead and profit. No additional mark-ups and/or surcharges will be added to the cost. The allowance for overhead and profit will include full compensation for superintendence, taxes, field office expense, extended overhead, home office overhead, and all other items of expense or cost not included in the cost of labor, materials, or equipment provided for under Paragraph 11.3. The allowance for overhead and profit will be made in accordance with the following schedule:

##### Overhead and Profit Allowance

Labor.....	20 percent
Materials .....	15 percent
Equipment....	15 percent

To the sum of the costs and markups provided for in this Article, an additional 2 percent of the sum will be added as compensation for Bonds and insurance.

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

#### 11.5 EXCLUDED COSTS

- A. The term "cost of the work" shall not include any of the following:
  - 1. Payroll costs and other compensation of CONTRACTOR's officers, executives, proprietors, partners, principals, general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and



contracting agents, expeditors, timekeepers, clerks, and other personnel employed by CONTRACTOR whether at the Site or in CONTRACTOR's principal or a branch office for general administration of the WORK all of which are to be considered administrative costs covered by the CONTRACTOR's allowance for overhead and profit;

2. Non-direct labor costs, including superintendence, shall be considered part of the markup for overhead and profit, and no additional payment will be allowed for such;
3. Expenses of CONTRACTOR's principal and branch offices other than CONTRACTOR's office at the Site;
4. Any part of CONTRACTOR's capital expenses, including interest on CONTRACTOR's capital employed for the WORK and charges against CONTRACTOR for delinquent payments;
5. Cost of premiums for all Bonds and for all insurance whether or no CONTRACTOR is required by the Contract Documents to purchase and maintain the same (except as provided by Paragraph 11.4 above);
6. Costs due to the negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of Defective Work, disposal of materials or equipment wrongly supplied, and making good any damages to property; and
7. Other overhead or general expense costs of any kind and the cost of any item not specifically and expressly included in Paragraph 11.4.

## 11.6 CONTRACTOR'S EXTRA WORK REPORT

- A. In order to be paid for extra work, the CONTRACTOR must submit a daily extra work report on the form furnished by the ENGINEER. The form must be completely filled out based on the provisions of Paragraphs 11.3 through 11.5 and signed by the CONTRACTOR and ENGINEER at the end of each work day. Failure to complete the form and obtain appropriate signatures by the next working day after the extra work of the previous day was completed will result in CONTRACTOR's costs for extra work being disallowed.

## ARTICLE 12 – CHANGE OF CONTRACT TIMES

### 12.1 GENERAL

- A. The Contract Times may only be changed by a Change Order. Any claim for an extension of the Contract Times shall be based on written notice delivered by the CONTRACTOR to the ENGINEER promptly (but in no event later than 10 days) after the start of the event giving rise to the claim and stating the general nature of the claim. Notice of the extent of the claim with supporting data shall be delivered within 30 days after the start of such event (unless the ENGINEER allows an additional period of time for the submission of additional or more accurate data in support of the claim) and shall be accompanied by the CONTRACTOR's written statement that the adjustment claimed is the entire adjustment to which the CONTRACTOR is entitled as a result of said event. All claims for adjustment in the Contract Times will be determined by the ENGINEER. No claim for an adjustment in the Contract Times will be valid if not submitted in accordance with the requirements of this Paragraph 12.1 A. An increase in Contract Times does not mean that the CONTRACTOR is due an increase in Contract Price. Only compensable time extensions will result in an increase in Contract Price.
- B. All time limits stated in the Contract Documents are of the essence of the Agreement.
- C. When CONTRACTOR is prevented from completing any part of the WORK within the Contract Times (or Milestones) due to delay beyond the control of CONTRACTOR, the Contract Times (or Milestones) will be extended in an amount equal to the time lost on the critical path of the WORK due to such delay, if a claim is made therefor as provided in Paragraph 12.1.A. Delays beyond the control of CONTRACTOR shall include, but not be limited to, acts or neglect by CITY; acts or neglect of those performing other work as contemplated by Article 7; and fires, floods, epidemics, abnormal weather conditions, or acts of God. Delays attributable to and within the control of any Subcontractor or Supplier shall be deemed to be delays within the control of the CONTRACTOR.
- D. In no event will CITY be liable to CONTRACTOR, any Subcontractor, any Supplier, any other person or organization, or to any surety for or employee or agent of any of them, for any increase in the Contract Price or other damages arising out of or resulting from the following:
1. Delays caused by or within the control of CONTRACTOR; or
  2. Delays beyond the control of both CITY and CONTRACTOR including but not limited to fires, floods, epidemics, abnormal weather conditions, acts of God, or acts or neglect by those performing other work as contemplated by Article 7.

## 12.2 EXTENSIONS OF CONTRACT TIMES FOR DELAY DUE TO WEATHER

- A. The CONTRACTOR's construction schedule shall anticipate delay due to unusually severe weather. The number of days of anticipated delay is set forth in the Supplementary General Conditions.
- B. Contract Times may be extended by the ENGINEER because of delays in excess of the anticipated delay. The CONTRACTOR shall, within 10 days of the beginning of any such delay, notify the ENGINEER in writing and request an extension of Contract Times. The ENGINEER will ascertain the facts and the extent of the delay and extend the Contract Times when, in its judgment, the findings of the fact justify such an extension.

## **ARTICLE 13 – INSPECTIONS AND TESTS; CORRECTION, REMOVAL, OR ACCEPTANCE OF DEFECTIVE WORK**

### 13.1 NOTICE OF DEFECTIVE WORK

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

### 13.2 ACCESS TO WORK

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

### 13.3 INSPECTIONS AND TESTS

- A. The CONTRACTOR shall give the ENGINEER not less than 24 hours notice of readiness of the WORK for all required inspections, tests, or approvals, and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.
- B. The CITY shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:
  - 1. For inspection, tests, or approvals covered by Paragraphs 13.3C. and 13.3D. below;

2. That costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.3G. shall be paid as provided in said Paragraph 13.3G.; and
  3. As otherwise provided in the Contract Documents.
- C. If Laws and Regulations of any public body having jurisdiction require any WORK (or any part thereof) to be inspected, tested, or approved by an employee or other representative of such public body, CONTRACTOR shall assume full responsibility for arranging and obtaining such inspections, tests or approvals; pay all costs in connection therewith; and furnish the ENGINEER the required certificates of inspection or approval.
- D. The CONTRACTOR shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for the ENGINEER's acceptance of materials or equipment to be incorporated in the WORK or acceptance of materials, mix designs, or equipment submitted for approval prior to the CONTRACTOR's purchase thereof for incorporation in the WORK. Such inspections, tests, or approvals shall be performed by organizations acceptable to the ENGINEER.
- E. The ENGINEER will make, or have made, such inspections and tests as the ENGINEER deems necessary to see that the WORK is being accomplished in accordance with the requirements of the Contract Documents. Unless otherwise specified in any Supplementary General Conditions, the cost of such inspection and testing will be borne by the CITY. In the event such inspections or tests reveal non-compliance with the requirements of the Contract Documents, the CONTRACTOR shall bear the cost of corrective measures deemed necessary by the ENGINEER, as well as the cost of subsequent reinspection and retesting. Neither observations by the ENGINEER nor inspections, tests, or approvals by others shall relieve the CONTRACTOR from the CONTRACTOR's obligation to perform the WORK in accordance with the Contract Documents.
- F. If any WORK (including the work of others) that is to be inspected, tested, or approved is covered without written concurrence of the ENGINEER, it must, if requested by the ENGINEER, be uncovered for observation. Such uncovering shall be at the CONTRACTOR's expense unless the CONTRACTOR has given the ENGINEER not less than 24 hours notice of the CONTRACTOR's intention to perform such test or to cover the same and the ENGINEER has not acted with reasonable promptness in response to such notice.
- G. If any WORK is covered contrary to the written request of the ENGINEER, it must, if requested by the ENGINEER, be uncovered for the ENGINEER's observation and recovered at the CONTRACTOR's expense.

- H. If the ENGINEER considers it necessary or advisable that covered WORK be observed by the ENGINEER or inspected or tested by others, the CONTRACTOR, at the ENGINEER's request shall uncover, expose, or otherwise make available for observation, inspection, or testing as the ENGINEER may require, that portion of the WORK in question, furnishing all necessary labor, material, and equipment. If it is found that such work is Defective Work, the CONTRACTOR shall bear all direct, indirect, and consequential costs and damages of such uncovering, exposure, observation, inspection, and testing and of satisfactory reconstruction, including but not limited to, fees and charges of engineers, architects, attorneys, and other professionals. However, if such work is not found to be Defective Work, the CONTRACTOR will be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, and reconstruction; and, if the parties are unable to agree as to the amount or extent thereof, the CONTRACTOR may make a claim therefor as provided in Articles 11 and 12.
- I. No acceptance of equipment, materials, or work shall be construed to result from such inspections by the ENGINEER. Any inspections or tests or waivers thereof shall not relieve the CONTRACTOR of its responsibility for meeting the requirement of the Contract.

#### 13.4 CITY MAY STOP THE WORK

- A. If Defective Work is identified, the ENGINEER may order the CONTRACTOR to stop performance of the WORK, or any portion thereof, until the cause for such order has been eliminated; however, this right of the ENGINEER to stop the WORK shall not give rise to any duty on the part of the ENGINEER to exercise this right for the benefit of the CONTRACTOR or any other party.

#### 13.5 CORRECTION OR REMOVAL OF DEFECTIVE WORK

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

#### 13.6 ACCEPTANCE OF DEFECTIVE WORK

- A. If, instead of requiring correction or removal and replacement of Defective Work, the CITY prefers to accept the Defective Work, the CITY may do so. The CONTRACTOR shall bear all direct, indirect, and consequential costs attributable to the CITY's evaluation of and determination to accept such Defective Work. If

any such acceptance occurs prior to final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the WORK, and the CITY shall be entitled to an appropriate decrease in the Contract Price.

### 13.7 CITY MAY CORRECT DEFECTIVE WORK

- A. If the CONTRACTOR fails within a reasonable time after written notice from the ENGINEER to correct Defective Work, or to remove and replace Defective Work as required by the ENGINEER in accordance with Paragraph 13.5A., or if the CONTRACTOR fails to perform the WORK in accordance with the Contract Documents, or if the CONTRACTOR fails to comply with any other provision of the Contract Documents, the CITY may, after seven days written notice to the CONTRACTOR, correct and remedy any such deficiency.
- B. In exercising the rights and remedies under this paragraph, the CITY shall proceed with corrective and remedial action. In connection with such corrective and remedial action, the CITY may exclude the CONTRACTOR from all or part of the Site, take possession of all or part of the WORK, and suspend the CONTRACTOR's services related thereto and incorporate in the WORK all materials and equipment for which the CITY has paid the CONTRACTOR whether stored at the Site or elsewhere. The CONTRACTOR shall provide the CITY and its ENGINEER, access to the Site to enable CITY to exercise the rights and remedies under this paragraph.
- C. All direct, indirect, and consequential cost and damages incurred by the CITY in exercising the rights and remedies under this paragraph will be charged against the CONTRACTOR and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the WORK; and the CITY shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, the CITY may make a claim therefor as provided in Article 11. Such claim will include, but not be limited to, all costs of repair or replacement of work of others, destroyed or damaged by correction, removal, or replacement of CONTRACTOR's Defective Work and all direct, indirect, and consequential damages associated therewith.
- D. The CONTRACTOR shall not be allowed an extension of Contract Times (or Milestones) because of any delay in the performance of the WORK attributable to the exercise by CITY of CITY's rights and remedies under this paragraph.

### 13.8 CORRECTION PERIOD

- A. The correction period for Defective Work shall be the longer of:
  - 1. One year after the date of final acceptance;

2. Such time as may be prescribed by Laws and Regulations;
  3. Such time as specified by the terms of any applicable special guarantee required by the Contract Documents; or
  4. Such time as specified by any specific provision of the Contract Documents.
- B. If, during the correction period as defined in Paragraph 13.8A above, any work is found to be Defective Work, the CITY shall have the same remedies as set forth in Paragraphs 13.5, 13.6, and 3.7 above.
- C. Where Defective Work (and damage to other work resulting therefrom) has been corrected, removed, or replaced under this paragraph, the correction period hereunder with respect to such work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

## **ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION**

### **14.1 SCHEDULE OF VALUES (LUMP SUM PRICE BREAKDOWN)**

- A. The schedule of values or lump sum price breakdown established as provided in the General Requirements shall serve as the basis for progress payments and shall be incorporated into a form of “Application for Payment acceptable to the ENGINEER.

### **14.2 UNIT PRICE BID SCHEDULE**

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

### **14.3 APPLICATION FOR PROGRESS PAYMENT**

- A. Unless otherwise prescribed by law, on the 25th of each month, the CONTRACTOR shall submit to the ENGINEER for review, the Application for Payment filled out and signed by the CONTRACTOR covering the WORK completed as of the Application for Payment and accompanied by such supporting documentation as is required by the Contract Documents.
- B. The Application for Payment shall identify, as a subtotal, the amount of the CONTRACTOR total earnings to date; plus the value of materials stored at the Site which have not yet been incorporated in the WORK; and less a deductive adjustment for materials installed which were not previously incorporated in the WORK, but for which payment was allowed under the provisions for payment for materials stored at the Site, but not yet incorporated in the WORK.

- C. The net payment due the CONTRACTOR shall be the above-mentioned subtotal from which shall be deducted the amount of retainage specified in the Supplementary General Conditions and the total amount of all previous payments made to the CONTRACTOR.
- D. The value of materials stored at the Site shall be an amount equal to the specified percent of the value of such materials as set forth in any Supplementary General Conditions. Said amount shall be based upon the value of all acceptable materials and equipment not incorporated in the WORK but delivered and suitably stored at the Site or at another location agreed to in writing; provided, each such individual item has a value of more than \$5,000 and will become a permanent part of the WORK. The Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that the CONTRACTOR has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance and other arrangements to protect the CITY's interest therein, all of which will be satisfactory to the CITY.
- E. A ten percent (10%) retention of payment amount shall be held by the CITY from the amount of each Application for Payment.
- F. **OPTIONAL:** Partial payments for mobilization/demobilization costs shall be as follows:
  - 1. Thirty-five percent (35%) of the amount bid for mobilization/demobilization or 1.75 percent of the original Contract Price, whichever is less, shall be paid in each of the first two progress payments.
  - 2. The balance of the amount bid for mobilization/demobilization shall be paid upon completion of all WORK on the project.

#### 14.4 CONTRACTOR'S WARRANTY OF TITLE

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

#### 14.5 REVIEW OF APPLICATIONS FOR PROGRESS PAYMENT

- A. The ENGINEER will, within 7 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the application to the CITY, or return the application to the CONTRACTOR indicating in writing the ENGINEER'S REASONS FOR REFUSING TO RECOMMEND PAYMENT. In the latter case, the CONTRACTOR may make



the necessary corrections and resubmit the application. If the ENGINEER still disagrees with a portion of the application, it will submit the application recommending the undisputed portion of the application to the CITY for payment and provide reasons for recommending non-payment of the disputed amount. Thirty days after presentation of the Application for Payment with the ENGINEER'S recommendation, the amount recommended will (subject to the provisions of Paragraph 14.5B.) become due and when due will be paid by the CITY to the CONTRACTOR.

- B. The ENGINEER, in its discretion, may refuse to recommend the whole or any part of any payment. ENGINEER may also refuse to recommend any such payment, or, because of subsequently discovered evidence or the results of subsequent inspections or tests, nullify any such payment previously recommended, to such extent as may be necessary in ENGINEER's opinion to protect CITY from loss because:
1. The work is Defective Work or the completed WORK has been damaged requiring correction or replacement.
  2. The Contract Price has been reduced by written amendment or Change Order.
  3. The CITY has been required to correct Defective Work or complete WORK in accordance with Paragraph 13.7.
  4. ENGINEER has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.1 through 15.4 inclusive.
  5. Third party claims filed or reasonable evidence indicating probable filing of such claims; or
  6. Failure of the Contractor to make payments properly to subcontractors or for labor, materials, or equipment; or
  7. Reasonable evidence that the work cannot be completed for the unpaid balance of the contract sum; or
  8. Failure of the Contractor to submit an acceptable construction schedule or failure to update the schedule; or
  9. Damage to the City or another contractor; or
  10. Reasonable evidence that the work will not be completed within the time provided for in the Contract; or

11. Contractor's failure or inability to obtain or maintain insurance coverage and bonds as required by the Contract throughout the course of the job; or
  12. Persistent failure to carry out the work in accordance with the Contract; or
  13. Failure to deliver copies of certified payrolls, as specified in Section 17.11, General Conditions.
  14. In addition, the City may deduct from any such payments due the Contractor any amounts the City may be currently or in the future authorized to retain pursuant to federal, state, or local laws or regulations, any amounts due the City from the Contractor, and any other amounts which the City is otherwise authorized to retain as specified in Special Provisions.
- C. The CITY may refuse to make payment of the full amount recommended by the ENGINEER because:
1. Claims have been made against CITY on account of CONTRACTOR's performance or furnishing of the WORK.
  2. Liens have been filed in connection with the WORK, except where CONTRACTOR has delivered a specific Bond satisfactory to CITY to secure the satisfaction and discharge of such Liens.
  3. There are other items entitling CITY to set-off against the amount recommended, or
  4. CITY has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.5B. through 14.5C and 15.1 through 15.4 inclusive.

The CITY must give the CONTRACTOR immediate written notice stating the reasons for such action and promptly pay the CONTRACTOR the amount so withheld, or any adjustment thereto agreed to by CITY and CONTRACTOR, when CONTRACTOR corrects to CITY's satisfaction the reasons for such action.

#### 14.6 COMPLETION

- A. When the CONTRACTOR considers the WORK ready for its intended use, the CONTRACTOR shall notify the ENGINEER in writing that the WORK is complete. The CONTRACTOR shall attach to this request a list of all work items that remain to be completed and a request that the ENGINEER prepare a Notice of Completion. Within a reasonable time thereafter, the CONTRACTOR, and the ENGINEER shall make an inspection of the WORK to determine the status of completion. If the ENGINEER considers the WORK complete, the ENGINEER

will prepare and execute and deliver for City Council approval and recordation the Notice of Completion signed by the ENGINEER and CONTRACTOR, which shall fix the date of completion.

#### 14.7 PARTIAL UTILIZATION

- A. The CITY shall have the right to utilize or place into service any item of equipment or other usable portion of the WORK prior to completion of the WORK. Whenever the CITY plans to exercise said right, the CONTRACTOR will be notified in writing by the ENGINEER, identifying the specific portion or portions of the WORK to be so utilized or otherwise placed into service.
- B. It shall be understood by the CONTRACTOR that until such written notification is issued, all responsibility for care and maintenance of all of the WORK shall be borne by the CONTRACTOR. Upon issuance of said written notice of Partial Utilization, the CITY will accept responsibility for the protection and maintenance of all such items or portions of the WORK described in the written notice.
- C. The CONTRACTOR shall retain full responsibility for satisfactory completion of the WORK, regardless of whether a portion thereof has been partially utilized by the CITY prior to completion of the WORK.

#### 14.8 FINAL APPLICATION FOR PAYMENT

- A. After the CONTRACTOR has completed all of the remaining work items referred to in Paragraph 14.6 and delivered all maintenance and operating instructions, schedules, guarantees, Bonds, certificates of inspection, marked-up record documents (as provided in the General Requirements), and other documents, all as required by the Contract Documents, and after the ENGINEER has indicated that the WORK is acceptable, the CONTRACTOR may make application for final payment following the procedure for progress payments. The final Application for Payment shall be accompanied by all documentation called for in the Contract Documents, together with complete and legally effective releases or waivers (satisfactory to the CITY) of all Liens arising out of or filed in connection with the WORK.

#### 14.9 FINAL PAYMENT AND ACCEPTANCE

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

of the final Application for Payment, indicate in writing the ENGINEER's recommendation of payment and present the application to the CITY for payment.

- B. After acceptance of the WORK by the City Council, the CITY will make final payment to the CONTRACTOR of the amount remaining after deducting all prior payments and all amounts to be kept or retained under the provisions of the Contract Documents, including the following items:
1. Liquidated damages, as applicable;
  2. Amounts withheld by CITY under Paragraph 14.5B. and C. which have not been released; and
  3. In accordance with Section 17.6, one-and-one-half times the value of outstanding items of correction work or punch list items yet uncompleted or uncorrected, as applicable. All such work shall be completed or corrected to the satisfaction of the ENGINEER as required by the Contract Documents, otherwise the CONTRACTOR does hereby waive any and all claims to all monies withheld by the CITY to cover the value of all such uncompleted or uncorrected items.
- C. Prior to final payment by the CITY, the CONTRACTOR must provide the CITY a fully-executed Conditional Waiver and Release Upon Final Payment in accordance with California Civil Code Section 3262.

## ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION

### 15.1 SUSPENSION OF WORK BY CITY

- A. The CITY may, at any time and without cause, suspend the WORK or any portion thereof for a period of not more than 90 days by notice in writing to the CONTRACTOR. The CONTRACTOR shall resume the WORK on receipt of a notice of resumption of work. The CONTRACTOR will be allowed an increase in the Contract Price or an extension of the Contract Time, or both directly attributable to any suspension if the CONTRACTOR makes an approval claim therefor as provided in Articles 11 and 12.

### 15.2 TERMINATION OF AGREEMENT BY ENGINEER FOR DEFAULT

- A. In the event of default by the CONTRACTOR, the ENGINEER may give seven days written notice to the CONTRACTOR and the CONTRACTOR's surety of CITY's intent to terminate the Agreement and provide the CONTRACTOR an opportunity to remedy the conditions constituting the default within a specified period of time. It will be considered a default by the CONTRACTOR whenever CONTRACTOR shall:
1. Declare bankruptcy, become insolvent, or assign its assets for the benefit of its creditors;
  2. Disregard or violate the Laws or Regulations of any public body having jurisdiction;
  3. Fail to provide materials or workmanship meeting the requirements of the Contract Documents;
  4. Disregard or violate provisions of the Contract Documents or ENGINEER's instructions;
  5. Fail to prosecute the WORK according to the approved progress schedule;
  6. Fail to provide a qualified superintendent, competent workmen, or materials or equipment meeting the requirements of the Contract Documents;
  7. Disregard the authority of the ENGINEER; or
  8. Assign or subcontract any part of the work without the ENGINEER's consent.
- B. If the CONTRACTOR fails to remedy the conditions constituting default within the time allowed, the ENGINEER may then issue the notice of termination.

- C. In the event the Agreement is terminated in accordance with Paragraph 15.2A., herein, the CITY may take possession of the WORK and may complete the WORK by whatever method or means the CITY may select. The cost of completing the WORK will be deducted from the balance which would have been due the CONTRACTOR had the Agreement not been terminated and the WORK completed in accordance with the Contract Documents. If such cost exceeds the balance which would have been due, the CONTRACTOR shall pay the excess amount to the CITY. If such cost is less than the balance which would have been due, the CONTRACTOR shall not have claim to the difference.

### 15.3 TERMINATION OF AGREEMENT BY CITY FOR CONVENIENCE

- A. Upon seven days' written notice to the CONTRACTOR, the CITY may, without cause and without prejudice to any other right or remedy of the CITY, elect to terminate the Agreement. In such case, the CONTRACTOR shall be paid (without duplication of any items):
  - 1. For completed and acceptable WORK executed in accordance with the Contract Documents, prior to the effective date of termination, including fair and reasonable sums for overhead and profit of such WORK;
  - 2. For expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted WORK, plus fair and reasonable sums or overhead and profit on such expenses;
  - 3. For all reasonable claims, costs, losses, and damages incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and
  - 4. For reasonable expenses directly attributable to termination.

CONTRACTOR shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

### 15.4 TERMINATION OF AGREEMENT BY CONTRACTOR

- A. The CONTRACTOR may terminate the Agreement upon 14 days written notice to the ENGINEER whenever:
  - 1. The WORK has been suspended under the provisions of Paragraph 15.1, herein, for more than 90 consecutive days through no fault or negligence of the CONTRACTOR, and notice to resume work or to terminate the

Agreement has not been received from the ENGINEER within this time period; or

2. The CITY should fail to pay the CONTRACTOR any monies due him in accordance with the terms of the Contract Documents and within 60 days after presentation to the ENGINEER by the CONTRACTOR of a request therefor, unless within said 14-day period the CITY shall have remedied the condition upon which the payment delay was based.
- B. In the event of such termination, the CONTRACTOR shall have no claims against the CITY except for those claims specifically enumerated in Paragraph 15.3, herein, and as determined in accordance with the requirements of said paragraph.

## **ARTICLE 16 – GENERAL TERMS**

### **16.1 GIVING NOTICE**

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

### **16.2 TITLE TO MATERIALS FOUND ON THE WORK**

- A. The CITY reserves the right to retain title to all soils, stone, sand, gravel, and other materials developed and obtained from excavations and other operations connected with the WORK. Unless otherwise specified in the Contract Documents, neither the CONTRACTOR nor any Subcontractor shall have any right, title, or interest in or to any such materials. The CONTRACTOR will be permitted to use in the WORK, without charge, any such materials which meet the requirements of the Contract Documents.

### **16.3 RIGHT TO AUDIT**

- A. If the CONTRACTOR submits a claim to the ENGINEER for additional compensation, the CITY shall have the right, as a condition to considering the claim, and as a basis for evaluation of the claim, and until the claim has been settled, to audit the CONTRACTOR's books to the extent they are relevant. This right shall include the right to examine books, records, documents, and other evidence and accounting procedures and practices, sufficient to discovery and verify all direct and indirect costs of whatever nature claimed to have been incurred or anticipated to be incurred and for which the claim has been submitted. The right to audit shall include the right to inspect the CONTRACTOR's plant or such parts thereof, as may be or have been engaged in the performance of the WORK. The CONTRACTOR further agrees that the right to audit encompasses

all subcontracts and is binding upon Subcontractors. The rights to examine and inspect herein provided for shall be exercisable through such representatives as the CITY deems desirable during the CONTRACTOR's normal business hours at the office of the CONTRACTOR. The CONTRACTOR shall make available to the ENGINEER for auditing, all relevant accounting records and documents, and other financial data, and upon request, shall submit true copies of requested records to the ENGINEER.

#### 16.4 SURVIVAL OF OBLIGATIONS

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

#### 16.5 CONTROLLING LAW

- A. This Agreement is to be governed by the law of the state in which the Project is located.

#### 16.6 SEVERABILITY

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

#### 16.7 WAIVER

- A. The waiver by the CITY of any breach or violation of any term, covenant or condition of this Agreement or of any provision, ordinance, or law shall not be deemed to be a waiver of any other term, covenant, condition, ordinance, or law or of any subsequent breach or violation of the same or of any other term, covenant, condition, ordinance, or law. The subsequent payment of any monies or fee by the CITY which may become due hereunder shall not be deemed to be a waiver of any preceding breach or violation by CONTRACTOR or any term, covenant, condition of this Agreement or of any applicable law or ordinance.



## ARTICLE 17 – CALIFORNIA STATE REQUIREMENTS

### 17.1 STATE WAGE DETERMINATIONS

- A. As required by Section 1770 and following, of the California Labor Code, the CONTRACTOR shall pay not less than the prevailing rate of per diem wages as determined by the Director of the California Department of Industrial Relations. Copies of such prevailing rate of per diem wages available file at the office of the City Clerk, which copies shall be made available to any interested party on request. The CONTRACTOR shall post a copy of such determination at each job site.
- B. In accordance with Section 1775 of the California Labor Code, the CONTRACTOR shall, as a penalty to the CITY, forfeit not more than **\$200.00** for each calendar day or portion thereof, for each worker paid less than the prevailing rates as determined by the Director for the work or craft in which the worker is employed for any public work done under the contract by him or her or by any subcontractor under him or her.

### 17.2 WORKERS' COMPENSATION

- A. In accordance with the provisions of Section 3700 of the California Labor Code, the CONTRACTOR shall secure the payment of compensation to its employees.
- B. Prior to beginning work under the Contract, the CONTRACTOR shall sign and file with the ENGINEER the following certification:

“I am aware of the provisions of Section 3700 of the Labor Code, which require every employer to be insured against liability for workers’ compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the WORK of this Contract.”
- C. Notwithstanding the foregoing provisions, before the Contract is executed on behalf of the CITY, a bidder to whom a contract has been awarded shall furnish satisfactory evidence that it has secured in the manner required and provided by law the payment of workers’ compensation.

### 17.3 APPRENTICES ON PUBLIC WORKS

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

#### 17.4 WORKING HOURS

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

#### 17.5 CONTRACTOR NOT RESPONSIBLE FOR DAMAGE RESULTING FROM CERTAIN ACTS OF GOD

- A. As provided in Section 7105 of the California Public Contract Code, the CONTRACTOR shall not be responsible for the cost of repairing or restoring damage to the WORK which damage is determined to have been proximately caused by an act of God, in excess of 5 percent of the contracted amount, provided, that the WORK damaged was built in accordance with accepted and applicable building standards and the plans and specifications of the CITY. The CONTRACTOR shall obtain insurance to indemnify the CITY for any damage to the WORK caused by an act of God if the insurance premium is a separate bid item in the bidding schedule for the WORK. For purposes of this Section, the term "acts of God" shall include only the following occurrences or conditions and effects: earthquakes in excess of a magnitude of 3.5 on the Richter Scale and tidal waves.

#### 17.6 NOTICE OF COMPLETION

- A. In accordance with the Sections 3086 and 3093 of the California Civil Code, within 10 days after date of acceptance of the WORK BY THE City Council the ENGINEER will file, in the County Recorder's office, a Notice of Completion of the WORK.

#### 17.7 UNPAID CLAIMS

- A. If, at any time prior to the expiration of the period for service of a stop notice, there is served upon the CITY a stop notice as provided in Sections 3179 and 3210 of the California Civil Code, the CITY shall, until the discharge thereof, withhold from the monies under its control so much of said monies due or to become due to the CONTRACTOR under this Contract as shall be sufficient to answer the claim stated in such stop notice and to provide for the reasonable cost of any litigation thereunder; provided, that if the ENGINEER shall, in its discretion, permit CONTRACTOR to file with the ENGINEER the bond referred to in Section 3196 of the Civil Code of the State of California, said monies shall not thereafter be withheld on account of such stop notice.

## 17.8 RETAINAGE FROM MONTHLY PAYMENTS

- A. Pursuant to Section 22300 of the California Public Contract Code, the CONTRACTOR may substitute securities for any money withheld by the CITY to insure performance under the Contract. At the request and expense of the CONTRACTOR, securities equivalent to the amount withheld shall be deposited with the CITY or with a state or federally chartered bank in California as to the escrow agent, who shall return such securities to the CONTRACTOR upon satisfactory completion of the Contract.
- B. Alternatively, the CONTRACTOR may request and the CITY shall make payment of retentions earned directly to the escrow agent at the expense of the CONTRACTOR. At the expense of the CONTRACTOR, the CONTRACTOR may direct the investment of the payments into securities and the CONTRACTOR shall receive the interest earned on the investments upon the same terms provided in Section 22300 of the Public Contract Code securities deposited by the CONTRACTOR. The CONTRACTOR shall be responsible for paying all fees for the expenses incurred by the escrow agent in administering the escrow account and all expenses of the CITY. These expenses and payment terms shall be determined by the CITY's Finance Director or his/her designee and the escrow agent. Upon satisfactory completion of the Contract, the CONTRACTOR shall receive from the escrow agent all securities, interest, and payments received by the escrow agent from the CITY, pursuant to the terms of Section 22300 of the Public Contract Code. The CONTRACTOR shall pay to each subcontractor, not later than 20 days of receipt of the payment, the respective amount of interest earned, net of costs attributed to retention withheld from each subcontractor, on the amount of retention withheld to insure the performance of the CONTRACTOR.
- C. Securities eligible for investment under Section 22300 shall be limited to those listed in Section 16430 of the Government Code and to bank or savings and loan certificates of deposit, interest bearing demand deposit accounts, standby letters of credit, or any other security mutually agreed to by the CONTRACTOR and the CITY.

## 17.9 PUBLIC WORKS CONTRACTS; ASSIGNMENT TO AWARDING BODY

- A. In accordance with Section 7103.5 of the California Public Contract Code, the CONTRACTOR and Subcontractors shall conform to the following requirements. In entering into a public works contract or a subcontract to supply goods, services, or materials pursuant to a public works contract, the CONTRACTOR or subcontractor offers and agrees to assign to the CITY all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. 15) or under the Cartwright Act (Chapter 2 (commencing with Section 16700) of Part 2 of Division 7 of the Business and Professions Code), arising

from purchases of goods, services, or materials pursuant to the public works contract or the subcontract. This assignment shall be made and become effective at the time the awarding body tenders final payment to the CONTRACTOR, without further acknowledgment by the parties.

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

- A. In accordance with Section 1776 of the California Labor Code the CONTRACTOR and each Subcontractor shall keep an accurate payroll record, showing the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by him or her in connection with the public work. Each payroll record shall contain or be verified by a written declaration that it is made under penalty of perjury, stating both of the following:
1. The information contained in the payroll record is true and correct.
  2. The employer has complied with the requirements of Sections 1771, 1811, and 1815 for any work performed by his or her employees on the public works project.
- B. The payroll records shall be certified and shall be available for inspection at all reasonable hours at the principal office of the CONTRACTOR on the following basis:
1. A certified copy of an employee's payroll record shall be made available for inspection or furnished to the employee or his or her authorized representative on request as well as submitted electronically online to the Department of Industrial Relations Labor Commissioner: <https://apps.dir.ca.gov/ecpr/DAS/AltLogin>.
  2. A certified copy of all payroll records shall be made available for inspection or furnished upon request to a representative of the body awarding the contract, the Division of Labor Standards Enforcement, and the Division of Apprenticeship Standards of the Department of Industrial Relations.
  3. A certified copy of all payroll records shall be made available upon request by the public for inspection or copies thereof made; provided, however, that a request by the public shall be made through either the body awarding the contract, the Division of Apprenticeship Standards, or the Division of Labor Standards Enforcement. If the requested payroll records have not been provided the requesting party shall, prior to being provided the records, reimburse the costs of preparation by the

CONTRACTOR, Subcontractors, and the entity through which the request was made. The public shall not be given access to the records at the principal office of the CONTRACTOR.

- C. The certified payroll records shall be on forms provided by the Division of Labor Standards Enforcement or shall contain the same information as the forms provided by the division.
- D. Any copy of records made available for inspection as copies and furnished upon request to the public or any public agency by the awarding body, the Division of Apprenticeship Standards, or the Division of Labor Standards Enforcement shall be marked or obliterated in such a manner as to prevent disclosure of an individual's name, address, and social security number. The name and address of the CONTRACTOR awarded the contract or performing the contract shall not be marked or obliterated.
- E. The CONTRACTOR shall inform the ENGINEER of the location of the records including the street address, city and county, and shall, within 5 working days, provide a notice of change of location and address.
- F. The CONTRACTOR shall have 10 days in which to comply subsequent to receipt of written notice specifying in what respects the CONTRACTOR must comply with this Section. In the event that the CONTRACTOR fails to comply within the 10-day period, he or she shall, as a penalty to the state or political subdivision on whose behalf the contract is made or awarded, forfeit twenty-five dollars (\$25.00) for each calendar day, or portion thereof, for each worker, until strict compliance is effectuated. Upon the request of the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement, these penalties shall be withheld from progress payments then due. A contractor is not subject to a penalty assessment pursuant to this section due to the failure of a subcontractor to comply with this section.

#### 17.11 CULTURAL RESOURCES

- A. The CONTRACTOR's attention is directed to the provisions of the Clean Water Grant Program Bulletin 76A which augments the National Historic Preservation Act of 1966 (16 U.S.C. 470) as specified under Section 01560 - Temporary Environmental Controls, of the General Requirements.

#### 17.12 PROTECTION OF WORKERS IN TRENCH EXCAVATIONS

- A. As required by Section 6705 of the California Labor Code and in addition thereto, whenever work under the Contract involves the excavation of any trench or trenches 5 feet or more in depth, the CONTRACTOR shall submit for acceptance by the ENGINEER, to whom authority to accept has been delegated, in advance of excavation, a detailed plan showing the design of shoring, bracing, sloping, or

other provisions to be made for worker protection from the hazard of caving ground during the excavation, of such trench or trenches. If such plan varies from the shoring system standards established by the Construction Safety Orders of the Division of Occupational Safety and Health, the plan shall be prepared by a registered civil or structural engineer employed by the CONTRACTOR, and all costs therefore shall be included in the price named in the Contract for completion of the WORK as set forth in the Contract Documents. Nothing in this Section shall be deemed to allow the use of a shoring, sloping, or other protective system less effective than that required by the Construction Safety Orders. Nothing in this Section shall be construed to impose tort liability on the CITY or any of its officers, agents, representatives, or employees.

- B. Excavation shall not start until the CONTRACTOR has obtained a permit from the California Division of Industrial Safety and has posted it at the site.

#### 17.13 CONCRETE FORMS, FALSEWORK, AND SHORING

- A. The CONTRACTOR shall comply fully with the requirements of Section 1717 of the Construction Safety Orders, State of California, Department of Industrial Relations, regarding the design of concrete forms, falsework and shoring, and the inspection of same prior to placement of concrete. Where the said Section 1717 requires the services of a civil engineer registered in the State of California to approve design calculations and working drawings of the falsework or shoring system, or to inspect such system prior to placement of concrete, the CONTRACTOR shall employ a registered civil engineer for these purposes, and all costs therefore shall be included in the price named in the Contract for completion of the WORK as set forth in the Contract Documents.

#### 17.14 REMOVAL, RELOCATION, OR PROTECTION OF EXISTING UTILITIES

- A. In accordance with the provisions with the provisions of Section 4215 of the California Government Code, the CITY shall assume the responsibility for the timely removal, relocation, or protection of existing main or trunkline utility facilities located on the site of any construction project that is a subject of the Contract, if such utilities are not identified by the CITY in the plans and specifications made a part of the invitation for bids. The CITY will compensate CONTRACTOR for the costs of locating, repairing damage not due to the failure of the CONTRACTOR to exercise reasonable care, and removing or relocating such utility facilities not indicated in the plans and specifications with reasonable accuracy, and for equipment on the project necessarily idled during such work.
- B. The CONTRACTOR shall not be assessed liquidated damages for delay in completion of the project, when such delay was caused by the failure of the public agency or the owner of the utility to provide for removal or relocation of such utility facilities.

- C. Nothing herein shall be deemed to require the public agency to indicate the presence of existing service laterals or appurtenances when the presence of such utilities on the site of the construction project can be inferred from the presence of other visible facilities, such as buildings, meter and junction boxes, on or adjacent to the site of construction; provided however, nothing herein shall relieve the public agency from identifying main or trunklines in the plans and specifications.
- D. If the CONTRACTOR while performing the Contract discovers utility facilities not identified by the public agency in the Contract Documents it shall immediately notify the public agency and utility in writing.
- E. The public utility, where they are the owner, shall have the sole discretion to perform such repairs or relocation work or permit the CONTRACTOR to do such repairs or relocation work at a reasonable price.

#### 17.15 CONTRACTOR LICENSE REQUIREMENTS

- A. In accordance with Section 7028.15 of the California Business and Professions Code:
- B. It is a misdemeanor for any person to submit a bid to a public agency in order to engage in the business or act in the capacity of a contractor within this state without having a license therefor, except in any of the following cases:
  - 1. The person is particularly exempted from this chapter.
  - 2. The bid is submitted on a state project governed by Section 10164 of the Public Contract Code or any local agency project governed by Section 20103.5 of the Public Contract Code.
- C. If a person has previously been convicted of the offense described in this section, the court shall impose a fine of 20 percent of the price of the contract under which the unlicensed person performed contract work, or four thousand five hundred dollars (\$4,500), whichever is greater, or imprisonment in the county jail for not less than 10 days nor more than six months, or both.
- D. In the event the person performing the contracting work has agreed to furnish materials and labor on an hourly basis, “the price of the contract” for the purpose of this subdivision means the aggregate sum of the cost of materials and labor furnished and the cost of completing the work to be performed.
- E. This section shall not apply to a joint venture license, as required by Section 7029.1 of the California Business and Professions Code. However, at the time of making a bid as a joint venture, each person submitting the bid shall be subject to this section with respect to his or her individual licensure.

- F. This section shall not affect the right or ability of a licensed architect, land surveyor, or registered professional engineer to form joint ventures with licensed contractors to render services within the scope of their respective practices.
- G. Unless one of the foregoing exceptions applies, a bid submitted to a public agency by a contractor who is not licensed in accordance with this chapter shall be considered nonresponsive and shall be rejected by the public agency. Unless one of the foregoing exceptions applies, a local public agency shall, before awarding a contract or issuing a purchase order, verify that the contractor was properly licensed when the contractor submitted the bid. Notwithstanding any other provision of law, unless one of the foregoing exceptions applies, the registrar may issue a citation to any public officer or employee of a public entity who knowingly awards a contract or issues a purchase order to a contractor who is not licensed pursuant to this chapter. The amount of civil penalties, appeal, and finality of such citations shall be subject to Sections 7028.7 and 7028.13 inclusive of the California Business and Professions Code. Any contract awarded to, or any purchase order issued to, a contractor who is not licensed pursuant to this chapter is void.
- H. Any compliance or noncompliance with subdivision (G) of this paragraph shall not invalidate any contract or bid awarded by a public agency during which time that subdivision was in effect.
- I. A public employee or officer shall not be subject to a citation pursuant to this section if the public employee, officer, or employing agency made an inquiry to the board for the purposes of verifying the license status of any person or contractor and the board failed to respond to the inquiry within three business days. For the purposes of this section, a telephone response by the board shall be deemed sufficient.

17.16 DIGGING TRENCHES OR EXCAVATIONS; NOTICE ON DISCOVERY OF HAZARDOUS WASTE OR OTHER UNUSUAL CONDITIONS; INVESTIGATIONS; CHANGE ORDERS; EFFECT ON CONTRACT

- A. If this Contract involves digging trenches or other excavations that extend deeper than four feet below the surface, the following shall apply:
  - 1. The CONTRACTOR shall promptly, and before the following conditions are disturbed, notify the ENGINEER in writing, of any:
    - a. Material that the CONTRACTOR believes may be material that is hazardous waste, as defined in Section 25117 of the Health and Safety Code, that is required to be removed to a Class I, Class II, or Class III disposal site in accordance with provisions of existing law.



- b. Subsurface or latent physical conditions at the site differing from those indicated.
- c. 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.
- d. The ENGINEER shall promptly investigate the conditions, and if it finds that the conditions do materially so differ, or do involve hazardous waste, and cause a decrease or increase in the CONTRACTOR'S cost of, or the time required for, performance of any part of the work shall issue a change order the procedures described in the Contract.
- e. In the event that a dispute arises between the ENGINEER 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.

#### 17.17 RETENTION PROCEEDS; WITHHOLDING; DISBURSEMENT

- A. In accordance with Section 7107 of the Public Contract Code with respects to all contracts entered into on or after January 1, 1993 relating to the construction of any public work of improvement the following shall apply:
  - 1. The retention proceeds withheld from any payment by the CITY from the original CONTRACTOR, or by the original CONTRACTOR from any subcontractor, shall be subject to this paragraph 17.18.
  - 2. Within 60 days after the date of completion of the WORK, including any punch-list WORK, the retention withheld by the CITY shall be released. In the event of a dispute between the ENGINEER and the original CONTRACTOR, the CITY may withhold from the final payment an amount not to exceed 150 percent of the disputed amount. For the purposes of this paragraph, "completion" means any of the following:
    - a. The occupation, beneficial use, and enjoyment of a work of improvement, excluding any operation only for testing, startup, or

commissioning, by the CITY, accompanied by cessation of labor on the work of improvement.

- b. The acceptance by the City Council of the work of improvement.
  - c. After the commencement of a work of improvement, a cessation of labor on the work of improvement for a continuous period of 100 days or more, due to factors beyond the control of the CONTRACTOR.
  - d. After the commencement of a work of improvement, a cessation of labor on the work of improvement for a continuous period of 30 days or more, if the ENGINEER files for record a notice of cessation or a notice of completion.
3. Subject to subparagraph 17.18 A.4, within 10 days from the time that all or any portion of the retention proceeds are received by the original CONTRACTOR, the original CONTRACTOR shall pay each of its subcontractors from whom retention has been withheld, each subcontractor's share of the retention received. However, if a retention payment received by the original CONTRACTOR is specifically designated for a particular subcontractor, payment of the retention shall be made to the designated subcontractor, if the payment is consistent with the terms of the subcontract.
  4. The original CONTRACTOR may withhold from a subcontractor its portion of the retention proceeds if a bona fide dispute exists between the subcontractor and the original CONTRACTOR. The amount withheld from the retention payment shall not exceed 150 percent of the estimated value of the disputed amount.
  5. In the event that retention payments are not made within the time periods required by this paragraph 17.18, the CITY or original CONTRACTOR shall be subject to a charge of 2 percent per month on the improperly withheld amount, in lieu of any interest otherwise due. Additionally, in any action for the collection of funds wrongfully withheld, the prevailing party shall be entitled to attorney's fees and costs.
  6. Any attempted waiver of the provisions of this section shall be void as against the public policy of this state.

17.18 TIMELY PROGRESS PAYMENTS; INTEREST; PAYMENT REQUESTS

- A. If the CITY fails to make any progress payment within 30 days after receipt of an undisputed and properly submitted payment request from the CONTRACTOR, the CITY shall pay interest to the CONTRACTOR equivalent to the legal rate set forth in subdivision (a) of Section 685.010 of the Code of Civil Procedure.
  
- B. Upon receipt of a payment request, the ENGINEER shall act in accordance with both of the following:
  - 1. Each payment request shall be reviewed by the ENGINEER as soon as practicable after receipt for the purpose of determining that the payment request is a proper payment request.
  
  - 2. Any payment request determined not to be a proper payment request suitable for payment shall be returned to the CONTRACTOR as soon as practicable, but not later than seven days, after receipt. A request returned pursuant to this paragraph shall be accompanied by a document setting forth in writing the reasons why the payment request is not proper.
  
- C. The number of days available to the CITY to make a payment without incurring interest pursuant to this paragraph shall be reduced by the number of days by which the CITY exceeds the seven-day requirement set forth above.
  
- D. For purposes of this paragraph:
  - 1. A “progress payment” includes all payments due the CONTRACTOR, except that portion of the final payment designated by the contract as retention earnings.
  
  - 2. A payment request shall be considered properly executed if funds are available for payment of the payment request, and payments is not delayed due to an audit inquiry by the financial officer of the CITY.

17.19 PREFERENCE FOR MATERIAL

- A. In accordance with Section 3400 of the California Public Contract Code, the CONTRACTOR will be provided a period prior to award of the contract for submission of data substantiating a request for a substitution of “as equal” item.

17.20 RESOLUTION OF CONSTRUCTION CLAIMS

- A. In accordance with Section 20104 et Seq. of the California Public Contract Code. This paragraph applies to all claims of \$375,000 or less which arise between the CONTRACTOR and the CITY under this Contract for:
1. A time extension;
  2. Payment of money or damages arising from work done by or on behalf of, the CONTRACTOR pursuant to this CONTRACT and payment of which is not otherwise expressly provided for or the CONTRACTOR is not otherwise entitled to; or
  3. An amount the payment of which is disputed by the ENGINEER.
- B. For any claim set out in Paragraphs A.1, 2, or 3 above, the following requirements apply:
1. The claim shall be in writing and include the documents necessary to substantiate the claim and be accompanied by the following certification:

“CONTRACT PROVISION REQUIRING PERSONAL CERTIFICATION OF ALL CLAIMS:

I, \_\_\_\_\_, BEING THE \_\_\_\_\_ (MUST BE AN OFFICER) OF \_\_\_\_\_ (GENERAL CONTRACTOR), DECLARE UNDER PENALTY OF PERJURY UNDER THE LAWS OF THE STATE OF CALIFORNIA, AND DO PERSONALLY CERTIFY AND ATTEST THAT: I HAVE THOROUGHLY REVIEWED THE ATTACHED CLAIM FOR ADDITIONAL COMPENSATION AND/OR EXTENSION OF TIME, AND KNOW ITS CONTENTS, AND SAID CLAIM IS MADE IN GOOD FAITH; THE SUPPORTING DATA IS TRUTHFUL AND ACCURATE; THAT THE AMOUNT REQUESTED ACCURATELY REFLECTS THE CONTRACT ADJUSTMENT FOR WHICH THE CONTRACTOR BELIEVES THE CITY IS LIABLE; AND, FURTHER THAT I AM FAMILIAR WITH CALIFORNIA PENAL CODE SECTION 12650, ET SEQ. PERTAINING TO FALSE CLAIMS, AND FURTHER KNOW AND UNDERSTAND THAT SUBMISSION OR CERTIFICATION OF A FALSE CLAIM MAY LEAD TO FINES, IMPRISONMENT AND/OR OTHER SEVERE LEGAL CONSEQUENCES.”

Claims must be filed on or before the date of final payment. Nothing herein is intended to extend the time limit or supersede notice requirements otherwise provided by Contract for the filing of claims.

The claim must include an actual cost documentation, including hours of work performed, equipment operation costs, and labor and overhead costs, which should be established at a standard percentage. Any overhead costs listed when paid, shall provide full and complete payment for any and all overhead, including jobsite overhead, home office overhead, as well as additional costs arising from disruption, resequencing or acceleration. A notice of POTENTIAL CLAIM shall be submitted in advance of the performance of any work, regardless of type, in which the CONTRACTOR may claim an additional cost. CONTRACTOR shall provide prompt notification of any disagreement in quantities of work performed along with a detailed accounting by means of a schedule update demonstrating any delays incurred.

2. For claims of less than fifty thousand dollars (\$50,000), the ENGINEER 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 CITY may have against the CONTRACTOR.

If additional information is thereafter required, it shall be requested and provided upon mutual agreement of the ENGINEER and the CONTRACTOR.

The ENGINEER's written response to the claim, as further documented, shall be submitted to the CONTRACTOR within 15 days after receipt of 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. For claims of over fifty thousand dollars (\$50,000) and less than or equal to three hundred seventy-five thousand dollars (\$375,000), the ENGINEER 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 CITY may have against the CONTRACTOR.

If additional information is thereafter required, it shall be requested and provided upon mutual agreement of the ENGINEER and the CONTRACTOR.

The ENGINEER's written response to the claim, as further documented, shall be submitted to 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.

4. If the CONTRACTOR disputes the ENGINEER's written response, or the ENGINEER fails to respond within the time prescribed, the CONTRACTOR may notify the ENGINEER, in writing, either within 15 days of receipt of the ENGINEER's response or within 15 days of the ENGINEER'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 ENGINEER shall schedule a meet and confer conference within 30 days for settlement of the dispute.
5. Following the meet and confer conference, if the claim or any portion remains in dispute, the CONTRACTOR may file a claim pursuant to 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 CONTRACTOR submits its written claim pursuant to subdivision (a) until the time the claim is denied as a result of the meet and confer process, including any period of time utilized by the meet and confer process.

C. The following procedures are established for all civil actions filed to resolve claims subject to this article:

1. Within 60 days, but no earlier than 30 days, following the filing or responsive pleadings, the court shall submit the matter to nonbinding mediation unless waived by mutual stipulation of both parties. The mediation process shall provide for the selection within 15 days by both parties of a disinterested third person as mediator, shall be commenced within 30 days of the submittal, and shall be concluded within 15 days from the commencement of the mediation unless a time requirement is extended upon a good cause showing to the court or by stipulation of both parties. If the parties fail to select a mediator within the 15-day period, any party may petition the court to appoint the mediator.
2. If the matter remains in dispute, the case shall be submitted to judicial arbitration pursuant to Chapter 2.5 (commencing with Section 1141.10) of Title 3 of Part 3 of the Code of Civil Procedure, notwithstanding Section 1141.11 of that code. The Civil Discovery Act of 1986 (Article 3 (commencing with Section 2016) of Chapter 3 of Title 3 of Part 4 of the Code of Civil Procedure) shall apply to any proceeding brought under this subdivision consistent with the rules pertaining to judicial arbitration.

Notwithstanding any other provision of law, upon stipulation of the parties, arbitrators appointed for purposes of Article 1.5 of Chapter 1 of Part 3 of Division 2 of the California Public Contract Code shall be experienced in construction law, and, upon stipulation of the parties, mediators and arbitrators shall be paid necessary and reasonable hourly rates of pay not to exceed their customary rate, and such fees and expenses shall be paid equally by the parties, except in the case of arbitration where the arbitrator, for good cause, determines a different division. In no event shall these fees or expenses be paid by state or county funds.

In addition to Chapter 2.5 (commencing with Section 1141.10 of Title 3 of Part 3 of the Code of Civil Procedure) any party who after receiving an arbitration award requests a trial de novo but does not obtain a more favorable judgment shall, in addition to payment of costs and fees under that chapter, also pay the attorney's fees of the other party arising out of the trial de novo .

3. The CITY shall not fail to pay money as to any portion of a claim which is undisputed except as otherwise provided in this Contract.
4. In any suit filed under Section 20104.4 of the California Public Contract Code, the CITY shall pay interest at the legal rate on any arbitration award or judgment. The interest shall begin to accrue on the date the suit is filed in a court of law.

#### END OF GENERAL CONDITIONS

file name:

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**SECTION III**  
**SPECIAL PROVISIONS**

## SECTION III.

### SPECIAL PROVISIONS

- 3-1. DESCRIPTION OF WORK – Installation of a new 16-Inch recycled water pipeline via open cut trenching and horizontal directional drilling, unimproved and asphalt surface restoration, and installation of new irrigation services.
- 3-2. ORDER OF PRECEDENCE OF CONTRACT DOCUMENTS – If the CONTRACTOR discovers any errors, omissions, discrepancies, or conflicts in the Contract, he/she shall immediately inform the ENGINEER in writing. The ENGINEER will promptly resolve such matters by issuing addenda or change orders. Failure or delay to act on the part of the ENGINEER shall not constitute a waiver of any right afforded the CITY or the ENGINEER by the Contract or constitute an implied approval. Any work affected by such discoveries that is performed by the CONTRACTOR prior to authorization by the CITY shall be at the CONTRACTOR'S risk.

Unless otherwise noted below, conflicts or inconsistencies between parts of the Contract will be resolved by the ENGINEER with a change order or an addendum, if required. Addenda and change orders bearing the most recent date shall prevail over addenda or change orders bearing earlier dates. Any reference to addenda-changed specifications or drawings shall be considered to have been changed accordingly.

In resolving conflicts, errors, or discrepancies, the order of precedence shall be as follows:

- 1) Change Orders/Addenda (most recent in time takes precedence)
  - 2) Agreement and Bond Forms
  - 3) Technical Specifications
  - 4) Special Provisions
  - 5) Drawings
  - 6) Standard Specifications (Current Caltrans Standard Specifications/City Standards)
  - 7) General Conditions
  - 8) Instructions to Bidders
  - 9) CONTRACTOR'S Bid (Bid Form)
  - 10) Notice Inviting Bids
  - 11) Permits from other agencies as may be required by law.
- 3-3. COOPERATION - Attention is directed to Sections 5-1.20, "Coordination with Other Entities", and 5-1.36D, "Non-highway Facilities", of the Standard Specifications and these special provisions.

The CONTRACTOR shall not adjust gas, electric, television cable, telephone, and Sonoma County structures. The CONTRACTOR will notify each agency who will be in turn adjust their own structures at least seven (7) working days prior to covering/burying these facilities at no cost to the CITY. Failure to do so shall result in the CONTRACTOR being liable for the utility agencies' claims.

- 3-4. **OBSTRUCTIONS** - Attention is directed to Sections 5-1.36D, "Non-highway Facilities", and 15, "Existing Facilities", of the Standard Specifications and these special provisions.

The CONTRACTOR's attention is directed to the existence of certain underground facilities that may require special precautions be taken by the CONTRACTOR to protect the health, safety and welfare of workmen and of the public. Facilities requiring special precautions include, but are not limited to: conductors of petroleum products, oxygen, chlorine and toxic or flammable gases; natural gas in pipelines greater than 6 inches in diameter or pipelines operating at pressures greater than 60 psi (gage); underground electric supply system conductors or cables either directly buried or in duct or conduit which do not have concentric neutral conductors or other effectively grounded metal shields or sheaths; and underground electrical conductors with potential to ground of more than 300 volts.

The CONTRACTOR shall notify the ENGINEER and the appropriate regional notification center for operators of subsurface installations at least 5 working days prior to performing any excavation or other work close to any underground pipeline, conduit, duct, wire or other structure. Regional notification centers include but are not limited to the following:

Underground Service Alert  
Northern California (USA)  
Telephone: 1 (800) 227-2600

If the CONTRACTOR's certain operation is delayed, in the opinion of the ENGINEER, by the discovery of an underground utility not indicated on the plans or not marked by USA, the CONTRACTOR shall be paid a fair and reasonable compensation for the actual loss. Actual loss shall be understood to include no items of expense other than idle time of equipment exclusively used in such operation and necessary payments for idle time of labor exclusively required for such operation only, determined as follows:

- 1) Compensation for idle equipment shall be applied at the reduced Caltrans' Equipment Rental Rates where the right of way delay factor for each classification of equipment shall be applied to such equipment rental rate. No markup shall be applied for overhead or profit.
- 2) Compensation for idle time of labor shall be actual wages paid to the workers. No markup shall be added for overhead and profit.
- 3) The time for which such compensation will be paid will not exceed eight (8) hours for each incident.
- 4) The CONTRACTOR shall be granted an extension of time for the delay.

5) No monetary compensation will be allowed for delays due to utilities indicated on the plans or marked by USA.

3-5. ORDER OF WORK – The CONTRACTOR shall submit a work plan to the City for review and shall identify proposed order of work to maximize efficiency of construction, minimize impact to the community and maintain safety.

3-6. PROJECT AND CONSTRUCTION AREA SIGNS – Project sign and construction area signs shall be furnished, installed, maintained, and removed when no longer required in accordance with the provisions in Section 12, “Construction Area Traffic Control Devices”, of the Standard Specifications.

Project sign shall be installed as described in Specification Section 01 30 00 – Administrative Requirements paragraph 2.1 – Project Sign.

The signs shall be approved prior to fabrication and posted as directed by the Engineer.

Construction area signs will be installed at a location approved by the City prior to start of construction and maintained in place for the duration of the project by the CONTRACTOR. When installed, the signs shall not extend beyond the street curb alignment into the travel way. Signs shall be repaired or replaced at no cost to the City of Petaluma, if damaged or stolen. The CONTRACTOR shall remove the signs and posts at the completion of the project and with prior approval of the ENGINEER.

All costs involved in purchasing and installing construction area and project signs shall be considered as included in the Lump Sum price paid for Traffic Control System.

3-7. MAINTAINING TRAFFIC – Attention is directed to Sections 7-1.03, “Public Convenience”, 7-1.04, “Public Safety”, and 12, “Temporary Traffic Control”, of the Standard Specifications, City of Petaluma Traffic Control Design and Construction Standards Series 700 and the latest edition of the California Manual of Uniform Traffic Control Device. Nothing in these special provisions shall be construed as relieving the CONTRACTOR from his/her responsibility as provided in said Section 7-1.04.

Prior to the start of construction, Contractor shall provide the County of Sonoma with a traffic control plan and obtain an encroachment permit in accordance with the project specifications. Additionally, Contractor shall also submit traffic control plan to the City.

Contractor shall maintain access to all driveways during construction. mail and garbage service shall be maintained throughout the course of this project.

Contractor shall notify property owners at least 72 hours in advance of driveway closures for construction of curb and gutter, driveway aprons and driveway transitions. Driveway closures are limited to 48 hours maximum. Contractor shall close only one driveway at a time for properties with more than one driveway access and shall provide alternate access where possible for single driveway properties.

- 3-8. WATERING - Watering shall conform to the provisions in Section 17, "Watering", of the Standard Specifications except that full compensation for developing water supply shall be considered as included in the prices paid for various contract items for work involving the use of water and no separate payment will be made therefore. The application of water for dust control will not be considered as extra work under any circumstances. Water can be purchased from the City at current rates provided that the CONTRACTOR meters the water used with a City furnished meter (a deposit will be required) and a CONTRACTOR furnished valve assembly. Due to the drought restrictions Recycled Water shall be required.
- 3-9. PROGRESS SCHEDULE - The CONTRACTOR shall submit a schedule which includes all major tasks and milestones to the City of Petaluma, Public Works and Utilities Department for review **at least** ten (10) working days prior to start of work.

After beginning of work, updated schedules shall be submitted. No progress payments will be processed without accepted updated schedules.

Payment for the original schedule and updated, weekly schedules shall be considered to be included in the various items of work and no additional compensation will be allowed therefore.

- 3-10. SUPERINTENDENCE - The CONTRACTOR shall designate in writing and submit to the Project Engineer two (2) working days before starting work, an authorized representative who shall have the authority to represent and act for the CONTRACTOR for the duration of the contract. Any change in the designation shall require prior approval of the ENGINEER.

When the CONTRACTOR is comprised of two (2) or more persons, firms, partnerships or corporations functioning on a joint venture basis, said CONTRACTOR shall designate in writing before starting work, the name of one authorized representative who shall have the authority to represent and act for the CONTRACTOR.

Said authorized representative shall be present at the site of work at all times while work is actually in progress on the contract. When work is not in progress and during periods when work is suspended, arrangements acceptable to the ENGINEER shall be made for any emergency work, which may be required.

If work is in progress and the authorized representative is not on site, the City reserves the right to stop the work at no cost to the City.

Once the work begins, the Superintendent shall keep the ENGINEER informed of the CONTRACTOR's daily schedule. The ENGINEER shall have at least twenty-four (24) hour advance notice of all work, on a daily basis, including SUBCONTRACTOR's work. If the CONTRACTOR fails to notify the ENGINEER, the ENGINEER reserves the right to stop the work at no cost to the City.

In the case of urgency or emergency where the CONTRACTOR's authorized representative is not present on any particular part of the work and where the ENGINEER wishes to give notification or direction, it will be given to and be obeyed by the superintendent or

foreperson who may have charge of the particular work or it will be given to and be obeyed by any worker in the area should the superintendent or foreperson not be immediately available.

All costs involved in superintendence shall be included in the contract prices paid for various items of work and no additional payment will be allowed therefore.

- 3-11. SAFETY REQUIREMENT - The CONTRACTOR shall comply with all CAL/OSHA safety requirements. It shall be the CONTRACTOR's sole responsibility for making sure these safety requirements are met and the CONTRACTOR shall fully assume all liabilities for any damages and/or injuries resulting from his or her failure to comply with the safety requirements. Failure on the City's part to stop unsafe practices shall, in no way, relieve the CONTRACTOR of his/her responsibility.

The CONTRACTOR shall first call City of Petaluma Emergency Center at 911, from a regular telephone, and (707) 762-2727 or from a cellular phone (707) 762-4545, if any gas lines or electrical power lines are broken or damaged.

- 3-12. PROJECT APPEARANCE – The CONTRACTOR shall maintain a neat appearance to the work area.

When practicable, debris developed during construction shall be disposed of concurrently with its removal. Stockpiling on the street shall not be allowed. The CONTRACTOR shall apply for a “stockpiling” permit from the City’s Community Development Department prior to stockpiling more than fifty (50) cubic yards of materials on private property. The CONTRACTOR shall solely be responsible for securing staging and/or stockpiling areas.

The CONTRACTOR shall provide dust control as often as required during the construction and shall clean the roads/streets with street sweepers at least once a day at the end of each working day or more often if safety or appearance conditions warrant. Failure to maintain dust control, street cleaning and/or any required work specified in this section shall result in the City performing the work with other forces and back charge the CONTRACTOR for the costs.

Full compensation for conforming to the provisions in this section, not otherwise provided for, shall be considered as included in prices paid for the various contract items of work involved and no additional compensation will be allowed, therefore.

- 3-13. RESPONSIBILITY FOR DAMAGE - The CONTRACTOR shall indemnify, hold harmless, release and defend the City of Petaluma, its officers, officials, employees and agents from and against any and all liabilities, claims, demands, losses, damages, expenses, costs (including without limitation costs and fees of litigation) of every nature arising out of or in connection with the activities of the CONTRACTOR, his/her subcontractors, employees and agents, except such loss or damage which was caused by the sole negligence or willful misconduct of the CITY, its employees or agents. The CITY may retain so much of the money due the CONTRACTOR as shall be considered necessary, until disposition has been made of claims or suits for damages as aforesaid.

- 3-14. GUARANTEE OF WORK - Neither the final certificate of payment nor any provision in the contract nor partial or entire use of the improvements embraced in this contract by the City or the public shall constitute an acceptance of work not done in accordance with the contract or relieve the CONTRACTOR of liability in respect to any warranties or responsibility for faulty materials or workmanship. The CONTRACTOR's attention is directed to Article 5, "Bonds and Insurance", of the General Conditions.
- 3-15. NOTICE TO PROCEED, BEGINNING OF WORK, CONTRACT TIME, TIME OF COMPLETION, AND LIQUIDATED DAMAGES – Article 2.3, "Commencement of Contract Times; Notice To Proceed" of the General Conditions is amended to read:

The CONTRACTOR shall begin work within ten (10) working days from the date of Notice To Proceed (NTP) and shall diligently prosecute the same to completion before the expiration of total allocated working days as specified in the Construction Agreement and/or Invitation to Bid, from the date of starting work. The CONTRACTOR shall complete all of the work directed by the ENGINEER in all parts and requirements within the time set forth. A working day is defined in these specifications.

The CONTRACTOR is on notice that it may take approximately eight (8) weeks from the bid opening to obtain the City Council's award of the contract, to process the construction agreement, and to issue the Notice to Proceed.

**The CONTRACTOR shall pay to the City of Petaluma the sum of \$1,500 per day for each and every *calendar day's* delay in finishing the work in excess of the number of days prescribed above (and/or in excess of the number of days prescribed for any scheduled operations or works described in the Special Provisions).**

A working day is defined as any day, except as follows:

- a. Saturdays, Sundays, and legal holidays
- b. Days on which the CONTRACTOR is prevented by inclement weather or conditions resulting immediately therefrom adverse to the current controlling operation or operations, as determined by the ENGINEER, from proceeding with at least 75 percent of the normal labor and equipment force engaged on that operation or operations for at least 60 percent of the total daily time being currently spent on the controlling operation or operations.

Should the CONTRACTOR prepare to begin work at the regular starting time of any day on which inclement weather, or the conditions resulting from the weather, or the condition of the work, prevents the work from beginning at the usual starting time and the crew is dismissed as a result thereof and the CONTRACTOR does not proceed with at least 75 percent of the normal labor and equipment force engaged in the current controlling operation or operations for at least 60 percent of the total daily time being currently spent on the controlling operation or operations, the CONTRACTOR will not be charged for a working day whether or not conditions should change thereafter during that day and the major portion of the day could be considered to be suitable for those construction operations.

Determination that a day is a non-working day by reason of inclement weather or conditions resulting immediately therefrom shall be made by the ENGINEER. The CONTRACTOR will be allowed 10 days from the issuance of the weekly statement of working days in which to file a written protest setting forth in what respects the CONTRACTOR differs from the ENGINEER; otherwise, the decision of the ENGINEER shall be deemed to have been accepted by the CONTRACTOR as correct. The ENGINEER will furnish the CONTRACTOR a weekly statement showing the number of working days charged to the contract for the preceding week, the number of working days of time extensions being considered or approved, the number of working days originally specified for the completion of the contract, and the number of working days remaining to complete the contract and any time extensions thereof.

### 3-16. HOURS OF WORK

Weekdays – Weekdays (Monday through Friday) hours shall be from 7:00 a.m. to 5:00 p.m. for all required work except those hours approved by the City of Petaluma or specified in “Order of Work” Section of these special provisions. Work hours for County of Sonoma and Caltrans right of way shall be governed by their respective permit conditions.

Night Hours – Upon request and approval by the City Contractor shall work be able to work night shifts. Contractor MUST submit request and approval prior to scheduling any work outside of the normal working hours listed above.

Liquidated Damages in the sum of One Thousand Five Hundred Dollars (\$1,500) per day will be assessed against the CONTRACTOR if he fails to comply with any of the daily conditions or operations such as maintaining erosion control facilities, job site/street cleanliness and daily cleanup and traffic control and flagging, as described in the General Conditions, these Special Provisions, and the Technical Specifications.

If the CONTRACTOR closes a street or sidewalk without prior notice and approval of the ENGINEER within 24 hours, the associated operation will be shutdown at the CONTRACTOR’s expense.

Holidays - Designated legal holidays are: January 1st, the third Monday in January, the third Monday in February, the last Monday in May, July 4th, the first Monday in September, the second Monday in October, November 11th, Thanksgiving Day, the day after Thanksgiving, December 24th and December 25th. When a designated legal holiday falls on a Sunday, the following Monday shall be a designated legal holiday. When November 11th falls on a Saturday, the preceding Friday shall be a designated legal holiday. The Contractor shall not work on the legal holidays unless approved in writing by the Engineer.

Holiday Shutdown - No work shall be allowed to be performed in the business district (defined by the map on the City of Petaluma web site at <http://cityofpetaluma.net/cdd/pdf/boundaries.pdf>) between Thanksgiving Day, the day after Thanksgiving, and December 25<sup>th</sup> thru January 3<sup>rd</sup> of the following year.



- 3-17. RECORD ("AS-BUILT") DRAWINGS – The CONTRACTOR shall furnish Record Drawings of the complete project and procure from the Director of Public Works a full sized set of Contract Drawings. Construction drawings shall be on the construction site at all times while the work is in progress. Drawings shall show approved substitutions, if any, of material including manufacturer's name and catalog number. The Drawings shall be to scale and all indications shall be neat and legible. All information noted on the CONTRACTOR's job-site print shall be transferred to the Record Drawings by CONTRACTOR and all indications shall be recorded in a neat, legible and orderly way. The Record Drawings shall be signed by the CONTRACTOR and turned over to the Director of Public Works before the final acceptance of the project. If the CONTRACTOR fails to provide the City with an acceptable “Record Drawings”, the City shall deduct \$2,000 from the amount due CONTRACTOR.
- 3-18. NOTICE OF POTENTIAL CLAIM - If for any reason the CONTRACTOR deems that additional compensation is due him/her for work or materials not clearly provided for in the contract, plans, or specifications or previously authorized extra work, a Notice of Potential Claim shall be made. The CONTRACTOR shall give the ENGINEER a written Notice of Potential Claim for such additional compensation before work begins on the items on which the claim is based. The notice shall set forth the reasons for which the CONTRACTOR believes additional compensation will or may be due and the nature of the costs involved. The CONTRACTOR shall afford the ENGINEER every opportunity and facility for keeping records of the actual cost of the work. The CONTRACTOR shall keep records of the disputed work in accordance with Contract General Conditions, Section 11.3, “Cost of Work (Based on Time and Materials).”

If such notification is not given or the ENGINEER is not afforded proper opportunity by the CONTRACTOR for keeping strict account of actual cost as required, then the CONTRACTOR hereby agrees to waive any claim for such additional compensation. Such notice by the CONTRACTOR and the fact that the ENGINEER has kept account of the cost of the work shall not in any way be construed as proving or substantiating the validity of the claim. When the work on which the claim for additional compensation is based has been completed, the CONTRACTOR shall, within 10 calendar days, submit his/her written claim to the ENGINEER who will present it to the City for consideration in accordance with local laws or ordinances. The CONTRACTOR is directed to Section 17.20 “Resolution of Construction Claims” of the General Conditions.

Any claim for overhead type expenses or costs, in addition to being certified as stated above, shall be supported by an audit report of an independent Certified Public Accountant. Any claim for overhead shall also be subject to audit by the City at its discretion.

Any costs or expenses incurred by the City in reviewing or auditing any claims that are not supported by the CONTRACTOR's cost accounting or other records shall be deemed to be damages incurred by the City within the meaning of the California False Claims Act.

Nothing in this subsection shall be construed as a waiver of the CONTRACTOR’s right to dispute final payment based on differences in in-place quantity measurements or computations of unit priced pay items.

3-19. PAYMENT FOR MATERIALS ON HAND - At the discretion of the ENGINEER, partial payments may be made to the extent of the delivered cost of materials to be incorporated in the work, provided that such materials meet the requirements of the contract, plans, and specifications. Such delivered costs of stored or stockpile materials may be included in the next partial payment after the following conditions are met:

1. The material has been stored or stockpiled and protected at the sole expense of the CONTRACTOR at a location acceptable to the City and in a manner acceptable to the ENGINEER.
2. The CONTRACTOR has furnished the ENGINEER with acceptable evidence of the quantity and quality of such stored or stockpiled materials.
3. The CONTRACTOR has furnished the ENGINEER with satisfactory evidence that the material and transportation costs have been paid.
4. The CONTRACTOR has furnished the City legal title (free of liens or encumbrances of any kind) to the material so stored or stockpiled.
5. The CONTRACTOR has furnished the City evidence that the material so stored or stockpiled is insured against loss by damage to or disappearance of such materials at anytime prior to use in the work.
6. The CONTRACTOR shall bear all costs associated with the partial payment of stored or stockpiled materials in accordance with the provisions of this subsection.

It is understood and agreed that the transfer of title and the City's payment for such stored or stockpiled materials shall in no way relieve the CONTRACTOR of his/her responsibility for furnishing and placing such materials in accordance with the requirements of the contract, plans, and specifications. In no case will the amount of partial payments for materials on hand exceed 70% of the contract price for the contract items in which the material is intended to be used.

3-20. ACCESS TO DRIVEWAYS – Access for local businesses and residents shall be maintained at all times. If needed, temporary ramps will be required each night to provide access to properties impacted by the work. The Contractor shall coordinate with each driveway user as needed.

3-21. ARCHAEOLOGICAL MONITORING – In the event that archaeological materials are found during construction, CONTRACTOR shall notify the ENGINEER immediately and shall temporarily cease work in the area until a determination or investigation of the site can be made by a qualified archaeologist. Archaeologist services shall be provided by the City at no cost to the CONTRACTOR.

3-22. STORM WATER MANAGEMENT, AND SEDIMENT AND EROSION CONTROL – Contractor shall reference Specification Section 31 25 00 – Erosion Control for compliance with the contract documents.

A Storm Water Pollution Prevention Plan (SWPPP) document is not required for this project.

CONTRACTOR shall prepare a Water Pollution Control Plan (WPCP) for review and approval by the Engineer, and implement water pollution prevention measures outlined in the approved WPCP, specified in this specification section, in Standard Specification Section 13, and the requirements of the National Pollution Discharge Elimination System (NPDES).

Storm water management, and sediment and erosion control shall include, but not be limited to fiber rolls (sediment logs or wattles), straw bales, drain rock, check dams, silt fencing, siltation basins and as required for construction conditions.

The CONTRACTOR shall also place drain rock bags around storm drain inlets/catch basins, and install drain rock check dams at 50-foot intervals within 100 feet upstream from the inlets/catch basins.

The CONTRACTOR shall comply with all Federal, State and local regulations and ordinances governing storm water pollution prevention.

All costs involved for completing all work described in this section shall be considered to be included in the contract price paid for Water Pollution Control and no additional compensation shall be allowed therefore.

3-23. ITEM INCREASES AND DECREASES -

**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 that item of work with the ENGINEER's Estimate therefor.

If the total pay quantity of any item of work required under the contract varies from the ENGINEER's Estimate therefore by 25 percent or less for increases and 25 percent or less for decreases, payment will be made for the quantity of work of the item performed at the contract unit price.

If the total pay quantity of any item of work required under the contract varies from the ENGINEER's Estimate therefor by more than 25 percent for increases and 25 percent for decreases, 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 the following sections.

**Increases of More Than 25 Percent**

Should the total pay quantity of any item of work required under the contract exceed the ENGINEER's Estimate therefore by more than 25 percent, the work in excess of 125 percent of the estimate and not covered by an executed contract change order specifying

the compensation to be paid therefor will be paid for by adjusting the contract unit price based upon a force account analysis.

The adjustment of the contract unit price will be the difference between the contract unit price and the actual unit cost which will be determined as hereinafter provided, of the total pay quantity of the item. If the costs applicable to the item of work include fixed costs, the fixed costs will be deemed to have been recovered by the CONTRACTOR by the payments made for 125 percent of the ENGINEER's Estimate of the quantity for the item, and in computing the actual unit cost, the fixed costs will be excluded. Subject to the above provisions, the actual unit cost will be determined by the ENGINEER in the same manner as if the work were to be paid for on a force account basis.

When the compensation payable for the number of units of an item of work performed in excess of 125 percent of the ENGINEER's Estimate is less than \$5,000 at the applicable contract unit price, the ENGINEER reserves the right to make no adjustment in the contract unit price if the ENGINEER so elects, except that an adjustment will be made if requested in writing by the CONTRACTOR.

### **Decreases of More Than 25 Percent**

Should the total pay quantity of any item of work required under the contract be less than 25 percent of the ENGINEER's Estimate therefore, an adjustment in compensation pursuant to this Section will not be made unless the CONTRACTOR so requests in writing. If the CONTRACTOR so requests, the quantity of the item performed, unless covered by an executed contract change order specifying the compensation payable therefor, will be paid for by adjusting the contract unit price based upon a force account analysis. In no case shall the payment for that work be less than that which would be made at the contract unit price.

The adjustment of the contract unit price will be the difference between the contract unit price and the actual unit cost, which will be determined as hereinafter provided, of the total pay quantity of the item, including fixed costs. The actual unit cost will be determined by the ENGINEER in the same manner as if the work were to be paid for on a force account basis; or the adjustment will be as agreed to by the CONTRACTOR and the ENGINEER.

The payment for the total pay quantity of the item of work will in no case exceed the payment which would be made for the performance of 25 percent of the ENGINEER's Estimate of the quantity for the item at the original contract unit price.

- 3-24. EXISTING WATER VALVES, MONUMENTS AND MANHOLES – The City shall have access at all times to water valves, monuments, and manholes except immediately following a construction operation as noted below.

Throughout the construction process, the CITY shall have access to manholes, monuments, and valves within 48 hours of any operation affecting the manholes, monuments and valves.

**A penalty of Fifty Dollars (\$50) per each valve, monument, and manhole that is not raised, or that the CITY is not provided easy access to, will be assessed against the contractor for each calendar day.**

- 3-25. WAGE RATES - The General Prevailing Wage Determination Made by the Director of Industrial Relations Pursuant to California Labor Code Part 7, Chapter 1, Article 2, Sections 1770, 1773 and 1773.2. The CONTRACTOR can download this information from the web site: <http://www.dir.ca.gov/dlsr/PWD/>

The most current prevailing wage rates available at the time of bid opening shall be used.

- 3-26. STAGING AREA – Contractor shall coordinate with the City and submit proposed staging plan prior to mobilization. Staging plan shall include proposed area size, list of materials and items to be stored, method of securing area, and BMPs to be installed, as applicable. Contractor is responsible for securing the staging area and safety of items stored. City shall not be liable nor responsible for guaranteeing the safety of items stored in the staging area throughout the duration of the project.

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**SECTION IV**  
**TECHNICAL SPECIFICATIONS**



**City of Petaluma**  
Adobe Road Recycled Water Project  
Technical Specifications



June 6, 2024



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SECTION 01 10 00

SUMMARY OF WORK

PART 1 GENERAL

1.1 PROJECT DESCRIPTION

- A. The work includes, but is not limited to, furnishing all labor, equipment, materials, and supplies to construct new recycled water pipelines and appurtenances in Petaluma, CA.
- B. Work includes excavation and fill; grading; Portland cement concrete; installing recycled water mains and services by open trench and horizontal directional drilling, including fittings, butterfly valves, air relief valves, and associated piping and appurtenances; backfill and compaction; pavement and surface restoration, and all other work described in the plans and specifications in accordance with the Contract Documents.
- C. All work to be performed is located on Frates Road and Adobe Road in Petaluma, California, as shown on the Contract Documents.
- D. Questions regarding the work should be directed to the Engineer.
- E. The Contractor shall coordinate all related work with affected parties including, but not limited to County of Sonoma, City of Petaluma, Public Works, Pacific Gas and Electric Company, AT&E, and Century Link.
- F. The Contractor shall take careful and accurate pre-construction photographs and video of the existing conditions prior to the start of construction. Copies of the photographs and video must be delivered to the Engineer prior to start of construction.
- G. The Contractor shall provide a detailed schedule of work. See Section 01 32 16, "Construction Progress Schedules," for schedule requirements. Contractor shall coordinate daily with the City.

1.2 RELATED SECTION:

- A. Contract General Conditions.

1.3 APPLICABLE CODES

- A. In instances where these specifications do not state exact materials or methods of construction, the applicable minimum requirements of the 2019 edition of the California Building Code shall govern, as amended by local agencies.

1.4 SEQUENCE AND SPECIAL CONDITIONS

- A. After the Notice to Proceed has been issued, the Contractor may begin work on items that can be completed off-site, including procurement of materials and services. These include submittal preparation, and purchase of materials, and delivery and storage of materials off the construction site. Purchased materials may be submitted for payment for if they are stored at a site where the City has access for inspection. The Contractor is responsible for any material loss or damage.

- B. The Contractor may mobilize materials and equipment to the project site upon approval of the City and Engineer.
- C. Prebid Conference. A prebid conference will be held to afford all bidders an opportunity to request information or interpretations of the drawings and specifications and to visit the site. The time of this meeting and inspection of the construction site is provided in the Notice to Bidders.
- D. At least two weeks prior to the start of construction, Contractor shall contact Underground Service Alert (USA) at (800) 642-2444 or 811 for utility mark outs and pothole all existing utilities that are in the vicinity of the work. Contractor shall survey the horizontal and vertical location to determine the position and elevation of each utility exposed by Contractor's potholing. Contractor shall provide a copy of the survey with locations and elevations to the Engineer one week prior to the start of construction. Notify the Engineer if any differences are noted and if there are any conflicts anticipated.
- E. Contractor shall proceed with construction in a manner that limits the inconvenience to traffic and to the property owners adjacent to the construction area.
- F. All costs of construction staging, phasing, or sequencing shall be included in the Contractor's bid. No additional compensation will be made therefore.

#### 1.5 CONTRACTOR USE OF SITE AND PREMISES

Limit use of site and premises to allow:

- A. City occupancy. The Contractor shall coordinate any utility shutdowns or cut-overs with the City or other utility owners. The Contractor shall allow for unlimited City access to the project site through the duration of construction.
- B. Use of site by the public.
- C. Work by other contractors.
- D. The Contractor shall cooperate fully with the City and other Contractors to provide continued access to their respective work sites. The Contractor's failure to do so shall not constitute the basis for delay claims by the Contractor.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Contractor shall receive, unload, store in a secure place, and deliver from storage to the site all materials and equipment required for the performance of the work. The storage facilities and methods of storing shall be designed to keep such materials and equipment in a new condition, free from deterioration and protected from damage by weather or construction activities. Such facilities and methods are subject to the Engineer's approval and the Engineer shall have the right to inspect all storage facilities and stored materials and equipment at reasonable times. Materials and equipment subject to degradation by outside exposure or the elements, such as mechanical equipment, building insulation, ornamental metal fabrications, gypsum board or case work, shall be suitably stored by Contractor in an indoor weather tight enclosure provided by the Contractor. Contractor shall keep complete and accurate records of all materials and equipment received, stored, and delivered for use in the work. Such records shall be made available for inspection by the Engineer.

#### 1.7 ARCHAEOLOGICAL AND HISTORICAL DISCOVERIES

- A. The Contractor shall immediately stop work if paleontological, archaeological or historical remains (including burials or skeletal material) are encountered during performance of this contract. The Contractor shall promptly notify the designated Inspector or the Engineer (if the Inspector is absent or one was not designated for this contract).
- B. After receiving such notification, the Engineer will contact an Archaeologist so that the provisions of 36 CFR 800.7 (Resources Discovered During Construction) and other relevant laws are followed. Work will cease in the immediate vicinity until permitted by written order from the Engineer. The Contractor may proceed with work in other areas as approved by the Archaeologist.

#### 1.8 DRAWINGS

- A. Contractor shall use approved drawings titled "Adobe Rd Recycled Water Pipeline," dated September. Any questions shall be brought to the attention of the Engineer. Any revisions or clarifications to the drawings will be issued in writing.

#### 1.9 COORDINATION OF DOCUMENTS GOVERNING THE WORK

- A. The standard City forms, specifications, associated plans, solicitation provisions and contract clauses, made a part of the contract are essential parts thereof and the requirements in one are as binding as though contained in all. They are intended to be mutually supplementary to describe and provide for a complete work.
- B. All discrepancies in the Drawings shall be brought to the attention of the Engineer for resolution. Blueprints shall not be scaled to obtain missing or conflicting dimensions. The Contractor shall keep a check on dimensions and details as the work progresses and any errors or discrepancies discovered shall be promptly reported to the Engineer.
- C. In cases of conflict between plans, specifications, contract provisions, supplemental agreements and provisions, the provisions of contract shall govern. In all cases of dispute in respect to such conflict or as to what part or parts of the specifications apply to any given parts of the work, decisions shall be made by the Engineer.

#### 1.10 COPIES OF DRAWINGS AND SPECIFICATIONS

- A. Half size 11"x17" prints shall be used for construction. The Contractor will be furnished with hard copy and electronic copies of the Drawings and specifications and will be responsible for providing hard copies of the Drawings and specifications he/she may require to carry on the work in a satisfactory manner. The Contractor shall also be responsible for providing copies of the Drawings and specifications to all subcontractors and trades performing work under this contract.

#### 1.11 EXISTING UTILITIES AND OBSTRUCTIONS

- A. Unless otherwise permitted by the City, the Contractor shall conduct his operations in a manner that will permit continuous operation of all utilities. The locations of existing underground utilities and structures, as can be determined from record information, have been shown on the Drawings. The Contractor is responsible to contact local utilities agencies at least 72 hours (or with more advance notice if required by the utility company or local agency) before excavation so that utilities may be marked in the field. Locations of existing utilities as shown on the Drawings are only approximate. The Engineer assumes no responsibility for the accuracy or completeness of said data, which is offered solely for the convenience of the Contractor.

- B. It shall be the responsibility of the Contractor to verify the exact location of all utilities. This verification shall be done far enough ahead of excavation to ensure that the excavations can be located as shown and that the planned line and grade will clear any obstructions. Prior to the start of construction, the locations of crossings of existing utilities shall be exposed to verify that planned line and grade are adequate to provide minimum clearance.
- C. The Contractor shall adjust the recycled water pipeline alignment or profile to avoid any utility conflicting with line and grade of the new utilities and facilities. Contractor shall prepare a plan for adjusting the plan or profile. Said plan must be reviewed and approved by the Engineer prior to commencement of the work. Disruption of utility services shall be kept to a maximum of 2 hours total for any one service.
- D. Any changes required in line or grade of the new utilities, due to interferences with existing utilities or other obstructions, shall be performed by the Contractor and shall have prior approval of the Engineer. If the Contractor fails to adequately verify the locations of utilities or tie-ins, and such failure necessitates additional fittings and /or the removal of previously laid pipe, to adjust the line or grade, then the cost of such changes shall be borne entirely by the Contractor.

#### 1.12 RESTORATION OF EXISTING IMPROVEMENTS

- A. Existing paving, curbs, gutters, sidewalks, utilities, landscaping, irrigation systems, planting or other improvements removed, damaged or disturbed due to the installation of new work and appurtenances shall be replaced in kind to the satisfaction of the Engineer at no additional expense to the City.

#### 1.13 PRE-CONSTRUCTION CONFERENCE

- A. Refer to Section 01 30 00, "Administrative Requirements" for required attendees. Scheduling and location of the Pre-Construction Conference shall be confirmed with the City and the Engineer at least 14 days prior to the meeting, and no more than 10 days after the Notice to Proceed.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

## SECTION 01 20 00

### PRICE AND PAYMENT PROCEDURES

#### PART 1 GENERAL

##### 1.1 GENERAL

- A. Contract Bid Items are a combination of unit prices and lump sum prices.
- B. This Section describes each Contract Bid Item, including the materials, equipment and labor included for payment within each bid item.
- C. This Section defines the process whereby the Schedule of Values shall be developed and utilized by the Contractor for preparation of Contractor's Progress Payment Requests.
- D. All unit price and lump sum price breakdown items shall include all manpower, equipment and material costs such that the total of all items equals The Contract Bid Price.
- E. The Contractor shall install all equipment and appurtenances required to construct the complete, fully operational system as specified and shown in the project drawings and specifications to receive full contract payment upon completion.
- F. Payment for the various items of the Bid Schedule, as further specified herein, shall include all compensation to be received by the Contractor for furnishing all tools, equipment, supplies, and manufactured articles, and for all labor, operations, and incidentals appurtenant to the items of Work being described, as necessary to complete the various items of the Work in accordance with the requirements of the Contract Documents, including all appurtenances thereto, and including all costs of permits and cost of compliance with the regulations of public agencies having jurisdiction, including Division of Drinking Water, Safety and Health Requirements of the California Division of Industrial Safety and the Occupational Safety and Health Administration of the U.S. Department of Labor (OSHA). No separate payment will be made for any item that is not specifically set forth in the Bid Schedule, and all costs therefore shall be included in the prices named in the Bid Schedule for various appurtenant items of Work.

##### 1.2 SCHEDULE OF VALUES

- A. Contractor shall provide associated schedule of values for all lump sum bid items with a corresponding schedule of quantities for payment purposes. Overhead and profit shall not be shown as a separate item and each line item shall include pro-rated amounts for the Contractor's costs, overhead, profit, temporary facilities, and other expenses in connection with the item of work. The Schedule of Values shall include both unit price and lump sum items. The total of all items listed in each item schedule shall be equal to the corresponding contract bid amount. The items included in each Schedule of Values shall include the major Work components of the bid item.
- B. The Engineer shall review the preliminary Schedule of Values and make any adjustments in the listing of major Work components of the bid item and associated value allocations if, in the opinion of the Engineer, these are necessary to establish fair and reasonable allocation of values for the major Work components. Front end loading will not be permitted. The Engineer may require reallocation of major Work components from items in the above listing if in the opinion of



the Engineer such reallocation is necessary. This review and any necessary revisions shall be completed within twenty-five (25) days from the date of the Notice of Proceed.

- C. Mobilization/Demobilization. Payment for mobilization and demobilization shall be based on the lump sum price established in the bid schedule and paid for monthly in a percentage amount as completed. Maximum value not to exceed five percent (5%) of total contract Base Bid price.

### 1.3 CHANGES TO SCHEDULE OF VALUES

- A. In the event that the Contractor and Engineer agree to make adjustments to the original Schedule of Values because of inequities discovered in the original accepted detailed Schedule of Values, increases and equal decreases to values for activities may be made.
- B. Revise schedule to list approved Change Orders with each Application for Payment.

### 1.4 APPLICATION FOR PAYMENT

- A. Submit electronic file in Microsoft Excel and Adobe PDF of each Application for Payment on EJCDC C-620 - Contractor's Application for Payment. Alternative equivalent formats are acceptable with approval of the Engineer.
- B. Content and Format: Use Bid Item list and Schedule of Values for listing items in Application for Payment.
- C. Submit updated construction schedule with each Application for Payment.
- D. Payments: General Conditions Article 14.
- E. Substantiating Data: When Engineer requires substantiating information, submit data justifying dollar amounts in question. Include the following with Application for Payment:
  - 1. Partial release of liens from major Subcontractors and vendors.
  - 2. Affidavits attesting to off-Site stored products.

### 1.5 CHANGE PROCEDURES

- A. Submittals: Submit name of individual who is authorized to receive change documents and is responsible for informing others in Contractor's employ or Subcontractors of changes to the Work.
- B. Carefully study and compare Contract Documents before proceeding with fabrication and installation of Work. Promptly advise Engineer of any error, inconsistency, omission, or apparent discrepancy.
- C. Requests for Interpretation (RFI) and Clarifications.
  - 1. Submit all RFIs in writing in a format approved by the Engineer.
  - 2. Allot time in construction scheduling for liaison with Engineer; establish procedures for handling queries and clarifications.
  - 3. Engineer shall provide written response to RFI within 7 calendar days.
- D. Engineer will advise of minor changes in the Work not involving adjustment to Contract Sum/Price or Contract Time by issuing supplemental instructions to Contractor.

- E. Engineer may issue Proposal Request or Notice of Change including a detailed description of proposed change with supplementary or revised Drawings and Specifications, a change in Contract Time for executing the change and with the period of time during which the requested price will be considered valid. Contractor will prepare and submit estimate within 14 calendar days.
- F. Contractor may propose changes by submitting a request for change to Engineer as described in General Conditions, Articles 10, 11 and 12.

#### 1.6 DEFECT ASSESSMENT

- A. Replace the Work, or portions of the Work, not conforming to specified requirements.
- B. If, in the opinion of Engineer, it is not practical to remove and replace the Work, Engineer will direct appropriate remedy or adjust payment.
- C. The defective Work may remain or will be partially repaired according to instructions of Engineer, but unit sum/price will be adjusted to new sum/price at discretion of Engineer and Owner.
- D. Individual specification sections may modify these options or may identify specific formula or percentage sum/price reduction.
- E. Authority of Engineer and Owner to assess defects and identify payment adjustments is final.
- F. Nonpayment for Rejected Products: Payment will not be made for rejected products for any of the following reasons:
  - 1. Products wasted or disposed of in a manner that is not acceptable.
  - 2. Products determined as unacceptable before or after placement.
  - 3. Products not completely unloaded from transporting vehicle.
  - 4. Products placed beyond lines and levels of the required Work.
  - 5. Products remaining on hand after completion of the Work.
  - 6. Loading, hauling, and disposing of rejected products.

#### 1.7 BID ITEMS

- A. The Bid Amounts for each Bid Item will be used for comparative bid analysis. The Bid amounts will also form the basis of monthly progress payments. Each Lump Sum bid amount will undergo further breakdown as described previously in this section. Bid items are not intended to be exclusive descriptions of Work categories and the Contractor shall determine and include in its pricing all materials, labor, and equipment necessary to complete each Bid Item (Work phase) as shown and specified.
- B. All pay line items will be paid for at the prices named in the Bid Schedule for the respective items of Work. The quantities of work or materials stated as unit price items on the Bid Schedule is supplied only to give an indication of the general scope of the Work.
- C. Payment for dewatering, field engineering and all other work required to complete the work in this contract is included in the various items of work. No separate payment will be made for any of these items of work.
- D. Contractor shall include in their bid minor adjustments of up to three feet in the recycled water pipeline horizontal alignment and up to one foot in the vertical profile, which may be necessary during construction to avoid existing underground utilities.

- E. All bid items including pipelines and buried valves, including but not limited to recycled water mains, recycled water services, storm drains, electrical conduits and telecommunication conduits shall include, but not be limited to excavation and disposal of material, root pruning, bedding, pipe, joints and other fittings as required, pipe embedment material, import backfill material, tunneling above and below existing utilities, underground detection tape, tracer wire, potholing existing utilities as required to positively verify their location and for adequate protection, supporting exposed utilities and pipes, trench backfill, protective concrete trench cover and polyethylene wrap, bedding and cover on existing utility conduits and pipes, compaction, control of grades, control of groundwater, dewatering, cleaning, flushing, testing, temporary paving or trench plating, permanent paving and surfacing, traffic markers, replacement of permanent monuments, removal and in-kind replacement of existing fencing, concrete cap over pipe installed with less than minimum cover, tees and mechanical plugs for future services, alignment survey staking, field engineering and all other related work as described in the Contract Documents unless otherwise included in another bid item.

## 1.8 BASE BID ITEM DESCRIPTIONS

- A. The following Base Bid item descriptions are numbered in accordance with the Bid Schedule in the Bid Proposal Form.
1. Mobilization and Demobilization: Full compensation for **Mobilization and Demobilization** will be paid for at the contract **lump sum** price, which price shall constitute full compensation for all such work. Maximum value shall not exceed five percent (5%) of total contract price. The scope of work for Mobilization shall include, but not be limited to, obtaining all bonds, insurance and permits, submittals, construction schedule, moving onto and out of the site of all plant and equipment, submitting a construction schedule, obtaining approval of a schedule of values for lump sum items. Payment for Mobilization shall not exceed 35% of the contract lump sum price. Payment for Demobilization shall occur when all required items per the contract are fulfilled, and the site is free of equipment and clean and ready for use by the public as determined by the Engineer.
  2. Water Pollution Control: Full compensation for **Water Pollution Control** will be paid for at the contract **lump sum price**, which price shall include full compensation for preparing and obtaining approval for a Water Pollution Control Plan (WPCP) and for implementation of the WPCP, including furnishing all labor, materials, tools, equipment and incidentals for performing all work involved in installing temporary erosion control measures within the limits shown on the Plans, approved WPCP and as specified in the Standard Specifications and these Technical Specifications, including but not limited to temporary construction fence, silt fence, seed, hydroseed, fiber rolls, erosion control blankets, covers, gravel bags, filter bags, hydraulic mulch, tacked straw, top soil, fine grading, cleaning and removing sediment deposits inside existing storm drains and drainage ditches, and no additional allowances will be made therefor.
  3. Temporary Traffic Control: **Temporary Traffic Control** shall be paid for at the contract **lump sum** price, which price shall include full compensation for furnishing all labor, materials, tools and equipment and doing all work involved in temporary traffic control as needed to construct the project as specified herein, and no additional allowance will be made therefor.
  4. Trench Sheet piling, Shoring and Bracing: **Trench Sheet piling, Shoring and Bracing** shall be paid for at the contract **lump sum** price, which price shall include full compensation for furnishing all labor, materials, tools and equipment and doing all work involved in trench bracing, sheet piling and shoring or equivalent method as needed to construct the project including but not limited to that required by Sections 6700-6708 of the Labor Code as specified herein, and no additional allowance will be made therefor.

5. 16-Inch Recycled Water Main AC Pavement Surface Restoration: Full compensation for **16-Inch Recycled Water Main AC Pavement Surface Restoration** will be paid for at the contract **linear foot** price, which price shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals for performing all work involved in establishing lines and grades and constructing open-trench new recycled water mains with asphalt pavement surface restoration including but not limited to, permits, saw cutting, trench excavation, grading, subgrade preparation, scarification, moisture conditioning, pipe bedding, pipeline materials, fittings, joint restraint, concrete thrust blocks, installation, backfilling, compaction, connections to existing pipelines, quality control testing, paving and resurfacing, mainline valves, water meters, backflow device, check valves and vaults, pressure reducing valves, vaults and covers, pressure testing, striping, signing, all items of work described in Paragraph 1.7, and related work, as enumerated in the plans and these specifications, and no additional allowances will be made therefor.
6. 16-Inch Recycled Water Main Unimproved Surface Restoration: Full compensation for **16-Inch Recycled Water Main Unimproved Surface Restoration** will be paid for at the contract **linear foot** price, which price shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals for performing all work involved in establishing lines and grades and constructing open-trench new recycled water mains with unimproved surface restoration including but not limited to, permits, saw cutting, trench excavation, grading, subgrade preparation, scarification, moisture conditioning, pipe bedding, pipeline materials, fittings, joint restraint, concrete thrust blocks, installation, backfilling, compaction, connections to existing pipelines, quality control testing, surface restoration, mainline valves, water meters, backflow device, check valves and vaults, pressure reducing valves, vaults and covers, pressure testing, striping, signing, all items of work described in Paragraph 1.7, and related work, as enumerated in the plans and these specifications, and no additional allowances will be made therefor.
7. 16-Inch FPVC or 20-Inch HDPE RW Main HDD (Crossing 1): Full compensation for **16-Inch FPVC or 20-Inch HDPE RW Main HDD (Crossing 1)** will be paid for at the contract **lump sum** price, which price shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals for performing all work involved in establishing lines and grades and installing a new recycled water main and casing by horizontal directional drilling (HDD) including but not limited to, permits, surveying, engineering, HDD Work Plan, saw cutting, trench excavation, subgrade preparation, scarification, moisture conditioning, pipe bedding, carrier pipe materials, casing pipe materials, drilling fluids and management and disposal of drilling fluids, fittings, installation, backfilling, compaction, connections to pipelines, abandonment, quality control testing, paving and resurfacing, CCTV inspection, pressure testing, surface restoration, striping, signing, all items of work described in Paragraph 1.7, and related work, as enumerated in the plans and these specifications, and no additional allowances will be made therefor.
8. 16-Inch FPVC or 20-Inch HDPE RW Main HDD (Crossing 2): Full compensation for **16-Inch FPVC or 20-Inch HDPE RW Main HDD (Crossing 2)** will be paid for at the contract **lump sum** price, which price shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals for performing all work involved in establishing lines and grades and installing a new recycled water main and casing by horizontal directional drilling (HDD) including but not limited to, permits, surveying, engineering, HDD Work Plan, saw cutting, trench excavation, subgrade preparation, scarification, moisture conditioning, pipe bedding, carrier pipe materials, casing pipe materials, drilling fluids and management and disposal of drilling fluids, fittings, installation, backfilling, compaction, connections to pipelines, abandonment, quality control testing, paving and resurfacing, CCTV inspection, pressure testing, surface restoration, striping, signing, all items of work described in Paragraph 1.7, and related

- work, as enumerated in the plans and these specifications, and no additional allowances will be made therefor.
9. 16-Inch FPVC or 20-Inch HDPE RW Main HDD (Crossing 3): Full compensation for **16-Inch FPVC or 20-Inch HDPE RW Main HDD (Crossing 3)** will be paid for at the contract **lump sum** price, which price shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals for performing all work involved in establishing lines and grades and installing a new recycled water main and casing by horizontal directional drilling (HDD) including but not limited to, permits, surveying, engineering, HDD Work Plan, saw cutting, trench excavation, subgrade preparation, scarification, moisture conditioning, pipe bedding, carrier pipe materials, casing pipe materials, drilling fluids and management and disposal of drilling fluids, fittings, installation, backfilling, compaction, connections to pipelines, abandonment, quality control testing, paving and resurfacing, CCTV inspection, pressure testing, surface restoration, striping, signing, all items of work described in Paragraph 1.7, and related work, as enumerated in the plans and these specifications, and no additional allowances will be made therefor.
  10. 16-Inch Butterfly Valve (Std. No. 879): Full compensation for **16-Inch Butterfly Valve (Std. No. 879)** will be paid for at the contract unit price per **each**, which price shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals for performing all work involved in providing butterfly valves, all items of work described in Paragraph 1.7, and related work, as enumerated in the plans and these specifications, and no additional allowances will be made therefor.
  11. 6-Inch Single Irrigation Service: Full compensation for **6-Inch Single Irrigation Service** will be paid for at the contract unit price per **each**, which price shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals for performing all work involved in providing irrigation service, including fittings, valves, piping, flowmeter, pipe supports, reinforced concrete pad, and all items of work described in Paragraph 1.7, and related work, as enumerated in the plans and these specifications, and no additional allowances will be made therefor.
  12. 6-Inch Dual Irrigation Service: Full compensation for **6-Inch Single Irrigation Service** will be paid for at the contract unit price per **each**, which price shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals for performing all work involved in providing irrigation service, including fittings, valves, piping, flowmeter, pipe supports, reinforced concrete pad, all items of work described in Paragraph 1.7, and related work, as enumerated in the plans and these specifications, and no additional allowances will be made therefor.
  13. Air-Vacuum Release Valve (Std. No. 883): Full compensation for **Air-Vacuum Release Valve (Std. No. 883)** will be paid for at the contract unit price per **each**, which price shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals for performing all work involved in providing air-vacuum release valves, all items of work described in Paragraph 1.7, and related work, as enumerated in the plans and these specifications, and no additional allowances will be made therefor.
  14. 6-Inch Blow-off (Std. No. 858.01): Full compensation for **6-Inch Blow-off (Std. No. 858.01)** will be paid for at the contract unit price per **each**, which price shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals for performing all work involved in providing blow-offs, all items of work described in Paragraph 1.7, and related work, as enumerated in the plans and these specifications, and no additional allowances will be made therefor.

City of Petaluma  
Adobe Rd Recycled Water Pipeline

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

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SECTION 01 30 00

ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.1 SUBMITTALS

- A. Statement of Qualification (SOQ) for land surveyor or professional engineers employed by the Contractor in the work.
- B. Photographs and other records of examination, as required herein.
- C. Project Sign.

1.1 RELATED SECTION:

- A. Contract General Conditions.

1.2 OTHER WORK

- A. Refer to Contract General Conditions.
- B. Ensuring continuous operation of all utilities: Refer to General Contract Conditions, Section 01 10 00 "Summary of Work" and Section 02 01 10 "Existing Utilities and Underground Structures" for Contractor's responsibilities regarding existing utilities and obstructions.

1.3 UTILITIES

- A. Notify applicable utility providers:
  - 1. Prior to commencing Work,
  - 2. If damage occurs, or
  - 3. If conflicts or emergencies arise during Work.
- B. Prior to connecting to any existing structure or pipeline carrying wastewater, water, gas, storm water, or other material, the Contractor shall prepare and have approved by the Engineer his detailed plan on how the connection may be made without causing an uncontrolled discharge resulting in contamination of the soil or groundwater. By reviewing and approving the plan, the City does not accept responsibility for the adequacy thereof nor for any damages to public or private property caused by the Contractor.

1.4 PROJECT MEETINGS

- A. General:
  - 1. Schedule meetings throughout the progress of the Work, prepare meeting agenda and distribute with written notice of each meeting, record minutes to include significant proceedings and decisions, and reproduce and distribute copies of minutes within one day after each meeting to participants and parties affected by meeting decisions.
  - 2. Representatives of City, Contractor, and Subcontractors shall attend meetings, as needed.
- B. Preconstruction Conference:
  - 1. A preconstruction conference attended by the Contractor, the Engineer, City staff and others as appropriate will be held to discuss the Work in accordance with the applicable procedures specified in Section 01 10 00, "Summary of Work." All subcontractors are



- required to be in attendance when safety issues and safety training requirements are presented.
2. Attendees may include but not be limited to:
    - a. Engineer and other City representatives.
    - b. Contractor's resident superintendent.
    - c. Contractor's quality control representative.
    - d. Contractor's safety program representative.
    - e. Subcontractors' representatives whom Contractor may desire or Engineer may request to attend.
    - f. Engineer's representatives.
    - g. Utility agencies' representatives.
    - h. Others as appropriate.
- C. Progress Meetings:
1. Schedule weekly progress meetings at the site. Conduct weekly meeting to review Work progress, progress schedule, submittal submissions schedule, Application for Payment, contract modifications, and other matters needing discussion and resolution.
  2. Attendees will include:
    - a. Engineer and other City representatives.
    - b. Contractor, and appropriate Subcontractors and Suppliers.
    - c. Engineer's representative(s).
    - d. Others as appropriate.
- D. Quality Control and Coordination Meeting(s):
1. Schedule on a regular basis and as necessary to review test and inspection reports, and other matters relating to quality control of Work and work of other contractors.
  2. Attendees will include Engineer and other City Representatives, Contractor, Contractor's designated quality control representative, selected Subcontractors and Suppliers, and Engineer's representatives.
- E. Pre-installation Meetings:
1. When required in individual specification sections, convene at site prior to commencing Work of that section.
  2. Require attendance of entities directly affecting, or affected by, Work of that section.
  3. Notify the Engineer 5 days in advance of meeting date.
  4. Provide suggested agenda to the Engineer to include reviewing conditions of installation, preparation and installation or application procedures, and coordination with related Work and work of others.
- F. Other Meetings: In accordance with Contract Documents and as may be required by City and Engineer.

## 1.5 SEQUENCE OF WORK

- A. Include the Milestones and sequences of Work specified herein as a part of the progress schedule required under Section 01 32 16, "Construction Progress Schedules."
- B. Construct Work in stages to allow for City continuous occupancy during construction. Coordinate construction schedule and operation with the City.
- C. Be responsible for temporary connections and structures required to maintain City operations. Sequences other than those specified will be considered by Engineer, provided they afford equivalent continuity of operations.

- D. Perform Work continuously during critical connections and changeovers, and as required to prevent interruption of City operations.
- E. Coordinate proposed Work with the Engineer and facility operations personnel before effecting unit shutdowns. Under no circumstances cease Work at the end of a normal working day if such actions may inadvertently cause a cessation of any facility operating process, in which case, remain onsite until necessary repairs are complete.
- F. Do not close lines, open switches, or take other action which would affect the operation of existing systems, except as specifically required by the Contract Documents and after approval of the Engineer. Such actions will be considered by City and Engineer upon one week written notice to the Engineer.

## 1.6 ADJACENT FACILITIES AND PROPERTIES

- A. Examination:
  - 1. After Effective Date of the Agreement and before Work at site is started, Contractor, Engineer, and affected property owners and utility owners shall make thorough examination of pre-existing conditions including existing buildings, structures, pipelines, and other improvements in vicinity of Work, as applicable, which might be damaged by construction operations.
  - 2. Contractor shall take two sets of photographs and videotape pre-existing conditions prior to the start of the work. One set of photographs and videotape shall be given to the Engineer. Periodic reexamination shall be jointly performed to include, but shall not be limited to, cracks in structures, settlement, leakage, and similar conditions. Include public roads and improvements to adjacent private property as part of preexisting condition documentation.
  - 3. Record observations for signature of Contractor.
- B. Documentation:
  - 1. Submit two copies of photographs, videotapes and other records documenting examination for Engineer's signature. Engineer will review, sign, and return one record copy of every observation document and photograph to Contractor to be kept on file in Contractor's field office as site records.
  - 2. These observations and photographs and videotapes are intended for use as indisputable evidence in ascertaining whether and to what extent damage occurred as a result of Contractor's operations, and are for protection of adjacent property owners, utility owners, Contractor, and City.
- C. Notification: The Contractor shall notify all affected property owners at least one week prior to construction.

## 1.7 SITE SECURITY

Contractor shall coordinate with the Engineer to ensure that site security is maintained at all times. Contractor shall take whatever measures are necessary to maintain site security, including the use of temporary fencing and gates if required. Contractor shall be completely responsible for the construction site security and for any vandalism or theft occurring thereto.

## 1.8 OWNER (CITY) FACILITIES

- A. Operation and Shutdown of Existing Facilities:
  - 1. Schedule and conduct activities to ensure minimal disturbance to the water distribution network, unless otherwise specified.

2. Conduct Work outside regular working hours on prior written consent of Engineer in accordance with Section 01 32 16, "Construction Progress Schedules," to meet Project schedule and avoid undesirable conditions.
3. Do not proceed with Work affecting a facility's operation without obtaining Engineer's advance approval of the need for and duration of such Work.

B. Relocation of Existing Facilities:

1. During construction, it is expected that minor relocations of Work may be necessary.
2. Provide complete relocation of existing structures and underground facilities; including piping, utilities, equipment, structures, electrical conduit wiring, electrical duct banks, and other necessary items.
3. Use only new materials for relocated facilities. Match materials of existing facilities, unless otherwise approved by the Engineer.
4. Perform relocations to minimize downtime of existing facilities.
5. Install new portions of existing facilities in their relocated position prior to removal of existing facilities, unless otherwise accepted by Engineer.

C. Damage to Existing Facilities

1. The Contractor shall be responsible for restoring, repairing, or replacing City facilities damaged by the Contractor, to the satisfaction of the Engineer.

1.9 PHYSICAL CONDITIONS

- A. Exercise reasonable care to verify the location of existing subsurface structures and underground facilities, proceeding in accordance with Section 01 10 00, "Summary of Work" and of other applicable sections of the Specifications.
- B. Thoroughly check adjacent areas subject to excavation by visual examination (and by electronic metal and pipe detection equipment, as necessary) for indications of subsurface structures and underground facilities.
- C. Make exploratory excavations where existing underground facilities or structures may potentially conflict with proposed underground facilities or structures. Conduct exploratory excavations sufficiently ahead of construction to avoid possible delays to Contractor's Work.

1.10 REFERENCE POINTS AND SURVEYS

- A. Location and elevation of benchmarks are shown on the Survey Control Diagram contained in the Drawings.
- B. Dimensions for lines and elevations for grades of structures, appurtenances, and utilities are indicated on the Plans, together with other pertinent information required for laying out Work. If conditions vary from those indicated, Contractor shall notify the City and Engineer immediately.
- C. City and/or Engineer may perform checks to verify accuracy of Contractor's layout Work and that completed Work complies with the Contract Documents.
- D. Any existing survey points or other control markers destroyed shall be replaced by a Land Surveyor licensed in the State of California and approved by City. Replacement shall be at the Contractor's expense.
- E. Contractor's Responsibilities:
  1. Provide additional survey and layout required, and construction staking as required.

2. Locate and protect reference points prior to starting Work at site.
3. Check and establish exact location of existing facilities prior to construction of new facilities and any connections thereto.
4. In event of discrepancy in data provided by Engineer, request clarification before proceeding with Work.
5. Preserve and leave undisturbed control staking.
6. Re-establish reference points resulting from destruction by Contractor's operations.
7. Retain professional Land Surveyor or Civil Engineer registered in California who shall perform or supervise engineering surveying necessary for additional construction staking and layout.
8. Maintain complete accurate log of survey Work onsite as it progresses as a Record Document. Include in project as-builts. See Section 01 72 00, "Record Documents."
9. Submit documentation, as requested.
10. Provide competent employee(s), tools, stakes, and other equipment and materials as the Engineer may require to:
  - a. Check layout, survey, and measurement of Work.
  - b. Measure quantities for payment purposes.
11. Cooperate with the Engineer so that checking and measuring may be accomplished with least interference to Contractor's operations.

#### 1.11 PERMIT REQUIREMENTS

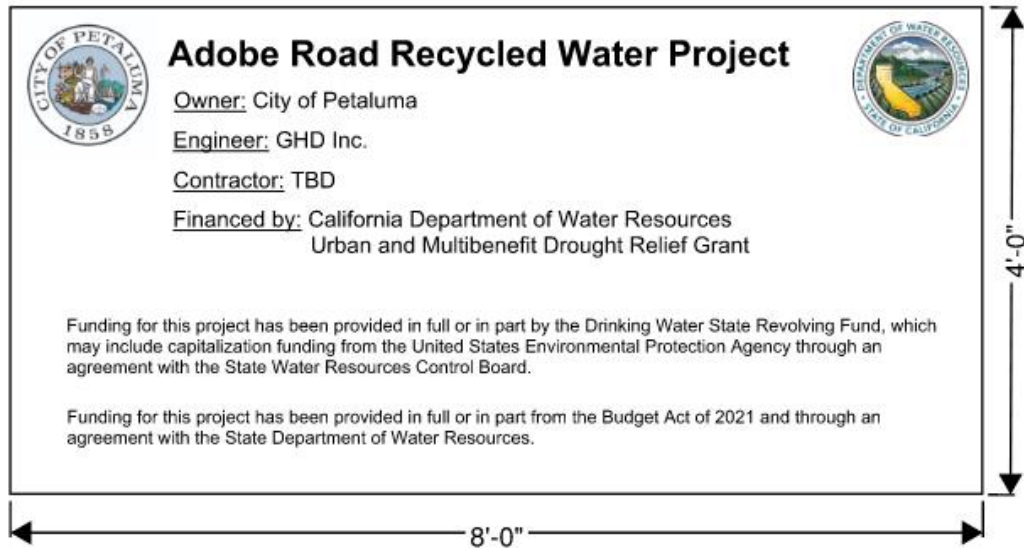
- A. Other Permits and Approvals
  1. An Encroachment Permit from the County of Sonoma is required.
- B. Notification
  1. The Contractor shall provide a contact name and mailing address for the purpose of notification in conformance with the approval or permit conditions. The Contractor shall provide the name(s), email addresses, and telephone numbers of representatives who can be reached at all times and who have the authority and responsibility to respond immediately to an emergency situation at the construction jobsite. Mailing addresses, email addresses, name and telephone numbers required for notification and emergency response shall be provided to the Engineer.
- C. The Contractor shall submit copies of all other permits and approvals from other government agencies with respect to the work. If a permit is not required from these agencies, the Contractor should provide copies of correspondence that indicates that a permit is not required.
- D. The above requirements shall be distributed to all Subcontractors working on the project site.

#### PART 2 PRODUCTS

##### 2.1 PROJECT SIGN

- A. Contractor shall provide Project Sign and maintain sign in good condition for the duration of construction.
- B. Sign shall be at least four feet tall by eight feet wide made of ¾-inch thick exterior grade plywood (APA Rated A-B Grade Exterior) or other approved material.
- C. Sign shall include the project name, owner name, engineer name, contractor name, financing agency names, and the following statements:

1. "Funding for this project has been provided in full or in part from the Budget Act of 2021 and through an agreement with the State Department of Water Resources."
- D. Sign shall include the California State Water Resources Control Board color logo, Drinking Water State Revolving Fund color logo.
- E. Conceptual sign detail:



- F. Sign shall be installed at location approved by Engineer, County and City.

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01 32 16

CONSTRUCTION PROGRESS SCHEDULE

PART 1 GENERAL

1.1 DESCRIPTION

- A. Summary: The work of this section consists of project schedule requirements including preparation of a project schedule, schedule updates, schedule revisions and time impact analysis. The project schedule shall be based upon the Critical Path Method (CPM) for planning, scheduling and reporting progress of the Work.
- B. Purpose: The purpose of the project schedule is to ensure adequate planning, coordination, scheduling, and reporting during execution of the work by the Contractor. The project schedule will assist the Contractor and the Engineer in monitoring the progress of the work, evaluating proposed changes, and processing the Contractor's monthly progress payment.
- C. Software: The software shall be the latest version of Primavera Project Planner (P3), SureTrak Project Scheduler, Microsoft Project, or approved equal.
- D. No work shall be done outside of the hours stated in the Contract Documents without written permission of the Engineer.

1.2 RELATED SECTION:

- A. Refer to Contract General Conditions for additional requirements.

1.3 SUBMITTALS

- A. Project Schedule: After contract award and before the Pre-Construction conference, submit one electronic copy on PC compatible CD-ROM and 2 paper copies of the proposed project schedule, and accompanying CPM Schedule Reports.
- B. Project Schedule Updates: On or before the 7th day preceding the progress payment request date, submit estimates of the percent completion of each schedule activity and necessary supporting data. Provide two paper copies and one electronic copy in PDF and native file formats.
- C. Project Schedule Revisions and Time Impact Analysis: Submit one electronic copy and two paper copies of a Time Impact Analysis. Each Time Impact Analysis shall include a Fragmentary Network (Fragnet) demonstrating how the Contractor proposes to incorporate a modification, change, delay, or Contractor request into the project schedule.

1.4 PROJECT SCHEDULE

- A. Schedule Development:
  - 1. The late finish date shown on the schedule shall be the same date as the last day of the contract period.
  - 2. The Contractor shall use the Precedence Diagram Method (PDM) with limited use of lead or lag durations between schedule activities. The Contractor's project schedule shall consist of procurement activities (including mobilization, submittal, and the fabrication and delivery of key and long-lead procurement items) and construction activities.

3. The Contractor's project schedule shall consist of, but not be limited to, the following for each activity:
    - a. Identify each and every activity number with numerical designations (maximum 5-digit). Numbering of activities shall be in increments of 10 digits.
    - b. Concise description of the work represented by the activity (maximum 48 characters). Avoid the use of non-standard abbreviations. The work related to each activity shall be limited to one work trade.
    - c. Activity duration in whole working days with a maximum duration of 15 work days each, unless otherwise approved by the Engineer, except for non-construction activities including mobilization, shop drawing and sample submittals, fabrication of materials, delivery of materials and equipment, and concrete curing.
  4. In developing the project schedule, ensure that subcontractor work at all tiers, as well as the prime contractor's work, is included and coordinated in the project schedule.
  5. The project schedule as developed shall show the sequence and interdependence of activities required for complete performance of the work. Ensure all work sequences are logical and the project schedule shows a coordinated plan of the work.
  6. Proposed duration assigned to each activity shall be the Contractor's best estimate of time required to complete the activity considering the scope and resources planned for the activity.
  7. Resource loading of each activity shall list all personnel by labor category and equipment type and capacity proposed to complete the activity in the duration shown.
  8. Consider seasonal weather conditions in planning and scheduling all work influenced by high or low ambient temperatures, wind and/or precipitation to ensure completion of all work within the contract time. Show anticipated weather conditions on project calendar.
- B. Joint Review, Revision, and Acceptance:
1. Within seven calendar days of receipt of the Contractor's proposed project schedule, the Engineer and Contractor shall meet for joint review, correction, or adjustment of the proposed project schedule. Any areas which, in the opinion of the Engineer, conflict with timely completion of the project shall be subject to revision by the Contractor.
  2. In the event the Contractor fails to define any element of work, activity, or logic, and the Engineer review does not detect this omission or error, such omission or error, when discovered by the Contractor or Engineer, shall be corrected by the Contractor at the next monthly project schedule update and shall not affect the contract time.
  3. Within seven (7) calendar days after the joint review between the Contractor and Engineer, the Contractor shall revise and resubmit the project schedule in accordance with agreements reached during the joint review.
  4. Upon acceptance of the project schedule by the Engineer, the project schedule will be used to evaluate the Contractor's monthly applications for payment based upon information developed at the monthly project schedule update meeting.

## 1.5 PROJECT SCHEDULE UPDATES

- A. General: Update the project schedule on a bi-weekly basis throughout the entire contract time and until project substantial completion. The status date of each schedule update shall be the 7th day preceding the progress payment request date.
- B. Procedure: The Contractor shall meet with the Engineer each month at a project schedule update meeting to review actual progress made through the status date of the project schedule update, including dates activities were started and/or completed and the percentage of work completed on each activity started and/or completed.
- C. Progress Payments: The monthly updating of the project schedule shall be an integral part of the process upon which progress payments will be made under this contract. If the Contractor

fails to provide schedule updates or revisions, then a portion of his monthly payment may be retained until such corrections have been made.

#### 1.6 PROJECT SCHEDULE REVISIONS

- A. Required Revisions: If, as a result of the monthly schedule update, it appears the project schedule no longer represents the actual prosecution and progress of the work, the Engineer will request, and the Contractor shall submit, a revision to the project schedule. The Contractor may also request reasonable revisions to the project schedule in the event the Contractor's planning for the work is revised. If the Contractor desires to make changes in the project schedule, the Contractor shall notify the Engineer in writing, stating the reason for the proposed revision. Accepted revisions will be incorporated into the project schedule at the next monthly schedule update.
- B. Procedure: If revision to the project schedule is contemplated, the Contractor or Engineer shall so advise the other in writing at least seven (7) calendar days prior to the next schedule update meeting, describing the revision and setting forth the reasons therefore. City-requested revisions to the project schedule will be presented in writing to the Contractor, who shall respond in writing within seven (7) calendar days.

#### 1.7 TIME IMPACT ANALYSIS FOR CONTRACT MODIFICATIONS, CHANGES, DELAYS, AND CONTRACTOR REQUESTS

- A. Requirements: When contract modifications or changes are initiated, delays are experienced, or the Contractor desires to revise the project schedule, the Contractor shall submit to the Engineer a written time impact analysis illustrating the influence of each modification, change, delay, or Contractor request on the contract time.
- B. Time Extensions: Activity delays shall not automatically mean that an extension of the contract time is warranted or due the Contractor. It is possible that a modification, change, or delay will not affect existing critical path activities or cause non-critical activities to become critical. A modification, change, or delay may result in only absorbing a part of the available total float that may exist within an activity chain of the project schedule, thereby not causing any effect on the contract time. Time extensions will be granted in accordance with the terms of the contract.
- C. Float: Float is not for the exclusive use or benefit of either the Government or the Contractor. Extension of the contract time will be granted only to the extent the equitable time adjustments to the activity or activities affected by the modification, change, or delay exceeds the total (positive or zero) float available on a particular activity.
- D. Procedure: Each time impact analysis shall be submitted within the time period stated in a request for proposal, or the time period designated under the clauses entitled Changes or Default. In cases where the Contractor does not submit a written request for extension of time and a time impact analysis within the designated time, it is mutually agreed that the particular modification, change, delay, or Contractor request does not require an extension of the contract time. Upon acceptance, the time impact analysis shall be incorporated into the project schedule at the next monthly schedule update.



City of Petaluma  
Adobe Rd Recycled Water Pipeline

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

## SECTION 01 33 00

### SUBMITTALS

#### PART 1 GENERAL

##### 1.1 DESCRIPTION

- A. This Section specifies the general methods and requirements of submissions applicable to the following work-related submittals: Shop Drawings, Product Data, Samples, and Construction or Submittal Schedules. Detailed submittal requirements will be specified in the technical specification section.

##### 1.2 SHOP DRAWINGS, PRODUCT DATA, SAMPLES

- A. Shop Drawings.
1. Shop drawings, as specified in individual work Sections include, but are not necessarily limited to: custom-prepared data such as fabrication and erection/installation (working) drawings of concrete reinforcement, piping layout, scheduled information, special wiring diagrams, coordination drawings, individual system or equipment inspection and test reports including performance curves and certifications as applicable to the work.
  2. All shop and working drawings shall be prepared on standard size, 22-inch by 34-inch sheets, except those which are made by changing existing standard shop or working drawings.
  3. All shop drawings submitted by subcontractors for approval shall be sent directly to the Contractor for checking. The Contractor shall be responsible for their submission at the proper time so as to prevent delays in delivery of materials.
  4. The Contractor shall check all subcontractors' shop drawings regarding measurements, size of members, materials, and details to satisfy himself/herself that they conform to the intent of the Drawings and Specifications. Shop drawings found to be inaccurate or otherwise in error shall be returned to the subcontractors for correction before submission thereof.
  5. All details on shop drawings submitted for approval shall show clearly the relation of the various parts of main members and lines of the structure, and where correct fabrication of the work depends upon field measurements; such measurements shall be made and noted on the Drawings before being submitted for approval.
- B. Product Data: Product data as specified in individual Sections, includes, but is not necessarily limited to, standard prepared data for manufactured products (sometimes referred to as catalog data), such as the manufacturer's product specifications and installation instructions, availability, roughing-in diagrams and templates, catalog cuts, product photographs, standard wiring diagrams, printed performance curves and operational-range diagrams, production or quality control inspection and test reports and certifications and recommended spare-parts listing, and product warranties, as applicable to the Work. Product data shall be submitted electronically to the maximum extent possible.
- C. Samples: Samples specified in individual Sections, includes, but is not necessarily limited to, physical examples of the work such as sections of manufactured or fabricated work, and units of work to be used by the Engineer for independent inspection and testing, as applicable to the Work.

##### 1.3 EQUIPMENT, MATERIALS AND COMPONENTS

- A. All equipment, materials and components furnished by the Contractor shall be stock models for which parts are readily available and shall be products which shall have performed satisfactorily in an installation independent of the manufacturer's facilities for a consecutive period of not less than two (2) years as of the date of the bid opening.
- B. Any item which the Contractor proposes to furnish as equal to any item specified shall be submitted for approval following the instructions below.

#### 1.4 REQUIRED SUBMITTALS

- A. Construction Schedule. The Contractor shall furnish the Engineer his/her proposed work schedule within fifteen (15) calendar days after award of contract. The Contractor shall also advise the Engineer of revisions of the schedule as modifications may become necessary, or as may be required after commencement of work. Such outlines and revisions shall be in sufficient detail to enable the Engineer to judge as to the adequacy of the Contractor's operations and to anticipate such conditions as may tend to impair or retard the progress and completion of the work.
- B. Payment Schedule. The Contractor shall furnish the Engineer a detailed payment schedule within fifteen (15) calendar days of award of contract. This schedule shall be based upon the Contract Bidding Schedule but with sufficient additional detail to allow accurate calculation of the Monthly Progress Payment. Lump sum bid items shall be broken down into their component parts, i.e., mobilization, excavation, arsenic treatment system, etc. in accordance with Section 01 20 00 Price and Payment Procedures.
- C. Submittal Schedule. The Contractor shall furnish the Engineer a list of all submittals anticipated to be submitted during the course of construction. The list shall include the specification section, paragraph, submittal item or name, estimated date of submission, and any other relevant information.
- D. List of Materials. Before beginning the work and within thirty-five (35) calendar days after award of the Contract, the Contractor shall submit a List of Materials to the Engineer for review. The List shall include all items of equipment, materials, and/or products to be incorporated into the work and the names of suppliers with whom purchase orders have been placed. The names on the List shall be arranged in the same order as in the specifications and shall contain sufficient data to precisely identify the items of equipment, materials, and/or products the Contractor proposes to furnish. The List shall include Specifications or Drawing references.
- E. Submittals are required on the items as listed individually in each section of the Technical Specifications (Divisions 2 through 44). The description of submittal data required is contained in the individual section.
- F. Daily Reports: The Contractor shall complete and submit a daily report no more than two (2) working days after the report date indicating location worked (station references), number of personnel with names for each construction trade, all major equipment on Site, each Subcontractor's personnel and equipment, weather conditions, and other related information involved in the performance of the Work.
- G. As-built drawings: One (1) complete set of (22" x 34") blue-line prints of the Contract Drawings will be furnished by the City to the Contractor for use in preparing as-built drawings. The Contractor shall keep this set of prints on the job site and accurately record (redline) all changes to contract drawings including Contract Modifications, as indicated in Section 01 72 00 Record Documents. Submit as-built redline prints to the Engineer at the completion of the job.

- H. The Contractor shall furnish to the Engineer three (3) complete bound sets of operation and maintenance instructions for those items as listed individually in each section of the Technical Specifications (Divisions 2 through 44). Each set shall contain manufacturer's specifications, operation and performance and dimensional data. Sets shall be neatly segregated, indexed and labeled. See also Section 01 73 00 Operations and Maintenance Data.

#### 1.5 CONTRACTOR'S RESPONSIBILITIES

- A. The Contractor shall review shop drawings, product data and samples, including those by Subcontractors, prior to submission to determine and verify the following:
  - 1. Field measurements.
  - 2. Field construction criteria.
  - 3. Catalog numbers and similar data.
  - 4. Conformance with the Specifications.
- B. If a shop drawing shows any deviation from the requirements of the Contract Documents, the Contractor shall provide a description of the deviations with the reason and justification in a letter attached to the submittal.
- C. The review and approval of shop drawings, samples or product data by the Engineer shall not relieve the Contractor from his responsibility with regard to the fulfillment of the Contract.
- D. No portion of the work requiring a shop drawing, sample, or product data shall be started nor shall any materials be fabricated or installed prior to the approval or qualified approval of such item. Fabrication performed, materials purchased or on-site construction accomplished which does not conform to approved shop drawings and data shall be at the Contractor's risk. The City will not be liable for any expense or delay due to corrections or remedies required to accomplish conformity.
- E. Project work, material, fabrication, and installation shall conform with approved shop drawings, applicable samples, and product data.

#### 1.6 SUBMISSION REQUIREMENTS

- A. Make submittals promptly in accordance with approved schedule.
- B. Deliver submittals electronically in PDF format.
- C. All submittals and Requests for Information (RFI) shall be made sufficiently in advance of construction to provide 25 calendar days for review by the Engineer.
- D. A single submittal shall be provided by the Contractor for all items contained within a single specification. Submit all product data, shop drawings, laboratory test results, material source information, and certificates of compliance listed in each specification section under a single submittal cover for review. Incomplete submittals will not be reviewed.
- E. Number of submittals required. It is the intent of the City to maximize the use of electronic submittals. Submit one electronic copy to the Engineer. If an electronic submittal is not practical submit per the following:
  - 1. Shop Drawings: Unless otherwise stated in the respective Specifications Sections, submit five hard copies.
  - 2. Product Data: Unless otherwise stated in the respective Specifications Sections, submit five hard copies.
  - 3. Samples: Submit five samples unless stated otherwise in the respective Specification Sections.

- F. Submittals shall contain:
1. Cover sheet that includes:
    - a. The date of submission and the dates of any previous submissions.
    - b. The Project title and number.
    - c. Contractor identification.
    - d. The names of:
      - 1) Contractor.
      - 2) Supplier.
      - 3) Manufacturer.
    - e. Identification of the product, with the specification section number, page, and paragraph(s).
  2. Field dimensions, clearly identified as such.
  3. Relation to adjacent or critical features of the Work or materials.
  4. Applicable standards, such as ASTM numbers.
  5. Identification of deviations from Contract Documents.
  6. Identification of revisions on resubmittals.

#### 1.7 REVIEW OF SHOP DRAWINGS, PRODUCT DATA, WORKING DRAWINGS AND SAMPLES

- A. The Engineer's review is for general conformance with the design concepts presented in the Contract Documents. Markings or comments shall not be construed as relieving the Contractor from compliance with the Contract Drawings and Specifications or from departures there from. The Contractor remains responsible for details and accuracy, for coordinating the work with all other associated work and trades, for selecting fabrication processes, for techniques of assembly, and for performing work in a safe manner.
- B. The review of shop drawings, data, and samples will be general. They shall not be construed:
1. As permitting any departure from the Contract requirements:
  2. As relieving the Contractor of responsibility for any errors, including details, dimensions, and materials:
  3. As approving departures from details furnished by the Engineer, except as otherwise provided herein.
- C. If the shop drawings, data or samples submitted describe variations and show a departure from the Contract requirements which the Engineer finds to be in the interest of the City and to be so minor as not to involve a change in Contract Price or time for performance, the Engineer may return the reviewed drawings without noting an exception.
- D. One electronic copy of shop drawings or product data will be returned to the Contractor. Samples will not be returned. If the Contractor wishes extra copies to be returned, he shall submit additional copies.
- E. Submittals will be returned to the Contractor under one of the action codes indicated and defined on the transmittal form furnished by the Engineer.
- F. Re-submittals will be handled in the same manner as first submittals. On re-submittals the Contractor shall direct specific attention, in writing, on the letter of transmittal and on re-submitted shop drawings by use of revision triangles or other similar methods, to revisions other than the corrections requested by the Engineer on previous submissions. Any such revisions which are not clearly identified shall be made at the risk of the Contractor. The Contractor shall make corrections to any work done because of a revision that is not in accordance with the Contract Documents.
- G. Partial submittals may not be reviewed. The Engineer will be the only judge as to the completeness of a submittal. Submittals not complete will be returned to the Contractor, and

will be considered "Rejected" until re-submitted. The Engineer may at his option provide a list or mark the submittal directing the Contractor to the areas that are incomplete.

- H. If the Contractor considers any correction indicated on the shop drawings to constitute a change to the Contract Documents, the Contractor shall give written notice thereof to the Engineer at least five (5) working days prior to release for manufacture.
- I. When the shop drawings have been completed to the satisfaction of the Engineer, the Contractor shall carry out the construction in accordance therewith and shall make no further changes therein except upon written instructions from the Engineer.

#### 1.8 DISTRIBUTION

- A. Distribute reproductions of approved shop drawings and copies of approved product data and samples, where required, to the job site file and elsewhere as directed by the Engineer.

#### 1.9 GENERAL PROCEDURES FOR SUBMITTALS

- A. Coordination of Submittal Times: Prepare and transmit each submittal sufficiently in advance of performing the related work or other applicable activities, or within the time specified in the individual work sections of the Specifications, so that the installation will not be delayed by processing times including re-submittal (if required), coordination with other submittals, testing, purchasing, fabrication, delivery and similar sequenced activities. No extension of time will be authorized because of poorly sequenced activities. No extension of time will be authorized because of the Contractor's failure to transmit submittals sufficiently in advance of the Work.
- B. All submittals shall be made utilizing an approved submittal cover form which shall be used as the document for approving or disapproving the material. Written approval must be obtained from the Engineer before items requiring submittal are installed. Submittals not in accordance with the plans and specifications shall be accompanied by a written statement indicating in detail all parts which deviate from the plans and specifications.
- C. All submittals shall be made to the Engineer by the Contractor only. Submittals received by the Engineer without the Contractor's signature shall be returned to the Contractor without action.
- D. Literature, shop drawings, etc., fully describing the items which the Contractor proposes to install shall be submitted in the form of one electronic copy. Material or finish samples shall be submitted in five (5) sets. Items submitted shall be plainly marked to indicate which options, models etc. are proposed.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

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SECTION 01 40 00

QUALITY CONTROL

PART 1 GENERAL

1.1 PERFORMANCE OF WORK BY CONTRACTOR

- A. The Contractor's procedure and methods of construction may, in general, be of his/her own choosing, provided they follow best general practice and are calculated to secure results which will satisfy the requirements of these specifications.
- B. The Contractor shall furnish the Engineer all reasonable facilities for obtaining such information as he may desire respecting the character of the materials and the progress of the work. The Contractor shall furnish information to include the number of persons employed, their pay, the time they worked, and other elements of cost at the request of the Engineer or the Engineer.

1.2 RELATED SECTION:

- A. Refer to Contract General Conditions for additional requirements.

1.3 AUTHORITY OF THE ENGINEER

- A. The authority of the Engineer for technical contract administration and inspection of the work is limited to the following functions:
  - 1. Inspect and accept or reject work and materials including exceptions to material submittals and shop drawings.
  - 2. Assure compliance with all technical contract terms and conditions.
  - 3. Clarify specifications and drawings where clarification does not involve contract cost or time. Any disagreements with the Contractor over clarification of specifications and drawings are to be immediately referred to the City.
  - 4. Verify, prepare, and recommend payment estimates on progress payments; forward to the City for approval.
  - 5. Conduct "Labor Standards Interviews" in accordance with instructions from the City. All known or suspected violations of the Labor Standards Provisions shall be reported immediately to the City.
  - 6. Enforce safety requirements in accordance with the Federal and State Regulations and the Technical Specifications.
- B. The Engineer is not authorized to take the following actions, all of which remain the sole responsibility of the Engineer.
  - 1. Make changes to the contract provisions, period of performance, or change any contract terms or conditions.
  - 2. Make decisions concerning any claims and disputes under this contract.
- C. Close liaison will be maintained by the Engineer, the City and the Contractor. The Engineer shall notify the City immediately of any problems encountered, including but not restricted to maintaining completion schedules.

1.4 AUTHORITY OF THE INSPECTOR

- A. An Inspector employed by the City will assist the Engineer in making inspections and measurements and will enforce strict compliance with the terms of the contract.



- B. The Inspector shall have free access to the job site at all times while construction is in progress, and the Contractor shall furnish such information and assistance as may be necessary.
- C. The Inspector shall, on a daily basis, record the work being accomplished, the trades working, materials delivered and/or installed, reasons for delays, and other pertinent information.
- D. The Inspector may reject unsuitable materials or work not performed in accordance with the terms of the contract until the situation has been referred to and resolved by the Engineer and/or City.
- E. The Inspector shall observe that all construction is performed in conformance with the contract health and safety requirements.
- F. The Inspector shall conduct wage rate interviews and report suspected labor standard violations to the City.
- G. The Inspector shall check and verify the Contractor's progress payment requests, if progress payments have been included in the contract.
- H. No decisions or instructions of an Inspector will at any time relieve the Contractor from the responsibility of complying fully with all the requirements of the contract. In cases of difference arising between an Inspector and the Contractor or his agent, appeal shall be taken to the Engineer.
- I. Inspectors are not authorized to waive or alter in any respect any of the terms or requirements of the contract, to make additional requirements, to grant extensions of time or delays, or to waive forfeitures. The Contractor shall not be entitled to payment for any work improperly performed with or without an Inspector's approval.

#### 1.4 INSPECTION AND TESTING

- A. Contract Description.
  - 1. Where the Contract Documents require work to be field tested or approved, it shall be tested in the presence of the Engineer or its authorized representative. The Engineer shall have the right to witness all on-site tests performed by the Contractor and any shop tests. The results of any tests performed by the Contractor shall be made available for the information of the Engineer. Inspections, tests or favorable reviews by the Engineer or others shall not relieve the Contractor from its obligation to perform the work in accordance with the requirements of the Contract Documents or for its sole responsibility for the quality of workmanship and materials.
  - 2. Except as specifically required under the technical specifications for testing and inspection, all tests for materials furnished by the Contractor will be done in accordance with commonly recognized standards of national organizations. Where tests are to be performed by an independent laboratory or agency, the Contractor shall furnish such samples of all materials as required by the Engineer without charge. The sample or samples of materials to be tested shall be selected by such laboratory or agency, or the Engineer, and not by the Contractor. No material for which the Contract Documents require the submittal and approval of tests, certificates of compliance or other documentation shall be incorporated in the Work until such submittal has been made and approved.
  - 3. The Contractor shall provide safe access for the Engineer and inspectors to adequately inspect the quality of work and the conformance with the Contract Documents. The Contractor shall furnish the Engineer the necessary labor and facilities for such things as excavation in the compacted fill to the depths required to take samples. The Contractor s may be necessary for the safe performance of inspections.

4. Upon completion of the Work the Engineer will conduct a final inspection as provided for in Section 01 77 00, "Project Closeout." Records shall be available at all reasonable hours for inspection by other local or State agencies to ascertain compliance with laws and regulations.

B. Notice

1. The Contractor shall notify the Engineer in writing at least 72 hours before any field testing or special inspections, including concrete and compaction testing, are required to be performed by the independent laboratory. Any offsite test will require more intense planning and scheduling.
2. Whenever the Contractor varies the period during which work is carried on each day, the Contractor shall give due notice to the Engineer so that proper inspection may be provided. Any work done in the absence of the Engineer shall be considered to be rejected. It will be the responsibility of the Contractor to demonstrate to the satisfaction of the Engineer that the work meets all conditions of the specification and if such conditions are not met to remove the work.
3. The Contractor shall give the Engineer written notification at least 30 days prior to the shipment of materials and equipment to be tested and/or inspected at the point of origin. Satisfactory tests and inspections at the point of origin shall not be construed as a final acceptance of the materials and equipment nor shall such tests and inspections preclude retesting or re-inspection at the site of the Work.

C. Testing

1. The Contractor shall be responsible for, and shall pay for, all source quality control and off-site tests of materials required including all source and mix design tests for the approval of soil and concrete materials.
2. The City will perform the soils and concrete confirmation tests detailed in the Technical Specifications during the performance of the Work. The City will retain the services of a qualified testing agency to perform soil and asphalt compaction testing and work identified as requiring special inspections and testing as defined by the CBC 2022.
3. The Contractor shall be responsible for the costs associated with the re-test of any failed test. The cost of the re-test of any failed test will be deducted from the bid price.
4. The Engineer shall have the authority to require additional tests or inspections due to the manner in which the Contractor executes its work. Examples of such additional tests and inspections include; tests of materials substituted for previously accepted materials, or substituted for specified materials, or retests made necessary by failure of material to comply with the requirements of the Specifications. The Contractor shall be responsible for the costs of any additional tests or inspections.
5. The Contractor shall submit information and certifications for any independent testing laboratory or agency to the Engineer for review and approval of the labs or agency.

D. Work Covered Prior to Inspection and/or Testing

1. Work requiring inspection and/or testing shall not be concealed or buried prior to the acceptance of such inspection or testing. Work covered without the favorable review or consent of the Engineer shall, if required by the Engineer, be uncovered for inspection and/or testing at the Contractor's expense.

E. Work Covered With Prior Inspection and/or Testing

1. If the Engineer considers it necessary or advisable that covered work which was favorably inspected and tested be uncovered for re-inspection and/or retesting, the Contractor, at the Engineer's request, will uncover, expose or otherwise make available for observation, inspection or testing as the Engineer may require, that portion of the work in question, furnishing all necessary labor, materials, tools, and equipment. If it is found that such work is defective, the Contractor will bear all expenses of such

uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction. If, however, such work is not found to be defective the Contractor will be allowed an increase in the Contract price or an extension of the Contract time, or both, directly attributable to such uncovering, exposure, observation, testing and reconstruction, and a Change Order shall be issued for such additional work.

- F. Coordination of State of California and other Inspections
  - 1. The Contractor is completely responsible for scheduling all State, County, and any other agency inspections such as Pacific Gas and Electric Company in accordance with the State, County, and agency requirements. The Contractor shall notify the Engineer of all work component inspection notices and schedules. Failure of the Contractor to properly coordinate and schedule these inspections shall not be cause for time extensions.

## PART 2 PRODUCTS

### 2.1 TEST WATER

- A. The Contractor shall coordinate with the City for the use of water available at the project site and shall pay all costs associated with the use of the water. The Contractor shall properly dispose of the water, which is required for testing of piping and structures, including dechlorination. The Contractor shall dispose of all testing water in the sanitary sewer without damage to property, and in accordance with applicable regulations.

## PART 3 EXECUTION

### 3.1 STATEMENT OF SPECIAL INSPECTIONS

- A. The Statement of Special Inspections is provided on the structural drawings in accordance with the requirements of the California Building Code.
- B. The Statement of Special Inspections summarizes the Special Inspections and tests required. Special Inspectors will be provided by the City, and will refer to the approved Drawings and specifications for detailed special inspection requirements. Any additional tests and inspections required by the approved Drawings and specifications shall also be performed.
- C. The Special Inspections identified are in addition to those required by other sections of the building code. Special Inspection is not a substitute for inspection by the Engineer.
- D. The Engineer will keep records of all inspections and will furnish inspection reports to the Contractor. Discovered discrepancies shall be brought to the immediate attention of the Contractor for correction. If such discrepancies are not corrected, the discrepancies shall be brought to the attention of the City and the registered design professional in responsible charge. The Special Inspection program does not relieve the Contractor of his or her responsibilities.
- E. Job site safety and means and methods of construction are solely the responsibility of the Contractor.
- F. The Contractor is required to coordinate for all inspections. The Contractor shall notify the Engineer and the Special Inspector a minimum of 72 hours prior to all Special Inspections and other inspections and tests that are required. The Contractor shall notify the Engineer and the Special Inspector a minimum of 72 hours prior to any concrete to be poured.
- G. Inspectors and testing agencies shall be engaged by the City. Any conflict of interest must be

disclosed to the Engineer prior to commencing work.

- H. Special inspected work that is installed or covered without the approval of the Engineer is subject to removal or exposure at the expense of the Contractor.
- I. Continuous inspection is always required during the performance of the work unless otherwise specified. When work in more than one category of work requiring special inspection is to be performed simultaneously, or the geographic location of the work is such that it cannot be continuously observed, it is the Contractor's responsibility to employ a sufficient number of inspectors to assure that all the work is inspected in accordance with the provisions of the building code.

### 3.2 CONTRACTOR STATEMENT OF RESPONSIBILITY

- A. Each Contractor responsible for the construction or fabrication of a system or component designated above as part of the main wind force or main seismic force resisting systems above must submit a Statement of Responsibility.

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SECTION 01 50 00

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 GENERAL

1.1 SUBMITTALS SECTION INCLUDES

- A. Meet requirements of Section 01 33 00, "Submittals," as applicable. Make submittals required below before starting Work at the site or in accordance with accepted schedule of submittals submissions.
- B. Administrative Submittals: Copies of permits and approvals for construction as required by Laws and Regulations and governing agencies.
- C. Traffic Control Plan: Submit vehicular and pedestrian traffic control plan as described in this section.

1.2 RELATED SECTION:

- A. Refer to Contract General Conditions for additional requirements.

1.3 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. State of California, Department of Transportation (Caltrans) Specifications and Standards:
  - 1. Standard Specifications:
    - a. Section 7 Legal Relations and Responsibility
    - b. Section 12 Construction Area Traffic Control Devices
  - 2. Standard Plans:
    - a. Temporary Traffic Control Systems
  - 3. California Manual on Uniform Traffic Control Devices, Current Edition (California MUTCD)
- B. Sonoma Public Infrastructure (formerly Sonoma County Department of Transportation and Public Works)
- C. The Contractor must so conduct their operations so as to cause the least possible obstruction and inconvenience to public traffic. Unless otherwise approved by the Engineer, all traffic must be permitted to pass through the Work.
- D. Due to the need to accommodate and minimize inconvenience to the public, unless expressly specified or approved in writing by the Engineer, no road closures will be permitted. Public vehicular and pedestrian traffic must be allowed to travel through the Work area with an absolute minimum of interruption or impedance unless otherwise provided for in the Technical Specifications or approved in writing by the Engineer. The Contractor must make provisions for the safe passage of pedestrians around the area of Work at all times.
- E. Residents affected by construction must be provided passage and access through the Work area to the maximum extent possible.
- F. The Contractor must provide multiple, advance written notices of closures to all affected property owners in a form approved by the Engineer.
- G. Except as otherwise approved by the County, the stockpiling or storing of material in County streets or right of way shall be prohibited. Where this is unavoidable, all such materials must

be piled or stored in a manner that will not obstruct sidewalks, driveways, or pedestrian crossings. Gutters and drainage channels must be kept clear and unobstructed at all times. All such materials shall be stored and handled in a manner that protects County streets, sidewalks, or other facilities from damage.

- H. Where approved in advance by the Engineer, the Contractor must construct and maintain detours for the use of public traffic at his or her own expense. Failure or refusal of the Contractor to construct and maintain detours so approved at the proper time will be a material breach of the Contract subject to any and all remedies available pursuant to the Contract Documents and at law and equity. Such remedies include, but are not limited to, termination pursuant to the Contract General Conditions.
- I. Throughout performance of the Work the Contractor must construct and adequately maintain suitable and safe crossings over trenches and such detours as are necessary to care for the public and private traffic at all times including Saturdays, Sundays and holidays.
- J. The Contractor will be responsible for keeping all emergency services, including the police and fire departments informed of obstructions to, or detours around any public or private roads caused by reasons of his or her operations.
- K. The Contractor must comply with the California Manual on Uniform Traffic Control Devices (MUTCD) at all times.
- L. The fact that rain or other causes, either within or beyond the control of the Contractor, may force suspension or delay of the Work, shall in no way relieve the Contractor of his or her responsibility of maintaining traffic through the Project and providing local access as specified in this section. The Contractor must, at all times, keep on the job such materials, force and equipment as may be necessary to keep roads, streets and driveways within the Project open to traffic and in good repair and shall expedite the passage of such traffic, using such force and equipment as may be necessary.

#### 1.4 MOBILIZATION

- A. Mobilization shall include, but not be limited to, these principal items:
  - 1. Moving Contractor's field office and equipment required for first month operations onto site.
  - 2. Installing temporary construction power, wiring, and lighting facilities.
  - 3. Providing on-site communication facilities, including telephones.
  - 4. Providing onsite sanitary facilities and potable water facilities as specified and as required by Laws and Regulations, and governing agencies.
  - 5. Insurance and bonds.
  - 6. Posting OSHA required notices and establishing safety programs and procedures.
  - 7. Having Contractor's superintendent at the site full time.
  - 8. Submitting of initially acceptable schedules as required.
- B. Obtaining required permits.

#### 1.5 ACCESS TO SITE

- A. Access to the work from existing roads. The City assumes no responsibility for the condition or maintenance of any road or structure thereon that may be used by the Contractor in performing the work under these specifications or in traveling to and from the site of the work. No payment will be made to the Contractor by the City for any work done in improving, repairing, or maintaining any road or structure thereon for use in the performance of the work under these specifications. Roads subject to interference by the Work shall be kept open.

## 1.6 PROTECTION OF PROPERTY

- A. The Contractor shall not enter upon private property for any purpose without first obtaining written permission from the owner or his duly authorized representative, shall be responsible for the preservation of all public and private property along and adjacent to work contemplated under the contract, and shall use every precaution necessary to prevent damage or injury thereto. He/she shall exercise due care in preventing, and shall be responsible for damages to structures of all kinds, whether owned by the City or privately, and shall protect from disturbance or damage all land monuments.

## 1.7 PROTECTION OF ENVIRONMENT

- A. All contract operations shall be conducted in compliance with all federal, state and local environmental laws and regulations. This condition applies to, but is not limited to, laws and regulations governing noise levels, air and water quality standards, and cultural resources.
- B. If the Contractor fails or refuses to promptly comply with the requirements of subparagraph A. above, the Engineer or his/her authorized representative, shall notify the Contractor of any noncompliance and indicate to the Contractor the action to be taken. The Contractor shall, after receipt of such notice, immediately correct the conditions to which attention has been directed. Such notice, either oral or written, when served on the Contractor or his representative(s) at the site of the work, shall be deemed sufficient.
- C. In the event the Contractor fails or refuses to promptly comply with the compliance directive issued under subparagraph above, the Engineer with the concurrence of the Contracting Officer may issue an order to suspend all or any part of the work.
- D. When satisfactory corrective action is taken, an order to resume work will be issued. The Contractor shall not be entitled to any extension of time, nor to any claim for damage or to excess costs by reason of either the directive or the suspension order.

## 1.8 ADDITIONAL SAFETY REQUIREMENT

- A. Roll-over protection and seat belts required by 29 CFR 1926 shall include equipment regardless of year of manufacture.
- B. Submit a written and detailed Fire Safety and Prevention Plan outlining the prevention measures and emergency procedures that will be implemented at the project site during demolition. The Fire Safety and Prevention Plan shall be prepared in accordance with §3221 of the California Code of Regulations, and shall include following elements:
  - 1. Potential fire hazards and their proper handling and storage procedures, potential ignition sources (such as welding, smoking and others) and their control procedures, and the type of fire protection equipment or systems which can control a fire involving them;
  - 2. Names or regular job titles of those responsible for maintenance of equipment and systems installed to prevent or control ignitions or fires; and
  - 3. Names or regular job titles of those responsible for the control of accumulation of flammable or combustible waste materials.
- C. Housekeeping. The Contractor shall control accumulations of flammable and combustible waste materials and residues so that they do not contribute to a fire emergency. The housekeeping procedures shall be included in the written fire prevention plan.
- D. Training.



1. The Contractor shall apprise employees of the fire hazards of the materials and processes to which they are exposed.
  2. The Contractor shall review with each employee upon initial assignment those parts of the fire prevention plan which the employee must know to protect the employee in the event of an emergency. The written plan shall be kept at the job site and made available for employee review.
- E. Maintenance. The Contractor shall regularly and properly maintain, according to established procedures, equipment and systems installed at the project site to prevent accidental ignition of combustible materials.

#### 1.7 CONTRACTOR'S USE OF PREMISES

- A. Availability of lands:
1. All work is to be performed on City lands or such other lands which are designated for the use of the Contractor. Easements for permanent structures or permanent changes in existing facilities will be obtained and paid for by the City, unless otherwise provided in the Contract Documents. Nothing contained in the Contract Documents shall be interpreted as giving the Contractor exclusive occupancy of the lands or rights of way provided.
- B. Use of premises: The Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the project site and approved staging areas. The Contractor shall assume full responsibility for any damage to any such land or area.
- C. Lands furnished by the City upon which Contractor shall perform the Work are as shown on the Drawings.
- D. Coordinate with the City on location(s) for Contractor's temporary facilities and laydown of materials and equipment. In the absence of available laydown area for materials and equipment on City-owned lands, Contractor shall make his/her own arrangements for temporary facilities and laydown of materials and equipment.
- E. Contractor's employees shall park their vehicles in City approved parking areas only.
- F. Contractor's employees shall not use existing City buildings or landscaped areas for break or lunch times. Contractor's employees shall be responsible for cleaning up any litter from break or lunch time.

#### 1.8 TEMPORARY TRAFFIC CONTROL PLAN

- A. The Contractor shall provide all materials, equipment, and labor necessary to furnish, place, and maintain all temporary traffic control systems, including construction and maintenance area traffic control devices and flaggers as required to access the project site and perform the Work in accordance with this Section, and all other appurtenant work, complete in place, as shown on the Drawings and as specified herein.
- B. The Contractor shall submit for review by the Engineer, Work Zone Traffic Control Plans on 11" x 17" format which contains only information related to the site-specific work zone traffic control. Separate Traffic Control Plans shall be prepared for work in the Sonoma County right-of-way.

- C. Approval for work within the Sonoma County right-of-way will require approval of the Sonoma County Transportation and Public Works Department. An encroachment permit for work within the Sonoma County right-of-way is required.
- D. The Work Zone Traffic Control Plans shall show which California MUTCD and/or Sonoma County Standard typical applications, if any, are to be used for each work operation in addition to site specific traffic control. If the Contractor proposed to use the current edition of California MUTCD in specific work operations, they shall submit in writing for consideration which Typical Application Diagram will be used for each work operation. The Work Zone Traffic Control Plan shall be specific to the proposed method(s) construction and shall include:
  - 1. Specific details for construction staging, including the location and limits of the work zone.
  - 2. Locations of all excavations.
  - 3. Plans for protection of the public from construction-related hazards.
  - 4. Lane closures and traffic routing including consideration of construction-related trucking routes.
  - 5. A trucking route for approval by the Engineer. The route must minimize traffic on residential streets that are not part of the project.
  - 6. A pedestrian routing plan for approval by the Engineer prepared in accordance with the California MUTCD. The routing plan must demonstrate how pedestrians will be safely routed around the project site during construction.
  - 7. Lane closure markings, barricade locations, and sign locations showing the necessary signing, methods of delineation and channelization and reference to the appropriate Caltrans standards and California MUTCD details for all affected roads.
  - 8. Dimensions of lanes affected by traffic control that will be open to traffic.
  - 9. Dimensions and locations of signs and cone tapers.
  - 10. Identification of side streets and driveways affected by construction and
  - 11. Time periods of lane closures and detours.
- E. The Work Zone Traffic Control Plan shall contain a title block which contains the Contractor's name, address, phone number, project superintendent's name, contract name, dates and hours traffic control will be in effect, and a space for review acknowledgment.
- F. The Work Zone Traffic Control Plan shall be submitted to the Engineer and other affected agencies for review at least two weeks prior to implementation in order to determine the Contractor's compliance with the requirements of this section.
- G. No work except for installation of project identification signs will be allowed to commence prior to approval of the Work Zone Traffic Control Plan.
- H. A "Letter of Responsibility," on company letterhead, indicating the names and telephone numbers of at least three different persons who shall be available to be contacted in case of emergency at any time during the life of the contract. Said persons must have decision-making authority within the company.

#### 1.9 PROTECTION OF WORK AND PROPERTY

- A. Reference General Conditions and this Section.
- B. Comply with all OSHA and other applicable safety rules.
- C. Keep Owner informed of all accidents or near accidents on the site and related claims.
- D. Use of Explosives: No blasting or use of explosives will be allowed on the site.

- E. During the performance of the Work, Contractor is responsible for adapting its means, methods, techniques, sequences, and procedures of construction to allow the City to maintain operation as described in Section 01 10 00, "Summary Of Work," at the existing level of facility production and consistent with applicable permit requirements, and Laws and Regulations. In performing such Work and in cooperating with the City to maintain operations, it may be necessary for Contractor to plan, design, and provide various temporary services, utilities, connections, temporary piping and heating, access, and similar items that will be included within the Contract Price.

## PART 2 PRODUCTS (NOT USED)

## PART 3 EXECUTION

### 3.1 TEMPORARY UTILITIES

- A. Power:
  - 1. Electrical appurtenances required for providing temporary electric power services for the Contractor shall be provided by the Contractor and approved by Pacific Gas and Electric Company.
  - 2. Cost of electric power used in performance and acceptance testing will be borne by Contractor.
  - 3. The Contractor shall provide its own diesel or gasoline engine driven air compressor system and power generator when required for its pneumatic tools or equipment, if any.
- B. Lighting: Provide temporary lighting at least to meet all applicable safety requirements to allow erection, application or installation of materials and equipment, and observation or inspection of the Work. Cost of temporary lighting required for performing the Work will be borne by the Contractor.
- C. Heating, Cooling, and Ventilating:
  - 1. Provide as required to maintain adequate environmental conditions to facilitate progress of the Work, to meet specified minimum conditions for the installation of materials, and to protect materials, equipment, and finishes from damage due to temperature or humidity.
  - 2. Provide adequate forced air ventilation of enclosed areas to cure installed materials, to dispense humidity, and to prevent hazardous accumulations of dust, fumes, vapors, or gases.
  - 3. Pay all costs of installation, maintenance, operation, removal, and fuel consumed.
  - 4. Provide portable unit heaters, complete with controls, oil or gas-fired, and suitably vented to outside as required for protection of health and property.
  - 5. Natural gas is not available at the site.
- D. Water:
  - 1. Contractor to pay for all water use related to the Work. The Contractor shall provide temporary connections, piping and valving. The Contractor shall not make connection to any water system without first obtaining permission from the City.
  - 2. Contractor shall provide temporary facilities and piping required to bring water to the point of use, and remove them when no longer needed. The City may install a metering device. The Contractor will pay for water used based on meter readings.
  - 3. Contractor shall provide and bear costs of necessary water required for testing equipment, tanks or vaults, and piping prior to Substantial Completion.
- E. Minimum Safety Equipment:

1. Contractor to provide and maintain onsite adequate safety equipment for activities involved, including but not limited to, air monitors, confined space entry equipment when required, adequate first aid supplies, etc. Contractor to submit list for City review.
- F. Sanitary and Personnel Facilities:
1. Provide and maintain facilities for Contractor's employees, Subcontractors, and all other onsite employees. Service, clean, and maintain facilities and enclosures.
  2. Use of the City's existing sanitary facilities by construction personnel will not be allowed.
  3. Locate sanitary facilities where they will not create a public nuisance or interfere with the work and at the direction of the Engineer or Engineer, relocate sanitary facilities.
  4. Make Contractor's facilities available to the City Construction Inspector.
- G. Communication:
1. The Contractor shall make arrangements to obtain and pay for its own communication equipment such as telephone, cellular phone, and facsimile equipment.
  2. Contractor to pay all costs of installation and monthly bills.
  3. No incoming telephone calls allowed to City telephone system.
- H. Fire Protection: Furnish and maintain on the site adequate firefighting equipment capable of extinguishing incipient fires. Comply with applicable parts of the National Fire Prevention Standard for Safeguarding Building Construction Operations (NFPA No. 241).

### 3.2 PROTECTION OF WORK AND PROPERTY

- A. General:
1. Contractor shall at no time interfere with or limit the public's access to and parking for the recreational path and trails at the site except as approved by the Engineer.
  2. Perform Work within rights-of-way and easements in a systematic manner that minimizes inconvenience to property owners and the public.
  3. No residence or business shall be cut off from vehicular traffic unless special arrangements have been made.
  4. Maintain in continuous service all existing oil and gas pipelines, underground power, telephone or communication cable, water mains, irrigation lines, sewers, poles and overhead power, and all other utilities encountered along the line of Work, unless other arrangements satisfactory to owners of said utilities have been made.
  5. Where completion of Work requires temporary or permanent removal and/or relocation of an existing utility, coordinate all activities with owner of said utility and perform all work to their satisfaction.
  6. Protect, shore, brace, support, and maintain underground pipes, conduits, drains, and other underground utility construction uncovered or otherwise affected by construction operations.
  7. Keep fire hydrants and water or sewer control valves free from obstruction and available for use at all times.
  8. In areas where Contractor's operations are adjacent to or near a utility such as gas, telephone, television, electric power, water, sewer, or irrigation system and such operations may cause damage or inconvenience, suspend operations until arrangements necessary for protection thereof have been made by Contractor.
  9. Notify property owners and utility companies which may be affected by the construction operation at least 7 calendar days in advance. Before exposing a utility, obtain utility owner's permission. Should service of utility be interrupted due to Contractor's operation, notify proper authority immediately. Cooperate with said authority in restoring service as promptly as possible and bear all costs incurred.
  10. Do not impair operation of existing sewer or storm drain systems. Prevent construction material, pavement, concrete, earth, volatile and corrosive wastes, and other debris from entering sewers, pump stations, storm drains, or other sewer structures. Maintain original site drainage wherever possible.

- B. Site Security: Provide and maintain additional temporary security fences as necessary to protect the Work and Contractor's equipment and stored material. Contractor shall be solely responsible for any vandalism, theft, or damage to the work and Contractor's equipment and stored material.
  
- C. Barricades and Lights:
  - 1. Provide barricades, as necessary, to prevent unauthorized entry to construction areas inside and outside of fenced area, and as required to ensure public safety and the safety of Contractor's employees, other employer's employees, and any others who may be affected by the Work.
  - 2. Provide to protect existing facilities and adjacent properties from potential damage.
  - 3. Locate to enable access by facility operators and property owners.
  - 4. Protect streets, roads, highways, and other public thoroughfares that are closed to traffic by effective barricades with acceptable warning signs that comply with the requirements of the manual on Uniform Traffic Control Devices, current edition.
  
- D. Signs and Equipment:
  - 1. Conform to requirements of the Contract Documents.
  - 2. Barricades: Provide in sufficient quantity to safeguard public and Work.
  - 3. Traffic Cones: Provide to delineate traffic lanes to guide and separate traffic movements.
  - 4. Provide barricades and lighting at obstructions, such as material piles and equipment.
  - 5. Illuminate barricades and obstructions with warning lights from sunset to sunrise.
  - 6. Alert the general public of construction hazards, which would include surface irregularities, unramped walkways, grade changes, and trenches or excavations in roadways and in other public access areas.
  
- E. Trees and Plantings:
  - 1. Protect from damage and preserve trees, shrubs, and other plants outside the limits of the Work and within the limits of the Work unless designated on the Drawings to be removed.
    - a. Where practical, tunnel beneath trees when on or near the line of trench.
    - b. Employ hand excavation as necessary to prevent tree injury.
    - c. Do not stockpile materials or permit traffic within drip lines of trees.
    - d. Provide and maintain temporary barricades around trees.
    - e. Water vegetation as necessary to maintain health.
    - f. Cover temporarily exposed roots with wet burlap, and keep the burlap moist until soil is replaced around the roots.
    - g. No trees, except those specifically shown on Drawings to be removed, shall be removed without written approval of the Engineer.
    - h. Dispose of removed trees in a legal manner off the site.
  - 2. In the event of damage to bark, trunks, limbs, or roots of plants that are not designated for removal, treat damage by corrective pruning, bark tracing, application of a heavy coating of tree paint, and other accepted horticultural and tree surgery practices.
  - 3. Replace each plant that dies as a result of construction activities.
  
- F. Existing Structures: Where Contractor contemplates removal of small structures such as mailboxes, signposts, and culverts that interfere with Contractor's operations, obtain approval of the Engineer. Replace those removed in a condition equal to or better than original.
  
- G. Finished Construction: Protect finished floors and concrete floors exposed as well as those covered with composition tile or other applied surfacing.
  
- H. Waterways: Keep ditches, culverts, and natural drainages continuously free of construction materials and debris.

- I. Dewatering: Construct, maintain, and operate cofferdams, channels, flume drains, sumps, pumps, or other temporary diversion and protection works. Furnish materials required, install, maintain, and operate necessary pumping and other equipment for the environmentally safe removal and disposal of water from the various parts of the Work. Maintain the foundations and parts of the Work free from water.

### 3.3 TEMPORARY CONTROLS

- A. Air Pollution Control: Comply with requirements of the Federal Clean Air Act and any and all governing local requirements.
- B. Noise Control: Provide acoustical barriers so noise emanating from tools or equipment will not exceed legal noise levels.
- C. Water Pollution Control: Comply with the NPDES General Permit and all requirements of the State of California, the County of Sonoma, and the Contract Documents.
- D. Erosion, Sediment, Runoff, and Flood Control
  1. Provide, maintain, and operate temporary facilities to control erosion and sediment releases, prevent runoff of contaminated or sediment laden water, and to protect Work and existing facilities from flooding during construction period.
  2. Comply with the NPDES General Permit for Storm Water Discharges associated with Construction Activity.

### 3.4 STORAGE YARDS AND BUILDINGS

- A. Temporary Storage Yards: Onsite storage of materials shall be limited to the staging areas indicated on the Drawings. Contractor shall obtain permission from the City prior to using any other location for temporary storage or stockpiling.
- B. Temporary Storage Buildings:
  1. No storage buildings will be allowed.
  2. No storage of combustible materials shall be permitted onsite other than what is being used or consumed that day.

### 3.5 ACCESS ROADS AND DETOURS

- A. No road detours are anticipated for the Work.
- B. Maintain drainage ways. Install and maintain culverts to allow water to flow beneath access roads. Provide corrosion-resistant culvert pipe of adequate strength to resist construction loads.
- C. Provide gravel, crushed rock, or other stabilization material to permit access by all motor vehicles at all times.
- D. Maintain road grade and crown to eliminate potholes, rutting, and other irregularities that restrict access.
- E. Coordinate with Engineer lane closures and other operations affecting traffic and access. Provide at least 72 hours' notice to the Engineer of operations that will alter access to the site.
- F. Upon completion of construction, leave roads and fences in same or better as pre-construction, and suitable for future use by the City.

### 3.6 PARKING AREAS

- A. Due to site constraints, Contractor shall provide parking facilities for personnel working on the Project in Contractor's parking area or other approved area. No employee or equipment parking will be permitted on the City's existing paved areas without prior approval. Any additional parking spaces required shall be the responsibility of the Contractor.

### 3.7 VEHICULAR TRAFFIC

- A. Refer to Section 7-1.03 "Public Convenience and Section "7-1.04, "Public Safety" of the State Standard Specifications.
- B. Full costs for "Maintaining Traffic", including "flagging Costs", shall be considered as included in the various items of work and no additional compensation will be made.
- C. Streets shall be open to through vehicular traffic during non-working hours. All public traffic shall be permitted to pass through the work with as little inconvenience and delay as possible.
- D. Comply with Laws and Regulations regarding closing or restricting the use of public streets or highways. No public or private road shall be closed, except by written permission of the Engineer. Assure the least possible obstruction to traffic and normal commercial pursuits.
- E. Prior to any anticipated road closure or detour, a traffic control plan and pedestrian traffic control plan prepared by a California licensed Civil or Traffic Engineer shall be submitted to the Engineer.
- F. No work shall commence until traffic control signing has been approved by the Engineer.
- G. The Contractor shall provide all materials, equipment, and labor necessary to furnish, place, and maintain all temporary traffic control systems and pedestrian control systems, including construction and maintenance area traffic control devices and flaggers as required to perform the Work.
- H. Conduct Work to interfere as little as possible with public travel, whether vehicular or pedestrian.
  - 1. Whenever it is necessary to cross, close, or obstruct roads, driveways, and walks, whether public or private, provide and maintain suitable and safe bridges, detours, or other temporary expedients for accommodation of public and private travel.
  - 2. Road Closures: Maintain satisfactory means of exit for persons residing or having occasion to transact business along the route of the Work. If it is necessary to close off roadway or alley providing sole vehicular access to property for periods greater than 2 hours, provide written notice to the Engineer so affected 3 days prior to such closure. In such cases, closings of up to 4 hours may be allowed. Closures of up to 10 hours may be allowed if a week's written notice is given and undue hardship does not result. Notification signs to the public including "No Parking" signs shall be posted at least 48 hours prior to Work in affected area.
  - 3. In making street crossings, do not block more than one-half the street at a time. Whenever possible, widen the shoulder on the opposite side to facilitate traffic flow. Provide temporary surfacing on shoulders as necessary.
- I. Whenever the Contractor's operations create a condition hazardous to the public, furnish, erect, and maintain such fences, barricades, lights, signs and other devices as are necessary to prevent accidents or damage or injury to the public.

- J. Maintain top of backfilled trenches before they are paved, to allow normal vehicular traffic to pass over. Provide temporary access for driveways where required. Cleanup operations shall follow immediately behind backfilling.
- K. When flaggers and guards are required by regulation or when deemed necessary for safety, furnish them with approved orange wearing apparel and other regulation traffic control devices complying with the provisions of the California MUTCD and State of California Department of Transportation Standard Specifications and Standard Plans.
- L. Coordination: Coordinate traffic routing with that of others working in the same or adjacent areas.
- M. Under no circumstances shall access to businesses or residences be held up more than 30 minutes at any one time. The Contractor may coordinate with property and business owners to schedule work so that longer delays do not adversely affect residents or business owners to their satisfaction. In addition, Contractor shall give personal notice to all affected property owners as specified in paragraph M, hereinbefore. Before closing any street to through traffic, Contractor shall obtain prior approval from the Engineer seven (7) days in advance of closure. Contractor shall at all times provide access to public facilities such as schools, etc. and make provisions for passage of emergency vehicles.
- N. Should the Contractor appear to be neglectful or negligent in furnishing warning and productive measures as above specified, the Engineer may direct attention to the existence of hazard, and the necessary warning and protective measures shall be furnished and installed by the Contractor at his expense, without cost to the City. Should the Engineer point out any inadequacy of warning and protective measures, such action on the part of the Engineer shall not relieve the Contractor from responsibility for public safety nor abrogate his obligation to furnish and pay for these devices
- O. The Contractor shall keep the Sonoma County Fire District informed regarding the closure or restriction of any traveled way. At a minimum, the Contractor shall call the Fire Department daily to report any traveled way closure. This requirement applies immediately upon closure for that day and again immediately after removal of the closure. For closures over multiple days, the daily notification still applies. This requirement does not apply for single lane closures on multiple lane local streets.

### 3.8 CLEANING DURING CONSTRUCTION

- A. General:
  - 1. Rubbish shall not be allowed to accumulate on the site and the Contractor shall collect and remove, from time to time, such rubbish and debris incident to the execution of the contract as, in the opinion of the Engineer, may be undesirable or disfiguring on the premises. The Contractor may not burn any material on the site. Wet down exterior surfaces prior to sweeping to prevent blowing of dust and debris.
  - 2. Provide approved containers for collection and disposal of waste materials, debris, and rubbish. At least at weekly intervals, dispose of such waste materials, debris, and rubbish offsite.
  - 3. At least weekly, brush sweep the entry drive and roadways, and all other streets and walkways affected by Work and where adjacent to Work. There will be times when sweeping will be required daily. Remove all mud and debris tracked onto roadway as soon as possible.
  - 4. Do not allow material to fall out of trucks onto any roadway when hauling away cleared and grubbed vegetation.



### 3.9 REMOVAL OF TEMPORARY FACILITIES AND UTILITIES

- A. At such time or times any temporary construction facilities and utilities are no longer required for the Work, Contractor shall notify the Engineer of his intent and schedule for removal of the temporary facilities and utilities, and obtain the Engineer's approval before removing the same. As approved, Contractor shall remove the temporary facilities and utilities from the site as his property and leave the site in such condition as specified, as directed by the Engineer, and/or as shown on the Plans.
- B. After completion of the project, all temporary utility services shall be disconnected or removed and all affected improvements shall be restored to their original condition by the Contractor at no cost to the City.
- C. The condition of the site shall be left in a condition that will restore original drainage, evenly graded, seeded or planted as necessary, and left with an appearance equal to, or better than original.

END OF SECTION

SECTION 01 60 00  
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

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

1.2 RELATED SECTION:

- A. Refer to Contract General Conditions for additional requirements.

1.3 PRODUCTS

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

1.4 PRODUCT DELIVERY REQUIREMENTS

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

## 1.5 PRODUCT STORAGE AND HANDLING REQUIREMENTS

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

## 1.6 STORAGE FACILITIES

- A. Temporary Storage Building:
  - 1. Provide a weather-proof temporary storage building or other secure facility specifically for the purpose of providing for protection of products and equipment.
  - 2. Equip building with lockable doors and lighting and provide electrical service for equipment space heaters and heating or ventilation as necessary to provide storage environments acceptable to specified manufacturers.
  - 3. Provide method of storage of products and equipment off the ground.

## 1.7 PRODUCT OPTIONS

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

## 1.8 PRODUCT SUBSTITUTION PROCEDURES

- A. Engineer will consider requests for Substitutions only within 60 days after date of Owner-Contractor Agreement.
- B. Substitutions may be considered when a product becomes unavailable through no fault of Contractor.
- C. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.
- D. A request constitutes a representation that Contractor:
  - 1. Has investigated proposed product and determined that it meets or exceeds quality level of specified product.
  - 2. Will provide same warranty for Substitution as for specified product.
  - 3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.
  - 4. Waives claims for additional costs or time extension which may subsequently become apparent.
  - 5. Will reimburse Owner for review or redesign services associated with re-approval by authorities having jurisdiction.
- E. Substitutions will not be considered when they are indicated or implied on Shop Drawing or Product Data submittals, without separate written request, or when acceptance will require revision to Contract Documents.
- F. Substitution Submittal Procedure:
  - 1. Submit three copies of request for Substitution for consideration. Limit each request to one proposed Substitution.
  - 2. Submit Shop Drawings, Product Data, and certified test results attesting to proposed product equivalence. Burden of proof is on proposer.
  - 3. Engineer will notify Contractor in writing of decision to accept or reject request.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

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SECTION 01 70 00

PROJECT CLOSEOUT

PART 1 GENERAL

1.1 FINAL CLEANUP

- A. The Contractor shall promptly remove all rubbish, debris, unused materials, concrete forms, construction equipment, and temporary structures and facilities used during construction. The Contractor may not burn any material on the site. Final acceptance of the Work by the City will be withheld until the Contractor has satisfactorily complied with the foregoing requirements for final cleanup of the project site.

1.2 CLOSEOUT TIMETABLE

- A. The Contractor shall establish dates for equipment testing, acceptance periods, (as required under the Contract). Such dates shall be established not less than two weeks prior to beginning any of the foregoing items, to allow the City, the Engineer, and their authorized representatives and consultants sufficient time to schedule attendance at such activities.
- B. All temporary buildings, including field offices, storage buildings, and sheds shall be removed from the project site seven (7) days after completion of the Work. All temporary services such as water, power, utilities, service contracts, pager contracts, telephones, and other temporary services shall remain in service for seven (7) days following approval of substantial completion of the Work by the City and shall be discontinued within seven (7) days after.

1.3 FINAL INSPECTION

- A. The Contractor shall notify the Engineer at least ten (10) working days prior to the anticipated date of completion of all work specified in the contract. Upon completion of the work, the Engineer shall proceed with final inspection and shall complete such inspection as promptly as practicable. The time required for such inspection and the making of any corrections as a result thereof shall be included in the contract performance time.

1.4 FINAL SUBMITTALS

- A. The Contractor, prior to requesting its final progress payment, shall submit the following items to the Engineer:
  - 1. Written guarantees or warranties.
  - 2. Certificates of compliance.
  - 3. Completed final Record Drawings.
  - 4. Certificates of inspection and acceptance by local governing agencies having jurisdiction.

1.5 COMPLETION OF THE WORK

- A. The date of substantial completion of the Project shall be the date when the construction is sufficiently completed, in accordance with the Contract Documents, as modified by any change orders agreed to by the parties, so that the City can occupy or utilize the project for the use for which it was intended, and the City has accepted the Project.

1.6 REMAINING PUNCH LIST ITEMS

- A. Upon attaining substantial completion and upon acceptance of the Work by the City, by agreement between the parties some small remaining punch list items may remain to be completed by the Contractor.
- B. Failure of the Contractor to complete or correct all such outstanding punch list work to the satisfaction of the Engineer shall constitute a waiver by the Contractor of all rights to any and all claims it may have to all monies withheld by the City under the Contract to cover the value of such uncompleted or uncorrected items.

1.7 MAINTENANCE, CORRECTION AND REPAIR PERIOD

- A. The Contractor shall comply with the correction and repair requirements contained in the General Conditions.
- B. Replacement of earth fill or backfill, where it has settled below the required finish elevations, shall be considered as a part of such required repair work, and any repair or resurfacing constructed by the Contractor which becomes necessary by reason of such settlement shall likewise be considered as a part of such required repair work unless the Contractor shall have obtained a statement in writing from the affected private owner or public agency releasing the City from further responsibility and liability in connection with such repair or resurfacing.
- C. The Contractor shall make all repairs and replacements promptly upon receipt of written order from the City. If the Contractor fails to make such repairs or replacements promptly, the City reserves the right to do the work or to have the work done by others and the Contractor and its Surety shall be liable to the City for the cost thereof.

1.8 ACCEPTANCE AND FINAL PAYMENT

- A. Final acceptance is the allowance of final estimates by the Contracting Officer. The Engineer shall certify to the Contracting Officer that the contract is complete and include with the certification the amount of the final payment due the Contractor. All progress or partial payments made prior to the final payment are subject to correction in the final estimate and payment.

1.9 RELEASE OF CLAIMS

- A. After completion of work, and prior to final payment, the Contractor shall furnish to the Contracting Officer a release of claims Form DI-137, properly executed by the Contractor, releasing claims against the United States arising out of the contract, other than claims specifically excepted from the operation of the release.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01 72 00

RECORD DOCUMENTS

PART 1 GENERAL

1.1 SUBMITTALS

- A. Quality Control Submittals: Written procedures for maintaining and markup of record documents. Contract description.
- B. Contract Closeout Submittal: Record Documents in accordance with the requirements of this section. Submit prior to application for final payment.

1.2 RELATED SECTIONS

- A. Section 01 33 00 - Submittals

1.3 QUALITY ASSURANCE

- A. Furnish a qualified and experienced person, whose duty and responsibility shall be to maintain record documents.
- B. Accuracy of Records:
  - 1. Coordinate changes within record documents, making neat, legible and accurate entries on each page of Specifications and each sheet of Drawings and other documents where such entry is required to show change.
  - 2. Purpose of project record documents is to provide factual information regarding aspects of Work, both concealed and visible, to enable future modification of Work to proceed without lengthy and expensive site measurement, investigation, and examination.
- C. Make entries within 24 hours after receipt of information that a change in Work has occurred.
- D. Prior to submitting each request for progress payment, request Engineer's review and approval of current status of record documents. Failures to properly maintain, update, and/ or submit record documents may result in return of Contractor's Application for Progress Payment by Engineer.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Maintain record documents completely protected from deterioration, loss, and damage until completion of Work.
- B. In event of loss of recorded data, use means necessary to again secure data to Engineer's acceptance. Such means shall include, if necessary in Engineer's opinion, removal and reconstruction of covering materials, at no additional cost to the City.

PART 2 PRODUCTS

2.1 Not Used



## PART 3 EXECUTION

### 3.1 MAINTENANCE OF RECORD DOCUMENTS

- A. General:
  - 1. Label or stamp each record document with title, "Record Documents," in neat large printed letters.
  - 2. Record information concurrently with construction progress and within 24 hours after receipt of information that change has occurred. Do not cover or conceal Work until required information is recorded.
  
- B. Preservation
  - 1. Maintain documents in a clean, dry, legible condition and in good order. Do not use record documents for construction purposes.
  - 2. Make documents and Samples available at all times for observation by Engineer.
  
- C. Making Entries on Drawings
  - 1. Using an erasable colored pencil (not ink or indelible pencil), clearly describe change by graphic line and note as required.  
Color Coding:
    - a. Green when showing information deleted from Drawings.
    - b. Red when showing information added to Drawings.
    - c. Blue and circled in blue to show notes.
  - 2. Date entries.
  - 3. Call attention to entry by "cloud" drawn around area or areas affected.
  - 4. Legibly mark to record actual changes made during construction, including, but not limited to:
    - a. Depths of various elements of foundation in relation to finished first floor data if not shown or where depth differs from that shown.
    - b. Horizontal and vertical locations of existing and new underground facilities and appurtenances, and other underground structures, equipment, or Work. Reference to at least two measurements of permanent surface improvements.
    - c. Location of internal utilities and appurtenances concealed in the construction referenced to visible and accessible features of the structure.
    - d. Locate existing facilities, piping, equipment, and items critical to the interface between existing physical conditions or construction and new construction.
    - e. Changes made by Addenda and Field Orders, Work Change Directive, Change Order, Written Amendment, and Engineer's written interpretation and clarification using consistent symbols for each and showing appropriate document tracking number.
  - 5. Dimensions on Schematic Layouts: Show on record drawings, by dimension, the centerline of each run of items such as are described in previous subparagraph above.
    - a. Clearly identify the item.
    - b. Show, by symbol or note, vertical location of item ("under slab," "in ceiling plenum," "exposed," and the like).
    - c. Make identification so descriptive that it may be related reliably to Specifications.
  
- D. Make entries in other pertinent documents as accepted by Engineer.

END OF SECTION

SECTION 01 73 00

OPERATION AND MAINTENANCE DATA

PART 1 GENERAL

1.1 OPERATION AND MAINTENANCE

- A. The Operation and Maintenance Manual Data for each piece of equipment must be submitted and favorably reviewed by the Engineer prior to final acceptance. Three (3) copies of the favorably reviewed Operation and Maintenance Manual shall be provided.
- B. The manual shall be bound in a 3-ring binder with rigid covers, marked to indicate the specific equipment furnished for this project, and shall utilize tab sheets to organize the information. Operation and maintenance manual shall include:
  - 1. Cover Page: Equipment Name, equipment tag number, project name, Owner's name, and other data as appropriate.
  - 2. Laminated Table of Contents: General description of information provided within each tab section.
  - 3. Lubrication Information: Required lubricants and lubrication schedules.
  - 4. Control Diagrams: Internal and connection wiring, including logic diagrams, wiring diagrams for control panels, ladder logic for computer-based systems, and connections between existing systems and new additions, and adjustments such as calibrations and set points for relays, and control or alarm contact settings.
  - 5. Start-up Procedures: Recommendations for installation, adjustment, calibration, and troubleshooting.
  - 6. Operating Procedures:
    - a. Step-by-step procedures for starting, operating, and stopping equipment under specified modes of operation.
    - b. Include safety precautions and emergency operating shutdown instructions.
  - 7. Preventative Maintenance Procedures: Recommended steps and schedules for maintaining equipment.
  - 8. Overhaul Instructions: Directions for disassembly, inspection, repair and reassembly of the equipment; safety precautions; and recommended tolerances, critical bolt torques, and special tools that are required.
  - 9. Parts List: Generic title and identification number of each component part of equipment; include bearing manufacturer, model and ball or roller pass frequencies for every bearing.
  - 10. Spare Parts List: Recommended number of parts to be stored at the site and special storage precautions.
  - 11. Drawings: Exploded view or plan and section views with detailed callouts.
  - 12. Provide electrical and instrumentation schematic record drawings.
  - 13. Source (Factory) Quality Control Test Results: Provide copies of factory test reports as specified in the Technical Specifications.
  - 14. Field Quality Control Test Results: After field testing is completed, insert field test reports as specified in the Technical Specifications.
  - 15. Equipment Summary Form: Completed form in the format attached below. Insert Equipment Summary Form after the tab sheet of each equipment section. The manufacturer's standard form will not be acceptable. Manual submitted without equipment summary form fully completed, including equipment identification number, will be rejected and returned.

### Equipment Summary Form

1. Equipment Item: \_\_\_\_\_  
Is it a packaged unit, i.e. pump, motor, shaft?      Yes \_\_\_\_\_      No \_\_\_\_\_  
If yes, please detail. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. How many: \_\_\_\_\_

3. Cost: \_\_\_\_\_

4. Manufacturer: \_\_\_\_\_  
Address: \_\_\_\_\_  
Phone #: \_\_\_\_\_      Fax: \_\_\_\_\_  
Email: \_\_\_\_\_      Website: \_\_\_\_\_

5. Equipment Identification Numbers:  
Serial Number: \_\_\_\_\_  
Model: \_\_\_\_\_  
Part #: \_\_\_\_\_

6. Location of Equipment: \_\_\_\_\_

7. Weight of Individual Components (Over 100 Pounds): \_\_\_\_\_  
\_\_\_\_\_

8. Nameplate Data:  
Horsepower: \_\_\_\_\_      RPM: \_\_\_\_\_  
Amperage: \_\_\_\_\_      Size: \_\_\_\_\_  
Voltage: \_\_\_\_\_      Frame Size: \_\_\_\_\_  
  
Service Factor (S.F.): \_\_\_\_\_      Seal Size: \_\_\_\_\_  
Speed: \_\_\_\_\_      Seal Type: \_\_\_\_\_  
Enclosure Type: \_\_\_\_\_      Bearings: \_\_\_\_\_  
GPM: \_\_\_\_\_      Impeller Size: \_\_\_\_\_  
Maximum Capacity @ \_\_\_\_\_ ft TDH      Other: \_\_\_\_\_  
Design Point Capacity @ \_\_\_\_\_ ft TDH

9. Manufacturer's Local Representative:  
Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
Telephone Number: \_\_\_\_\_  
Email: \_\_\_\_\_      Website: \_\_\_\_\_

10. Maintenance Requirements (including schedules):

TASK	SCHEDULE

11. Lubricant List:


12. Spare Parts (with accurate part #'s):


12. Comments:

\_\_\_\_\_

13. General Info:

Year Installed: \_\_\_\_\_

Project Name & Number: \_\_\_\_\_

Design Engineer: \_\_\_\_\_

14. Warranty:

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

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

Prorated: \_\_\_\_\_

END OF SECTION

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## SECTION 01 74 19

### CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
  - 1. Recycling nonhazardous construction waste.
  - 2. Disposing of nonhazardous demolition and construction waste.
- B. Related Sections:
  - 1. Section 02 41 10 - Demolition, Salvage and Abandonment: for disposition of waste resulting from site demolition activities.

##### 1.2 DEFINITIONS

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

##### 1.3 PERFORMANCE REQUIREMENTS

- A. Construction Waste:
  - 1. Site-clearing and demolition waste.
  - 2. Soils.
  - 3. Concrete and asphalt.
  - 4. Lumber.
  - 5. Wood sheet materials.
  - 6. Metals.
  - 7. Piping and fittings.
  - 8. Electrical conduit.
  - 9. Packaging: Regardless of salvage/recycle goal indicated in paragraph above, salvage or recycle 100 percent of the following uncontaminated packaging materials:
    - a. Paper.
    - b. Cardboard.

- c. Boxes.
  - d. Plastic sheet and film.
  - e. Polystyrene packaging.
  - f. Wood crates.
  - g. Plastic pails.
  - h. HI-5 beverage containers.
10. A minimum of 50% of the non-hazardous waste generated at the site shall be diverted to an off-site recycle, diversion, or salvage facility.

#### 1.4 ACTION SUBMITTALS

- A. Waste Management Plan: Submit plan within 7 days of date established for the Notice to Proceed.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Waste Reduction Report: Concurrent with final Application for Payment, submit report. Include the following information:
1. Material category.
  2. Generation point of waste.
  3. Total quantity of waste in tons.
  4. Quantity of waste salvaged, both estimated and actual in tons.
  5. Quantity of waste recycled, both estimated and actual in tons.
  6. Total quantity of waste recovered (salvaged plus recycled) in tons.
  7. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.
- B. Waste Reduction Calculations: Before request for Substantial Completion, submit calculated end-of-Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.
- C. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- D. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

#### 1.6 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

#### 1.7 WASTE MANAGEMENT PLAN

- A. General: Develop a waste management plan according to ASTM E 1609 and requirements of this Section. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.

## PART 2 - PRODUCTS (NOT USED)

## PART 3 - EXECUTION

### 3.1 PLAN IMPLEMENTATION

- A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
  - 1. Comply with Division 01 Section "Temporary Facilities and Controls" for operation, termination, and removal requirements.
- B. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project site.
  - 1. Distribute waste management plan to everyone concerned within three days of submittal return.
  - 2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.
- C. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
  - 1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
  - 2. Comply with Division 01 Section "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

### 3.2 RECYCLING CONSTRUCTION WASTE, GENERAL

- A. General: Recycle paper and beverage containers used by on-site workers.
- B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Contractor.
- C. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.
- D. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.
  - 1. Provide appropriately marked containers or bins for controlling recyclable waste until they are removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
    - a. Inspect containers and bins for contamination and remove contaminated materials if found.
  - 2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
  - 3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
  - 4. Store components off the ground and protect from the weather.



5. Remove recyclable waste off Owner's property and transport to recycling receiver or processor.

### 3.3 RECYCLING CONSTRUCTION WASTE

- A. Packaging:
  1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
  2. Polystyrene Packaging: Separate and bag materials.
  3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
  4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.
- B. Site-Clearing Wastes:
  1. No burning of brush or any other materials will be allowed on the site.
  2. Any and all organic material that has been cleared and grubbed must be stockpiled and composted such that seeds of invasive species by the heat of composting over a period of six to nine months. Composted material shall be used as organic mulch in accordance with Division 32 Section "Plants".
- C. Wood Materials:
  1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
  2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.

### 3.4 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
  1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
  2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn waste materials.
- C. Disposal: Transport waste materials off Owner's property and legally dispose of them.
- D. Washing out of concrete trucks shall be limited to temporary concrete washout areas indicated on the Drawings.

END OF SECTION

SECTION 02 01 00

SITE CONDITIONS

PART 1 GENERAL

1.1 DESCRIPTION

- A. General: All information obtained by the Engineer regarding site conditions, subsurface information, groundwater elevations, existing construction of site facilities, and existing underground utilities and similar data are shown on the Drawings, or are available for review in the Geotechnical Investigation Report (Soils Report). See Section 02 32 00, "Geotechnical Investigation Data" for Soils Report(s) prepared for the project.
- B. Investigations conducted by a geotechnical Engineer of subsurface conditions were made for the purpose of study and design, and neither the City's Representative nor the City assume any responsibility whatever with respect to the sufficiency or accuracy of borings, or of the Log of Test Borings, or of other investigations that have been made, or of the interpretations made thereof, and there is no warranty or guarantee, either expressed or implied, that the conditions indicated by such investigations are representative of those existing throughout such area, or any part thereof, or that unlooked for developments may not occur.
- C. This Geotechnical Investigation is not part of the Contract Documents but the technical data contained therein upon which Bidder is entitled to rely are incorporated therein by reference. Such technical data is boring method, location and logs; and laboratory test methods and results.
- D. Any logs of test borings or topographic maps showing a record of the data obtained by the City's Representative's investigations of surface and subsurface conditions that are made available or bound herewith shall be considered a part of the Contract Documents. Said logs represent the opinion of the City's Representative as to the character of the materials encountered by them in their investigations.
- E. Information derived from inspection of logs of test borings, of topographic maps, or from plans showing locations of utilities and structures will not in any way relieve the Contractor from any risk, or from properly examining the site and making such additional investigations as he may elect, or from properly fulfilling all the terms of the Contract Documents.
- F. Related Work described elsewhere:
  - 1. Section 02 01 10 - Existing Utilities and Underground Structures
  - 2. Section 02 32 00 - Geotechnical Investigation Data
  - 3. Section 31 00 00 - Earthwork

1.2 CONTRACTOR'S RESPONSIBILITIES

- A. The Contractor shall satisfy himself as to the nature and location of the Work, the general and local conditions, particularly those bearing upon availability of transportation, disposal, handling and storage of materials, availability of labor, water, sanitary sewer, electric power, communications, roads, and uncertainties of weather, river stages, or similar physical conditions at the site, the conformation and conditions of the ground, the character of equipment facilities needed preliminary to and during the prosecution of the Work and all other matters which can in any way affect the Work or the cost thereof under this Contract.
- B. The Contractor shall further satisfy himself as to the character, quality, and quantity of surface and subsurface materials to be encountered by inspecting the site as well as, any exploratory

work performed by the City's Representative, and information presented by the plans and specifications made as part of this Contract. Any failure by the Contractor to acquaint himself with all available information will not relieve him from responsibility for properly estimating the difficulty or cost of successfully performing the Work.

- C. The Contractor shall anticipate underground obstructions such as utility lines, foundations, groundwater, stumps, varying soil conditions, and debris. No extra payment will be allowed for the removal, replacement, repair, or possible increased cost caused by underground obstructions indicated in the Contract Documents. Any such lines or obstructions indicated on the Drawings show only the approximate location and must be verified in the field by the Contractor.
- D. The Contractor shall note that portions of the existing road surfaces are not in structural sections and that heavy truck and equipment operations may cause road surface damage in excess of normal usage. If damage does occur due to construction activity, the Engineer shall be notified immediately before proceeding with the Work, or causing more damage to occur. Damage caused to the existing asphalt road surface by Contractor's operations shall be repaired per Sonoma County standards.

### 1.3 ADDITIONAL INFORMATION

- A. Prior to bidding, bidders may make their own subsurface investigations subject to time schedules and arrangements approved in advance by the City. Before any subsurface test holes are excavated, obtain clearance from City.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 02 01 10

EXISTING UTILITIES AND UNDERGROUND STRUCTURES

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes: Contractor is responsible for locating and protecting existing utilities, facilities and underground structures. Responsibilities shall include but are not limited to those defined in this section.
- B. Refer to Drawings for the approximate locations of utilities and underground structures.

1.2 GENERAL

- A. The Contractor shall protect all existing utilities and improvements not designated for removal, and shall restore damaged or temporarily relocated utilities and improvements to a condition equal to or better than they were prior to such damage or temporary relocation, all in accordance with requirements of the Contract Documents.
- B. The approximate locations of known existing utilities are shown in the Drawings. The Contractor shall verify the location of existing utilities at least 2 working days but no more than 14 calendar days prior to the beginning excavation by notifying Underground Services Alert (USA) at (800) 642-2444 or 811. The Contractor shall notify the Engineer of any utilities not shown in the Drawings or substantially different from the Drawings. The Contractor shall make exploratory excavations of all utilities including those not shown in the Drawings that may interfere with the Work. All such exploratory excavations shall be performed as soon as practicable after award of the Contract and, in any event, a sufficient time in advance of construction to avoid possible delays to the Contractor's Work.
- C. The number of exploratory excavations required shall be that number which is sufficient to determine the alignment and grade of the utility.

1.3 CALIFORNIA ADMINISTRATIVE CODE

- A. Section 1540(a)1 of Construction Safety Orders (Title 8) California Administrative Code, Section 1540 states:
  - 1. (1) "Prior to opening and excavation, effort shall be made to determine whether underground installations; i.e., sewer, water, fuel, electric lines, etc., will be encountered and, if so, where such underground installations are located. When the excavation approaches the approximate location of such an installation, the exact location shall be determined by careful probing or hand digging; and, when it is uncovered, adequate protection shall be provided for the existing installation. All known owners of underground facilities in the area concerned shall be advised of proposed Work at least 48 hours prior to the start of actual excavation."
- B. The City and Engineer have determined the approximate location of public utilities and underground structures as well as existing mapping permits. However, in accordance with California's Administrative Code, Section 1540, the Contractor shall make the effort to determine the exact location of underground installations.

#### 1.4 PUBLIC UTILITIES AND AGENCIES AFFECTED

- A. General, For underground utility location call Underground Service Alert (USA) at (800) 642-2444 or 811.
- B. Electrical, Pacific Gas & Electric Company has jurisdiction over gas and electrical power - Call: (707) 468-3954 a minimum of 48 hours prior to any excavation within 10 feet of existing electrical and gas lines. It should be noted that where a structure is known to receive service and does not have overhead service, then underground service shall be assumed to exist. For underground utility location call Underground Service Alert (USA) at (800) 227-2600.
- C. Telephone Service, AT&T - Call: (415) 499-4900. It should be noted that where service to a structure is known to receive service and does not have overhead service, then underground service shall be assumed to exist. For assistance with location of underground telephone facilities, call U.S.A. at (800) 227-2600.
- D. Communications, Comcast - Call: (925) 424-0278.
- E. Water Service, City of Petaluma - Call: (707) 778-4507.
- F. Sanitary Sewer Service, City of Petaluma - Call: (707) 778-4303.
- G. Storm Drainage, County of Sonoma - Call: (707) 565-2268.

#### 1.5 PROTECTION OF STREET OR ROADWAY MARKERS

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

#### 1.6 RESTORATION OF PAVEMENT

- A. General. All paved areas, including asphalt concrete berms cut or damaged during construction, shall be replaced with similar materials and of a thickness equal to the existing plus 1 inch or 6 inches, whichever is greater, except where specific resurfacing requirements have been called for in the Contract Documents. Restoration of paved areas shall be in accordance with the requirements of Sonoma County standards and State of California, Department of Transportation (Caltrans) Specifications and Standards Section 39 Asphalt Concrete. All pavements that are subject to partial removal shall be neatly sawcut in straight lines.
- B. Temporary Resurfacing. The Contractor shall place temporary surfacing promptly after backfilling and shall maintain such surfacing until final restoration of improvements.
- C. Permanent Resurfacing. Damaged edges of pavement along excavations and elsewhere shall be trimmed back by saw cutting in straight line to provide a clean, sound, vertical joint before permanent replacement of an excavated or damaged portion of pavement. All pavement restoration and other facilities restoration shall be constructed to finish grades compatible with adjacent undisturbed pavement and other facilities (i.e., valve lids, manhole covers, etc). The Contractor shall replace damaged pavement striping in kind.

- D. Restoration of Sidewalks. Wherever sidewalks have been removed for purposes of construction, the Contractor shall place suitable temporary sidewalks promptly after backfilling and shall maintain them in satisfactory condition until the final restoration there has been made.

#### 1.7 EXISTING UTILITIES AND IMPROVEMENTS

- A. General. The Contractor shall protect all existing underground utilities and other improvements that may be impaired during construction operations. It shall be the Contractor's responsibility to ascertain the actual location of all existing utilities and other improvements that will be encountered in its construction operations, and to see that such utilities or other improvements are adequately protected from damage due to such operations. The Contractor shall take all possible precautions for the protection of unforeseen utility lines to provide for uninterrupted service and to provide such special protection as may be necessary.
- B. Utilities to be moved. In case it shall be necessary to move the property of any public utility or franchise holder, such utility company or franchise holder will, upon request of the Contractor, be notified by the City to move such property. Time of relocation of the utility by the utility company is not a responsibility of the City. When utility lines that are to be removed are encountered within the area of operations, the Contractor shall notify the Engineer a sufficient time in advance for the necessary measures to be taken to prevent interruption of service.
- C. Where the proper completion of the Work requires the temporary or permanent removal and/or relocation of an existing utility or other improvement that is indicated, the Contractor shall remove and, without unnecessary delay, temporarily replace or relocate such utility or improvement in a manner satisfactory to the Engineer and the City of the facility. In all cases of such temporary removal or relocation, restoration to former location shall be accomplished by the Contractor in a manner that will restore or replace the utility or improvement as nearly as possible to its former location and to equal or better condition as found prior to removal.
- D. City's Right of Access. The right is reserved to the City and to the owners of public utilities and franchises to enter at any time upon any public street, alley, right-of-way, or easement for the purpose of making changes in their property made necessary by the Work of this Contract.
- E. Underground Utilities Indicated. Existing utility lines that are indicated or the locations of which are made known to the Contractor prior to excavation and that are to be retained, and all utility lines that are constructed during excavation operations shall be protected from damage during excavation and backfilling, and if damaged, shall be immediately repaired or replaced by the Contractor to the satisfaction of the Engineer.
- F. Underground Utilities not Indicated. In the event that the Contractor damages any existing utility lines that are not indicated or the locations of which are not made known to the Contractor prior to excavation, a written report there-of shall be made by the Contractor to the City.
- G. All costs of locating, repairing damage not due to failure of the Contractor to exercise reasonable care, and removing or relocating such utility facilities not shown in the Contract documents with reasonable accuracy, and for equipment on the project which was actually working on that portion of the Work which was interrupted or idled during such Work will be paid for as extra Work.
- H. Approval of Repairs. All repairs to a damaged utility or improvement are subject to inspection and approval by an authorized representative of the utility or improvement City before being concealed by backfill or other Work. Contractor to schedule with City for all inspections.

- I. Maintain In Service. All power and telephone or the communication cable ducts, gas and water mains, irrigation lines, sanitary sewer lines, storm drain lines, poles, and overhead power and communication wires and cables encountered along the line of Work shall remain continuously in service during all the operations under the Contract, unless other arrangements satisfactory to the Engineer are made with the City of said pipelines, duct, main, irrigation lines, sanitary sewer, storm drain, pole, or wire or cable. The Contractor shall be responsible for and shall repair all damage due to its operations, and the provisions of this section shall not be abated even in the event such damage occurs after backfilling or is not discovered until after completion of the backfilling.

## 1.8 TREES WITHIN STREET RIGHTS-OF-WAYS AND PROJECT LIMITS

- A. General. The Contractor shall exercise all necessary precautions so as not to damage or destroy any trees or shrubs, including those lying within street rights-of-way and project limits, and shall not trim or remove any trees unless such trees have been approved for trimming or removal by the City. All existing trees and shrubs that are damaged during construction shall be trimmed or replaced by the Contractor or a certified tree company under permit from the City. Tree trimming and replacement shall be accomplished in accordance with the following paragraphs.
- B. Trimming. Symmetry of the tree shall be preserved; no stubs or splits or torn branches left; clean cuts shall be made close to the trunk or large branch. Spikes shall not be used for climbing live trees. All limbs over 1-1/2 inches in diameter shall be coated with an asphaltic emulsion material.
- C. Replacement. The Contractor shall immediately notify the City if any tree is damaged by the Contractor's operations. If, in the opinion of the City, the damage is such that replacement is necessary, the Contractor shall replace the tree at its own expense. The tree shall be of a like size and variety as the tree damaged, or, if of a smaller size, the Contractor shall pay to the City of said tree a compensatory payment acceptable to the tree City, subject to the approval of the jurisdictional agency or City. The size of the trees shall be not less than 1-inch diameter nor less than 6 feet in height.

## 1.9 NOTIFICATION BY THE CONTRACTOR

- A. Prior to any excavation in the vicinity of any existing underground facilities, including all water, sanitary sewer, storm drain, gas, or other pipelines; all buried electric power, communications, or television cables; all traffic signal and street lighting facilities; and all roadway; the Contractor shall notify the respective authorities representing the owners or agencies responsible for such facilities not less than three (3) days nor more than seven (7) days prior to excavation so that a representative of said owners of agencies can be present during such Work if they so desire. The Contractor shall also notify USA at (800) 227-2600 at least 2 working days, but no more than 14 calendar days, prior to such excavation.

## PART 2 PRODUCTS (NOT USED)

## PART 3 EXECUTION

### 3.1 CONTRACTOR RESPONSIBILITY

- A. The Contractor shall anticipate work along existing water, sanitary sewer, electrical, gas, communication, drainage and telephone services. It may be expected that there will be variation in location from that as shown on the Drawings to the actual location. Contractor

responsible for verifying actual location in the field after pre-marking by the various utilities affected.

- B. No extra payment will be allowed for the removal, replacement, repair, or possible increased cost caused by inadvertent or planned interception and breaking of underground obstructions which may exist.
- C. It should be understood that the various utilities are indicated on the Drawings to show only the approximate location and must be verified in the field by the Contractor. The various utility agencies will cooperate with the Contractor to endeavor to familiarize him with all known underground utilities obstructions, but this will not relieve the Contractor from full responsibility in anticipating and locating their actual location.
- D. The Contractor, in conjunction with the affected utility company(s), shall pothole and establish the horizontal and vertical location of all utilities shown on the Drawings and marked in the field. This may be done on an area-by-area basis, but shall be accomplished at least five working days in advance of the date of construction within such area. Any discrepancies (horizontal and/or vertical) between the location of a utility found by the potholing operation than that shown on the Drawings shall be brought to the Engineer's attention immediately. Potholing shall be required at the connection to existing facilities prior to the shop drawing submittals.

### 3.2 PRIOR INVESTIGATION

- A. Prior to bidding, each bidder shall make his own subsurface investigations, talk to the various utilities affected to secure, for his own information, the knowledge of each utility with the precise location of their facilities so that he may take into account in his bid the difference in location from that believed to exist to that which may actually prove to be the precise location.

END OF SECTION



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SECTION 02 32 00

GEOTECHNICAL INVESTIGATION DATA

PART 1 GENERAL

1.1 GEOTECHNICAL INVESTIGATION

- A. A soil and subsurface investigation was conducted for the project, and the results and recommendations are contained in the following report:
  - 1. Title: Final Geotechnical Investigation Report, Proposed Recycled Water Pipeline Project, Adobe Road, Petaluma California  
Date: February 24, 2020.  
Author: Kleinfelder.
- B. An electronic copy of the geotechnical investigation report is included with this specification.
- C. Hard copy reproductions of information will NOT be available or made at the office of the Engineer.
- D. This report of explorations and tests of subsurface conditions at the site has been utilized by the Engineer in preparation of the Contract Documents. Bidder may rely upon the accuracy of the "technical" data contained in such reports but not upon nontechnical data, interpretations or opinions contained therein or for the completeness thereof for the purposes of bidding or construction.
- E. This Geotechnical Investigation is not part of the Contract Documents but the technical data contained therein upon which Bidder is entitled to rely are incorporated therein by reference. Such technical data is boring method, location and logs; and laboratory test methods and results.
- F. Before submitting a Bid, each Bidder will, at Bidder's own expense, make or obtain any additional examinations, investigations, explorations, tests and studies and obtain any additional information and data, which pertain to the physical conditions, surface or subsurface, at or contiguous to the site or otherwise which may affect cost, progress, performance or furnishing of the Work and which Bidder deems necessary to determine its Bid for performing and furnishing the Work in accordance with the time, price and other terms and conditions of the Contract Documents.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

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February 24, 2020  
Project No. 20193762.003A

Mr. Dan Herrera, PE  
Senior Civil Engineer  
**City of Petaluma**  
**Public Works and Utility Department**  
202 N. McDowell Blvd.  
Petaluma, CA 94954

**Subject: Final Geotechnical Investigation Report  
Proposed Recycled Water Pipeline Project  
Adobe Road  
Petaluma, California**

Dear Mr. Herrera:

Kleinfelder is pleased to present the results of our geotechnical investigation for the proposed 16-inch-diameter recycled water pipeline project to be constructed along Adobe Road between Frates Road and Hamilton Road in Petaluma, California. Prior to this report, Kleinfelder prepared a draft Geotechnical Investigation Report (GIR), dated October 22, 2019. This final report addresses review comments provided by the City of Petaluma on our draft GIR regarding questions about the work zones for the proposed trenchless crossings.

Kleinfelder prepared a supplemental memorandum dated February 24, 2020 that includes graphics depicting preliminary, schematic trenchless crossing geometry and work zones for each of the proposed crossings. We understand the memorandum will be used solely by the City of Petaluma in order to aid in their environmental assessment and land access process.

It is our understanding that the construction of this water pipeline will be implemented using both open cut and trenchless methods. The purpose of this study was to evaluate the subsurface conditions near the proposed trenchless crossing areas (beneath roadways and creeks) in order to characterize the subsurface materials likely to be encountered during trenchless construction activities and to assist in evaluating appropriate trenchless methods. Specific recommendations regarding the geotechnical aspects of project design and construction are presented in the following report.

Respectfully submitted,

**KLEINFELDER, INC.**

Martin J. Pucci, PE  
Senior Engineer

William V. McCormick  
Sr. Principal Engineering Geologist

Kenneth G. Sorensen, PE, GE  
Sr. Principal Geotechnical Engineer



**FINAL GEOTECHNICAL INVESTIGATION REPORT  
PROPOSED RECYCLED WATER PIPELINE PROJECT  
ADOBE ROAD  
PETALUMA, CALIFORNIA**

**FEBRUARY 24, 2020**

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**ONLY THE CLIENT OR ITS DESIGNATED REPRESENTATIVES MAY USE THIS DOCUMENT AND ONLY FOR THE SPECIFIC  
PROJECT FOR WHICH THIS REPORT WAS PREPARED.**

A Report Prepared for:

Mr. Dan Herrera, PE  
Senior Civil Engineer  
**City of Petaluma**  
**Public Works and Utility Department**  
202 N. McDowell Blvd.  
Petaluma, CA 94954

**Final Geotechnical Investigation Report**  
**Proposed Recycled Water Pipeline Project**  
**Adobe Road**  
**Petaluma, California**

Prepared by:



Martin J. Pucci, PE  
Senior Engineer



Kenneth G. Sorensen, PE, GE  
Sr. Principal Geotechnical Engineer

Reviewed By:



William V. McCormick  
Sr. Principal Engineering Geologist

**KLEINFELDER**  
2240 Northpoint Parkway  
Santa Rosa, California 95407  
Phone: 707.571.1883  
Fax: 707.571.7813

February 24, 2020  
Project No. 20193762.003A

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## 1 EXECUTIVE SUMMARY

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The proposed 16-inch-diameter recycled water pipeline construction project is located along the north and east sides of Adobe Road between Frates Road and Hamilton Road in Petaluma, California. The project will consist of four (4) trenchless crossings of seasonal drainage channels. The drainage located near the Frates Road and Adobe Road intersection is relatively narrow and shallow. It appears to be approximately 5 to 8 feet deep (below road grade) and about 25 to 115 feet wide, depending on the location within the drainage. The three other drainages east of Frates Road are relatively large and are incised to about 20 feet deep and about 100 to 400 feet wide.

Subsurface soil and rock conditions at the proposed crossings were investigated by advancing a total of eight (8) borings to depths between about 36½ to 66½ feet below the ground surface. Based on our field investigation, the primary soil units encountered generally consisted of stiff to hard lean and fat clays with interbedded medium dense to very dense sand and gravel lenses. These soils were, underlain by siltstone and claystone to boring termination depths. Groundwater was encountered during the field investigation between depths of about 14 to 35 feet below the ground surface. Regional well record data indicates groundwater levels between about 20 and 40 feet below the ground surface.

Chemical analyses performed on selected soil samples indicates a pH range of 7.76 to 8.35. Soil resistivity, sulfate content, and chloride content test results are contained in section 4.5 of this report. These preliminary screening test results indicate that the soils tested are corrosive to severely corrosive to buried steel.

Based on our review of the data collected during our investigation, the proposed trenchless crossings are considered feasible provided the geotechnical data presented in this report is incorporated into design and construction. Pipe materials that may be suitable for the proposed types of trenchless construction are Fusible PVC and HDPE, which are flexible and resistant to corrosion. At crossing 1, jack and bore (or pipe ramming) methods would require an outer steel casing to install a plastic water pipeline. The table below shows a general summary of the proposed trenchless crossings and methods:

<b>Crossing</b>	<b>Borings</b>	<b>Approximate Length of Crossing (ft)</b>	<b>Approximate Maximum Depth of Channel (ft)</b>	<b>Recommended Trenchless Construction Method</b>
1	B-1 & B-2	70 – 100	8	Jack and Bore
2	B-3 & B-4	900 – 1000	25	HDD
3	B-5 & B-6	800 – 900	23	HDD
4	B-7 & B-8	800 – 900	20	HDD

## 2 INTRODUCTION

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### 2.1 GENERAL

This report presents the results of a geotechnical investigation conducted for the proposed City of Petaluma 16-inch-diameter recycled water pipeline project being undertaken by the City of Petaluma along Adobe Road in Petaluma, California. The purpose of this investigation was to characterize the subsurface conditions near the four (4) proposed trenchless crossings of seasonal drainages along the alignment and to aid in evaluating appropriate trenchless pipeline construction methods. The approximate location of the proposed pipeline alignment is shown on Figure 1, Site Location.

This report includes our recommendations related to the geotechnical aspects of project planning, design and construction of the proposed pipeline. Conclusions and recommendations presented in this report are based on the subsurface conditions encountered in eight (8) exploratory borings drilled for this investigation and our review of published geologic data referenced in this report. Recommendations presented herein should not be extrapolated to other areas or used for other projects without our prior review. The approximate locations of our exploratory borings are shown on Figures 2 through 6.

### 2.2 PROJECT DESCRIPTION

It is our understanding that the first phase of the 16-inch-diameter recycled water pipeline will be constructed along Adobe Road roughly between Frates Road and Hamilton Road. Except for a segment near the intersection of Frates Road and Adobe Road, the majority of the pipeline alignment is expected to be on the north and/or east sides of Adobe Road. There are four areas where seasonal drainages cross the proposed alignment. The one located near the Frates Road and Adobe Road intersection is relatively narrow and shallow. It appears to be on the order of 5 to 8 feet deep (below road grade) and about 25 to 115 feet wide, depending on crossing location. The three other drainages east of Frates Road are relatively large and are incised to about 20 feet deep and about 100 to 400 feet wide.

## 2.3 SCOPE OF SERVICES

As authorized by the City of Petaluma, the scope of our services was outlined in our proposal dated June 20, 2019 and included the following items:

- Review of existing geologic and geotechnical data for the site vicinity
- Drilling and sampling of eight borings to explore subsurface conditions and to obtain samples for laboratory testing
- Laboratory testing of selected samples to assess pertinent geotechnical properties
- Evaluation of the available data to develop conclusions and recommendations to guide geotechnical aspects of design and construction
- Preparation of this report

Environmental evaluations and analyses, including detailed review of possible contaminants in the investigated soils, are outside of our scope of services.

### 3 FIELD INVESTIGATION AND LABORATORY TESTING

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#### 3.1 SITE DESCRIPTION

This proposed pipeline alignment is adjacent to Adobe Road between Frates Road and Hamilton Road in Petaluma, California. The alignment will generally be located on the north and/or east side of Adobe Road. Four (4) trenchless crossings are planned along the alignment at seasonal drainage locations, which are shown on Figures 2 through 6. The alignment area is surrounded by rural agricultural land with generally flat to slightly sloping topography surrounding the drainage channels.

#### 3.2 FIELD EXPLORATION

The subsurface conditions at the site were explored between August 19<sup>th</sup> and August 26<sup>th</sup>, 2019 by drilling eight (8) borings (B-1 through B-8) to depths ranging from approximately 36½ to 66½ feet below the ground surface. The borings were drilled using a CME-75, truck-mounted drill rig equipped with hollow-stem auger and mud rotary drilling capabilities.

The borings were located in the field by visual sighting and/or pacing from existing site features. Therefore, the locations of the borings shown on Figures 2 through 6 should be considered approximate and may vary slightly from those indicated.

Kleinfelder professionals maintained logs of the borings, visually classified the soils encountered according to the Unified Soil Classification System (American Society for Testing and Materials International [ASTM] D2488 visual-manual procedure) and obtained both disturbed and relatively undisturbed samples of the subsurface materials. A Graphics Key with the Unified Soil Classification System descriptive criteria is presented on Figure A-1 in Appendix A. Following laboratory testing, the field visual classifications were revised, as appropriate, based on ASTM D2487. Soil and Rock Description Keys are provided on Figures A-2 and A-3 in Appendix A. Logs of Borings are presented on Figures A-4 through A-11.

### 3.3 SAMPLING PROCEDURES

Samples were obtained from the borings at selected depths by driving a 2.5-inch inside diameter (I.D.), split-barrel, California sampler containing stainless steel and brass liners into undisturbed soil with a 140-pound automatic hammer free-falling a distance of 30 inches. The California sampler was in general conformance with ASTM D3550. Soil sampled using this method may have experienced some minor disturbance due to hammer impact, retrieval, and handling.

Disturbed samples were also obtained at selected depths by driving a 1.4-inch I.D. Standard Penetration Test (SPT) sampler into undisturbed soil with a 140-pound automatic hammer free-falling a distance of 30 inches. The SPT sampler was used in sandy and gravelly soils and when sufficient recovery could not be achieved with the California sampler. The SPT sampler was in general conformance with ASTM D1586.

Blow counts were recorded at 6-inch depth intervals for each driven sample attempt and are reported on the logs. Blow counts shown on the boring logs have not been corrected for the effects of overburden pressure, rod length, sampler size, or hammer efficiency. Sampler size correction factors were applied to estimate the sample apparent density noted on the boring logs. The consistency terminology used in soil descriptions for cohesive soils is based on field observations (see Figure A-2). Relatively undisturbed soil samples obtained from the borings were packaged and sealed in the field to reduce moisture loss and disturbance and returned to our laboratory for further testing. After the borings were completed, they were backfilled with neat cement grout.

### 3.4 LABORATORY TESTING

#### 3.4.1 Geotechnical Laboratory Testing

Laboratory tests were performed on selected samples recovered from the borings to evaluate physical and engineering properties. The geotechnical laboratory testing included the following tests:

- Unit Weight (ASTM D2937)
- Moisture Content (ASTM D2216)
- Atterberg Limits (ASTM D4318)
- Sieve Analysis (ASTM D422)
- Unconsolidated-Undrained Triaxial Compression (ASTM D2850)

Unit weight, moisture content, sieve analysis, and Atterberg Limits results are summarized on the boring logs presented in Appendix A. The results of all laboratory tests are included in Appendix B.

### 3.4.2 Preliminary Corrosivity Testing

Samples of near-surface soil encountered at the site were subjected to chemical analysis for the purpose of preliminary corrosion screening. Cerco Analytical of Concord, California performed the tests under subcontract to Kleinfelder. The tests consisted of the following.

- Soluble Chlorides and Sulfates (ASTM D516)
- pH (ASTM D4972)
- Minimum Resistivity (ASTM G-57)

These results are presented in Table 4.2 of Section 4.5 and in Appendix C.

## 4 SITE CONDITIONS

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### 4.1 AREA AND SITE GEOLOGY

The site is located within the Coast Range Geomorphic Province of Northern California. This province is generally characterized by northwest-trending mountain ranges and intervening valleys, which are a reflection of the dominant northwest structural trend of the bedrock in the region. The basement rock in the northern portion of this province consists predominantly of the Franciscan Complex, a subduction complex of diverse groups of igneous, sedimentary and metamorphic rocks of Cretaceous to Upper Jurassic age (65 to 160 million years old [USGS, 2010]), and to the east, the Coast Range Ophiolite and Great Valley Complex, an Upper to Middle Jurassic age (approximately 145 to 175 million years old [USGS, 2010]) volcanic ophiolite sequence with associated Lower Cretaceous to Upper Jurassic (approximately 100 to 160 million years old [USGS, 2010]) sedimentary rocks. The Coast Range Ophiolite and Great Valley Complex were tectonically juxtaposed with the Franciscan Complex. The Coast Range Ophiolite and the Great Valley Sequence were tectonically juxtaposed with the Franciscan Complex (most likely during subduction accretion of the Franciscan) and these ancient fault boundaries are truncated by a modern right-lateral fault system that includes the San Andreas, Hayward-Rodgers Creek and West Napa faults. The San Andreas fault defines the westernmost boundary of the local bedrock and is located approximately 18.4 miles southwest of the site. In the site vicinity, the Great Valley Sequence and Franciscan Complex are unconformably overlain by Tertiary age (approximately 2.6 to 65 million years old [USGS, 2010]) continental and marine sedimentary and volcanic rocks. These Tertiary age rocks are locally overlain by younger Quaternary (approximately 2.6 million years old to present day [USGS, 2010]) alluvial and bay mud deposits.

The geology along the pipeline alignment has been mapped by Wagner et al. (2003) and Graymer et al. (2007) among others. Wagner et al. (2003) indicate the majority of the alignment is underlain by latest Pleistocene to Holocene age (30,000 years old to present day [USGS, 2010]) alluvial fan deposits, comprised of sand, gravel silt and clay. Wagner et al. (2003) show the area in the vicinity of the easternmost drainage location to be underlain Holocene age (approximately 11,700 years old to present day [USGS, 2010]) alluvium, consisting of poorly sorted sand, gravel and silt. Wagner et al. (2003) have mapped the low hills north of the site to be underlain by Pleistocene age (approximately 2.6 million to 11,700 years old [USGS, 2010]) alluvium, undivided, and by siltstone bedrock (with diatomite, tuff and gravel) of the Tertiary age Petaluma Formation.



Graymer et al. (2007) are in general agreement and indicate the proposed alignment is underlain by latest Pleistocene to Holocene age alluvial fan deposits. Graymer et al. (2007) also show the low hills north of the alignment to be underlain by Pleistocene age alluvium consisting of clay, silt, sand, and gravel, and by bedrock of the Tertiary age Petaluma Formation. According to Graymer et al. (2007), the Petaluma Formation consists of pebble and cobble conglomerate, gritstone, sandstone and mudstone.

The site has also been mapped by Witter et al. (2006), who indicate the majority of the alignment is underlain by latest Pleistocene to Holocene age alluvial fan deposits, and at the eastern drainage area by Holocene age alluvial deposits, undifferentiated. According to Witter et al. (2006), both deposits have moderate liquefaction susceptibility.

#### 4.2 SEISMICITY AND FAULTING

The site is not located within an Earthquake Fault Zone as defined by the California Geological Survey (CGS, 2020) in accordance with the Alquist-Priolo Earthquake Fault Zone Act of 1972. The nearest zoned active fault is the Hayward-Rodgers Creek fault, which, according to the CGS (2020), is located approximately 1.7 miles northeast of the site. Peterson et al. (2008), indicate the Hayward-Rodgers Creek fault (considered a source of seismic shaking) is located approximately 0.5 miles from the site. Moderate to major earthquakes generated on the Hayward-Rodgers Creek and other faults in the region can be expected to cause strong ground shaking at the site.

The proximities and seismic parameters of significant faults in the vicinity of the site are listed in Table 4.1. For faults with multiple segmentation scenarios we have only listed parameters for the scenario rupturing the most segments (i.e., the most severe scenario). The locations of the faults and associated parameters presented on Table 4.1 are based on Petersen et al. (2008). The maximum earthquake magnitudes presented in this table are based on the moment magnitude scale developed by Kanamori (1977). Felzer (2008) details calculations of California seismicity rates including correction for magnitude rounding and error, Gutenberg-Richter b value and seismicity rates.

**Table 4.1  
Significant Faults**

<b>Fault Name</b>	<b>Closest Distance to Site* (mi)</b>	<b>Magnitude of Characteristic Earthquake**</b>	<b>Slip Rate (millimeters/year)</b>
Hayward-Rodgers Creek-SH+NH+RC	0.5	7.3	9
West Napa	13.8	6.7	1
San Andreas-SAS+SAP+SAN+SAO	18.4	8.1	17-24
Green Valley Connected	22.5	6.8	4.7
Maacama	23.3	7.4	6

\* Closest distance to the potential rupture.

\*\* *Moment magnitude*: An estimate of an earthquake's magnitude based on the seismic moment (measure of an earthquake's size utilizing rock rigidity, amount of slip, and area of rupture).

According to Petersen et al. (2008), characterizations of the Hayward-Rodgers Creek and the San Andreas faults are based on the following fault rupture segments and fault rupture scenarios:

- The Hayward-Rodgers Creek fault has been characterized by three segments and six rupture scenarios plus a floating earthquake. The three segments are the Rodgers Creek fault (RC), the Hayward North (HN), and the Hayward South (HS).
- The San Andreas fault has been characterized by four segments and nine rupture scenarios, plus a floating earthquake. The four segments are Santa Cruz Mountains (SAS), Peninsula (SAP), North Coast (SAN), and Offshore (SAO).

A number of large earthquakes have occurred within this region in the historic past. Some of the significant nearby events include two 1969 Santa Rosa earthquakes (M5.6, 5.7), the 2000 Yountville earthquake (M5.2), the 1869 Ukiah earthquake (M5.6), the 1906 San Francisco earthquake (M8+), and the 2014 South Napa earthquake (M6.0). Future seismic events in this region can be expected to produce strong seismic ground shaking at this site. The intensity of future shaking will depend on the distance from the site to the earthquake focus, magnitude of the earthquake, and the response of the underlying soil and bedrock.

#### 4.3 SUBSURFACE CONDITIONS

The following descriptions provide a general summary of the subsurface conditions encountered during the field exploration program. For more detailed descriptions of the actual conditions

encountered at specific crossing locations, refer to the Anticipated Boring Condition sections for each crossing located in Section 5 of this report, and the boring logs contained in Appendix A.

The primary soil units encountered varied between borings, but generally consisted of alluvial lean and fat clays with interbedded sand and gravel lenses underlain by Petaluma Formation siltstone and claystone to boring termination depths. The apparent density of the coarse-grained soils encountered ranged from medium dense to very dense and the consistency of the fine-grained soils ranged from stiff to hard. These densities/consistencies are based on sampler blow counts and field observations. The Petaluma Formation siltstone and claystone encountered was visually classified as poorly indurated, moderately weathered, extremely weak (R0) bedrock, according to the International Society of Rock Mechanics (IRSM) rating criteria.

#### 4.4 GROUNDWATER CONDITIONS

According to regional well record data published by the California Department of Water Resources (DWR), groundwater levels are likely between about 20 and 40 feet below the ground surface. Groundwater was encountered between depths of about 14 and 35 feet during the field investigation for this study.

It is possible that groundwater conditions at the site could change due to variations in rainfall, groundwater withdrawal or recharge, construction activities, well pumping, or other factors not apparent at the time the explorations were performed.

#### 4.5 SOIL CORROSIVITY

Samples of near-surface soil encountered at the site were subjected to chemical analysis for the purpose of corrosion screening. Cerco Analytical of Concord, California performed the tests under subcontract to Kleinfelder. The test results are presented in Appendix C and below in Table 4.2, Summary of Corrosion Test Results.

**Table 4.2  
Summary of Corrosion Test Results**

<b>Boring No.</b>	<b>Depth (ft.)</b>	<b>Minimum Resistivity (ohm-cm)</b>	<b>pH</b>	<b>Water Soluble Sulfates (ppm)</b>	<b>Water Soluble Chlorides (ppm)</b>
B-1/B-2	4½ / 4½	1,200	7.76	N.D.	N.D.
B-3/B-4	4½ / 4½	450	8.19	170	260
B-5/B-6	5 / 4½	520	8.35	140	150
MW-9	4½ / 4½	550	8.22	57	130

Ferrous metal and concrete elements in contact with soil, whether part of a foundation or part of the supported structure, are subject to degradation due to corrosion or chemical attack. Therefore, buried ferrous metal and concrete elements should be designed to resist corrosion and degradation based on accepted practices.

Minimum resistivity testing performed indicated that the soils tested are considered to be corrosive to severely corrosive to buried, unprotected metal objects. We recommend that a corrosion engineer be consulted to recommend appropriate protective measures, if deemed necessary.

The degradation of concrete or cement grout can be caused by chemical agents in the soil or groundwater that react with concrete to either dissolve the cement paste or precipitate larger compounds within the concrete, causing cracking and flaking. The concentration of water-soluble sulfates in the soils is a good indicator of the potential for chemical attack of concrete or cement grout. The American Concrete Institute (ACI) in their publication "Guide to Durable Concrete" (ACI 201.2R-08) provides guidelines for this assessment. The results of sulfate test indicate the potential for deterioration of concrete is mild, no special requirements are expected to be necessary for the concrete mix.

Concrete and the reinforcing steel within it are at risk of corrosion when exposed to water-soluble chloride in the soil or groundwater. The results of chloride test indicate the potential for deterioration of concrete and reinforcing steel is moderate. The project structural engineer should review this data to determine if remedial measures are necessary for the concrete reinforcing steel.

## 5 CONCLUSIONS AND DESIGN CONSIDERATIONS

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### 5.1 GENERAL CONCLUSIONS

Based on our geotechnical evaluation of the data discussed in this report, it is our professional opinion that the proposed trenchless crossings are feasible provided the geotechnical data presented in this report is incorporated into design and construction. Table 5.1 below provides a general summary of the proposed trenchless crossings and construction methods.

**Table 5.1  
Summary of Proposed Crossings**

Crossing	Borings	Approximate Length of Crossing (ft)	Approximate Maximum Depth of Channel (ft)	Recommended Trenchless Construction Method
1	B-1 & B-2	70 – 100	N/A	Jack and Bore or Pipe Ram
2	B-3 & B-4	900 – 1000	25	HDD
3	B-5 & B-6	800 – 900	23	HDD
4	B-7 & B-8	800 – 900	20	HDD

Presented in the following sections of this report are descriptions of the anticipated subsurface conditions along with our conclusions and recommendations regarding the geotechnical aspects of the proposed trenchless installations.

### 5.2 LIQUEFACTION POTENTIAL AND SEISMIC SETTLEMENT

Liquefaction describes a condition in which saturated soil loses shear strength and deforms as a result of increased pore water pressure induced by strong ground shaking during an earthquake. Dissipation of the excess pore water pressures will produce volume changes within the liquefied soil layer, which causes settlement. Factors known to influence liquefaction include soil type, structure, grain size, relative density, confining pressure, depth to groundwater and the intensity and duration of ground shaking. Soils most susceptible to liquefaction are saturated, loose sandy soils, and low plasticity clays and silts. If liquefaction occurs, structures above the liquefiable layers may undergo settlement.

Based on density, soil types, and groundwater levels at the site, the risk of soil liquefaction is considered negligible.

### 5.3 CROSSING 1 AT FRATES ROAD

#### 5.3.1 General Evaluation

The trenchless crossing located near the intersection of Frates Road and Adobe Road is anticipated to be constructed between a depth of 8 and 10 feet below the ground surface with a length between about 70 and 100 feet. Groundwater was encountered at a depth of about 20 feet below the ground surface in Boring B-2. Due to the short and shallow nature of this crossing, jack and bore methods are deemed the most appropriate trenchless application. If groundwater is above the bore path at the time of construction, pipe ramming may be used as an alternate to jack and bore. Both of these methods require installation of an over-sized steel casing followed by insertion of the plastic water pipeline within it.

#### 5.3.2 Anticipated Boring Conditions

Near the southwestern side of the crossing within Boring B-1, the upper approximately 3½ feet of soil encountered was found to be fill composed of medium dense poorly-graded sand with clay and gravel. This sand layer is underlain by a dense clayey gravel layer with sand to a depth of about 13 feet. Below that depth, moderately weathered extremely weak claystone and siltstone was encountered to the maximum depth explored of about 35 feet below the ground surface. This shallow rock layer could trap infiltrating surface water and cause perched groundwater conditions within the upper soils seasonally. The risk of this issue is much lower following the dry season than in the winter and spring months.

In Boring B-2 located on the northeastern side of the crossing, medium dense poorly-graded sand with clay and gravel was encountered to a depth of about 5 feet and was underlain by stiff to very stiff lean and fat clay to a depth of 12½ feet. Another poorly-graded sand layer was encountered to an approximate depth of 22½, with groundwater being encountered at a depth of approximately 20 feet. A 4½-foot-thick fat clay layer was encountered before transitioning into claystone for the remainder of the boring to the maximum depth explored of about 35 feet below the ground surface.

Dependent on the depth of planned excavation of the jack and bore pits, the expected encountered soils will range from sands and gravels to lean and fat clays, as described above.

Encountering claystone/siltstone or groundwater is considered unlikely, but plans should be put in place to handle such conditions should they or perched groundwater conditions be encountered. It may be preferable to perform jack and bore in the clayey soils below the gravel layer to avoid the risk of raveling ground and overmining of the heading.

At the contractor's option, pipe ramming methods could be used to install the casing pipe if fast raveling ground or perched groundwater conditions dictate. Pipe ramming can be done in the gravels without the risk of raveling soils and overmining of the heading. Mixed face conditions (i.e., boring at a transition between soil types/rock) should be avoided, as they represent difficulty maintaining the bore profile.

### 5.3.3 Bore Instability

Over-mining of the headings in cohesionless soils, such as the sands and gravels encountered in Borings B-1 and B-2, can cause sink holes to develop at the ground surface. This should be considered when selecting the bore path and in the installation of the pipeline. Where a cohesive or cemented soil overlies cohesionless materials, the upward propagation of caving sand in a sink hole may be retarded. However, a cavity may still remain below the cohesive layer that could lead to a future sink hole if not mitigated during construction.

In jack and bore applications it is preferable to avoid cohesionless soils when selecting the bore path to reduce the risk of post-construction settlement or sinkhole development. In cohesionless soils, it is best to have the cutter head extend as little as possible in front of the lead casing to reduce the risk of over-mining. However, the Contractor should be prepared to fill excessive voids that may develop around the pipe and near the headings if fast-raveling or cohesionless materials are encountered.

We recommend the steel casing be fitted with grout ports to allow for contact grouting of the annular space around the casing. These grout ports are typically threaded 2-inch ports welded to the pipe 6 feet apart that allow for connection of a grout hose. The ports can be laid out on the top center line of the casing pipe or staggered at 2 and 10 O'clock positions alternating across the pipe crown. Contact grouting may not be needed in areas where ground surface settlement is not an issue. Risk of over-mining of the heading and contact grouting around the casing pipe could be eliminated using pipe ramming methods as an alternative to jack and bore. However, it has been our experience that pipe ramming may be more costly than jack and bore.

#### 5.3.4 Bore Monitoring

At a minimum, we recommend the jack and bore spoil volumes recovered from the bore be monitored during construction to evaluate whether the excavated volume is consistent with the theoretical hole volume. Bulking of the excavated soils must be considered when comparing the spoil volumes to the theoretical hole volume. If spoil quantities (adjusted for bulking) exceed the theoretical hole volume, over-mining of the heading may be occurring. This can result in voids along the bore path that can lead to settlement and/or sinkholes at the ground surface. If excessive voids occur, provisions should be made to fill those voids with cement grout or other suitable material in a roadway crossing and in other developed areas to prevent distortion of the ground surface. If pipe ramming is used as an alternate to jack and bore, monitoring of the spoil volumes is usually not needed.

#### 5.3.5 Temporary Excavations

##### 5.3.5.1 General Considerations

All excavations should comply with applicable local, state, and federal safety regulations including the current Occupational Safety & Health Administration (OSHA) Excavation and Trench Safety Standards. Construction site safety generally is the responsibility of the Contractor, who is responsible for the means, methods, and sequencing of construction operations. Kleinfelder is providing the information below solely as a service to the client. Under no circumstances should the information provided be interpreted to mean that Kleinfelder is assuming responsibility for construction site safety or the Contractor's activities. Such responsibility is not being implied and should not be inferred.

##### 5.3.5.2 Excavations and Slopes

Excavated slope height, slope inclination, or excavation depths (including utility trench excavations) should in no case exceed those specified in local, state, and/or federal safety regulations (e.g., OSHA Health and Safety Standards for Excavations, 29 CFR Part 1926, or successor regulations). Such regulations are strictly enforced and, if they are not followed, the Owner, Contractor, and/or earthwork and utility subcontractors could be liable for substantial penalties.



Heavy construction equipment, building materials, excavated soil, and vehicular traffic should be kept sufficiently away from the top of any excavation to prevent any unanticipated surcharging. Alternatively, excavation slopes and shoring systems can be designed to accommodate surcharge loadings, if necessary. Shoring, bracing, or underpinning required for the project (if any), should be designed by a professional engineer registered in the State of California.

### 5.3.6 Temporary Shoring

#### 5.3.6.1 General Considerations

The site soils include varied alluvium composed of stiff to hard silts and clays and medium dense to very dense sands and gravels underlain by siltstone and claystone. In areas where Standard Penetration test sampler blow counts exceed about 20 blows per foot and California Sampler blow counts exceed 30 blows per foot, as in the hard silts and clays, very dense gravels, and siltstone and claystone encountered, driving of steel sheet piles may not be feasible without pre-drilling or pre-trenching. The Contractor and designers should be aware of this condition and select appropriate shoring systems for the soil and rock conditions present in those areas.

In the event that driven sheet piles are not appropriate, drilled solutions such as soldier piles, secant pile walls or similar methods should be considered for shoring. The selection of these systems will depend on the presence of groundwater and/or cohesionless soils.

If soldier piles are to be used, continuous lagging will be required to retain potentially caving materials. Where voids exist behind the lagging following shoring installation, the surrounding ground will tend to yield towards the shoring and settlement can result in the areas adjacent to the excavation. Equipment and stockpiled materials adjacent to the trench will exacerbate this condition. These ground movements behind the shoring generally occur within a horizontal distance equal to the excavation depth. Excessive ground movement/settlement can cause damage to adjacent buried utilities and pavement sections. Therefore, it is important to backfill the lagging panels as the shoring progresses. It may also be necessary to repair cracked and/or settled pavement sections following construction where they area adjacent to the excavations.

Discontinuous or trench box shoring systems are generally not suitable in cohesionless soils and where positive support for the excavation side walls is needed.

Since selection of appropriate shoring systems will be dependent on construction methods and scheduling, we recommend the Contractor be solely responsible for the design, installation, maintenance, and performance of temporary shoring systems.

### 5.3.6.2 Jacking and Receiving Pits

Where there is insufficient space to lay back the slopes for the planned excavations at the jacking and receiving pits, shoring will be required. For design of cantilevered shoring, a triangular distribution of lateral earth pressure may be used. For design of braced shoring, a uniform distribution of earth pressure is recommended. Table 5.2 provides approximate lateral earth pressures for use in preliminary shoring design. Final design of shoring systems should be performed by the contractor based on their review of the trench wall soil conditions. Design of shoring systems for the project should be performed by a state registered professional engineer.

**Table 5.2  
Lateral Earth Pressures for Shoring**

Condition	Level Backfill	
	Sand and Gravel	Silt and Clay
Active Pressure (psf/ft)	38	60
Braced Pressure (psf)	25H <sup>(1)</sup>	39H <sup>(1)</sup>
Passive Pressure (psf/ft)	375	250

Notes: 1. H is shored height in feet.

### 5.3.6.3 Lateral Deflections

Lateral deflection of a shored excavation is heavily dependent on the relative stiffness of the shoring system, the amount of bracing and/or tiebacks, and the quality of workmanship during installation. The limiting condition of maximum active earth pressure is generally reached when the shoring tilts or deflects laterally about 0.05 percent of the shoring wall height in dense sands and gravels and 1 percent of the shoring wall height in stiff cohesive material. If the shoring tilts or deflects less than the limiting condition, the lateral earth pressure will lie between the active and at-rest earth pressures. This soil movement can extend horizontally from 1H to 2H back from the top of cantilever retaining structures, with vertical movements approximately equal to the horizontal. The movement tends to be greatest close to the excavation and becomes less with increasing distance away. Backfilling void spaces behind shoring with sand or pea gravel may reduce the potential for vertical and lateral movements around the excavation.

The shoring designer should perform a deflection analysis of the shoring system. If movements are greater than the tolerance of existing project features (buried utilities, pavements, structures, etc.) tiebacks, dead-man anchors, or cross bracing may be needed to reduce deflections. Design using the at-rest pressure and/or more stringent tie-back or bracing systems may be required in the vicinity of improvements that cannot withstand lateral movements.

#### 5.3.6.4 Lateral Resistance

All soldier or sheet piles should extend to a sufficient depth below the excavation bottom to provide the required lateral resistance. Embedment depths should be determined using methods based on the principles of force and moment equilibrium. To account for three-dimensional effects on a soldier pile, the passive pressure may be assumed to act on an area 2 times the width of the embedded portion of the pile, provided adjacent piles are spaced at least 3 diameters, center-to-center. A minimum factor of safety of 1.2 should be applied to the calculated embedment depth and to determine the allowable passive pressure. The shoring professional should evaluate the final design conditions and shoring type to select the appropriate factor of safety for design.

The passive earth pressure, similar to active earth pressures, is mobilized when the shoring below the excavation bottom tilts or deflects laterally. The limiting condition of maximum passive earth pressure is generally reached when the shoring deflects laterally below the base of the excavation about 0.2 percent of the embedment depth below the bottom of the excavation in dense sands and gravels and about 2 percent of the embedment depth below the bottom of the excavation in stiff cohesive material. If the shoring system is restrained against movement, the lateral resistance below the base of the excavation will lie somewhere between the passive and at-rest earth pressure conditions. Accordingly, if lateral deflection at the base of the excavation is objectionable, the at-rest earth pressure should be used in design for lateral resistance.

#### 5.3.6.5 Surcharge Pressures

Shoring systems should be designed to resist lateral pressures due to hydrostatic forces, if present, and surface loads adjacent to excavations. We anticipate surface loads will be imposed by construction equipment, foundations, railroads, roadways, etc. Actual surcharge pressures will depend upon the geometry (i.e., point-, strip- or rectangular-shaped loaded area), the size of the loaded area, the position of the loaded area relative to the shoring, and the magnitude of the load. It is common in shoring design to use an appropriate Boussinesq theory solution to evaluate

surcharge load pressures. Caltrans typically uses a traffic surcharge pressure of up to 250 psf for highway traffic.

#### 5.3.6.6 Existing Trench Backfill Conditions

In areas where existing trench backfills are exposed in or located adjacent to excavations for the proposed pipeline, the guideline trench side slope and shoring design criteria presented above may not be valid. The shoring designer should consider the presence of existing utility trenches in and near the proposed excavation areas as well as methods to protect the utilities. If existing trench backfill materials are encountered in excavations on the site, the shoring designer should be notified immediately to observe and address the encountered conditions. It should be noted that trench wall collapses have occurred where these conditions were not recognized and addressed during construction.

#### 5.3.6.7 Monitoring

Where lateral deflection of shoring elements can cause damage to existing, adjacent improvements, horizontal and vertical movements of the shoring system should be monitored by establishing survey points, installation of inclinometers, or a combination of both prior to excavation. The results should be reviewed by a qualified Geotechnical Engineer from Kleinfelder on a daily basis for a period of at least one week during excavation and following construction of the shoring system. Measurements should be obtained on a weekly basis thereafter. Detailed recommendations for monitoring should be provided by a qualified Geotechnical Engineer from Kleinfelder after a review of the planned shoring system.

#### 5.3.6.8 Construction Vibrations

The Contractor should use means and methods that will limit vibrations where adjacent structures/facilities are present. As a guide, the peak particle velocity of construction vibrations in adjacent structures/facilities should be limited to less than 1 inch/second when measured using an accelerometer.

#### 5.3.6.9 Shoring Removal

Shoring systems typically are removed as part of the excavation backfill process. Depending on the shoring system used, the removal process may create voids along the sides of the excavation.

If these voids are left in place and are significantly large, backfill may shift laterally into the voids resulting in settlement of the backfill and overlying improvements. Therefore, care should be taken to remove the shoring system and backfill the trench in such a way as to not create these voids. If the shoring system requires removal after backfill is in place, resulting voids should be filled with cement slurry or grout.

## 5.4 CROSSINGS 2 THROUGH 4

### 5.4.1 General Evaluation

Due to the relatively deep nature of Crossings 2 through 4 and the expected lengths, horizontal directional drilling (HDD) methods are deemed the most appropriate trenchless method. The crossings located between Frates Road and Hamilton Road are anticipated to cross seasonal drainages with inverts extending about 20 feet below existing road grade. These crossings are thickly vegetated and generally bound on either side by relatively flat vineyards or farmland. Based on the geometry of the existing drainages and preliminary evaluation of potential HDD alignments, the HDD crossings at all three locations can be expected to be approximately 30 feet below the drainage inverts. The anticipated HDD plan length at Crossing 2 (Borings B-3 and B-4) is anticipated to be approximately 920 feet. Crossing 3 (Borings B-5 and B-6) is anticipated to be approximately 820 feet in plan length. Crossing 4 (Borings B-7 and B-8) is anticipated to be approximately 800 feet in plan length. The anticipated depths and lengths should be adjusted as appropriate in final design. This information is based on a preliminary review of the proposed project.

It is recommended that the proposed HDD installation be designed and constructed in general accordance with the fourth edition of the “Horizontal Directional Drilling (HDD) Good Practices Guidelines” by the north American Society of Trenchless Technologies (NASTT) dated 2017.

### 5.4.2 Anticipated HDD Drilling Conditions

Borings B-3 through B-8 represent the geotechnical conditions at Crossings 2 through 4. For these crossings, soil conditions encountered in the exploratory borings were generally similar. From the ground surface to depths ranging between about 27½ and 39½ feet, stiff to hard lean and fat alluvial clays were encountered with sand lenses with varying amounts of gravel at varying depths. Moderately weathered, extremely weak siltstone and claystone was then encountered to boring termination depths at all locations.

### 5.4.3 Steering

The soils encountered within the exploratory borings appear to consist of stiff to hard clays and silts along with medium dense to dense sands with varying amounts of fines and gravels. These variations in density/consistency generally do not cause much difficulty steering along the bore path. However, if the bore paths extend into claystone and siltstone layers, the drill bit may tend to skip on the harder materials and wander off the bore path. It is best to steer vertical curves either in the soil or rock but not across both to avoid this issue. The approximate depth that bedrock was encountered below the ground surface at each of the three HDD crossings is provided in Table 5.3 below.

**Table 5.3  
Bedrock Depths**

<b>Crossing</b>	<b>Boring (Approximate Depth to Bedrock)</b>
2	B-3 (34 feet)
	B-4 (27½ feet)
3	B-5 (39½ feet)
	B-6 (35 feet)
4	B-7 (30 feet)
	B-8 ( 30½ feet)

In hard soils and rock with SPT sampler blow counts over 50 and California Sampler blow counts over 70, a mud motor drill will likely be necessary to penetrate the formations during pilot hole drilling. Mud motors are generally limited to a turning radius of 1,000 feet or more. Reaming to enlarge the hole for the pipe may require hole openers suitable for soft rock rather than soft soil reamers.

### 5.4.4 Borehole Instability

Sand lenses that were encountered in many of the borings at various depths may be prone to instability in an HDD borehole. If such sands are encountered during drilling, proper drilling fluid

makeup or use of conductor casing can reduce the potential for borehole caving and stuck pipe during pullback.

#### 5.4.5 Inadvertent Returns of Drilling Fluid

Hydraulic fracturing occurs when borehole pressure causes plastic deformation of the soil surrounding the borehole, initiating and propagating fractures in the soil mass. The resistance to plastic deformation and fracturing is a function of soil strength, overburden pressure, and pore water pressure. Hydraulic fracturing can result in drilling fluid inadvertently returning to the ground surface or running horizontally away from the borehole.

Borehole instability issues and/or the contactor not maintaining a clean borehole can result in poor drilling returns and partial or complete plugging of the borehole. This will result in higher fluid pressures within the bore and can lead to hydraulic fracturing and inadvertent fluid returns to the ground surface. Furthermore, at shallow depths, hydraulic fracturing is likely and is expected to occur near the bore exit point as the drill bit approaches the ground surface. Provisions should be in place to mitigate the effects of hydraulic fracturing and inadvertent fluid returns. Exit pits, containment areas, and similar countermeasures to contain drilling fluid releases should be considered.

Loss of drilling fluid returns typically occurs when the drill bit encounters rock fractures or large interstitial pore spaces in coarse materials (i.e. gravels and cobbles). Loss of returns is recognized by a decrease of drilling fluid returns, or a drop in drilling fluid pressure.

If fractures or interstitial pore spaces are small or discontinuous, they may fill with solids contained in the drilling fluid returns as drilling progresses beyond them. Once the fractures or pore spaces are filled, fluid will return up the bore hole again and fluid pressure will increase until another fracture or gravel layer is encountered. If rock fractures or gravel/cobble layers are continuous to the surface, drilling fluid may inadvertently return to the surface. Based on the soil conditions encountered in the borings, the risk of significant drilling fluid losses is considered to be low.

It is recommended that a hydraulic fracturing analysis be performed during final bore path design to confirm a safe depth of cover over the bore. The analysis should be performed in accordance with the recommendations contained in the above-referenced Horizontal Directional Drilling (HDD) Good Practices Guidelines.

## 5.4.6 Drilling Fluid Program

### 5.4.6.1 General

The drilling contractor should develop a Drilling Fluid Program (DFP) as part of the HDD Bore Plan. A properly designed drilling fluid program can substantially reduce losses due to frac-out, stuck product pipe, or loss of tooling. The drilling fluid program should take into account anticipated soil and rock conditions, fluid selection, drill bit and reamer selection, and volume calculations.

### 5.4.6.2 Borehole Slurry Density

The density of the slurry in the borehole directly affects the buoyancy force and therefore the normal force between the pipe and the wall of the borehole. The density of drilling returns is a function of ground conditions, penetration rate, mud flow rate, drilling fluid composition, and efficiency of the mud cleaning system. In general, drilling return density varies between 10 and 12 pounds per gallon. In coarse gravel and cobbles, drilling fluid densities may approach 13 pounds per gallon.

For this project we anticipate drilling fluid return density will be on the order of 10 to 12 pounds per gallon where good returns are achieved, and drilling is performed in accordance with the HDD Good Practices Guidelines.

### 5.4.6.3 Soil Conditions for Drilling Fluid Design

For the purpose of drilling fluid design, earth materials are divided into two categories: Inert, including sand and gravel; and reactive, including clay. Information regarding subsurface conditions likely to be encountered at the site is provided in the Subsurface Conditions section of this report as well as in the boring logs contained in Appendix A and Laboratory Testing contained in Appendix B.

### 5.4.6.4 Drilling Fluid Selection

Drilling fluid program base fluid should be designed for site specific soil conditions. The base fluid may consist of either a bentonite or polymer and water, with additives to achieve specific fluid properties. Salt (chloride) is detrimental to base fluid performance and should not be present in



make-up water. Bore hole stability and positive pressure should be maintained to minimize infiltration in formations containing saltwater.

The drilling contractor should submit a base fluid design with a list of additives, loss of circulation materials, and grouting materials that may be used on the project and MSD sheets for approval at least two weeks prior to mobilization. Assistance with drilling fluid selection can be obtained from reputable drilling fluid suppliers.

#### 5.4.6.5 Drill Bit and Reamer Selection

Drill bits and reamers should be selected based on anticipated subsurface conditions and past experience. The drilling contractor should be prepared with a variety of bits and reamers that have worked well in similar soil conditions.

#### 5.4.6.6 Soil and Fluid Volume

The volume of soil or rock to be removed can be estimated as follows:

$$\frac{(\text{Hole Diameter in Inches})^2}{25} = \text{Volume in Gallons per Foot}$$

Sufficient fluid should be pumped during drilling and reaming operations to maintain flow. Drilling rates and drilling fluid flow rates may be adjusted in the field to match varying site conditions. However, an estimate of drilling fluid demand is useful when sizing drilling equipment, mud pumps, and solids removal systems, and can be particularly helpful in determining realistic drilling rates. Drilling fluid demand can be estimated based on the bore hole volume and the following ratios:

<u>Fluid Volume: Soil Volume</u>	<u>Ratio</u>
Sand, Gravel, Cobble, Rock	1:1
Above, mixed with Clay	2:1
Clay or reactive Shale	3-5:1

Drilling rates can be estimated based on the drilling fluid demand and the pump output at the design base fluid viscosity.

#### 5.4.6.7 Solids Separation Plant

Fine-grained silts and clays are generally the most difficult to remove from drilling fluids. Depending on their extent, the presence of these soils along the proposed bore paths may require use of de-silters/centrifuge in order to remove the fine soils from the drilling fluids.

#### 5.4.6.8 Fluidic Drag Coefficient

A fluidic drag coefficient of 0.050 psi (345 Pa) was recommended in the original Pipeline Research Council International (PRCI) design guidelines and is still routinely used by pipeline designers. Recently it has been suggested the coefficient could be decreased to 0.025 psi (172 Pa) for a stable borehole with good solids removal (Puckett 2003). The higher value (0.050 psi) is recommended for routine calculations. The lower value (0.025 psi) may be appropriate for long bores in stable formations where significant cost saving could be realized by using a lower grade of steel or thinner pipe wall.

#### 5.4.7 Borehole Friction Factor and Abrasion

A large portion of the pullback load is generated from friction between the pipe and the wall of the borehole. The pipe rubs against the borehole as it goes around corners and is pushed against the top of the borehole by buoyancy and capstan forces. The friction factor is an expression of the ratio of the normal force between the pipe and the borehole wall and the axial force needed to drag the pipe along the wall. The PRCI Guidelines recommend friction factors of 0.2 to 0.3 for steel pipe. ASTM Standard F1962-99 recommends a friction factor of 0.3. Due to the presence of gravels and rock, an abrasion resistant coating is recommended for steel pipes and generally required for natural gas pipelines. Recommended friction factors for abrasion resistant polymer concrete coating were not found in the above literature. The coating material is similar in texture to smooth, formed concrete. NAVFAC DM 7.02, Chapter 3, Table 1 reports friction factors for formed concrete against various soils types as presented in Table 5.4 below. We have added the bedrock formation in this table as well. The friction factors reported below do not account for the presence of a drilling fluid filter cake, as is normally present in HDD application using bentonite-based drilling fluids.

**Table 5.4  
Ultimate Friction Factors**

<b>Interface Material</b>	<b>Friction Factor (tan<math>\delta</math>)</b>	<b>Friction angle <math>\delta</math> (deg.)</b>
Clean gravel, sandy gravel, coarse sand, highly fractured rock	0.55 to 0.60	29 to 31
Clean fine to medium sand, silty medium to coarse sand, silty or clayey gravel	0.45 to 0.55	24 to 29
Clean fine sand, silty or clayey fine to medium sand	0.35 to 0.45	19 to 24
Fine sandy silt, non-plastic silt	0.30 to 0.35	17 to 19
Very stiff and hard residual or pre-consolidated clay	0.40 to 0.50	22 to 26
Medium stiff and stiff clay and silty clay	0.30 to 0.35	17 to 19

#### 5.4.8 Drill Pad support

Surface soils in the vicinity of our exploratory borings generally consist of clays and are not likely to provide adequate support for HDD drilling equipment, especially when they are wet. When these soils become wet, they may also be slippery and unstable. If rig set up is not planned for a paved surface, soil stabilization is likely to be required to provide a stable platform for the HDD drill rig and surrounding area. Use of a gravel surface course underlain by a geotextile is recommended where heavy truck and equipment traffic is planned. This may also be needed for a storm water pollution prevention plan (SWPPP).

#### 5.4.9 Contractor Selection

The success of the project will be substantially dependent on the experience and performance of the specialty contractor retained to perform the work. We recommend the use of a specialty contractor with a minimum of 3 years construction experience in the field of horizontal directional drilling in similar drilling conditions on projects of similar scope (i.e., diameter, length, and depth). The contractor should be familiar with the use of drilling mud and additives, rock tools, and conductor casings and should provide examples of projects they have successfully completed installing similar utilities in similar conditions.

## 5.5 PIPELINE DESIGN CONSIDERATIONS

### 5.5.1 Trenchless Installations

The dead load imparted to a buried pipe may be calculated using the prism load (soil load applied over the pipe width). For a flexible pipe installed using trenchless methods such as jack and bore or pipe ramming, the American Lifelines Alliance (2001) recommends soil cohesion be incorporated into the pipe loading analysis, as described below:

$$P_{DL} = \gamma \cdot H - 2 \cdot c \cdot (H/B_t)$$

Where:  $\gamma$  = total unit weight of soil –  $\gamma = 130$  pcf

H = backfill height above the pipe crown

$B_t$  = width of bore and

c = allowable soil cohesion – c = 500 psf

If the bore crown is in gravel, the cohesion value should be taken as zero.

### 5.5.2 Design Values for Buried Flexible Pipes

Flexible pipes typically derive part of their resistance to ring deflection from the stiffness of initial backfill and trench wall soils. In a trenchless application, the amount of overcut used to install the pipe will not provide resistance to ring deflection. Once the pipe deflects enough to engage the borehole walls, the evaluation of further ring deflection under soil and live loads may be determined using the Iowa Formula or Reclamation Formula. The elastic modulus of the soil surrounding the pipe,  $E'n$  (also termed Constrained Modulus) should be taken as 1,500 psi.

## 5.6 UTILITIES AND WELL CLEARANCE

The location of existing utilities and water wells was beyond the scope of this report. There should be a concerted attempt to locate any and all underground utilities near the alignment during the design phase and certainly prior to construction and these utilities should be protected by the Contractor so as not to be impacted by the trenchless crossings. The bore profiles should be designed to allow sufficient clearance from all underground utilities to avoid entering into the utility trench or pipe zone materials or causing excessive settlement of the utilities above the bore. If

existing utilities are within about 25 feet of the bore entry and exit pits, conductor casings should be used to help contain HDD drilling fluids and keep them out of adjacent utility areas.

Nearby water wells may exist and must be located, and protected if possible, to prevent being impacted by HDD construction. The HDD bore profile should be designed to allow sufficient clearance from nearby wells to avoid drilling fluid releases into them. In general, we recommend wells be located at least 100 feet from the HDD bore path for this type of HDD installation. If a well becomes impacted with drilling fluid, the well may need to be re-developed or replaced.

## 6 LIMITATIONS

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This report presents information for planning, permitting, preliminary design, and construction of a proposed City of Petaluma 16-inch-diameter recycled water pipeline installation in Petaluma, California. It is expected that information contained in this report will be used to help other design professionals select the ultimate location, length, and depth of the proposed trenchless crossing. However, this report should not be used to define site conditions for contractual purposes and Kleinfelder will accept no liability for changed conditions claims based on this report. If requested, Kleinfelder can prepare the construction drawings at an additional fee.

Recommendations contained in this report are based on materials encountered in Borings B-1 through B-8, evaluation of existing geotechnical data, geologic interpretation based on published articles and geotechnical data, and our present knowledge of the proposed construction. The Kleinfelder exploratory borings were extended to depths of approximately 36½ to 66½ feet below grade and are located as shown on Figure 2 through 6.

It is possible that soil conditions could vary between or beyond the points explored. If the scope of the proposed construction, including the proposed alignment location, changes from that described in this report, we should be notified immediately in order that a review may be made, and any supplemental evaluation and/or recommendations can be provided.

We have prepared this report in accordance with the generally accepted geotechnical engineering practice as it exists in the site area at the time of our study. No warranty is expressed or implied.

This report may be used only by the City of Petaluma and only for the purposes stated, and within 2 years of its issuance. Land use, site conditions (both on site and off site) or other factors may change over time, and additional work may be required with the passage of time. Any party other than the client who wishes to use this report shall notify Kleinfelder of such intended use. Based on the intended use of the report, Kleinfelder may require that additional work be performed and that an updated report be issued. Non-compliance with any of these requirements by the client or anyone else will release Kleinfelder from any liability resulting from the use of this report by any unauthorized party.

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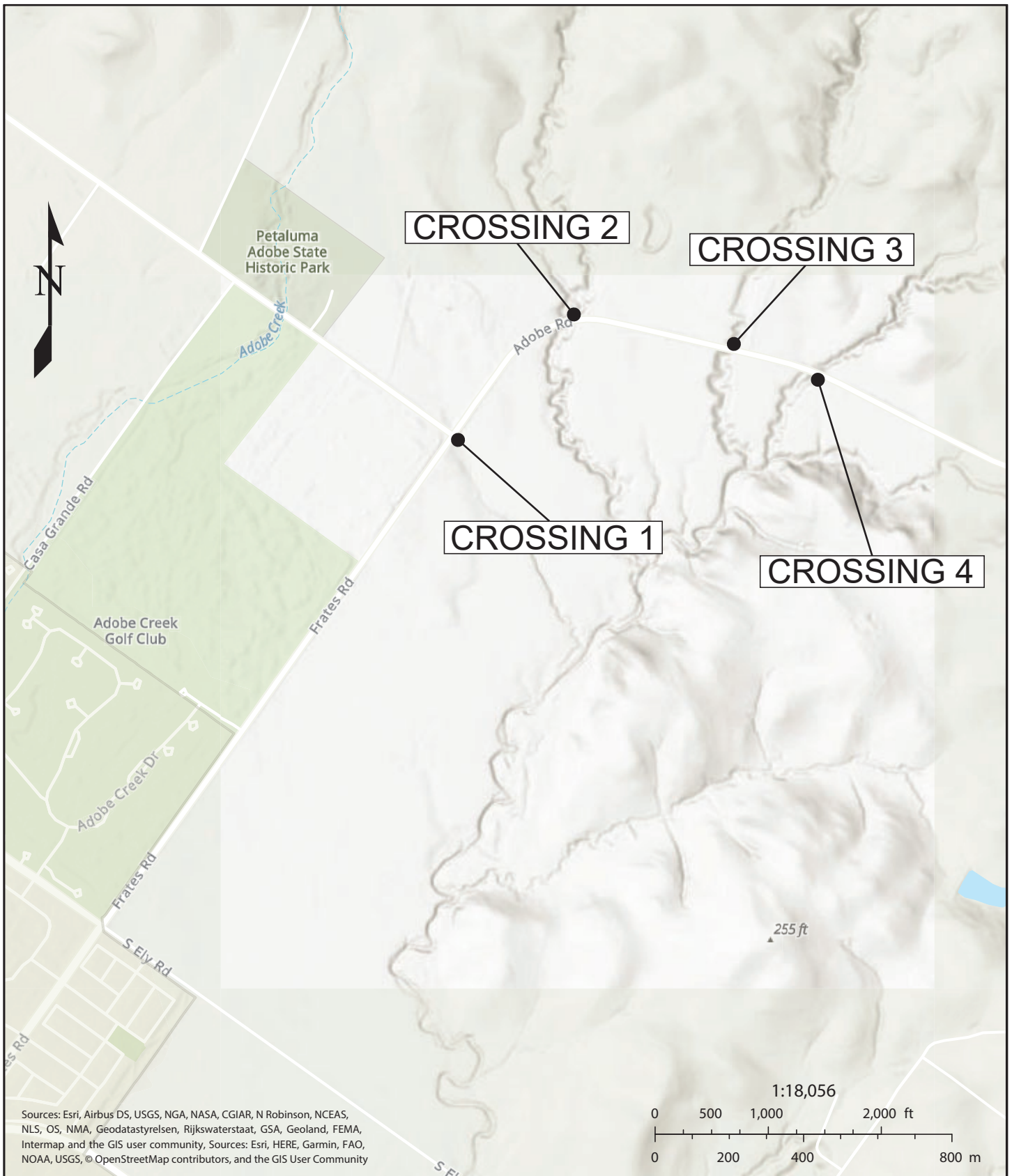
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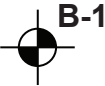
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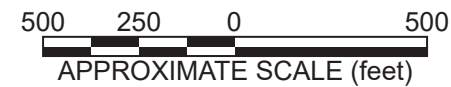
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	PROJECT NO.: 20193762	<b>SITE LOCATION</b>  TRENCHLESS RECYCLED WATER PIPELINE ADOBE ROAD PETALUMA, CALIFORNIA	<b>FIGURE</b>  1
	DRAWN BY: DJS CHECKED BY: MJP DATE: 2/2020 REVISED: -		

**SYMBOLS**

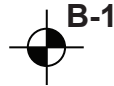
	<b>B-1</b> Approximate Boring Location (Kleinfelder, 2019)
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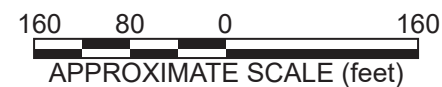



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	DRAWN FEB 2020		
	DRAWN BY DJS		
	CHECKED BY MJP		
FILE NAME Figure 2 Site Plan.ai			

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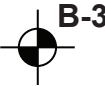
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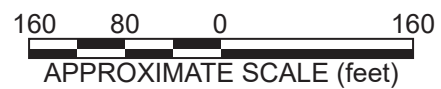



 <p><b>KLEINFELDER</b> Bright People. Right Solutions. www.kleinfelder.com</p>	PROJECT NO. 20193762.003	<b>CROSSING 1</b> <b>B-1 &amp; B-2 BORING LOCATIONS</b>	FIGURE  <b>3</b>
	DRAWN FEB 2020		
	DRAWN BY DJS	TRENCHLESS RECYCLED WATER PIPELINE ADOBE ROAD PETALUMA, CALIFORNIA	
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
	B-3 Approximate Boring Location (Kleinfelder, 2019)
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	PROJECT NO. 20193762.003	<b>CROSSING 2</b> <b>B-3 &amp; B-4 BORING LOCATIONS</b>	FIGURE  <b>4</b>
	DRAWN FEB 2020		
	DRAWN BY DJS	TRENCHLESS RECYCLED WATER PIPELINE ADOBE ROAD PETALUMA, CALIFORNIA	
	CHECKED BY MJP		
FILE NAME Site Plan.ai			

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**SYMBOLS**

	<p><b>B-5</b> Approximate Boring Location (Kleinfelder, 2019)</p>
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FILE NAME	Site Plan.ai

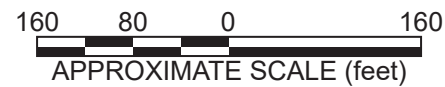
<p><b>CROSSING 3</b> <b>B-5 &amp; B-6 BORING LOCATIONS</b></p>
<p>TRENCHLESS RECYCLED WATER PIPELINE ADOBE ROAD PETALUMA, CALIFORNIA</p>


FIGURE  
**5**

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**SYMBOLS**

	B-8 Approximate Boring Location (Kleinfelder, 2019)
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	DRAWN FEB 2020		
	DRAWN BY DJS	TRENCHLESS RECYCLED WATER PIPELINE ADOBE ROAD PETALUMA, CALIFORNIA	
	CHECKED BY MJP		
FILE NAME Site Plan.ai			

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***KLEINFELDER***

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**SAMPLE/SAMPLER TYPE GRAPHICS**

	BULK SAMPLE
	CALIFORNIA SAMPLER (3 in. (76.2 mm.) outer diameter)
	STANDARD PENETRATION SPLIT SPOON SAMPLER (2 in. (50.8 mm.) outer diameter and 1-3/8 in. (34.9 mm.) inner diameter)

**ROCK LITHOLOGY GRAPHICS**

	CLAYSTONE
	SANDSTONE
	SILTSTONE

**GROUND WATER GRAPHICS**

	WATER LEVEL (level where first observed)
	WATER LEVEL (level after exploration completion)
	WATER LEVEL (additional levels after exploration)
	OBSERVED SEEPAGE

**NOTES**

• The report and graphics key are an integral part of these logs. All data and interpretations in this log are subject to the explanations and limitations stated in the report.

• Lines separating strata on the logs represent approximate boundaries only. Actual transitions may be gradual or differ from those shown.

• No warranty is provided as to the continuity of soil or rock conditions between individual sample locations.

• Logs represent general soil or rock conditions observed at the point of exploration on the date indicated.

• In general, Unified Soil Classification System designations presented on the logs were based on visual classification in the field and were modified where appropriate based on gradation and index property testing.

• Fine grained soils that plot within the hatched area on the Plasticity Chart, and coarse grained soils with between 5% and 12% passing the No. 200 sieve require dual USCS symbols, ie., GW-GM, GP-GM, GW-GC, GP-GC, GC-GM, SW-SM, SP-SM, SW-SC, SP-SC, SC-SM.

• If sampler is not able to be driven at least 6 inches then 50/X indicates number of blows required to drive the identified sampler X inches with a 140 pound hammer falling 30 inches.

**ABBREVIATIONS**

WOH - Weight of Hammer  
WOR - Weight of Rod

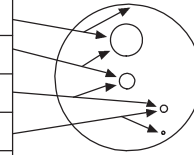
**UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487)**

GRAVELS (More than half of coarse fraction is larger than the #4 sieve)	CLEAN GRAVEL WITH <5% FINES	Cu ≥ 4 and 1 ≤ Cc ≤ 3		GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
		Cu < 4 and/or 1 > Cc > 3		GP	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
	GRAVELS WITH 5% TO 12% FINES	Cu ≥ 4 and 1 ≤ Cc ≤ 3		GW-GM	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE FINES
				GW-GC	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE CLAY FINES
		Cu < 4 and/or 1 > Cc > 3		GP-GM	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE FINES
				GP-GC	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE CLAY FINES
	GRAVELS WITH > 12% FINES			GM	SILTY GRAVELS, GRAVEL-SILT-SAND MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
				GC-GM	CLAYEY GRAVELS, GRAVEL-SAND-CLAY-SILT MIXTURES
	COARSE GRAINED SOILS (More than half of coarse fraction is smaller than the #4 sieve)	CLEAN SANDS WITH <5% FINES	Cu ≥ 6 and 1 ≤ Cc ≤ 3		SW
Cu < 6 and/or 1 > Cc > 3				SP	POORLY GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
SANDS WITH 5% TO 12% FINES		Cu ≥ 6 and 1 ≤ Cc ≤ 3		SW-SM	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE FINES
				SW-SC	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE CLAY FINES
		Cu < 6 and/or 1 > Cc > 3		SP-SM	POORLY GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE FINES
				SP-SC	POORLY GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE CLAY FINES
SANDS WITH > 12% FINES				SM	SILTY SANDS, SAND-GRAVEL-SILT MIXTURES
				SC	CLAYEY SANDS, SAND-GRAVEL-CLAY MIXTURES
				SC-SM	CLAYEY SANDS, SAND-SILT-CLAY MIXTURES
FINE GRAINED SOILS (More than half of material is smaller than the #200 sieve)		SILTS AND CLAYS (Liquid Limit less than 50)		ML	INORGANIC SILTS AND VERY FINE SANDS, SILTY OR CLAYEY FINE SANDS, SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS	
			CL-ML	INORGANIC CLAYS-SILTS OF LOW PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS	
	SILTS AND CLAYS (Liquid Limit greater than 50)		OL	ORGANIC SILTS & ORGANIC SILTY CLAYS OF LOW PLASTICITY	
			MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILT	
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS	
		OH	ORGANIC CLAYS & ORGANIC SILTS OF MEDIUM-TO-HIGH PLASTICITY		

 <b>Bright People. Right Solutions.</b>	PROJECT NO.: 20193762	<b>GRAPHICS KEY</b>  TRENCHLESS RECYCLED WATER PIPELINE ADOBE ROAD PETALUMA, CALIFORNIA	FIGURE
	DRAWN BY:		A-1
CHECKED BY:	DATE:		
REVISD:	-		

**GRAIN SIZE**

DESCRIPTION	SIEVE SIZE	GRAIN SIZE	APPROXIMATE SIZE
Boulders	>12 in. (304.8 mm.)	>12 in. (304.8 mm.)	Larger than basketball-sized
Cobbles	3 - 12 in. (76.2 - 304.8 mm.)	3 - 12 in. (76.2 - 304.8 mm.)	Fist-sized to basketball-sized
Gravel	coarse 3/4 - 3 in. (19 - 76.2 mm.)	3/4 - 3 in. (19 - 76.2 mm.)	Thumb-sized to fist-sized
	fine #4 - 3/4 in. (#4 - 19 mm.)	0.19 - 0.75 in. (4.8 - 19 mm.)	Pea-sized to thumb-sized
Sand	coarse #10 - #4	0.079 - 0.19 in. (2 - 4.9 mm.)	Rock salt-sized to pea-sized
	medium #40 - #10	0.017 - 0.079 in. (0.43 - 2 mm.)	Sugar-sized to rock salt-sized
	fine #200 - #40	0.0029 - 0.017 in. (0.07 - 0.43 mm.)	Flour-sized to sugar-sized
Fines	Passing #200	<0.0029 in. (<0.07 mm.)	Flour-sized and smaller



**SECONDARY CONSTITUENT**

Term of Use	AMOUNT	
	Secondary Constituent is Fine Grained	Secondary Constituent is Coarse Grained
Trace	<5%	<15%
With	≥5 to <15%	≥15 to <30%
Modifier	≥15%	≥30%

**MOISTURE CONTENT**

DESCRIPTION	FIELD TEST
Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water, usually soil is below water table

**CEMENTATION**

DESCRIPTION	FIELD TEST
Weakly	Crumbles or breaks with handling or slight finger pressure
Moderately	Crumbles or breaks with considerable finger pressure
Strongly	Will not crumble or break with finger pressure

**CONSISTENCY - FINE-GRAINED SOIL**

CONSISTENCY	SPT - N <sub>60</sub> (# blows / ft)	Pocket Pen (tsf)	UNCONFINED COMPRESSIVE STRENGTH (Q <sub>u</sub> )(psf)	VISUAL / MANUAL CRITERIA
Very Soft	<2	PP < 0.25	<500	Thumb will penetrate more than 1 inch (25 mm). Extrudes between fingers when squeezed.
Soft	2 - 4	0.25 ≤ PP <0.5	500 - 1000	Thumb will penetrate soil about 1 inch (25 mm). Remolded by light finger pressure.
Medium Stiff	4 - 8	0.5 ≤ PP <1	1000 - 2000	Thumb will penetrate soil about 1/4 inch (6 mm). Remolded by strong finger pressure.
Stiff	8 - 15	1 ≤ PP <2	2000 - 4000	Can be imprinted with considerable pressure from thumb.
Very Stiff	15 - 30	2 ≤ PP <4	4000 - 8000	Thumb will not indent soil but readily indented with thumbnail.
Hard	>30	4 ≤ PP	>8000	Thumbnail will not indent soil.

**REACTION WITH HYDROCHLORIC ACID**

DESCRIPTION	FIELD TEST
None	No visible reaction
Weak	Some reaction, with bubbles forming slowly
Strong	Violent reaction, with bubbles forming immediately

FROM TERZAGHI AND PECK, 1948; LAMBE AND WHITMAN, 1969; FHWA, 2002; AND ASTM D2488

**APPARENT / RELATIVE DENSITY - COARSE-GRAINED SOIL**

APPARENT DENSITY	SPT-N <sub>60</sub> (# blows/ft)	MODIFIED CA SAMPLER (# blows/ft)	CALIFORNIA SAMPLER (# blows/ft)	RELATIVE DENSITY (%)
Very Loose	<4	<4	<5	0 - 15
Loose	4 - 10	5 - 12	5 - 15	15 - 35
Medium Dense	10 - 30	12 - 35	15 - 40	35 - 65
Dense	30 - 50	35 - 60	40 - 70	65 - 85
Very Dense	>50	>60	>70	85 - 100

FROM TERZAGHI AND PECK, 1948

**PLASTICITY**

DESCRIPTION	LL	FIELD TEST
Non-plastic	NP	A 1/8-in. (3 mm.) thread cannot be rolled at any water content.
Low (L)	< 30	The thread can barely be rolled and the lump or thread cannot be formed when drier than the plastic limit.
Medium (M)	30 - 50	The thread is easy to roll and not much time is required to reach the plastic limit. The thread cannot be rerolled after reaching the plastic limit. The lump or thread crumbles when drier than the plastic limit.
High (H)	> 50	It takes considerable time rolling and kneading to reach the plastic limit. The thread can be rerolled several times after reaching the plastic limit. The lump or thread can be formed without crumbling when drier than the plastic limit.

**STRUCTURE**

DESCRIPTION	CRITERIA
Stratified	Alternating layers of varying material or color with layers at least 1/4-in. thick, note thickness.
Laminated	Alternating layers of varying material or color with the layer less than 1/4-in. thick, note thickness.
Fissured	Breaks along definite planes of fracture with little resistance to fracturing.
Slickensided	Fracture planes appear polished or glossy, sometimes striated.
Blocky	Cohesive soil that can be broken down into small angular lumps which resist further breakdown.
Lensed	Inclusion of small pockets of different soils, such as small lenses of sand scattered through a mass of clay; note thickness.

**ANGULARITY**

DESCRIPTION	CRITERIA
Angular	Particles have sharp edges and relatively plane sides with unpolished surfaces.
Subangular	Particles are similar to angular description but have rounded edges.
Subrounded	Particles have nearly plane sides but have well-rounded corners and edges.
Rounded	Particles have smoothly curved sides and no edges.



PROJECT NO.: 20193762  
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SOIL DESCRIPTION KEY  
TRENCHLESS RECYCLED WATER PIPELINE  
ADOBE ROAD  
PETALUMA, CALIFORNIA

FIGURE  
A-2

**INFILLING TYPE**

NAME	ABBR	NAME	ABBR
Albite	Al	Muscovite	Mus
Apatite	Ap	None	No
Biotite	Bi	Pyrite	Py
Clay	Cl	Quartz	Qz
Calcite	Ca	Sand	Sd
Chlorite	Ch	Sericite	Ser
Epidote	Ep	Silt	Si
Iron Oxide	Fe	Talc	Ta
Manganese	Mn	Unknown	Uk

**DENSITY/SPACING OF DISCONTINUITIES**

DESCRIPTION	SPACING CRITERIA
Unfractured	>6 ft. (>1.83 meters)
Slightly Fractured	2 - 6 ft. (0.061 - 1.83 meters)
Moderately Fractured	8 in - 2 ft. (203.20 - 609.60 mm)
Highly Fractured	2 - 8 in (50.80 - 203.30 mm)
Intensely Fractured	<2 in (<50.80 mm)

**ADDITIONAL TEXTURAL ADJECTIVES**

DESCRIPTION	RECOGNITION
Pit (Pitted)	Pinhole to 0.03 ft. (3/8 in.) (>1 to 10 mm.) openings
Vug (Vuggy)	Small openings (usually lined with crystals) ranging in diameter from 0.03 ft. (3/8 in.) to 0.33 ft. (4 in.) (10 to 100 mm.)
Cavity	An opening larger than 0.33 ft. (4 in.) (100 mm.), size descriptions are required, and adjectives such as small, large, etc., may be used
Honeycombed	If numerous enough that only thin walls separate individual pits or vugs, this term further describes the preceding nomenclature to indicate cell-like form.
Vesicle (Vesicular)	Small openings in volcanic rocks of variable shape and size formed by entrapped gas bubbles during solidification.

**ADDITIONAL TEXTURAL ADJECTIVES**

DESCRIPTION	CRITERIA
Unweathered	No evidence of chemical / mechanical alteration; rings with hammer blow.
Slightly Weathered	Slight discoloration on surface; slight alteration along discontinuities; <10% rock volume altered.
Moderately Weathered	Discoloring evident; surface pitted and alteration penetration well below surface; Weathering "halos" evident; 10-50% rock altered.
Highly Weathered	Entire mass discolored; Alteration pervading most rock, some slight weathering pockets; some minerals may be leached out.
Decomposed	Rock reduced to soil with relic rock texture/structure; Generally molded and crumbled by hand.

**RELATIVE HARDNESS / STRENGTH DESCRIPTIONS**

GRADE	UCS (Mpa)	FIELD TEST	
R0	Extremely Weak	0.25 - 1.0	Indented by thumbnail
R1	Very Weak	1.0 - 5.0	Crumbles under firm blows of geological hammer, can be peeled by a pocket knife.
R2	Weak	5.0 - 25	Can be peeled by a pocket knife with difficulty, shallow indentations made by firm blow with point of geological hammer.
R3	Medium Strong	25 - 50	Cannot be scraped or peeled with a pocket knife, specimen can be fractured with a single firm blow of a geological hammer.
R4	Strong	50 - 100	Specimen requires more than one blow of geological hammer to fracture it.
R5	Very Strong	100 - 250	Specimen requires many blows of geological hammer to fracture it.
R6	Extremely Strong	> 250	Specimen can only be chipped with a geological hammer.

**ROCK QUALITY DESIGNATION (RQD)**

DESCRIPTION	RQD (%)
Very Poor	0 - 25
Poor	25 - 50
Fair	50 - 75
Good	75 - 90
Excellent	90 - 100

**APERTURE**

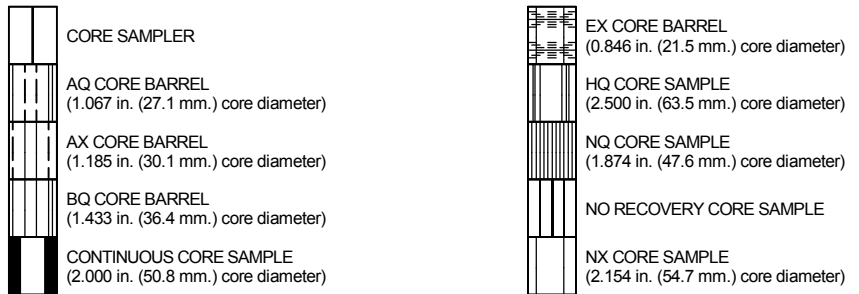
DESCRIPTION	CRITERIA [in (mm)]
Tight	<0.04 (<1)
Open	0.04 - 0.20 (1 - 5)
Wide	>0.20 (>5)

**BEDDING CHARACTERISTICS**

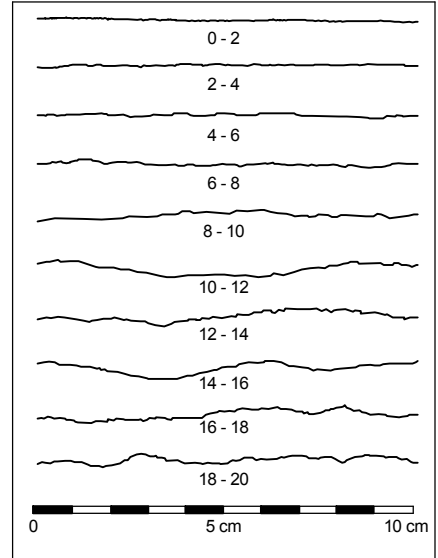
DESCRIPTION	Thickness [in (mm)]
Very Thick Bedded	>36 (>915)
Thick Bedded	12 - 36 (305 - 915)
Moderately Bedded	4 - 12 (102 - 305)
Thin Bedded	1 - 4 (25 - 102)
Very Thin Bedded	0.4 - 1 (10 - 25)
Laminated	0.1 - 0.4 (2.5 - 10)
Thinly Laminated	<0.1 (<2.5)

Bedding Planes Planes dividing the individual layers, beds, or stratigraphy of rocks.  
 Joint Fracture in rock, generally more or less vertical or traverse to bedding.  
 Seam Applies to bedding plane with unspecified degree of weather.

**CORE SAMPLER TYPE GRAPHICS**



**JOINT ROUGHNESS COEFFICIENT (JRC)**



From Barton and Choubey, 1977

RQD Rock-quality designation (RQD) Rough measure of the degree of jointing or fracture in a rock mass, measured as a percentage of the drill core in lengths of 10 cm. or more.



PROJECT NO.: 20193762  
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 DATE:  
 REVISED: -

**ROCK DESCRIPTION KEY**  
 TRENCHLESS RECYCLED WATER PIPELINE  
 ADOBE ROAD  
 PETALUMA, CALIFORNIA

**FIGURE**  
 A-3

PLOTTED: 10/08/2019 03:36 PM BY: DSullivan


**Date Begin - End:** 8/19/2019 **Drilling Company:** Gulf Shore Exploration **BORING LOG B-1**  
**Logged By:** DJ Sullivan **Drill Crew:** Carlos, Troy  
**Hor.-Vert. Datum:** WGS84 - NAVD88 **Drilling Equipment:** CME-75 **Hammer Type - Drop:** 140 lb. Auto - 30 in.  
**Plunge:** -90 degrees **Drilling Method:** Hollow Stem Auger  
**Weather:** Overcast **Auger Diameter:** 8 in. O.D.

Approximate Elevation (feet)	Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS							Additional Tests/Remarks	
			Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= Isf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)		
			Approximate Ground Surface Elevation (ft.): 116 Surface Condition: Soil Shoulder												
115			<b>Poorly Graded SAND with Clay and Gravel (SP):</b> light brownish gray, dry to moist, medium dense, fine to coarse grained sand, subangular to subrounded gravel to 2.5" (fill)												
	5		<b>Clayey GRAVEL with Sand (GC):</b> light brownish gray, moist, medium dense, fine to coarse sand, subangular to subrounded gravel to 2" (fill)	BC=15 30 23	50%		11.8	113.9	40	15					
110															
	10			BC=10 25 35	44%										
105															
	15		<b>SILTY CLAYSTONE:</b> light brownish gray, moderately weathered, R0, poorly to non-indurated, excavates as lean clay (native)	BC=5 8 13	83%		34.7	84.3			56	28	TXUU: c=1.07 ksf		
100															
	20		<b>CLAYSTONE:</b> light bluish gray with reddish brown, moderately weathered, R0, poorly indurated	BC=10 22 37	56%		22.4	103.0							
95															
	25		Dark bluish gray with brownish gray, trace fine to medium sand, poorly indurated	BC=10 22 34	89%		19.8	104.6					TXUU: c=4.59 ksf		
90															
	30		<b>SILTY CLAYSTONE:</b> bluish gray, moderately weathered, R0, very fine sand, poorly indurated	BC=14 38 50/4"	94%		19.5	102.2							
85															
	35		<b>SILTSTONE:</b> bluish gray, moderately weathered, R0, very fine sand, poorly indurated	BC=34 50/4"	100%										
80			The boring was terminated at approximately 35 ft. below ground surface. The boring was backfilled with neat cement grout on August 19, 2019.				<b>GROUNDWATER LEVEL INFORMATION:</b> Groundwater was not observed during drilling or after completion. <b>GENERAL NOTES:</b> The exploration location and elevation are approximate and were estimated by Kleinfelder.								

OFFICE FILTER: SANTA ROSA

PROJECT NUMBER: 20193762.003A  
 GINT LIBRARY: 2019.GLB [KLF\_BORING/TEST PIT SOIL LOG]

GINT FILE: KLF\_gint\_master\_2019  
 GINT TEMPLATE: E:KLF\_STANDARD\_GINT\_LIBRARY\_2019.GLB

	PROJECT NO.: 20193762	<b>BORING LOG B-1</b>  TRENCHLESS RECYCLED WATER PIPELINE ADOBE ROAD PETALUMA, CALIFORNIA	FIGURE
	DRAWN BY: CSE		A-4
CHECKED BY: MJP			
DATE:			
REVISED: -			PAGE: 1 of 1

PLOTTED: 10/08/2019 03:36 PM BY: DSullivan


<b>Date Begin - End:</b> 8/19/2019	<b>Drilling Company:</b> Gulf Shore Exploration	<b>BORING LOG B-2</b>
<b>Logged By:</b> DJ Sullivan	<b>Drill Crew:</b> Carlos, Troy	
<b>Hor.-Vert. Datum:</b> WGS84 - NAVD88	<b>Drilling Equipment:</b> CME-75	<b>Hammer Type - Drop:</b> 140 lb. Auto - 30 in.
<b>Plunge:</b> -90 degrees	<b>Drilling Method:</b> Hollow Stem Auger	
<b>Weather:</b> Sunny	<b>Auger Diameter:</b> 8 in. O.D.	

Approximate Elevation (feet)	Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS							Additional Tests/Remarks	
			Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= Isf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)		
			Approximate Ground Surface Elevation (ft.): 116 Surface Condition: Soil Shoulder												
115			<b>Poorly Graded SAND with Clay and Gravel (SP-SC):</b> grayish brown, dry to moist, medium dense, fine to coarse sand, subangular to subrounded gravel to 1.5" (fill)												
	5		<b>Fat CLAY with Sand and Gravel (CH):</b> dark brownish gray, moist, stiff, fine sand, angular gravel to 2", rootlets (fill)	BC=9 7 7	83%										
110			<b>Lean CLAY with Sand and Gravel (CL):</b> brown, moist, very stiff, fine to coarse sand, subangular to subrounded sand to 2"												
	10			BC=33 28 50/3"	107%										
105			<b>Poorly Graded SAND with Silt and Gravel (SP-SM):</b> dark brown, wet, dense, fine to coarse sand, subangular to subrounded gravel to 1", some fines content												
	15			BC=18 27 24	NR										
100			medium dense												
	20			BC=7 11 12	94%	SP-SM			73	7.2					
95			<b>Fat CLAY (CH):</b> dark bluish gray, moist, very stiff, trace fine sand												
	25			BC=12 14 17	67%			24.0	97.6			61	36		
90			<b>CLAYSTONE:</b> dark bluish gray, moderately weathered, R0												
	30			BC=17 37 50	89%	CH	23.4	104.1	100	98	58	32			
85															
	35			BC=18 29 37	83%										
80			The boring was terminated at approximately 35.5 ft. below ground surface. The boring was backfilled with neat cement grout on August 19, 2019.				<b>GROUNDWATER LEVEL INFORMATION:</b> ∇ Groundwater was observed at approximately 20 ft. below ground surface during drilling. <b>GENERAL NOTES:</b> The exploration location and elevation are approximate and were estimated by Kleinfelder.								

OFFICE FILTER: SANTA ROSA

PROJECT NUMBER: 20193762.003A

GINT FILE: Kf\_gint\_master\_2019  
GINT TEMPLATE: E:KLF\_STANDARD\_GINT\_LIBRARY\_2019.GLB [KLF\_BORING/TEST PIT SOIL LOG]

 <b>KLEINFELDER</b> <i>Bright People. Right Solutions.</i>	PROJECT NO.: 20193762	<b>BORING LOG B-2</b>	FIGURE
	DRAWN BY: CSE	TRENCHLESS RECYCLED WATER PIPELINE ADOBE ROAD PETALUMA, CALIFORNIA	<b>A-5</b>
CHECKED BY: MJP	DATE:		
REvised: -			PAGE: 1 of 1

PLOTTED: 10/08/2019 03:36 PM BY: DSullivan

<b>Date Begin - End:</b> 8/21/2019	<b>Drilling Company:</b> Gulf Shore Exploration	<b>BORING LOG B-3</b>
<b>Logged By:</b> DJ Sullivan	<b>Drill Crew:</b> Carlos, Troy	
<b>Hor.-Vert. Datum:</b> WGS84 - NAVD88	<b>Drilling Equipment:</b> CME-75	<b>Hammer Type - Drop:</b> 140 lb. Auto - 30 in.
<b>Plunge:</b> -90 degrees	<b>Drilling Method:</b> Hollow Stem Auger	
<b>Weather:</b> Sunny	<b>Auger Diameter:</b> 8 in. O.D.	

Approximate Elevation (feet)	Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS							Additional Tests/Remarks	
			Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= Isf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)		
			Approximate Ground Surface Elevation (ft.): 121 Surface Condition: Grass												
120			<b>Lean CLAY (CL):</b> dark brown, moist, hard, rootlets	X											
5				BC=7 11 17 PP=4.5	61%		23.3	98.4							
115			<b>Lean CLAY with Sand (CL):</b> brown, moist, very stiff	BC=5 8 13 PP=4.0	83%										
10				BC=3 5 10 PP=2.0	83%	CH	27.3	96.1	79	51	50	31			
110			<b>Sandy Fat CLAY with Gravel (CH):</b> brown, moist, stiff to very stiff, medium to coarse sand, subangular gravel to 2"	BC=8 7 11 PP=4.0	89%										
15				BC=5 6 10 PP=1.5	100%										
105			<b>Lean CLAY with Sand (CL):</b> mottled bluish gray and brown, moist, very stiff to hard, fine sand	BC=17 25 13	100%	SM	20.2	106.8	100	15	NP	NP			
20				BC=6 36	100%										
100			<b>Sandy Lean CLAY (CL):</b> mottled bluish gray and reddish brown, moist, stiff, fine sand												
25															
95			<b>Silty SAND (SM):</b> dark bluish gray, wet, dense, fine to medium sand												
30															
90															

PROJECT NUMBER: 20193762.003A  
OFFICE FILTER: SANTA ROSA  
GINT TEMPLATE: E:KLF\_STANDARD\_GINT\_LIBRARY\_2019.GLB [ KLF\_BORING/TEST PIT SOIL LOG ]



PROJECT NO.: 20193762  
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DATE:  
REVISED: -

**BORING LOG B-3**  
  
TRENCHLESS RECYCLED WATER PIPELINE  
ADOBE ROAD  
PETALUMA, CALIFORNIA

FIGURE  
  
**A-6**  
  
PAGE: 1 of 2

PLOTTED: 10/08/2019 03:36 PM BY: DSullivan

**BORING LOG B-3**

**Date Begin - End:** 8/21/2019 **Drilling Company:** Gulf Shore Exploration  
**Logged By:** DJ Sullivan **Drill Crew:** Carlos, Troy  
**Hor.-Vert. Datum:** WGS84 - NAVD88 **Drilling Equipment:** CME-75 **Hammer Type - Drop:** 140 lb. Auto - 30 in.  
**Plunge:** -90 degrees **Drilling Method:** Hollow Stem Auger  
**Weather:** Sunny **Auger Diameter:** 8 in. O.D.

Approximate Elevation (feet)	Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS							
			Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= Isf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			Approximate Ground Surface Elevation (ft.): 121 Surface Condition: Grass											
85			<b>SANDY CLAYSTONE:</b> bluish gray, moderately weathered, R0, very fine sand, poorly indurated		50/3"									
	40			BC=13 26 35		78%		23.0	104.5			32	13	TXUU: c=1.89 ksf
80														
75			<b>SANDSTONE:</b> gray, fine to medium-grained sand, moderately weathered, R0, non-indurated											
	50			BC=33 50/5"		91%		20.5	96.3					
70														
65			<b>CLAYSTONE:</b> bluish gray, moderately weathered, R0, poorly indurated											
	60			BC=20 30 46		94%		18.1	108.0					
60														
65				BC=16 30 40		50%								
55			The boring was terminated at approximately 65.5 ft. below ground surface. The boring was backfilled with neat cement grout on August 21, 2019.				<b>GROUNDWATER LEVEL INFORMATION:</b> ☒ Groundwater was observed at approximately 14 ft. below ground surface during drilling. <b>GENERAL NOTES:</b> The exploration location and elevation are approximate and were estimated by Kleinfelder.							

OFFICE FILTER: SANTA ROSA

PROJECT NUMBER: 20193762.003A

PROJECT NUMBER: 20193762.003A  
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 GINT FILE: KLF\_gint\_master\_2019



PROJECT NO.: 20193762  
 DRAWN BY: CSE  
 CHECKED BY: MJP  
 DATE:  
 REVISED: -

**BORING LOG B-3**  
**TRENCHLESS RECYCLED WATER PIPELINE**  
 ADOBE ROAD  
 PETALUMA, CALIFORNIA

FIGURE  
**A-6**  
 PAGE: 2 of 2

PLOTTED: 10/08/2019 03:36 PM BY: DSullivan

<b>Date Begin - End:</b> 8/20/2019	<b>Drilling Company:</b> Gulf Shore Exploration	<b>BORING LOG B-4</b>	
<b>Logged By:</b> DJ Sullivan	<b>Drill Crew:</b> Carlos, Troy		
<b>Hor.-Vert. Datum:</b> WGS84 - NAVD88	<b>Drilling Equipment:</b> CME-75		<b>Hammer Type - Drop:</b> 140 lb. Auto - 30 in.
<b>Plunge:</b> -90 degrees	<b>Drilling Method:</b> Hollow Stem Auger		
<b>Weather:</b> Overcast	<b>Auger Diameter:</b> 8 in. O.D.		

Approximate Elevation (feet)	Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS							
			Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= Isf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			Approximate Ground Surface Elevation (ft.): 121 Surface Condition: Base Rock Driveway											
			<b>Baseroack Driveway: 6"</b>											
120			<b>Lean CLAY (CL):</b> dark brown, moist, very stiff											
	5			BC=5 10 16 PP=3.5	83%									
	10		some fine sand	BC=7 13 16	44%									
	15		<b>Sandy Lean CLAY (CL):</b> brown to light brown, moist, hard, medium to coarse sand	BC=5 16 17 PP=4.5	83%		21.9	100.5						
	20		very stiff, fine to medium sand	BC=5 9 10 PP=2.5	83%									
	25		<b>Clayey SAND (SC):</b> light brown, moist, medium dense, coarse sand, angular gravel to 2.5"	BC=8 9 21	94%		15.1	117.1	71	23				
	30		<b>SANDY CLAYSTONE:</b> pale olive to light brownish gray, moderately weathered, R0, very fine sand, poorly indurated	BC=12 26 42	78%		19.5	108.3						
			<b>CLAYSTONE:</b> dark bluish gray, moderately weathered, R0, poorly indurated	BC=19 39	100%									
														TXUU: c=8.04 ksf

PROJECT NUMBER: 20193762.003A  
 OFFICE FILTER: SANTA ROSA  
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PROJECT NO.: 20193762  
 DRAWN BY: CSE  
 CHECKED BY: MJP  
 DATE:  
 REVISED: -

**BORING LOG B-4**

TRENCHLESS RECYCLED WATER PIPELINE  
 ADOBE ROAD  
 PETALUMA, CALIFORNIA

FIGURE  
**A-7**

PAGE: 1 of 2




PLOTTED: 10/08/2019 03:36 PM BY: DSullivan

<b>Date Begin - End:</b> <u>8/20/2019</u>	<b>Drilling Company:</b> <u>Gulf Shore Exploration</u>	<b>BORING LOG B-4</b>
<b>Logged By:</b> <u>DJ Sullivan</u>	<b>Drill Crew:</b> <u>Carlos, Troy</u>	
<b>Hor.-Vert. Datum:</b> <u>WGS84 - NAVD88</u>	<b>Drilling Equipment:</b> <u>CME-75</u>	<b>Hammer Type - Drop:</b> <u>140 lb. Auto - 30 in.</u>
<b>Plunge:</b> <u>-90 degrees</u>	<b>Drilling Method:</b> <u>Hollow Stem Auger</u>	
<b>Weather:</b> <u>Overcast</u>	<b>Auger Diameter:</b> <u>8 in. O.D.</u>	

Approximate Elevation (feet)	Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS								
			Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= Isf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks	
			Approximate Ground Surface Elevation (ft.): 121 Surface Condition: Base Rock Driveway												
85		█	<b>CLAYSTONE:</b> dark bluish gray, moderately weathered, R0, poorly indurated	50/4"											
	40	█		BC=25 46 50/4"	94%			15.3	112.9						
80		█													
	45	█		BC=20 39 50/4"	75%										
75		█													
	50	█		BC=17 35 47	83%										
70		█													
	55	█	<b>SANDY CLAYSTONE:</b> gray to bluish gray, moderately weathered, R0, very fine sand, poorly indurated												
65		█													
	60	█		BC=30 50/4"	140%										
60		█	The boring was terminated at approximately 60 ft. below ground surface. The boring was backfilled with neat cement grout on August 20, 2019.												
	65	█													
55		█													

**GROUNDWATER LEVEL INFORMATION:**  
Groundwater was not observed during drilling or after completion.  
**GENERAL NOTES:**  
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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	PROJECT NO.: 20193762	<b>BORING LOG B-4</b>  TRENCHLESS RECYCLED WATER PIPELINE ADOBE ROAD PETALUMA, CALIFORNIA	FIGURE
	DRAWN BY: CSE		<b>A-7</b>
CHECKED BY: MJP	DATE:		
REVISD: -			PAGE: 2 of 2

PLOTTED: 10/08/2019 03:37 PM BY: DSullivan

<b>Date Begin - End:</b> <u>8/26/2019</u>	<b>Drilling Company:</b> <u>Gulf Shore Exploration</u>	<b>BORING LOG B-5</b>
<b>Logged By:</b> <u>Cavan Ewing</u>	<b>Drill Crew:</b> <u>Carlos, Troy</u>	
<b>Hor.-Vert. Datum:</b> <u>WGS84 - NAVD88</u>	<b>Drilling Equipment:</b> <u>CME-75</u>	<b>Hammer Type - Drop:</b> <u>140 lb. Auto - 30 in.</u>
<b>Plunge:</b> <u>-90 degrees</u>	<b>Drilling Method:</b> <u>Hollow Stem Auger</u>	
<b>Weather:</b> <u>Sunny</u>	<b>Auger Diameter:</b> <u>8 in. O.D.</u>	

Approximate Elevation (feet)	Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS									
			Approximate Ground Surface Elevation (ft.): 121 Surface Condition: Grass		Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= Isf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks	
			Lithologic Description													
120			<b>Fat CLAY with Sand (CH):</b> dark gray, moist, stiff, fine to medium sand, occasional coarse sand and fine gravel (fill)		X											
	5		<b>Fat CLAY (CH):</b> grayish brown to brownish gray, moist, very stiff, trace fine sand (native)		BC=5 8 12 PP=3.75	78%		20.9	40.6							
	10		decreasing stiffness with depth		BC=4 5 10 PP=2.75	94%										
	15		decreasing stiffness with depth, decrease in sand content		BC=4 7 10 PP=2.25	100%		27.5	93.6							
	20		grayish brown to light brownish gray, stiff, fine to medium sand		BC=4 6 9 PP=1.75	100%										
	25		very stiff		BC=5 7 11 PP=2.5	100%										
	30		<b>Lean CLAY with Sand (CL):</b> light brownish gray, moist, very stiff, fine to medium sand (native)		BC=4 7 11 PP=3.5	100%		27.3	96.3			46	28	TXUU: c=2.53 ksf		
	90		increasing sand content with depth													

PROJECT NUMBER: 20193762.003A  
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GINT FILE: KLF\_gint\_master\_2019  
KLF\_BORING/TEST PIT SOIL LOG



PROJECT NO.: 20193762  
DRAWN BY: CSE  
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DATE:  
REVISED: -

**BORING LOG B-5**

TRENCHLESS RECYCLED WATER PIPELINE  
ADOBE ROAD  
PETALUMA, CALIFORNIA

FIGURE  
**A-8**

PAGE: 1 of 2

PLOTTED: 10/08/2019 03:37 PM BY: DSullivan

**Date Begin - End:** 8/26/2019 **Drilling Company:** Gulf Shore Exploration **BORING LOG B-5**  
**Logged By:** Cavan Ewing **Drill Crew:** Carlos, Troy  
**Hor.-Vert. Datum:** WGS84 - NAVD88 **Drilling Equipment:** CME-75 **Hammer Type - Drop:** 140 lb. Auto - 30 in.  
**Plunge:** -90 degrees **Drilling Method:** Hollow Stem Auger  
**Weather:** Sunny **Auger Diameter:** 8 in. O.D.

Approximate Elevation (feet)	Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS							Additional Tests/Remarks	
			Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= Isf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)		
			Approximate Ground Surface Elevation (ft.): 121 Surface Condition: Grass												
85			<b>Poorly Graded SAND (SP):</b> mottled yellowish brown and brownish gray, wet, medium dense, mostly fine sand, some clayey fines (native)												
40			<b>CLAYSTONE:</b> gray to bluish gray, moderately weathered, R0, poorly indurated	BC=17 40 50/6"	89%										
80			<p>The boring was terminated at approximately 40.5 ft. below ground surface. The boring was backfilled with neat cement grout on August 26, 2019.</p> <p><u>GROUNDWATER LEVEL INFORMATION:</u>                      ☒ Groundwater was observed at approximately 35 ft. below ground surface during drilling.</p> <p><u>GENERAL NOTES:</u>                      The exploration location and elevation are approximate and were estimated by Kleinfelder.</p>												
45															
75															
50															
70															
55															
65															
60															
60															
65															
55															

PROJECT NUMBER: 20193762.003A OFFICE FILTER: SANTA ROSA  
 GINT TEMPLATE: E:KLF\_STANDARD\_GINT\_LIBRARY\_2019.GLB [KLF\_BORING/TEST PIT/ SOIL LOG]

GINT FILE: Klf\_gint\_master\_2019



PROJECT NO.: 20193762  
 DRAWN BY: CSE  
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 DATE:  
 REVISED: -

**BORING LOG B-5**  
 TRENCHLESS RECYCLED WATER PIPELINE  
 ADOBE ROAD  
 PETALUMA, CALIFORNIA

FIGURE  
**A-8**  
 PAGE: 2 of 2

PLOTTED: 10/08/2019 03:37 PM BY: DSullivan

<b>Date Begin - End:</b> <u>8/23/2019</u>	<b>Drilling Company:</b> <u>Gulf Shore Exploration</u>	<b>BORING LOG B-6</b>
<b>Logged By:</b> <u>DJ Sullivan</u>	<b>Drill Crew:</b> <u>Carlos, Troy</u>	
<b>Hor.-Vert. Datum:</b> <u>WGS84 - NAVD88</u>	<b>Drilling Equipment:</b> <u>CME-75</u>	<b>Hammer Type - Drop:</b> <u>140 lb. Auto - 30 in.</u>
<b>Plunge:</b> <u>-90 degrees</u>	<b>Drilling Method:</b> <u>Mud Rotary</u>	
<b>Weather:</b> <u>Sunny</u>	<b>Exploration Diameter:</b> <u>4 in. O.D.</u>	

Approximate Elevation (feet)	Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS							Additional Tests/Remarks	
			Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= Isf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)		
120			Approximate Ground Surface Elevation (ft.): 121 Surface Condition: Grass												
			<b>Fat CLAY (CH):</b> dark brown, moist, very stiff												
	5				BC=5 8 11	56%			22.1	103.6					
	10				BC=5 9 12 PP=2.5	61%									
	15		<b>Fat CLAY with Sand (CH):</b> brown, moist, very stiff, fine sand		BC=6 9 11 PP=2.5	61%									
	20				BC=5 7 9 PP=2.5	61%		29.7	92.8	98	87				
	25				BC=4 6 9 PP=2.0	83%									
	30		<b>Lean CLAY with Sand (CL):</b> brown to light brown, moist, very stiff, medium to coarse sand, trace subangular gravel to 1.25"		BC=6 10 15 PP=3.0	61%	CL	26.8	99.4	99	71	44	26		
					BC=9 13	89%									

PROJECT NUMBER: 20193762.003A  
OFFICE FILTER: SANTA ROSA  
GINT TEMPLATE: E:KLF\_STANDARD\_GINT\_LIBRARY\_2019.GLB  
GINT FILE: KLF\_gint\_master\_2019  
KLF\_BORING/TEST PIT SOIL LOG



PROJECT NO.: 20193762  
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DATE:  
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**BORING LOG B-6**  
  
TRENCHLESS RECYCLED WATER PIPELINE  
ADOBE ROAD  
PETALUMA, CALIFORNIA

FIGURE  
  
**A-9**  
  
PAGE: 1 of 2

PLOTTED: 10/08/2019 03:37 PM BY: DSullivan

**Date Begin - End:** 8/23/2019 **Drilling Company:** Gulf Shore Exploration **BORING LOG B-6**  
**Logged By:** DJ Sullivan **Drill Crew:** Carlos, Troy  
**Hor.-Vert. Datum:** WGS84 - NAVD88 **Drilling Equipment:** CME-75 **Hammer Type - Drop:** 140 lb. Auto - 30 in.  
**Plunge:** -90 degrees **Drilling Method:** Mud Rotary  
**Weather:** Sunny **Exploration Diameter:** 4 in. O.D.

Approximate Elevation (feet)	Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS							
			Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= Isf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			Approximate Ground Surface Elevation (ft.): 121 Surface Condition: Grass											
85			<b>SANDY CLAYSTONE:</b> dark bluish gray, moderately weathered, R0, fine sand, poorly indurated		16				21.8	105.7				
40														
80														
45			Mottled bluish gray and brown, fine to medium sand		BC=37 50/3"	89%								
75														
50														
70														
55			Bluish gray, fine sand		BC=27 40 50/5"	88%								
65			The boring was terminated at approximately 55.5 ft. below ground surface. The boring was backfilled with neat cement grout on August 23, 2019.				<b>GROUNDWATER LEVEL INFORMATION:</b> Groundwater was not observed during drilling or after completion. <b>GENERAL NOTES:</b> The exploration location and elevation are approximate and were estimated by Kleinfelder.							
60														
55														

OFFICE FILTER: SANTA ROSA

PROJECT NUMBER: 20193762.003A

PROJECT NUMBER: 20193762.003A  
 GINT TEMPLATE: E:KLF\_STANDARD\_GINT\_LIBRARY\_2019.GLB [KLF\_BORING/TEST PIT SOIL LOG]



PROJECT NO.: 20193762  
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 DATE:  
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**BORING LOG B-6**  
 TRENCHLESS RECYCLED WATER PIPELINE  
 ADOBE ROAD  
 PETALUMA, CALIFORNIA

FIGURE  
**A-9**

PLOTTED: 10/08/2019 03:37 PM BY: DSullivan  
 PROJECT NUMBER: 20193762.003A  
 OFFICE FILTER: SANTA ROSA  
 GINT TEMPLATE: E:KLF\_STANDARD\_GINT\_LIBRARY\_2019.GLB L:KLF\_BORING/TEST PIT/ SOIL LOG  
 GINT FILE: KLF\_gint\_master\_2019  
 GINT TEMPLATE: E:KLF\_STANDARD\_GINT\_LIBRARY\_2019.GLB L:KLF\_BORING/TEST PIT/ SOIL LOG

<b>Date Begin - End:</b> <u>8/22/2019 - 8/26/2019</u>	<b>Drilling Company:</b> <u>Gulf Shore Exploration</u>	<b>BORING LOG B-7</b>
<b>Logged By:</b> <u>DJ Sullivan, Cavan Ewing</u>	<b>Drill Crew:</b> <u>Carlos, Troy</u>	
<b>Hor.-Vert. Datum:</b> <u>WGS84 - NAVD88</u>	<b>Drilling Equipment:</b> <u>CME-75</u>	<b>Hammer Type - Drop:</b> <u>140 lb. Auto - 30 in.</u>
<b>Plunge:</b> <u>-90 degrees</u>	<b>Drilling Method:</b> <u>Hollow Stem Auger</u>	
<b>Weather:</b> <u>Sunny</u>	<b>Auger Diameter:</b> <u>8 in. O.D.</u>	

Approximate Elevation (feet)	Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS								
			Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= Isf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks	
			Approximate Ground Surface Elevation (ft.): 115 Surface Condition: Grass												
			<b>Sandy Lean CLAY with Gravel (CL):</b> brown, moist, hard, fine to medium sand, subrounded gravel to 0.75"												
110	5			BC=7 16 19		83%			26.1	100.1					
			very stiff												
105	10			BC=5 8 13		89%									
			light brown, very stiff, medium to coarse sand												
100	15			BC=4 8 11 PP=3.5		83%									
			<b>Clayey SAND with Gravel (SC):</b> brown, moist, medium dense, medium to coarse grained sand, subrounded gravel to 1.5"												
95	20			BC=5 12 22		89%			16.8	111.6	69	35			
			<b>Sandy Lean CLAY (CL):</b> mottled bluish gray and reddish brown, moist to wet, very stiff, fine to medium sand												
90	25			BC=4 11 15		83%			20.6	106.4		56			
			wet												
85	30			BC=8 11 17		94%			31.0	91.5					
			<b>SANDY CLAYSTONE:</b> bluish gray, moderately weathered, R0, fine sand, poorly indurated												
			<b>CLAYSTONE:</b> bluish gray, moderately weathered, R0, poorly indurated												
				BC=6 15		94%									TXUU: c=1.36 ksf

 <p><b>KLEINFELDER</b> Bright People. Right Solutions.</p>	PROJECT NO.: 20193762	<b>BORING LOG B-7</b>	FIGURE
	DRAWN BY: CSE	TRENCHLESS RECYCLED WATER PIPELINE ADOBE ROAD PETALUMA, CALIFORNIA	<b>A-10</b>
CHECKED BY: MJP	DATE:		
REVISD: -			PAGE: 1 of 2

PLOTTED: 10/08/2019 03:37 PM BY: DSullivan


<b>Date Begin - End:</b> <u>8/22/2019 - 8/26/2019</u>	<b>Drilling Company:</b> <u>Gulf Shore Exploration</u>	<b>BORING LOG B-7</b>
<b>Logged By:</b> <u>DJ Sullivan, Cavan Ewing</u>	<b>Drill Crew:</b> <u>Carlos, Troy</u>	
<b>Hor.-Vert. Datum:</b> <u>WGS84 - NAVD88</u>	<b>Drilling Equipment:</b> <u>CME-75</u>	<b>Hammer Type - Drop:</b> <u>140 lb. Auto - 30 in.</u>
<b>Plunge:</b> <u>-90 degrees</u>	<b>Drilling Method:</b> <u>Hollow Stem Auger</u>	
<b>Weather:</b> <u>Sunny</u>	<b>Auger Diameter:</b> <u>8 in. O.D.</u>	

Approximate Elevation (feet)	Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS								
			Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= Isf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks	
			Approximate Ground Surface Elevation (ft.): 115 Surface Condition: Grass												
			<b>CLAYSTONE:</b> bluish gray, moderately weathered, R0, poorly indurated		18										
75	40				BC=20 41 50/5"	106%									
70	45		<b>SANDY CLAYSTONE:</b> bluish gray to gray, moderately weathered, R0, very fine sand, poorly indurated												
65	50				BC=17 28 36	100%									
60	55		<b>CLAYSTONE:</b> dark bluish gray, moderately weathered, R0, trace fine to medium sand, poorly indurated												
55	60				BC=15 26 34	100%									
			The boring was terminated at approximately 60.5 ft. below ground surface. The boring was backfilled with neat cement grout on August 22, 2019.				<b>GROUNDWATER LEVEL INFORMATION:</b> Groundwater was not observed during drilling or after completion. <b>GENERAL NOTES:</b> The exploration location and elevation are approximate and were estimated by Kleinfelder.								

OFFICE FILTER: SANTA ROSA

PROJECT NUMBER: 20193762.003A

GINT FILE: KLF\_gint\_master\_2019  
GINT TEMPLATE: E:KLF\_STANDARD\_GINT\_LIBRARY\_2019.GLB [KLF\_BORING/TEST PIT SOIL LOG]

	PROJECT NO.: 20193762	<b>BORING LOG B-7</b>  TRENCHLESS RECYCLED WATER PIPELINE ADOBE ROAD PETALUMA, CALIFORNIA	FIGURE
	DRAWN BY: CSE		<b>A-10</b>
CHECKED BY: MJP	DATE:		
REvised: -			PAGE: 2 of 2

PLOTTED: 10/08/2019 03:37 PM BY: DSullivan

**Date Begin - End:** 8/22/2019 **Drilling Company:** Gulf Shore Exploration **BORING LOG B-8**  
**Logged By:** DJ Sullivan **Drill Crew:** Carlos, Troy  
**Hor.-Vert. Datum:** WGS84 - NAVD88 **Drilling Equipment:** CME-75 **Hammer Type - Drop:** 140 lb. Auto - 30 in.  
**Plunge:** -90 degrees **Drilling Method:** Mud Rotary  
**Weather:** Sunny **Exploration Diameter:** 4 in. O.D.

Approximate Elevation (feet)	Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS							Additional Tests/Remarks	
			Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= Isf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)		
			Asphalt: 6"												
			Lean CLAY with Sand (CL): brown, dry to moist, very stiff, medium sand												
115	5				BC=6 10 17 PP=2.5	89%									
			Sandy Lean CLAY (CL): brown, moist, hard, medium to coarse sand												
110	10				BC=8 10 14 PP=4.0	83%		23.4	98.9						
			Clayey SAND (SC): brown to dark brown, moist, medium dense, coarse sand, subangular gravel to 0.75"												
105	15				BC=11 12 10	61%	SC	22.7	99.2	97	31	46	27		
			Lean CLAY with Sand (CL): brown, moist, very stiff, fine to medium sand												
100	20				BC=7 10 14	56%									
			Poorly Graded SAND with Gravel (SP): brown to dark brown, wet, loose, coarse sand, subangular gravel to 0.5"												
95	25				BC=5 5 6	NR									
			very dense												
90	30				BC=19 50/6"	92%									
			SANDY CLAYSTONE: dark bluish gray, moderately weathered, R0, fine sand												
85					BC=20 40 50/5"	94%		21.7	101.0						

OFFICE FILTER: SANTA ROSA

PROJECT NUMBER: 20193762.003A

GINT FILE: KLF\_gint\_master\_2019  
GINT TEMPLATE: E:KLF\_STANDARD\_GINT\_LIBRARY\_2019.GLB [KLF\_BORING/TEST PIT SOIL LOG]



PROJECT NO.: 20193762  
 DRAWN BY: CSE  
 CHECKED BY: MJP  
 DATE:  
 REVISED: -

**BORING LOG B-8**  
 TRENCHLESS RECYCLED WATER PIPELINE  
 ADOBE ROAD  
 PETALUMA, CALIFORNIA

FIGURE  
**A-11**  
 PAGE: 1 of 2



PLOTTED: 10/08/2019 03:37 PM BY: DSullivan

<b>Date Begin - End:</b> 8/22/2019	<b>Drilling Company:</b> Gulf Shore Exploration	<b>BORING LOG B-8</b>
<b>Logged By:</b> DJ Sullivan	<b>Drill Crew:</b> Carlos, Troy	
<b>Hor.-Vert. Datum:</b> WGS84 - NAVD88	<b>Drilling Equipment:</b> CME-75	<b>Hammer Type - Drop:</b> 140 lb. Auto - 30 in.
<b>Plunge:</b> -90 degrees	<b>Drilling Method:</b> Mud Rotary	
<b>Weather:</b> Sunny	<b>Exploration Diameter:</b> 4 in. O.D.	

Approximate Elevation (feet)	Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS							Additional Tests/Remarks	
			Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= Isf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)		
			Approximate Ground Surface Elevation (ft.): 120 Surface Condition: Asphalt												
			<b>SANDY CLAYSTONE:</b> dark bluish gray, moderately weathered, R0, fine sand												
80	40			BC=22 38 50/5"	94%		18.2	113.7							TXUU: c=5.53 ksf Specific Gravity= 90.00
75	45														
70	50			BC=40 50/4"	100%										
65	55		The boring was terminated at approximately 49 ft. below ground surface. The boring was backfilled with neat cement grout on August 22, 2019.				<b>GROUNDWATER LEVEL INFORMATION:</b> ∇ Groundwater was observed at approximately 28 ft. below ground surface during drilling. <b>GENERAL NOTES:</b> The exploration location and elevation are approximate and were estimated by Kleinfelder.								
60	60														
55	65														
50															

PROJECT NUMBER: 20193762.003A

OFFICE FILTER: SANTA ROSA  
 GINT TEMPLATE: E:KLF\_STANDARD\_GINT\_LIBRARY\_2019.GLB [ KLF\_BORING/TEST PIT SOIL LOG ]

GINT FILE: Kf\_gint\_master\_2019



PROJECT NO.: 20193762  
 DRAWN BY: CSE  
 CHECKED BY: MJP  
 DATE:  
 REVISED: -

**BORING LOG B-8**

---

TRENCHLESS RECYCLED WATER PIPELINE  
 ADOBE ROAD  
 PETALUMA, CALIFORNIA

FIGURE  
**A-11**  
PAGE: 2 of 2



***KLEINFELDER***

*Bright People. Right Solutions.*

Exploration ID	Depth (ft.)	Sample Description	Water Content (%)	Dry Unit Wt. (pcf)	Sieve Analysis (%)			Atterberg Limits			Additional Tests
					Passing 3/4"	Passing #4	Passing #200	Liquid Limit	Plastic Limit	Plasticity Index	
B-1	5.0 - 10.5	CLAYEY GRAVEL WITH SAND (GC)	11.8	113.9	66	40	15				
B-1	15.0	FAT CLAY (CH)	34.7	84.3				56	28	28	TXUU: c=1.07 ksf
B-1	20.0	CLAYSTONE	22.4	103.0							
B-1	25.0	CLAYSTONE	19.8	104.6							TXUU: c=4.59 ksf
B-1	29.5	SILTY CLAYSTONE	19.5	102.2							
B-2	19.0 - 20.5	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM)			94	73	7.2				
B-2	24.0 - 25.5	FAT CLAY (CH)						61	25	36	
B-2	25.0	FAT CLAY (CH)	24.0	97.6							
B-2	30.0	FAT CLAY (CH)	23.4	104.1		100	98	58	26	32	
B-3	5.0	LEAN CLAY (CL)	23.3	98.4							
B-3	14.5 - 15.5	SANDY FAT CLAY WITH GRAVEL (CH)			84	79	51	50	19	31	
B-3	15.0	SANDY FAT CLAY WITH GRAVEL (CH)	27.3	96.1							
B-3	30.0	SILTY SAND (SM)	20.2	106.8		100	15	NP	NP	NP	
B-3	40.0	CLAYEY SAND (SC)	23.0	104.5				32	19	13	TXUU: c=1.89 ksf
B-3	49.5	SANDSTONE	20.5	96.3							
B-3	60.0	CLAYSTONE	18.1	108.0							
B-4	15.0	SANDY LEAN CLAY (CL)	21.9	100.5							
B-4	25.0	CLAYEY SAND WITH GRAVEL (SC)	15.1	117.1	92	71	23				
B-4	30.0	SANDY CLAYSTONE	19.5	108.3							TXUU: c=8.04 ksf
B-4	40.0	CLAYSTONE	15.3	112.9							
B-5	5.5	FAT CLAY (CH)	20.9	40.6							
B-5	15.0	FAT CLAY (CH)	27.5	93.6							
B-5	30.0	LEAN CLAY WITH SAND (CL)	27.3	96.3				46	18	28	TXUU: c=2.53 ksf
B-6	5.0	FAT CLAY (CH)	22.1	103.6							
B-6	20.0	FAT CLAY WITH SAND (CH)	29.7	92.8		98	87				
B-6	30.0	LEAN CLAY WITH SAND (CL)	26.8	99.4		99	71	44	18	26	
B-6	35.0	SANDY CLAYSTONE	21.8	105.7							TXUU: c=3.48 ksf
B-7	5.0	SANDY LEAN CLAY WITH GRAVEL (CL)	26.1	100.1							

Refer to the Geotechnical Evaluation Report or the supplemental plates for the method used for the testing performed above.  
NP = NonPlastic



PROJECT NO.: 20193762

DRAWN BY:

CHECKED BY:

DATE:

REVISED:

**LABORATORY TEST  
RESULT SUMMARY**

---

TRENCHLESS RECYCLED WATER PIPELINE  
ADOBE ROAD  
PETALUMA, CALIFORNIA

FIGURE

**B-1**

Exploration ID	Depth (ft.)	Sample Description	Water Content (%)	Dry Unit Wt. (pcf)	Sieve Analysis (%)			Atterberg Limits			Additional Tests
					Passing 3/4"	Passing #4	Passing #200	Liquid Limit	Plastic Limit	Plasticity Index	
B-7	20.0	CLAYEY SAND WITH GRAVEL (SC)	16.8	111.6	87	69	35				
B-7	25.0	SANDY LEAN CLAY (CL)	20.6	106.4			56				
B-7	30.0	SANDY CLAYSTONE	31.0	91.5							TXUU: c=1.36 ksf
B-8	9.0	SANDY LEAN CLAY (CL)	23.4	98.9							
B-8	14.0	CLAYEY SAND (SC)	22.7	99.2		97	31	46	19	27	
B-8	34.0	SANDY CLAYSTONE	21.7	101.0							
B-8	39.0	SANDY CLAYSTONE	18.2	113.7							TXUU: c=5.53 ksf
											Specific Gravity= 90.00

Refer to the Geotechnical Evaluation Report or the supplemental plates for the method used for the testing performed above.  
NP = NonPlastic



PROJECT NO.: 20193762

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DATE:

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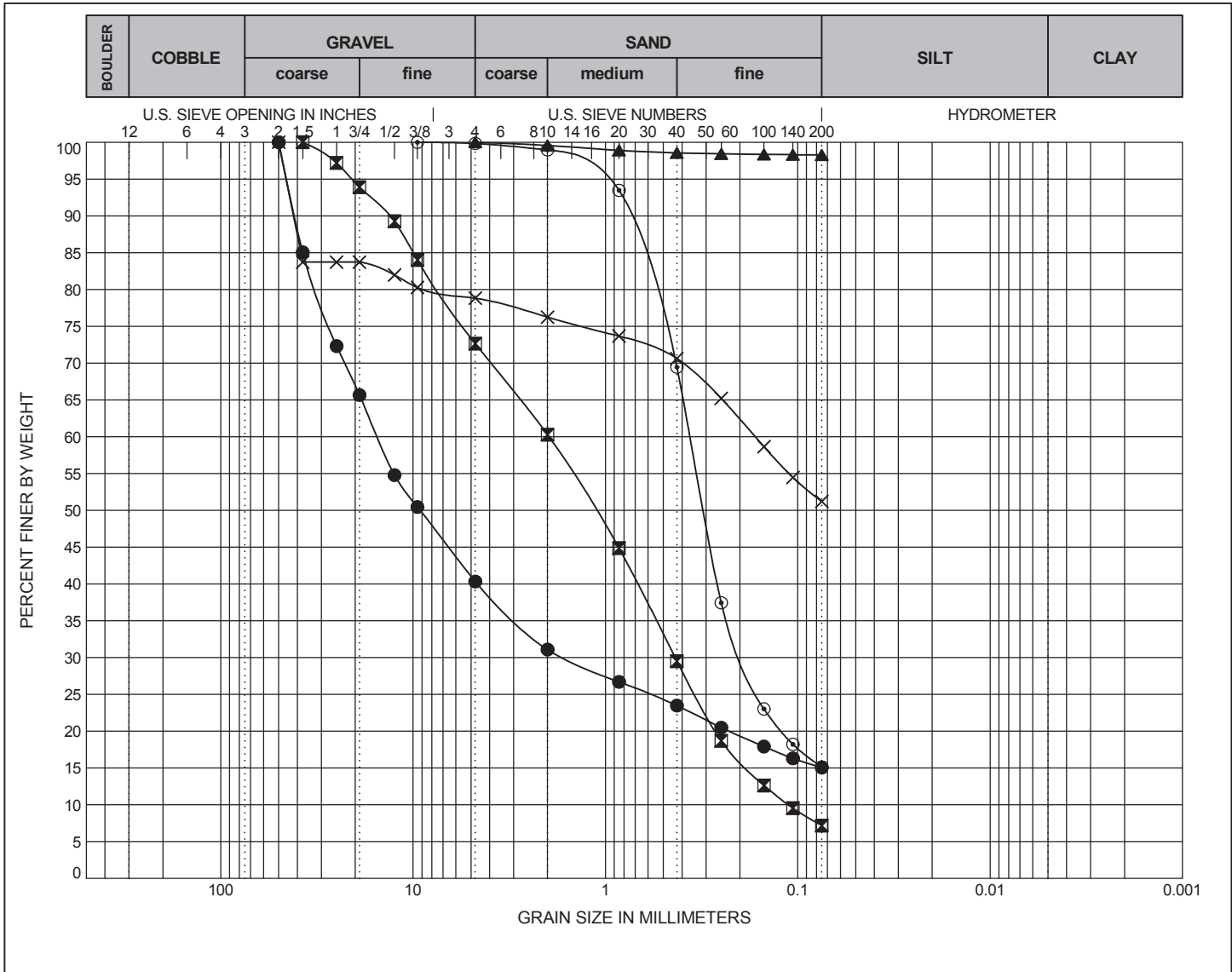
LABORATORY TEST  
RESULT SUMMARY

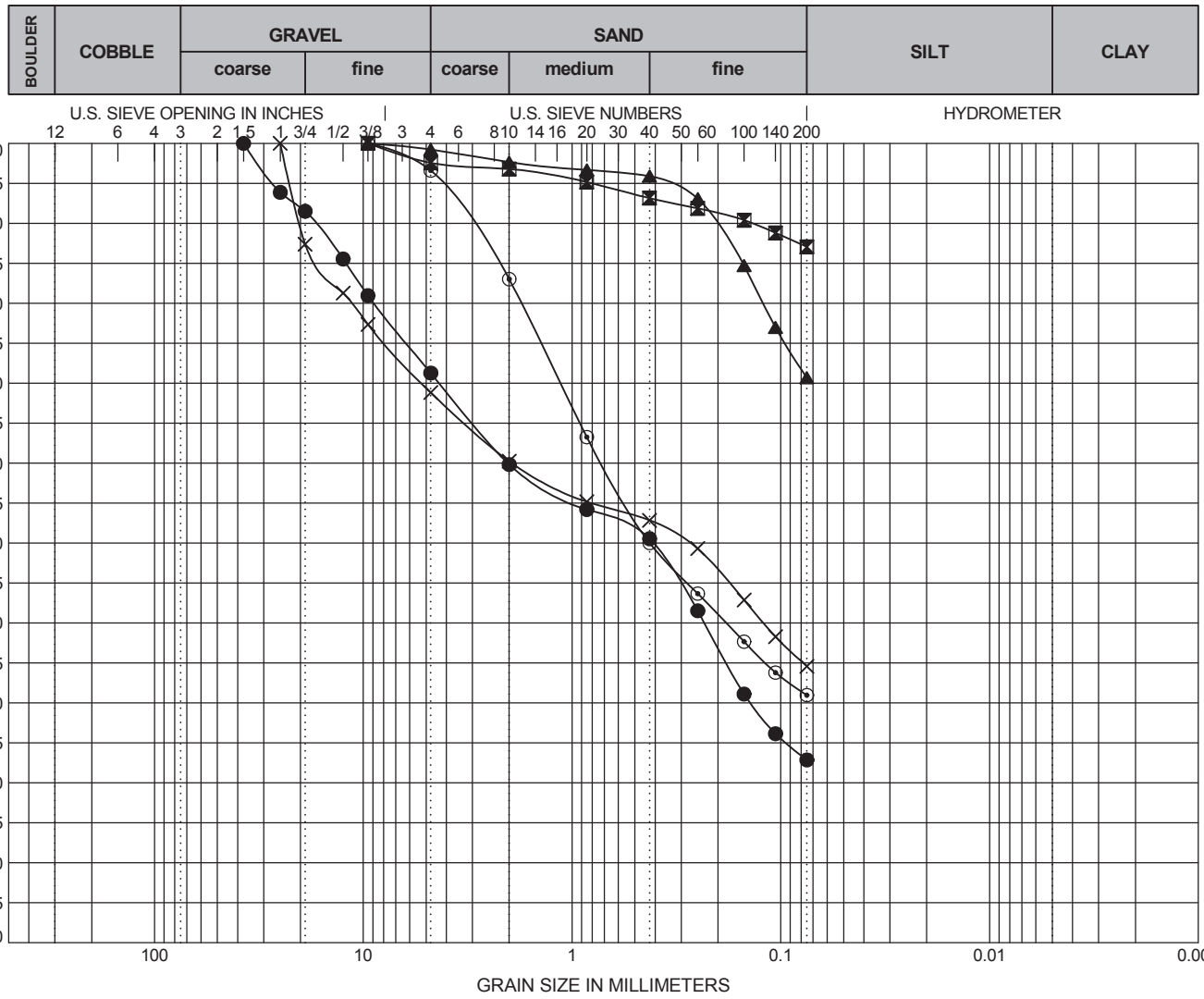
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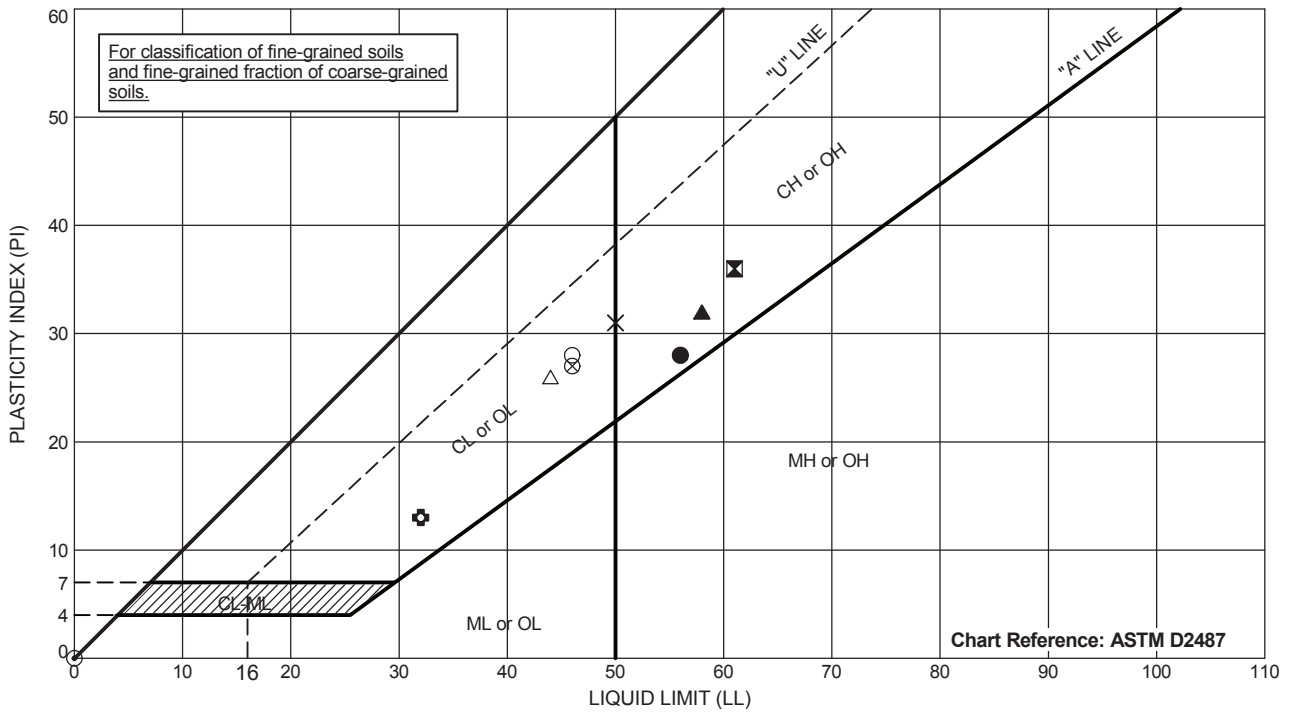
TRENCHLESS RECYCLED WATER PIPELINE  
ADOBE ROAD  
PETALUMA, CALIFORNIA

FIGURE

B-2







Exploration ID	Depth (ft.)	Sample Description	Passing #200	LL	PL	PI
● B-1	15	FAT CLAY (CH)	NM	56	28	28
⊠ B-2	24 - 25.5	FAT CLAY (CH)	NM	61	25	36
▲ B-2	30	FAT CLAY (CH)	98	58	26	32
× B-3	14.5 - 15.5	SANDY FAT CLAY WITH GRAVEL (CH)	51	50	19	31
⊙ B-3	30	SILTY SAND (SM)	15	NP	NP	NP
⊕ B-3	40	CLAYEY SAND (SC)	NM	32	19	13
○ B-5	30	LEAN CLAY WITH SAND (CL)	NM	46	18	28
△ B-6	30	LEAN CLAY WITH SAND (CL)	71	44	18	26
⊗ B-8	14	CLAYEY SAND (SC)	31	46	19	27

Testing performed in general accordance with ASTM D4318.  
 NP = Nonplastic  
 NM = Not Measured



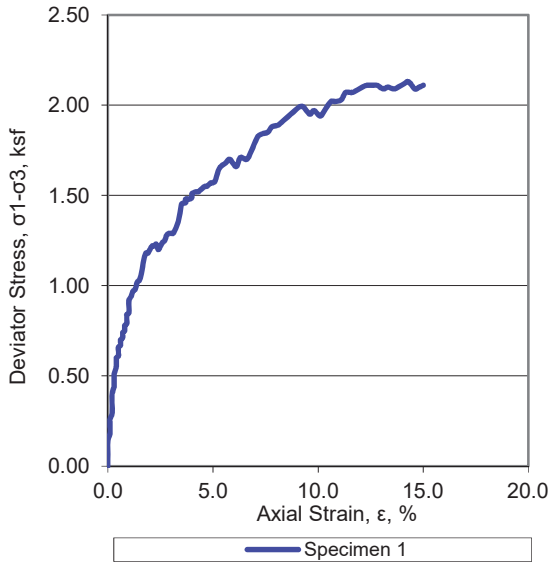
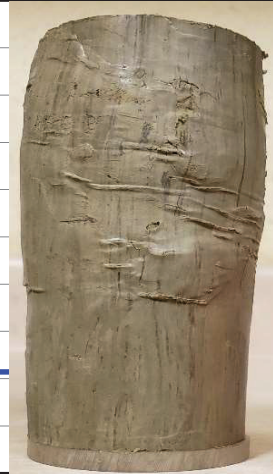
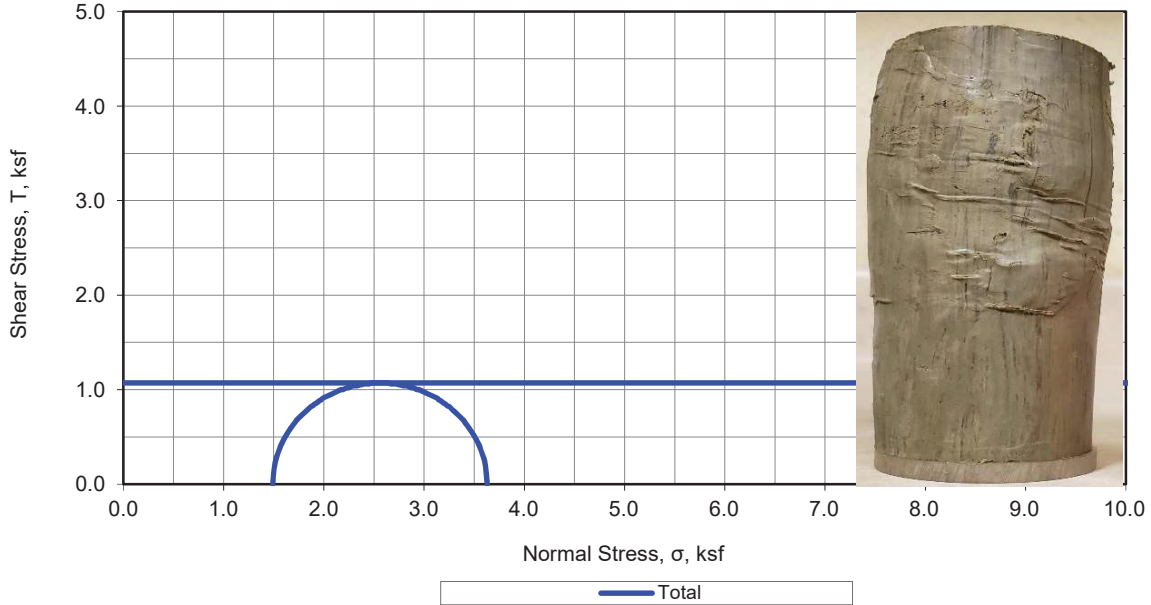
PROJECT NO.: 20193762  
 DRAWN BY: CSE  
 CHECKED BY: MJP  
 DATE:  
 REVISED: -

ATTERBERG LIMITS  
 TRENCHLESS RECYCLED WATER PIPELINE  
 ADOBE ROAD  
 PETALUMA, CALIFORNIA

FIGURE  
 B-5

Total	
c =	1.07 ksf

Specimen Shear Picture



Specimen No.		1
Initial	Diameter, in	D <sub>0</sub> 2.40
	Height, in	H <sub>0</sub> 5.41
	Water Content, %	w <sub>0</sub> 34.7
	Dry Density, lbs/ft <sup>3</sup>	γ <sub>d0</sub> 84.3
	Saturation, %	S <sub>0</sub> 96
	Void Ratio	e <sub>0</sub> 0.962
Minor Principal Stress, ksf		σ <sub>3</sub> 1.50
Maximum Deviator Stress, ksf		(σ <sub>1</sub> -σ <sub>3</sub> ) <sub>max</sub> 2.13
Time to (σ <sub>1</sub> -σ <sub>3</sub> ) <sub>max</sub> , min		t <sub>f</sub> 14.33
Deviator Stress @ 15% Axial Strain, ksf		(σ <sub>1</sub> -σ <sub>3</sub> ) <sub>15%</sub> 2.11
Ultimate Deviator Stress, ksf		(σ <sub>1</sub> -σ <sub>3</sub> ) <sub>ult</sub> na
Rate of strain, %/min		'ε 1.00
Axial Strain at Failure, %		ε <sub>f</sub> 14.33

Description of Specimen: Fat Clay (CH)	
Amount of Material Finer than the No. 200, %:	nm
LL: 56	PL: 28
PI: 28	G <sub>S</sub> : 2.65 Assumed
Specimen Type: Undisturbed	Test Method: ASTM D2850

<b>Membrane correction applied</b>	
Boring:	B-1
Sample:	4C
Depth, ft:	15.0
Test Date:	9/18/19
Remarks: nm= not measured, na = not applicable	



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Date:	10/1/19
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Checked By:	CP
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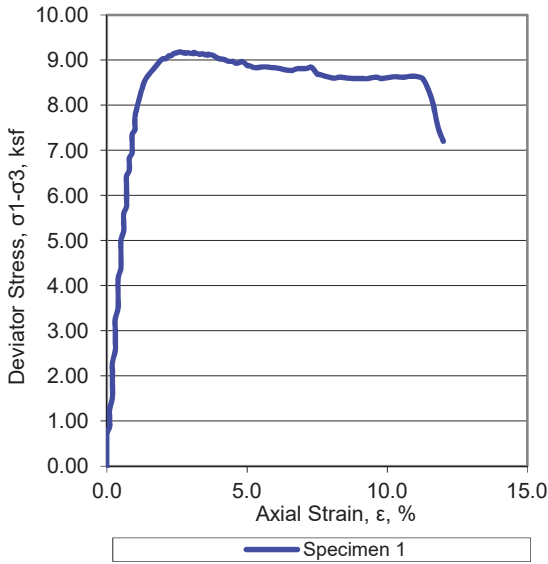
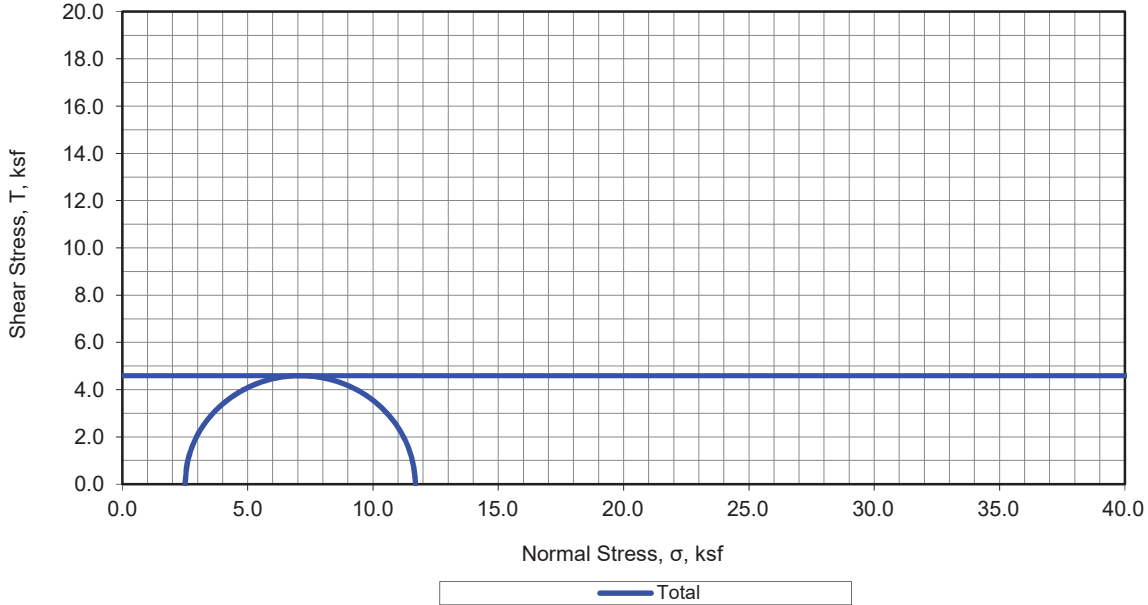
**TRIAxIAL COMPRESSION  
TEST (UU)**  
**Trenchless Recycled Pipeline**  
**Adobe Road**  
**Petaluma, CA**

Figure  
1 of 1  
**B-6**



Total	
c =	4.59 ksf

Specimen Shear Picture



Specimen No.		1
Initial	Diameter, in	D <sub>0</sub> 2.41
	Height, in	H <sub>0</sub> 5.53
	Water Content, %	w <sub>0</sub> 19.8
	Dry Density, lbs/ft <sup>3</sup>	γ <sub>d0</sub> 104.6
	Saturation, %	S <sub>0</sub> 91
	Void Ratio	e <sub>0</sub> 0.581
Minor Principal Stress, ksf		σ <sub>3</sub> 2.51
Maximum Deviator Stress, ksf		(σ <sub>1</sub> -σ <sub>3</sub> ) <sub>max</sub> 9.18
Time to (σ <sub>1</sub> -σ <sub>3</sub> ) <sub>max</sub> , min		t <sub>f</sub> 2.65
Deviator Stress @ 15% Axial Strain, ksf		(σ <sub>1</sub> -σ <sub>3</sub> ) <sub>15%</sub> 7.20
Ultimate Deviator Stress, ksf		(σ <sub>1</sub> -σ <sub>3</sub> ) <sub>ult</sub> na
Rate of strain, %/min		'ε 1.00
Axial Strain at Failure, %		ε <sub>f</sub> 2.65

Description of Specimen: Sandy Lean Clay (CL)	
Amount of Material Finer than the No. 200, %:	nm
LL: nm	PL: nm
PI: nm	G <sub>s</sub> : 2.65 Assumed
Specimen Type: Undisturbed	Test Method: ASTM D2850

<b>Membrane correction applied</b>	
Boring:	B-1
Sample:	6C
Depth, ft:	25.0
Test Date:	9/24/19
Remarks: nm= not measured, na = not applicable	



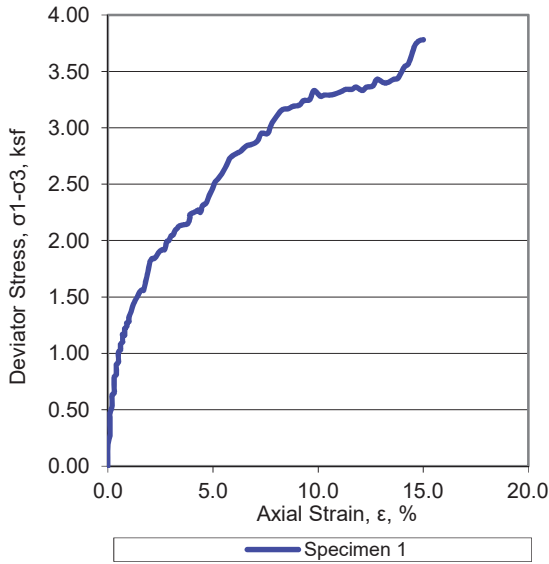
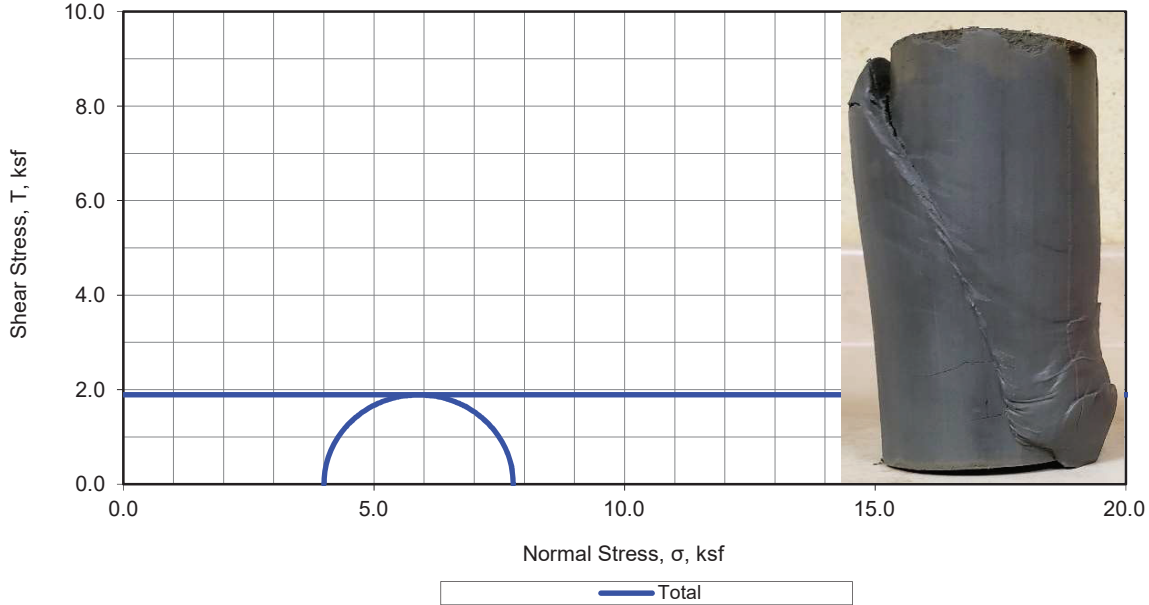
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Checked By:	CP
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**TRIAXIAL COMPRESSION TEST (UU)**  
**Trenchless Recycled Pipeline**  
**Adobe Road**  
**Petaluma, CA**

Figure  
 1 of 1  
**B-7**

Total	
c =	1.89 ksf

Specimen Shear Picture



Specimen No.		1
Initial	Diameter, in	D <sub>0</sub> 2.40
	Height, in	H <sub>0</sub> 5.97
	Water Content, %	ω <sub>0</sub> 23.0
	Dry Density, lbs/ft <sup>3</sup>	γ <sub>d0</sub> 104.5
	Saturation, %	S <sub>0</sub> 100
	Void Ratio	e <sub>0</sub> 0.583
Minor Principal Stress, ksf		σ <sub>3</sub> 4.00
Maximum Deviator Stress, ksf		(σ <sub>1</sub> -σ <sub>3</sub> ) <sub>max</sub> 3.78
Time to (σ <sub>1</sub> -σ <sub>3</sub> ) <sub>max</sub> , min		t <sub>f</sub> 15.00
Deviator Stress @ 15% Axial Strain, ksf		(σ <sub>1</sub> -σ <sub>3</sub> ) <sub>15%</sub> 3.78
Ultimate Deviator Stress, ksf		(σ <sub>1</sub> -σ <sub>3</sub> ) <sub>ult</sub> na
Rate of strain, %/min		'ε 1.00
Axial Strain at Failure, %		ε <sub>f</sub> 15.00

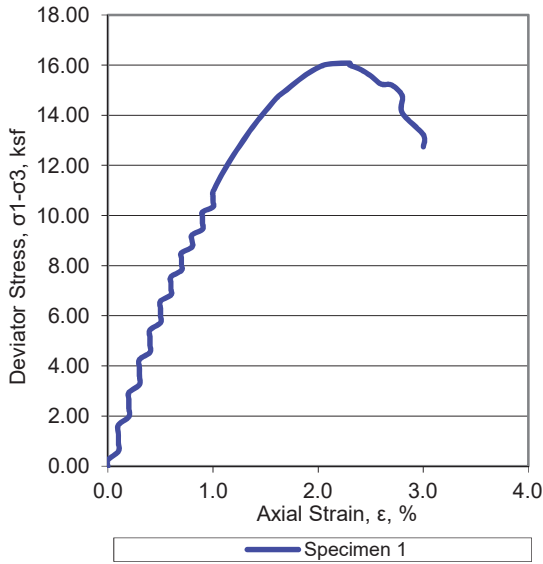
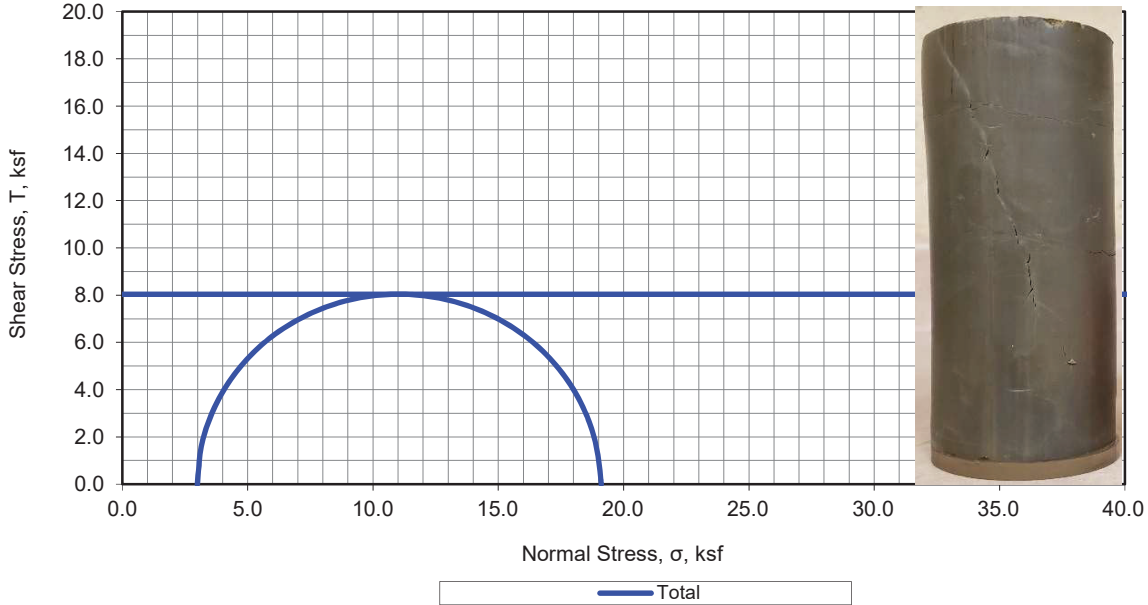
Description of Specimen: Clayey Sand (SC)	
Amount of Material Finer than the No. 200, %:	nm
LL: 32	PL: 19
PI: 13	G <sub>S</sub> : 2.65 Assumed
Specimen Type: Undisturbed	Test Method: ASTM D2850

<b>Membrane correction applied</b>	
Boring:	B-3
Sample:	9C
Depth, ft:	40.0
Test Date:	9/24/19
Remarks: nm= not measured, na = not applicable	

	Project No.: 20193762.003A	<b>TRIAXIAL COMPRESSION TEST (UU)</b> <b>Trenchless Recycled Pipeline</b> <b>Adobe Road</b> <b>Petaluma, CA</b>	Figure 1 of 1  <b>B-8</b>
	Date: 10/1/19		
	Entry By: CP		
	Checked By: CP		
File Name: B-3@40 TXUU			

Total	
c =	8.04 ksf

Specimen Shear Picture



Specimen No.		1
Initial	Diameter, in	D <sub>0</sub> 2.41
	Height, in	H <sub>0</sub> 5.64
	Water Content, %	w <sub>0</sub> 19.5
	Dry Density, lbs/ft <sup>3</sup>	γ <sub>d0</sub> 108.3
	Saturation, %	S <sub>0</sub> 98
	Void Ratio	e <sub>0</sub> 0.527
Minor Principal Stress, ksf		σ <sub>3</sub> 3.00
Maximum Deviator Stress, ksf		(σ <sub>1</sub> -σ <sub>3</sub> ) <sub>max</sub> 16.08
Time to (σ <sub>1</sub> -σ <sub>3</sub> ) <sub>max</sub> , min		t <sub>f</sub> 2.25
Deviator Stress @ 15% Axial Strain, ksf		(σ <sub>1</sub> -σ <sub>3</sub> ) <sub>15%</sub> 13.22
Ultimate Deviator Stress, ksf		(σ <sub>1</sub> -σ <sub>3</sub> ) <sub>ult</sub> na
Rate of strain, %/min		'ε 1.00
Axial Strain at Failure, %		ε <sub>f</sub> 2.25

Description of Specimen: Fat Clay (CH)	
Amount of Material Finer than the No. 200, %:	nm
LL: nm	PL: nm
PI: nm	G <sub>S</sub> : 2.65 Assumed
Specimen Type: Undisturbed	Test Method: ASTM D2850

<b>Membrane correction applied</b>	
Boring:	B-4
Sample:	7C
Depth, ft:	30.0
Test Date:	9/30/19
Remarks: nm= not measured, na = not applicable	



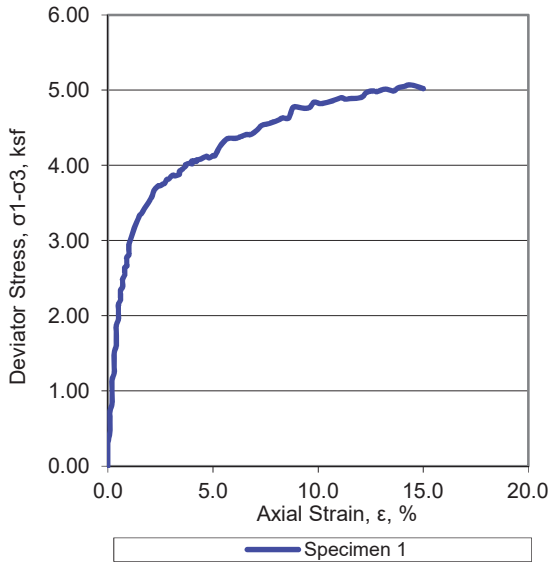
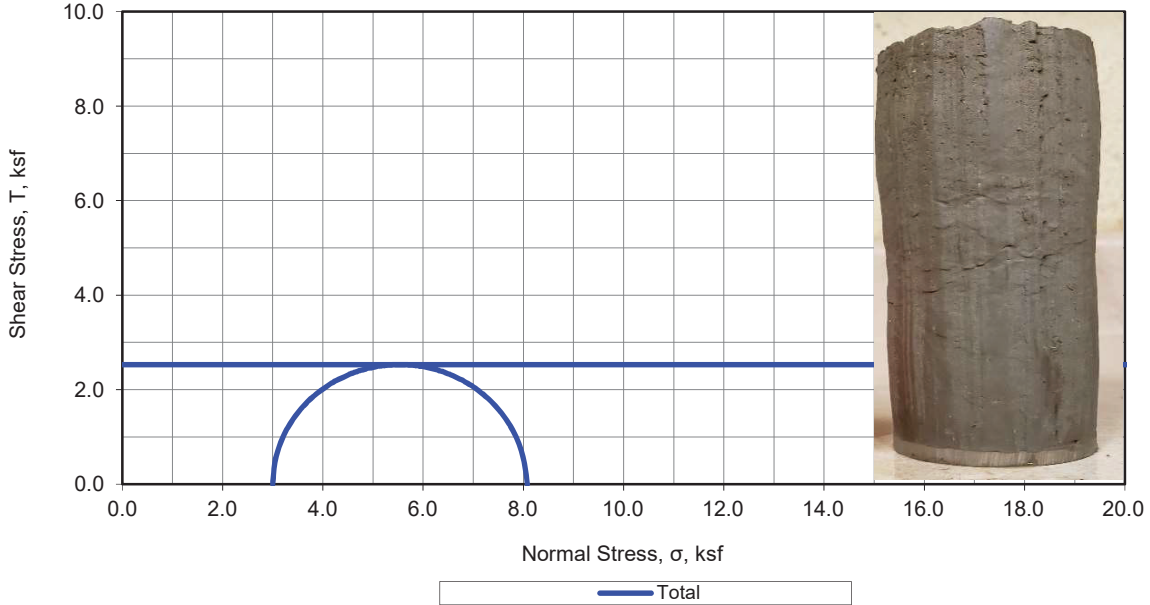
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**TRIAxIAL COMPRESSION TEST (UU)**  
**Trenchless Recycled Pipeline**  
**Adobe Road**  
**Petaluma, CA**

Figure  
 1 of 1  
**B-9**

Total	
c =	2.53 ksf

Specimen Shear Picture



Specimen No.		1
Initial	Diameter, in	D <sub>0</sub> 2.40
	Height, in	H <sub>0</sub> 5.59
	Water Content, %	w <sub>0</sub> 27.3
	Dry Density, lbs/ft <sup>3</sup>	γ <sub>d0</sub> 96.3
	Saturation, %	S <sub>0</sub> 100
	Void Ratio	e <sub>0</sub> 0.717
Minor Principal Stress, ksf		σ <sub>3</sub> 3.00
Maximum Deviator Stress, ksf		(σ <sub>1</sub> -σ <sub>3</sub> ) <sub>max</sub> 5.07
Time to (σ <sub>1</sub> -σ <sub>3</sub> ) <sub>max</sub> , min		t <sub>f</sub> 14.33
Deviator Stress @ 15% Axial Strain, ksf		(σ <sub>1</sub> -σ <sub>3</sub> ) <sub>15%</sub> 5.02
Ultimate Deviator Stress, ksf		(σ <sub>1</sub> -σ <sub>3</sub> ) <sub>ult</sub> na
Rate of strain, %/min		'ε 1.00
Axial Strain at Failure, %		ε <sub>f</sub> 14.33

Description of Specimen: Lean Clay with Sand (CL)	
Amount of Material Finer than the No. 200, %:	nm
LL: 46	PL: 18
PI: 28	G <sub>S</sub> : 2.65 Assumed
Specimen Type: Undisturbed	Test Method: ASTM D2850

<b>Membrane correction applied</b>	
Boring:	B-5
Sample:	7C
Depth, ft:	30.0
Test Date:	9/23/19
Remarks: nm= not measured, na = not applicable	



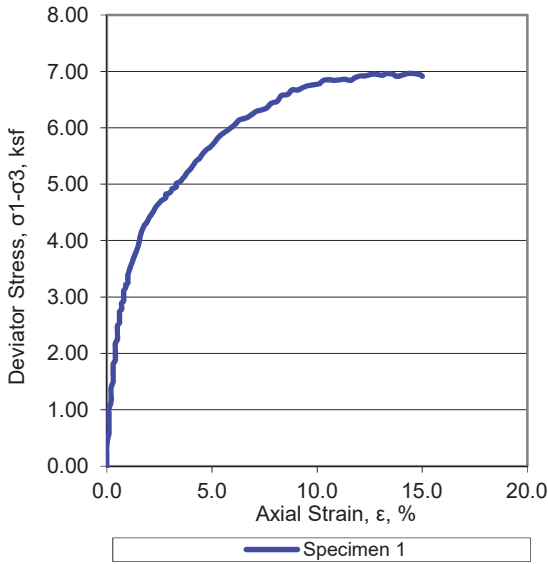
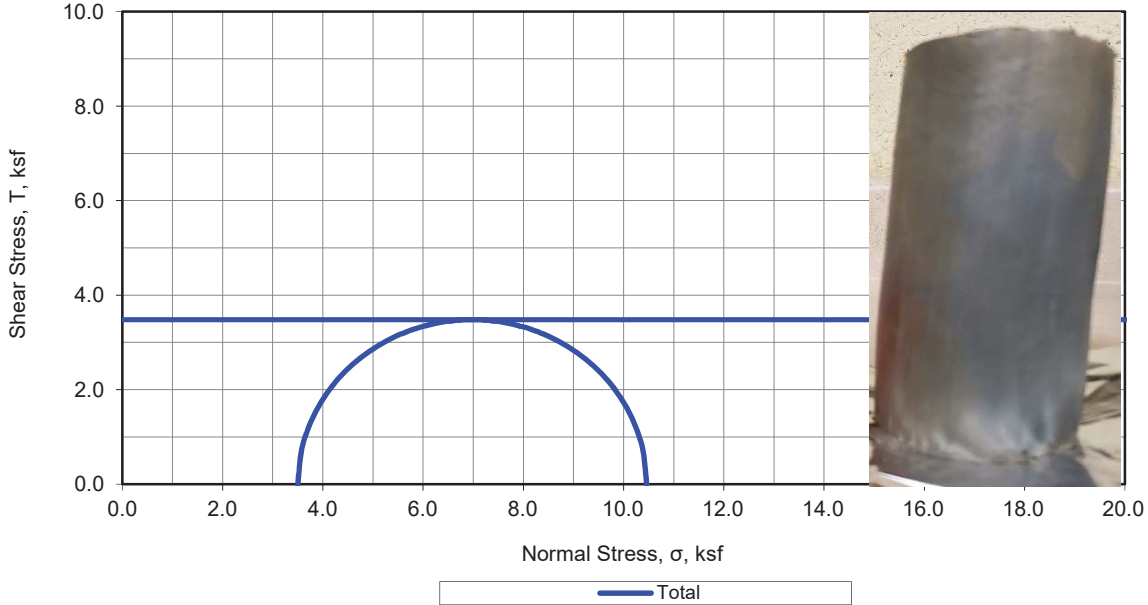
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**TRIAxIAL COMPRESSION TEST (UU)**  
**Trenchless Recycled Pipeline**  
**Adobe Road**  
**Petaluma, CA**

Figure  
 1 of 1  
**B-10**

Total	
c =	3.48 ksf

Specimen Shear Picture



Specimen No.		1
Initial	Diameter, in	D <sub>0</sub> 2.41
	Height, in	H <sub>0</sub> 5.73
	Water Content, %	w <sub>0</sub> 21.8
	Dry Density, lbs/ft <sup>3</sup>	γ <sub>d0</sub> 105.7
	Saturation, %	S <sub>0</sub> 100
	Void Ratio	e <sub>0</sub> 0.565
Minor Principal Stress, ksf		σ <sub>3</sub> 3.50
Maximum Deviator Stress, ksf		(σ <sub>1</sub> -σ <sub>3</sub> ) <sub>max</sub> 6.96
Time to (σ <sub>1</sub> -σ <sub>3</sub> ) <sub>max</sub> , min		t <sub>f</sub> 14.33
Deviator Stress @ 15% Axial Strain, ksf		(σ <sub>1</sub> -σ <sub>3</sub> ) <sub>15%</sub> 6.91
Ultimate Deviator Stress, ksf		(σ <sub>1</sub> -σ <sub>3</sub> ) <sub>ult</sub> na
Rate of strain, %/min		'ε 1.00
Axial Strain at Failure, %		ε <sub>f</sub> 14.33

Description of Specimen: Sandy Lean Clay (CL)	
Amount of Material Finer than the No. 200, %:	nm
LL: nm	PL: nm
PI: nm	G <sub>s</sub> : 2.65 Assumed
Specimen Type: Undisturbed	Test Method: ASTM D2850

<b>Membrane correction applied</b>	
Boring:	B-6
Sample:	8C
Depth, ft:	35.0
Test Date:	9/30/19
Remarks: nm= not measured, na = not applicable	



Project No.:	20193762.003A
Date:	10/1/19
Entry By:	CP
Checked By:	CP
File Name:	B-6@35 TXUU

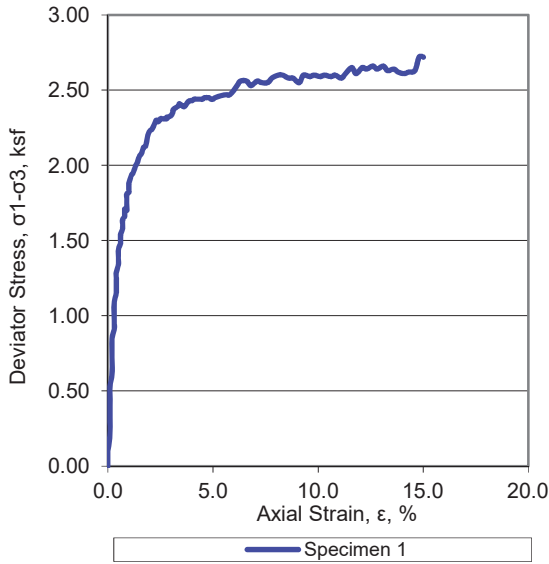
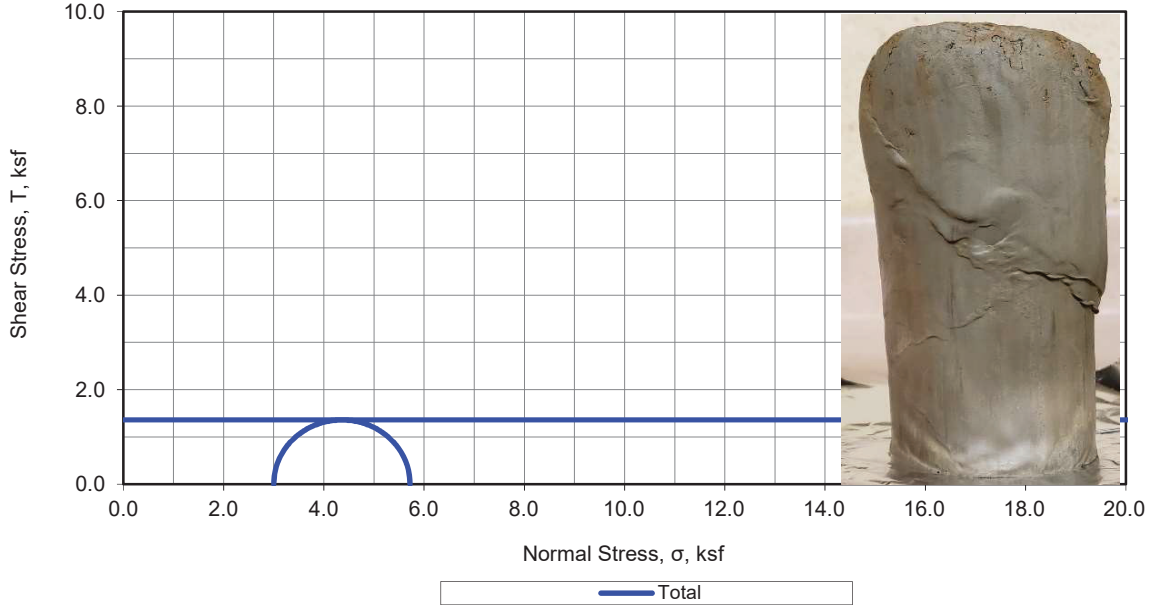
**TRIAxIAL COMPRESSION  
TEST (UU)**  
**Trenchless Recycled Pipeline**  
**Adobe Road**  
**Petaluma, CA**

Figure  
1 of 1

B-11

Total	
c =	1.36 ksf

Specimen Shear Picture



Specimen No.		1
Initial	Diameter, in	D <sub>0</sub> 2.40
	Height, in	H <sub>0</sub> 5.83
	Water Content, %	ω <sub>0</sub> 31.0
	Dry Density, lbs/ft <sup>3</sup>	γ <sub>d0</sub> 91.5
	Saturation, %	S <sub>0</sub> 100
	Void Ratio	e <sub>0</sub> 0.807
Minor Principal Stress, ksf		σ <sub>3</sub> 3.00
Maximum Deviator Stress, ksf		(σ <sub>1</sub> - σ <sub>3</sub> ) <sub>max</sub> 2.72
Time to (σ <sub>1</sub> - σ <sub>3</sub> ) <sub>max</sub> , min		t <sub>f</sub> 15.02
Deviator Stress @ 15% Axial Strain, ksf		(σ <sub>1</sub> - σ <sub>3</sub> ) <sub>15%</sub> 2.72
Ultimate Deviator Stress, ksf		(σ <sub>1</sub> - σ <sub>3</sub> ) <sub>ult</sub> na
Rate of strain, %/min		'ε 1.00
Axial Strain at Failure, %		ε <sub>f</sub> 15.02

Description of Specimen: Sandy Fat Clay (CH)					
Amount of Material Finer than the No. 200, %:	nm				
LL: nm	PL: nm	PI: nm	G <sub>S</sub> : 2.65 Assumed	Specimen Type: Undisturbed	Test Method: ASTM D2850

<b>Membrane correction applied</b>		
Boring:	B-7	Remarks: nm= not measured, na = not applicable
Sample:	7C	
Depth, ft:	30.0	
Test Date:	9/30/19	



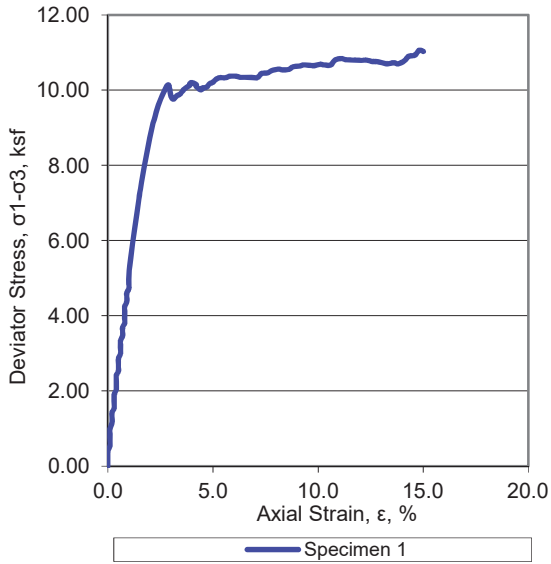
Project No.:	20193762.003A
Date:	10/1/19
Entry By:	CP
Checked By:	CP
File Name:	B-7@30 TXUU

**TRIAXIAL COMPRESSION  
TEST (UU)**  
**Trenchless Recycled Pipeline**  
**Adobe Road**  
**Petaluma, CA**

Figure  
1 of 1  
**B-12**

Total	
c =	5.53 ksf

Specimen Shear Picture



Specimen No.		1
Initial	Diameter, in	D <sub>0</sub> 2.43
	Height, in	H <sub>0</sub> 5.56
	Water Content, %	w <sub>0</sub> 18.2
	Dry Density, lbs/ft <sup>3</sup>	γ <sub>d0</sub> 113.7
	Saturation, %	S <sub>0</sub> 100
	Void Ratio	e <sub>0</sub> 0.454
Minor Principal Stress, ksf		σ <sub>3</sub> 4.00
Maximum Deviator Stress, ksf		(σ <sub>1</sub> -σ <sub>3</sub> ) <sub>max</sub> 11.06
Time to (σ <sub>1</sub> -σ <sub>3</sub> ) <sub>max</sub> , min		t <sub>f</sub> 14.82
Deviator Stress @ 15% Axial Strain, ksf		(σ <sub>1</sub> -σ <sub>3</sub> ) <sub>15%</sub> 11.03
Ultimate Deviator Stress, ksf		(σ <sub>1</sub> -σ <sub>3</sub> ) <sub>ult</sub> na
Rate of strain, %/min		'ε 1.00
Axial Strain at Failure, %		ε <sub>f</sub> 14.82

Description of Specimen: Lean Clay (CL)	
Amount of Material Finer than the No. 200, %:	nm
LL: nm	PL: nm
PI: nm	G <sub>S</sub> : 2.65 Assumed
Specimen Type: Undisturbed	Test Method: ASTM D2850

<b>Membrane correction applied</b>	
Boring:	B-8
Sample:	9C
Depth, ft:	39.0
Test Date:	9/24/19
Remarks: nm= not measured, na = not applicable	

	Project No.: 20193762.003A	<b>TRIAXIAL COMPRESSION TEST (UU)</b> <b>Trenchless Recycled Pipeline</b> <b>Adobe Road</b> <b>Petaluma, CA</b>	Figure 1 of 1 <b>B-13</b>
	Date: 10/1/19		
	Entry By: CP		
	Checked By: CP		
	File Name: B-8@39 TXUU		



***KLEINFELDER***

*Bright People. Right Solutions.*





1100 Willow Pass Court, Suite A  
 Concord, CA 94520-1006  
 925 462 2771 Fax: 925 462 2775  
 www.cercoanalytical.com

Client: Kleinfelder  
 Client's Project No.: 20193762.003  
 Client's Project Name: Petaluma Recycled Water Pipeline  
 Date Sampled: August, 2019  
 Date Received: 20-Sep-19  
 Matrix: Soil  
 Authorization: Chain of Custody

Date of Report: 30-Sep-2019

Job/Sample No.	Sample I.D.	Redox (mV)	pH	Conductivity (umhos/cm)*	Resistivity (100% Saturation) (ohms-cm)	Sulfide (mg/kg)*	Chloride (mg/kg)*	Sulfate (mg/kg)*
1909130-001AB	B-1/B-2 @ 4.5'/4.5'	+200	7.76	-	1,200	-	N.D.	N.D.
1909130-002AB	B-3/B-4 @ 4.5'/4.5'	+220	8.19	-	450	-	260	170
1909130-003AB	B-5/B-6 @ 5'/4.5'	+180	8.35	-	520	-	150	140
1909130-004AB	B-7/B-8 @ 4.5'/5.5'	+190	8.22	-	550	-	130	57

Method:	ASTM D1498	ASTM D4972	ASTM D1125M	ASTM G57	ASTM D4658M	ASTM D4327	ASTM D4327
Reporting Limit:	-	-	10	-	50	15	15
	26-Sep-2019	26-Sep-2019	-	23-Jun-2019	-	26-Sep-2019	23-Aug-2019

Cheryl McMillen  
 Laboratory Director

\* Results Reported on "As Received" Basis  
 N.D. - None Detected



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# Important Information about This

# Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

**The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, clients can benefit from a lowered exposure to the subsurface problems that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed below, contact your GBA-member geotechnical engineer. Active involvement in the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.**

## Geotechnical-Engineering Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. *Those who rely on a geotechnical-engineering report prepared for a different client can be seriously misled.* No one except authorized client representatives should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one – not even you – should apply this report for any purpose or project except the one originally contemplated.*

## Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read it *in its entirety*. Do not rely on an executive summary. Do not read selected elements only. *Read this report in full.*

## You Need to Inform Your Geotechnical Engineer about Change

Your geotechnical engineer considered unique, project-specific factors when designing the study behind this report and developing the configuration-dependent recommendations the report conveys. A few typical factors include:

- the client's goals, objectives, budget, schedule, and risk-management preferences;
- the general nature of the structure involved, its size, configuration, and performance criteria;
- the structure's location and orientation on the site; and
- other planned or existing site improvements, such as retaining walls, access roads, parking lots, and underground utilities.

Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.*

## This Report May Not Be Reliable

*Do not rely on this report* if your geotechnical engineer prepared it:

- for a different client;
- for a different project;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, that it could be unwise to rely on a geotechnical-engineering report whose reliability may have been affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If your geotechnical engineer has not indicated an "apply-by" date on the report, ask what it should be, and, in general, if you are the least bit uncertain about the continued reliability of this report, contact your geotechnical engineer before applying it.* A minor amount of additional testing or analysis – if any is required at all – could prevent major problems.

## Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface through various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing were performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgment to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team from project start to project finish, so the individual can provide informed guidance quickly, whenever needed.

## This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, *they are not final*, because the geotechnical engineer who developed them relied heavily on judgment and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* revealed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

## This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a full-time member of the design team, to:

- confer with other design-team members,
- help develop specifications,
- review pertinent elements of other design professionals' plans and specifications, and
- be on hand quickly whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction observation.

## Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for informational purposes only*. To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report, but they may rely on the factual data relative to the specific times, locations, and depths/elevations referenced. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may

perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

## Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely*. Ask questions. Your geotechnical engineer should respond fully and frankly.

## Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures*. If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. As a general rule, *do not rely on an environmental report prepared for a different client, site, or project, or that is more than six months old*.

## Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, none of the engineer's services were designed, conducted, or intended to prevent uncontrolled migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, *proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration*. Confront the risk of moisture infiltration by including building-envelope or mold specialists on the design team. *Geotechnical engineers are not building-envelope or mold specialists*.



Telephone: 301/565-2733

e-mail: [info@geoprofessional.org](mailto:info@geoprofessional.org) [www.geoprofessional.org](http://www.geoprofessional.org)

SECTION 02 41 10

DEMOLITION, SALVAGE, AND ABANDONMENT

PART 1 GENERAL

1.1 DESCRIPTION

- A. The Contractor shall furnish all tools, equipment, materials, and supplies and shall perform all labor as required for the demolition, abandonment, or removal of pavements and structures and utility removals and abandonments, as indicated on the Drawings and as specified herein.
- B. The Work of this Section shall include, but shall not be limited to the following items:
  - 1. Demolition of asphalt pavement, concrete structures, pavement, underground piping, and other features as required to install utilities, structures, concrete pavement and asphalt pavement.
  - 2. Abandonment or removal of existing pipe and other utilities as indicated on the Drawings and specified herein.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 02 01 00 - Site Conditions
- B. Section 02 01 10 - Existing Utilities and Underground Structures
- C. Section 02 32 00 - Geotechnical Investigation Data
- D. Section 31 00 00 - Earthwork

1.3 DEMOLITION/ABANDONMENT COORDINATION

- A. The Contractor shall anticipate and coordinate construction demolition and improvement as shown on the Drawings and described in the Construction Documents.
- B. The Contractor shall carefully coordinate the extent of the Work in areas where existing utilities shall be reconnected to new facilities and where existing facilities shall remain operational.
- C. While Work is being performed, the Contractor shall provide adequate access for normal operations, including access, routine operation and maintenance. The Contractor shall erect and maintain fences, warning signs, barricades, and other devices as required for the protection of the Contractor's and City's employees and the public around pipelines, structures and excavations. The Contractor shall remove all such protection when the demolition/abandonment operations are completed, or as Work progresses, or when directed by the Engineer or City.
- D. The Contractor shall coordinate all Work with the Engineer and City.
- E. The Contractor shall be responsible for scheduling and coordinating any required shut down and/or relocations as necessary for performance of the work.

#### 1.4 POTENTIALLY HAZARDOUS WASTE

- A. When approved by the City, Contractor shall impact, excavate, demolish, recycle, and/or properly dispose of material containing lead under the rules and regulations of the following agencies:
1. US Department of Transportation (US DOT)
  2. US Environmental Protection Agency (US EPA)
  3. California Environmental Protection Agency (Cal/EPA)
  4. California Department of Public Health (CDPH)
  5. California Department of Toxic Substances Control (DTSC)
  6. California Department of Industrial Relations, Division of Occupational Safety and Health (Cal/OSHA)
  7. California Department of Resources Recycling and Recovery (CalRecycle)
  8. California Air Resources Board (CARB)
- B. Work at the project site is understood to meet the Cal/OSHA definition of construction work [1532.1(a)] and includes the planned impactation of presumed lead based paint and/or known lead containing surface coatings, thus, is subject to regulation by governmental agencies and standards, including those listed below:
1. Code of Federal Regulations (CFR)
  2. 29 CFR 1926, Construction Standards
  3. 40 CFR Parts 261, 265, and 268, Hazardous Waste Management
  4. 40 CFR Part 745, Lead: Identification of Dangerous Levels of Lead
  5. 40 CFR Part 745, Subpart E Lead Renovation, Repair and Painting Program
  6. 49 CFR Parts 172, 173, 178, 179, Hazardous Material Transportation
  7. California Code of Regulations (CCR)
  8. 8 CCR Division 1, Chapter 4, Construction Safety Orders
  9. 8CCR1532.1, Lead in Construction
  10. 8 CCR 1537, Welding, Cutting, and Heating of Coated Metals
  11. 8 CCR 1531, Respiratory Protection
  12. 17 CCR Division 1, Chapter 8, Accreditation/Certification, and Work Practices in Lead-Related Construction
  13. 22 CCR Division 4.5, Environmental Health Standards for Management of Hazardous Waste
- C. Contractor shall prevent visible dust migration during demolition, excavation, transportation, placement, and handling of material containing lead. Contractor shall use wet methods (water) when impacting lead containing coatings to suppress airborne lead dust.
- D. Employee exposure to material containing any detectable quantity of lead will trigger compliance with applicable lead regulations, including 8 CCR 1532.1. Individuals engaged in lead-related construction work activities should attend lead hazard training appropriate to their assignments. All training for other lead-related construction activities should be in accordance with the Cal/OSHA and CDPH worker training provisions, including 8 CCR 1532.1(l).
- E. Contractor shall designate, in writing, one or more individuals as lead Supervisor(s). Supervisor(s) shall be capable of identifying existing and predictable lead hazards in the surroundings or working conditions and who has authorization to take prompt corrective measures to eliminate them. Supervisors shall be trained, as required by 8 CCR 1532.1, and, when required, be certified consistent with section 8 CCR 1532.1(l)(3).
- F. Contractor is responsible for all sampling, characterization, removal, handling and disposal of contaminated materials that are not determined to be hazardous waste by the Engineer under 22 California Code of Regulations Division 4.5, including trucking, disposal site fees, and additional testing if required by disposal sites. You shall comply with all disposal regulations, such as City, County, and/or State permits and licenses, as may be required.

- G. Handle, store, and dispose of hazardous waste under 22 California Code of Regulations Division 4.5. Dispose of hazardous waste within 90 days of the start of generation. Store hazardous waste in sealed, covered containers labeled with the contents and accumulation start date under 22 CA Code of Regulations, Division 4.5. Labels must comply with the provisions of 22 CA Code of Regulations, Division 4.5 § 66262.31 and § 66262.32. Use a hazardous waste manifest and a transporter registered with the Department of Toxic Substances Control (DTSC) and in compliance with the California Highway Patrol Biennial Inspection of Terminals Program to transport hazardous waste to an appropriately permitted hazardous waste management facility.
- H. In general, the Contractor shall maintain awareness of potential signs of contamination throughout the project limits and shall notify the City immediately upon discovery of any potential contamination.
- I. The Contractor shall provide 40-hour OSHA-HAZWOPER certified workers when performing any work around potentially contaminated areas and provide a field Site Safety Officer that is also an 8-hour OSHA-HAZWOPER Supervisor trained to directly oversee the contaminated materials removal and handling operation. All workers in this circumstance must have their initial and annual renewal refresher training, medical clearance and personal protective equipment in accordance with 8CCR Section 5192.
- J. The Contractor shall provide for secure onsite temporary storage of petroleum hydrocarbon-containing and lead-containing material and/or related waste. Waste storage location, equipment, containers and methods shall comply with all applicable regulations.
- K. Waste streams shall be tested by the Contractor using appropriate US EPA and CalEPA testing protocols for the purpose of hazardous waste characterization. It is the Contractor's sole responsibility to ensure the waste produced by the Contractor's work is properly characterized and disposed of. Waste shall be packaged, stored, handled, transported and disposed of appropriately for each category of waste generated based on the testing results and regulatory protocol. The cost of all waste characterization, waste profiling, transportation and disposal will be the responsibility of the Contractor.
- L. At the conclusion of the project, the project site shall be free of any lead and petroleum hydrocarbon contamination potentially produced as a result of the Contractor's work. Lead contamination of the environment caused by the Contractor shall be the Contractor's sole responsibility to assess and decontaminate to a pre-project condition.
- M. Prior to disposal of any excess material from the work site, submit to the Engineer written authorization for such disposal and entry permission signed by the approved disposal site. You shall disclose in landfill applications the existing conditions and the written disposal and entry permission shall include acknowledgement of such disclosure.

#### 1.5 MATERIAL SALVAGE

#### 1.6 SUBMITTALS

- A. Demolition and Abandonment Plan: The Contractor shall prepare and submit a Utility and Building Demolition and Abandonment Plan to the Engineer for review at least 14 days prior to start of demolition. The procedures shall provide for safe conduct of the Work, careful deactivation, removal and disposition of materials and equipment, protection of property which are to remain undisturbed, coordination with existing facilities to remain in service, and timely disconnection of utility services. The procedures shall include a detailed description of the methods and equipment to be used for each operation, and the sequence of operation.

### 1.7 REPAIR OF DAMAGE

- A. Any damage to existing street improvements, utility poles, building elements to remain, other existing utilities and facilities to remain, and private property, as caused by the Contractor's operations shall be repaired at the Contractor's expense to the satisfaction of the Engineer.
- B. Damaged items shall be repaired or replaced with new materials as required to restore damaged items or surfaces to a condition equal to and matching that existing prior to damage or start of Work of this Contract.

### 1.8 PROTECTION OF EXISTING FACILITIES

- A. Before beginning any cutting, trenching, demolition or abandonment Work, the Contractor shall carefully inspect the existing facilities to determine the extent of the Work. The Contractor shall take all necessary precautions to prevent damage to existing facilities which are to remain in place and in operation. The Contractor shall be responsible for any damages to existing facilities, which are caused by the operations of the Contractor. Damages to such facilities shall be repaired or replaced to existing condition at no additional cost to the City and to the satisfaction of the Engineer. The Contractor shall carefully coordinate the Work of this Section with all other Work and shall provide shoring, bracing, and supports, as required. The Contractor shall ensure that structural elements are not overloaded and shall be responsible for increasing structural supports or adding new supports as may be required as a result of any cutting, removal, or demolition Work performed under any part of this Contract. The Contractor shall remove all temporary protection when the Work is complete or when so authorized by the Engineer.
- B. The Contractor shall carefully consider all bearing loads and capacities for placement of equipment and material.

## PART 2 PRODUCTS (NOT USED)

## PART 3 EXECUTION

### 3.1 DEMOLITION AND ABANDONMENT OF FACILITIES

- A. Demolition shall be accomplished in accordance with applicable codes and regulations. Blasting shall not be permitted.
- B. Disposal of all materials shall be performed in compliance with all applicable local, state and federal codes, regulations, and requirements. Structures to be abandoned shall be cleaned prior to abandonment.
- C. The Drawings used in this Contract to indicate demolition, abandonment and salvage are based on Record Drawings and the best available information on the existing facilities. The structures and utilities may differ slightly. Prior to the submittal of bids, the Contractor shall conduct a comprehensive survey of the facilities to verify the scope of Work, the extent of utilities, and the physical sequencing constraints.
- D. The Contract Drawings define the minimum portion of the structures to be removed. Unless otherwise shown on the Drawings, the Contractor may make rough cuts or breaks that exceed the limits of demolition shown.



- E. All debris, materials, piping, and miscellaneous waste products from the demolition process shall be removed safely from the project site as soon as possible. They shall be disposed of in accordance with applicable federal, state, and local regulations. The Contractor is responsible for determining and complying with these regulations and shall bear all costs associated with disposal of these items.
- F. All equipment, materials, and piping within the limits of the demolition shall become the property of the Contractor, unless noted otherwise on the Drawings, and shall be removed from the site.
- G. No toxic or hazardous materials are anticipated for demolition or removal. If these or questionable substances are found during the demolition process, report the condition immediately to the Engineer in writing.

### 3.2 UTILITIES

- A. The existing known utilities at the project site include potable water underground electrical and overhead power.. Existing utilities shall be maintained as specified in Section 02 01 10, "Existing Utilities and Underground Structures."
- B. The Contractor shall be responsible for coordinating all utility service shut-downs with the City or City's Representative before demolition is started.
- C. Where utility lines that are abandoned or are designated for abandonment are exposed by demolition excavation, they shall be removed.
- D. Sewer lines and other piping to be plugged and abandoned shall be done so in accordance with Sonoma County Standards.
- E. All utilities designated to remain in service shall remain in service for the duration of the work.
- F. Salvage utility facilities for reuse where designated on the Drawings. Store in a safe and protected location until reinstalled. The Contractor shall be responsible for any damages to these facilities. Damages to such facilities shall be repaired or replaced with new at no additional cost to the City and to the satisfaction of the Engineer.

### 3.3 POTENTIALLY HAZARDOUS WASTE

### 3.4 PAVING DEMOLITION

- A. Asphalt concrete and armor coats shall be saw cut with a suitable tool before excavation. For all roads and paved areas, saw cutting shall be required. Breaking of asphalt, concrete, or armor coats with jack hammers or excavation equipment will not be permitted.
- B. All edges of asphalt concrete or armor coats shall be cut four (4) inches vertically, with a neat, square edge.
- C. In all cases, existing asphalt paving or armor coating shall be saw cut out after construction and just prior to final paving as shown on County of Sonoma standards.
- D. The Contractor shall dispose of all Portland cement concrete and asphalt concrete generated from removal or demolition activities on the project at a recycler for these materials. The Contractor shall provide receipts verifying delivery and approximate quantity (TONS) of the material delivered to the material recycler.

### 3.5 PROTECTED AREAS

- A. The existing structures not designated for removal, along with its associated utilities and landscaping, shall remain in place, in service and accessible to employees. The Contractor shall exercise caution when working near these structures. Any damage to structures, surrounding landscaping, or paved areas shall be repaired or replaced to original pre-contract conditions at the Contractor's sole expense. The Contractor is responsible for providing any temporary access as required for this facility.
- B. All other areas of the site not within the limits of demolition and grading shown on the Drawings shall be left undisturbed. Any damage to these areas during the demolition or construction process shall be repaired or replaced to original pre-contract conditions at the Contractor's sole expense. Disturbed areas, not within the demolition and grading limits shown on the Drawings, shall be reseeded.

### 3.6 BACKFILLING

- A. The Contractor shall backfill all demolition areas to final grade with appropriate fill material as shown on the Drawings and described in these Specifications.
- B. Backfill material shall meet the applicable requirements of Section 31 00 00, "Earthwork." In all areas not immediately backfilled to ground level, the Contractor shall erect safety barriers around the excavation.

END OF SECTION

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
  - 1. Formwork.
  - 2. Reinforcement.
  - 3. Accessories.
  - 4. Cast-in place concrete.
  - 5. Finishing and curing.

1.2 SYSTEM DESCRIPTION

- A. Design, engineer and construct formwork, shoring and bracing in accordance with ACI 301 to conform to design and applicable code requirements to achieve concrete shape, line and dimension.

1.3 REFERENCES

- A. American Concrete Institute:
  - 1. ACI 301 – Specifications for Structural Concrete
  - 2. ACI 302.1R – Guide to Concrete Floor and Slab Construction
  - 3. ACI 305.1 – Standard Specification for Hot Weather Concreting
  - 4. ACI 306.1 – Standard Specification for Cold Weather Concreting
  - 5. ACI 318 – Building Code Requirements for Structural Concrete
  - 6. ACI 347 – Guide to Formwork for Concrete
- B. ASTM International:
  - 1. ASTM C31/C31M – Standard Practice for Making and Curing Concrete Test Specimens in the Field
  - 2. ASTM C33 – Standard Specification for Concrete Aggregates
  - 3. ASTM C39/C39M – Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
  - 4. ASTM C94/C94M – Standard Specification for Ready-Mix Concrete
  - 5. ASTM C143/C143M – Standard Test Method for Slump of Hydraulic Cement Concrete
  - 6. ASTM C150 – Standard Specification for Portland Cement
  - 7. ASTM C172 – Standard Practice for Sampling Freshly Mixed Concrete
  - 8. ASTM C173/C173M – Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
  - 9. ASTM C260 – Standard Specification for Air-Entraining Admixtures for Concrete
  - 10. ASTM C494/C494M – Standard Specification for Chemical Admixtures for Concrete
  - 11. ASTM C618 – Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete
  - 12. ASTM C1017/C1017M – Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete
  - 13. ASTM C1064/C1064M – Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete
  - 14. ASTM C1077 – Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation

15. ASTM C1107/C1107M – Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
16. ASTM E1155 – Standard Test Method for Determining FF Floor Flatness and FL Floor Levelness Numbers

C. AWS D1.4/D4.1M – Structural Welding Code – Steel Reinforcing Bars

#### 1.4 SUBMITTALS

- A. Shop Drawings: Signed and sealed by professional Civil or Structural Engineer licensed in the State of California.
  1. Indicate pertinent dimensioning, form materials, arrangement of joints and ties, location of bracing and temporary supports, schedule of erection and stripping.
  2. Indicate reinforcement sizes, spacing, locations, quantities, grade, bending and cutting schedules, and supporting and spacing devices.
  3. Indicate slabs-on-grade.
  4. Indicate penetrations and embedded objects.
- B. Product Data:
  1. Cementitious materials: type, manufacturing location, shipping locations, and certificates showing compliance with ASTM C150.
  2. Coarse and fine aggregates: types, pit or quarry locations, producers' names, and gradations.
  3. Admixtures: types, brand names, producers, manufacturer's technical data sheets, and certification data.
  4. Ready-mix plant certification or ASTM C94 certification documentation.
  5. Attachment accessories.
  6. Joint devices and filler materials.
- C. Design Data:
  1. Submit concrete mix designs for each concrete strength. Identify mix ingredients and proportions, including admixtures. Submit separate mix designs when admixtures require hot and cold weather concrete work or air entrained concrete work.
  2. Submit certified laboratory compression test results for each concrete strength.
- D. Manufacturer's Installation Instructions: Submit installation procedures and interface required with adjacent Work.

#### 1.5 CLOSEOUT SUBMITTALS

- A. Project Record Documents: Accurately record actual locations of embedded utilities and components concealed from view in finished construction.

#### 1.6 QUALITY ASSURANCE

- A. Construct and erect concrete formwork in accordance with ACI 301.
- B. Perform concrete reinforcing work in accordance with ACI 301.
- C. Perform cast-in-place concrete work in accordance with ACI 301.
- D. Conform to ACI 305 when concreting during hot weather.
- E. Conform to ACI 306.1 when concreting during cold weather.

- F. Perform Work in accordance with State of California standards.
- G. Maintain one copy of each document on site.
- H. Design Work under direct supervision of Professional Engineer experienced in design of this Work and licensed in State of California.

## 1.7 COORDINATION

- A. Coordinate placement of joint devices with erection of concrete formwork and placement of form accessories.

## PART 2 PRODUCTS

### 2.1 FORM MATERIALS AND ACCESSORIES

- A. Form Materials: At discretion of Contractor. New material to be used.
- B. Form Release Agent: Colorless mineral oil not capable of staining concrete or impairing natural bonding characteristics of coating intended for use on concrete.

### 2.2 REINFORCEMENT MATERIALS

- A. Reinforcing Steel: ASTM A615/A615M, 60 ksi yield grade, deformed billet bars, uncoated.
- B. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for support of reinforcing; plastic tipped or non-corroding for supports in slabs forming finished ceilings or where supports are exposed to weather.
- C. Fabricate concrete reinforcement in accordance with ACI 318.
- D. Weld reinforcement in accordance with AWS D1.4.

### 2.3 CONCRETE MATERIALS

- A. Cement:
  - 1. ASTM C150, Type II/V Portland type.
  - 2. The concrete must contain at least 675 pounds of cementitious material per cubic yard.
  - 3. The cementitious material must be composed of one of the following, by weight:
    - a. 25 percent natural pozzolan or fly ash with a CaO content of up to 10 percent and 75 percent Portland cement.
    - b. 20 percent natural pozzolan or fly ash with a CaO content of up to 10 percent, 5 percent silica fume, and 75 percent Portland cement.
    - c. 12 percent silica fume, metakaolin, or UFFA, and 88 percent Portland cement.
    - d. 50 percent GGBFS and 50 percent Portland cement.
- B. Normal Weight Aggregates: ASTM C33.
  - 1. Coarse aggregate maximum size: 1 inch in accordance with ACI 318.
- C. Water: ACI 318; potable, clean, and without deleterious amounts of chloride ions.

## 2.4 ADMIXTURES:

- A. Air Entrainment Admixture: ASTM C260, containing no chlorides or other corrosion causing chemicals.
- B. Chemical: ASTM C494/C494M Type A – Water Reducing, Type D – Water Reducing and Retarding, containing no chlorides or other corrosion causing chemicals.
- C. Fly Ash: ASTM C617 Class F.
- D. Plasticizing: ASTM C1017/C1017M Type I, plasticizing and Type II, plasticizing and retarding.

## 2.5 ACCESSORIES

- A. Epoxy Bonding Compound: ASTM C881. Provide Type I for bonding hardened concrete to hardened concrete; Type II for bonding freshly mixed concrete to hardened concrete; and Type III as a binder in epoxy mortar or concrete, or for use in bonding skid-resistant materials to hardened concrete. Provide Grade 1 or 2 for horizontal surfaces and Grade 3 for vertical surfaces. Provide Class A if placement temperature is below 40 degrees F; Class B if placement temperature is between 40 and 60 degrees F; or Class C if placement temperature is above 60 degrees F.
- B. Vapor Barrier: ASTM E1745 10 mil thick; type recommended for below grade application, Stego Wrap brand or equal. Furnish joint tape recommended by manufacturer.
- C. Polysulphide Sealant: ASTM C920-87, Type M, grade NS, Class 121/2 Min.
  - 1. Primer: in accordance with manufactures recommendations.
  - 2. Prepare surfaces, primer, and install in accordance with manufactures recommendations for intended application.
- D. Evaporation Retardant:
  - 1. Provide to retard rapid evaporation of water from fresh exposed concrete.
  - 2. Fluorescent color tint which shall disappear completely upon drying is optional.
  - 3. Manufacturers:
    - a. Master Builders Co., Cleveland, OH, Confilm or Confilm LL-898.
    - b. Evelid Chemical Co., Cleveland, OH, Eucobar.
    - c. Or approved equal.
- E. Non-Shrink Grout: ASTM C1107/C1107M; Grade A; premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; capable of developing minimum compressive strength of 3,000 psi in 72 hours and 7,000 psi in 28 days.

## 2.6 JOINT DEVICES AND FILLER MATERIALS

- A. Joint Filler: ASTM D1751; Asphalt impregnated fiberboard or felt, 1/4 inch thick; tongue and groove profile.
- B. Joint Sealant: ASTM C920 unless otherwise noted; suitable for materials to which applied.
  - 1. Horizontal Joints: Grade P, use T.
  - 2. Vertical Joints: Grade NS.

## 2.7 CONCRETE MIX

- A. Mix and deliver concrete in accordance with ASTM C94/C94M, Option A.

- B. Select proportions for concrete in accordance with ACI 301.
- C. Furnish concrete of the following strength:

Parameter	All concrete shown on structural drawings	Miscellaneous concrete not shown on structural drawings
Compressive Strength (measured at 28 days)	4,000 psi	3,000 psi
Maximum Water-Cement Ratio	0.45 by weight	0.59 by weight
Maximum Aggregate Size	1.0 inch	1.0 inch
Slump	1 inch minimum to 4 inches maximum, as measured at point of placement	1 inch minimum to 4 inches maximum, as measured at point of placement
Air Content	6% plus or minus 2%	6% plus or minus 2%
Fly Ash Content	25% maximum, 15% minimum of total weight of cementitious materials	25% maximum, 15% minimum of total weight of cementitious materials

- D. Employ an independent commercial testing laboratory complying with ASTM C1077 and favorably reviewed by the Engineer to design all concrete mixes and carry out all necessary testing. Concrete mix design proportions shall be established on the basis of field experience and trial mixtures with the materials to be employed in accordance with ACI 318 Section 26.4.
1. When the testing laboratory has mix designs meeting the specifications that are available from prior projects, submit material and mixture proportions with supporting test results and test record statistics to demonstrate compliance with the requirements of this Section and ACI 318 Section 26.4. Include calculations for  $f'_{cr}$  based on source quality test records.
  2. If new mix designs are required, prepare a range of trial batches for each design and submit the mixes that demonstrate satisfactory test results in accordance with ACI 318 Section 26.4.
    - a. Allow for the variability of concrete strength from test to test by increasing the required average compressive strength over the specified strength as specified in ACI 318 Section 26.4.
- E. Select admixture proportions for normal weight concrete in accordance with ACI 301.
1. Use of admixtures will not relax weather placement requirements.
    - a. Use accelerating admixtures in cold weather only when approved by the Engineer.
    - b. Use set retarding admixtures during hot weather only when approved by the Engineer.
  2. Do not use calcium chloride nor admixtures containing calcium chloride.
  3. Add air entraining agent to concrete mix for concrete work exposed to exterior.
  4. Do not exceed the water-cementitious material ratios. Vary the water-reducing admixtures to accomplish an increase in slump or workability time.

## PART 3 EXECUTION

### 3.1 FORMWORK ERECTION

- A. Erect formwork, shoring and bracing to achieve design requirements. Use new materials for all formwork.

- B. Camber slabs and framing to achieve ACI 301 tolerances.
- C. Provide bracing to ensure stability of formwork.
- D. Form external corners of equipment pad with 3/4-inch chamfer.
- E. Apply form release agent to formwork prior to placing form accessories and reinforcement.
- F. Clean forms as erection proceeds, to remove foreign matter.

### 3.2 INSERTS, EMBEDDED COMPONENTS, AND OPENINGS

- A. Provide formed openings where required for work to be embedded in and passing through concrete members.
- B. Coordinate work of other sections in forming and setting openings, slots, recesses, chases, sleeves, bolts, anchors, and other inserts.
- C. Install concrete accessories straight, level, and plumb.
- D. Install Vapor Retarder in accordance with ASTM 1643.
- E. Place formed construction joint device in pattern pouring sequence.

### 3.3 REINFORCEMENT PLACEMENT

- A. Place reinforcement, supported and secured against displacement.
- B. Ensure reinforcing is clean, free of loose scale, dirt, or other foreign coatings.
- C. Space reinforcement bars with minimum clear spacing in accordance with ACI 318.
- D. Weld reinforcement in accordance with AWD D1.4.
  - 1. Do not weld crossing reinforcement bars for assembly except as permitted by the Engineer.
- E. Maintain concrete cover around reinforcement in accordance with ACI 318.

### 3.4 EXAMINATION

- A. Verify requirements for concrete cover over reinforcement.
- B. Verify anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with placing concrete

### 3.5 PREPARATION

- A. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent. Remove laitance, coatings, and unsound materials.
- B. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.
- C. Remove debris and ice from formwork, reinforcement, and concrete substrates.



- D. Remove water from areas receiving concrete before concrete is placed.

### 3.6 PLACING CONCRETE

- A. Place concrete in accordance with ACI 301.
- B. Notify testing laboratory minimum 24 hours prior to commencement of operations.
- C. Ensure reinforcement, inserts, embedded parts, formed expansion and contraction joints, and anchor bolts are not disturbed during concrete placement.
- D. Install vapor retarder under interior slabs on grade in accordance with ASTM E1643. Lap joints minimum 6 inches and seal watertight in accordance with manufacturer's recommendations.
- E. Repair vapor retarder damaged during placement of concrete reinforcing. Repair with vapor retarder material; lap over damaged areas minimum 6 inches and seal watertight in accordance with manufacturer's recommendations.
- F. Separate slabs on grade from vertical surfaces with 1/4 inch thick joint filler.
- G. Deposit concrete at final position. Prevent segregation of mix.
- H. Place concrete in continuous operation for each panel or section determined by predetermined joints.
- I. Do not interrupt successive placement: do not permit cold joints to occur.
- J. Consolidate concrete.
- K. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.
- L. Saw cut joints within 12 hours after placing. Saw cut joints as soon as concrete surface is firm enough not to be torn or damaged by blade and before random shrinkage cracks can form. Use 3/16 inch thick blade, cut into 1/4 depth of slab thickness.
- M. Screed slabs on grade level, maintaining surface flatness of maximum 1/4 inch in 10 ft.

### 3.7 FORM REMOVAL

- A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.
- B. Remove formwork progressively and in accordance with code requirements.

### 3.8 CONCRETE FINISHING

- A. Finish concrete floor surfaces in accordance with ACI 301 and ACI 302.1.
- B. Steel trowel surfaces which are indicated to be exposed.
- C. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains as indicated on drawings.

### 3.9 CURING AND PROTECTION

- A. Cure slab surfaces in accordance with ACI 301.
- B. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
  - 1. Protect concrete footings from freezing for minimum 5 days.
- C. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete for not less than 7 days.

### 3.10 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed by Owner's testing laboratory in accordance with ACI 301 and under provisions of General Conditions.
- B. Provide free access to Work and cooperate with appointed firm.
- C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of Work.
- D. Concrete Inspections:
  - 1. Continuous Placement Inspection: Inspect for proper installation procedures.
  - 2. Periodic Curing Inspection: Inspect for specified curing temperature and procedures.
- E. Strength Test Samples:
  - 1. Sampling Procedures: ASTM C172.
  - 2. Cylinder Molding and Curing Procedures: ASTM C31/C31M, cylinder specimens, field cured.
  - 3. Samples for strength tests of each class of concrete placed each day shall be taken not less than once a day, or not less than once for each 50 cubic yards of concrete, or not less than once for each 2,000 square feet of surface area for slabs or walls. Additional samples for seven-day compressive strength tests shall be taken for each class of concrete at the beginning of the concrete work or whenever the mix or aggregate is changed (CBC sec 1905A.1.15).
  - 4. When volume of concrete for any class of concrete would provide less than 5 sets of cylinders, take samples from five randomly selected batches, or from every batch when less than 5 batches are used.
  - 5. Make one additional cylinder during cold weather concreting, and field cure.
- F. Field Testing:
  - 1. Slump Test Method: ASTM C143/C143M.
  - 2. Air Content Test Method: ASTM C173/C173M.
  - 3. Temperature Test Method: ASTM C1064/C1064M.
  - 4. Measure slump and temperature for each compressive strength concrete sample.
  - 5. Measure air content in air entrained concrete for each compressive strength concrete sample.
- G. Cylinder Compressive Strength Testing:
  - 1. Test Method: ASTM C39/C39M.
  - 2. Test Acceptance: In accordance with ACI 318.
  - 3. Testing laboratory will transport cylinders from site, cure, test, and provide report.
  - 4. Test results from cured test cylinders shall be evaluated separately for each specified concrete mixture.
  - 5. Test one cylinder at 7 days.

6. Test two cylinders at 28 days.
  7. Retain one for testing when requested by Engineer.
  8. Dispose remaining cylinders when testing is not required.
- H. Maintain records of concrete placement. Record date, location, quantity, air temperature and test samples taken
- I. Reinforcement Inspection:
1. Inspect for correct materials, fabrication, sizes, locations, spacing, concrete cover, and splicing.

### 3.11 PATCHING

- A. Allow Engineer to inspect concrete surfaces immediately upon removal of forms.
- B. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Engineer upon discovery.
- C. Patch imperfections in accordance with ACI 301.

### 3.12 DEFECTIVE CONCRETE

- A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances, or specified requirements.
- B. Repair or replacement of defective concrete will be determined by Engineer.
- C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Engineer for each individual area.

END OF SECTION

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SECTION 31 00 00

EARTHWORK

PART 1 GENERAL

1.1 DESCRIPTION

- A. Earthwork shall consist of performing all operations necessary for excavation, subgrade preparation and grading where applicable.
- B. All work shall conform to the lines, grades and cross-sections or elevations shown on the Drawings.
- C. Prior to bid, Contractor shall verify existing topography and notify Engineer of any discrepancy between existing topographic information indicated on the plans and actual field topographic data. Failure to notify Engineer of any discrepancy prior to bid indicates Contractor acceptance of existing conditions in conformance with those shown on the Plans.
- D. See Section 02 32 00, "Geotechnical Investigation Data" for Soils Report(s) prepared for the project.
- E. Existing power and telephone lines, trees, fences, pipelines or other conduits, embankments, and structures in the vicinity of the work that are to remain shall be supported and protected from injury by the Contractor during the construction and until the completion of the Work. The Contractor shall be liable for all damages to such structures, as herein provided, and shall save and keep the City and Engineer harmless from any liability or expense for injuries, damages, or repairs to same.
- F. Excess material from the excavation shall become the property of the Contractor and shall be disposed of by him at his expense.

1.2 RELATED ITEMS DESCRIBED ELSEWHERE:

- A. Section 02 01 00 - Site Conditions
- B. Section 02 01 10 - Existing Utilities and Underground Structures
- C. Section 31 01 40 - Shoring and Trench Safety
- D. Section 31 23 00 - Trench Excavation and Backfill
- E. Section 31 23 19 - Dewatering

1.3 QUALITY ASSURANCE

- A. Qualifications of workmen: Provide sufficient skilled workmen and supervisors who shall be present at all times during execution of this portion of the work and who shall be thoroughly familiar with the type of construction involved and the materials and techniques specified.
- B. Codes and Standards:
  - 1. Wherever a test method is referenced in this Section it shall be made in accordance with the most current test methods in use by the California Department of Transportation

(Caltrans) as listed in the State Standard Specifications, latest edition, or ASTM method as listed below at the City's option:

<u>TEST</u>	<u>TEST METHOD</u>
Standard Specification for Concrete Aggregates	ASTM C33
Particle-Size Analysis of Soils	ASTM D422
Density of Soil in Place by Sand Cone Method	ASTM D1556
Moisture-Density Relations of Soil & Soil Aggregates	ASTM D1557
Unconfined Compressive Strength of Cohesive Soil	ASTM D2166
Laboratory Determination of Water Content of Soil & Rock	ASTM D2216
Classification of Soils for Engineering Purposes	ASTM D2487
Resistance R-Value and Expansion Pressure of Compacted Soils	ASTM D2844
Density of Soil and Soil-Aggregate in Place by Nuclear Methods	ASTM D2922
Density of Soil in Place by the Drive-Cylinder Method	ASTM D2937
Direct Shear Test of Soils Under Consolidated Drained Conditions	ASTM D3080
Liquid Limit, Plastic Limit, & Plasticity Index of Soils	ASTM D4318
Expansion Index of Soils	ASTM D4829

2. Where reference is made to the State Standard Specifications, reference shall mean the State of California, Department of Transportation (Caltrans), Standard Specifications, 2018, excluding measurement and payment Sections.

#### 1.4 TESTING

- A. Relative compaction, moisture, and permeability tests will be made at locations determined by the Engineer. When tests indicate that the specified compaction has not been achieved, that portion of the Work shall be reworked until the required density, moisture, and permeability has been attained.
- B. The Contractor shall be responsible for the sampling and testing costs associated with any failed test.
- C. The Contractor shall be responsible for the sampling and testing costs associated with soil disposal requirements for soils that are not determined to be contaminated.
- D. The Engineer will perform all observations and testing for excavations and trenches.
- E. A minimum of 72 hours' notice shall be given to the Engineer by the Contractor prior to commencing or recommencing any grading operation.

#### 1.5 SUBMITTALS

- A. Submit all product data, shop drawings, laboratory test results, material source information, and certificates of compliance listed in this Section under a single submittal cover for review. Incomplete submittals will not be reviewed.
- B. Samples: In accordance with the provisions of Section 01 33 00, "Submittals," of the specifications, submit samples of all materials 15 days prior to construction. Periodic testing of the material will also be made during construction.
- C. Product Data: submit data for geotextile fabric indicating fabric properties, test methods, and manufacturer's installation instructions.
- D. Material Source: Submit name of imported fill materials supplied.

- E. Manufacturer's Certificate: Submit Certifications that products meet or exceed specified requirements.

## PART 2 PRODUCTS

### 2.1 TOPSOIL AND UNDOCUMENTED FILL

- A. Topsoil is classified as the top three inches of excavated material including buried organics, shallow vegetation roots and other deleterious materials and excluding cleared and grubbed materials.
- B. Undocumented fill pertains to soils previously imported and placed at the project site.

### 2.2 GENERAL FILL MATERIAL

- A. Shall be non-expansive and free of debris and organic material, with a Liquid Limit less than 40 and a plasticity index less than 15 percent as determined by ASTM D4318, shall not contain clumps/rock larger than 3 inches, and should consist predominantly of materials less than 1/2 inch in greatest dimension.
- B. Existing material excavated on site may be used as general fill provided it meets the requirements of subparagraph 2.3.A, after vegetative matter, rocks larger than 3 inches, and other debris is removed and after approval by the Engineer.
- C. All on-site and off-site sources of fill shall be approved by the Engineer a minimum of 2 working days prior to placement or importation to the site.

### 2.3 ENGINEERED FILL

- A. Material specified in paragraph 2.2, except that potentially expansive soils shall not be used as engineered fill within the top 3 feet of subgrade beneath lightly loaded structures, building foundations, concrete slabs and paving. Highly plastic soils (Plasticity Index >25) should not be placed in areas that support foundations or pavements.
- B. Standard Specifications, Section 19-3.02C Structure Backfill.
- C. Standard Specifications, Section 26, Class 2, 3/4-inch maximum.

### 2.4 IMPORT FILL

- A. Imported fill shall be approved by the Engineer, and shall:
  - 1. Be predominately granular.
  - 2. 100% passing a 3-inch sieve.
  - 3. A plasticity index less than 15 percent.

### 2.5 STRUCTURAL AGGREGATE

- A. Structural aggregate material shall consist of washed angular aggregate with the following ASTM D422 test particle size distribution:

Sieve Size	Percent Passing
3/4 Inch	100%
No. 4	0-5%
No. 200	0-3%

## 2.6 PIPE BEDDING MATERIAL

- A. Pipe bedding material shall have a minimum sand equivalent value of 30 and shall conform to the following ASTM D422 test particle size distribution:

<u>Sieve Size</u>	<u>Percent Passing</u>
1 Inch	100%
3/4 Inch	100%
3/8 Inch	80% - 100%
No. 4	10% - 50%
No. 16	5% - 30%
No. 200	0% - 4%

## 2.7 TRENCH BACKFILL MATERIAL

- A. The following materials may be used as Trench Backfill Material above the pipe zone in unpaved areas:
1. Engineered Fill Material.
- B. Backfill shall be placed and compacted as described in Paragraph 3.12.
- C. Backfill for trench sections in finished gravel surface areas shall be as indicated on the Drawings.

## 2.8 SHOULDER BACKING

- A. State Standard Specification Section 19-9.

## 2.9 PERMEABLE MATERIAL

- A. State Standard Specification Section 68.2.02F(3), Class 2.

## 2.10 AGGREGATE BASE

- A. Standard Specifications, Section 26, Class 2, 3/4-inch maximum.

## 2.11 SAND

- A. Standard Specifications, Section 19-3.02E(2), Salt Free.

## 2.12 PEA GRAVEL

- A. Pea gravel material shall be clean, dried, free of organic/deleterious materials, have a minimum sand equivalent value of 30 and shall conform to the following ASTM C33 test particle size distribution:

<u>Sieve Size</u>	<u>Percent Passing</u>
1/2 Inch	100%
3/8 Inch	85% - 100%
No. 4	10% - 30%
No. 8	0% - 10%
No. 200	0% - 15%



2.13 SUBGRADE STABILIZATION FABRIC

- A. Standard Specifications, Section 88-1.02O, Class B1.

2.14 NOT USED

2.15 NOT USED

2.16 ROCK SLOPE PROTECTION FABRIC

- A. Standard Specifications, Section 88-1.02I, Class 8.

PART 3 EXECUTION

3.1 GENERAL

- A. Verify exact location (horizontal and vertical) of all utilities by potholing prior to the start of excavation. Underground pipe or conduits to remain shall be protected during the work to not disturb their function.
- B. All active portions of the construction site and material excavations shall be sufficiently watered to prevent excessive amounts of dust. Watering shall occur at least twice a day with complete coverage, preferably in the late morning and after work for the day.
- C. All grading, earthmoving and excavation shall cease during periods of winds greater than 20 miles per hour average over a one hour period.
- D. All material transported offsite shall be either sufficiently watered or securely covered to prevent excessive amounts of dust.

3.2 Areas disturbed by earthmoving or excavation activities shall be minimized at all times.

3.3 TOPSOIL EXCAVATION

- A. Remove all topsoil and organics.
- B. Material specified in Paragraph 2.1 shall be removed before commencement of any excavation. Do not use this material for fill or backfill, except as approved by the Engineer. Topsoil shall be spread on fill slopes or other areas of the site approved by the Engineer.

3.4 DISPOSAL OF WASTE MATERIAL

- A. Refer to Technical Specification Section 01 74 19 – Construction Waste Management.
- B. Burning is prohibited. Remove unsuitable material from the site in accordance with all local laws, codes and ordinances.
- C. Existing clean suitable fill material may be stockpiled at a designated location on site after approval by the Engineer.

### 3.5 COMPACTION EQUIPMENT

- A. Compaction Equipment: All compaction shall be by mechanical means. Compaction equipment shall be of suitable type and adequate to obtain the densities specified and approved.

### 3.6 SITE EXCAVATION

- A. Perform all excavation of every description, regardless of the type, nature, or condition of material encountered, as specified, shown, or required to accomplish the Work.
- B. The Contractor shall control excavations and stockpiling in a manner to prevent water from entering the excavations. Material for fill, backfill, or for protection of excavations from surface drainage shall be neatly placed and kept shaped and covered so as to cause no dust or interference with other work.
- C. The Engineer shall observe all excavated bottoms, including foundations and utility structures and trenches, following removal of material. Unsuitable materials observed by the Engineer in the excavated bottom shall be removed by the Contractor and stabilized using Engineered Fill material, as specified in Paragraph 2.3.

### 3.7 STRUCTURAL EXCAVATION

- A. Expansive clay shall be removed to a minimum depth of 2.5 feet beneath the entire fill area and extending a minimum of five feet beyond the tank perimeter in all directions and replaced with native or imported engineered fill with a Plasticity Index less than 15.
- B. In areas where structural fill is to be placed, over-excavate the upper three feet of weak native soils beneath the entire fill and/or building area and extending a minimum of five feet beyond the limits of the structural fill and/or building footprint in all directions.
- C. Excavate for structures to the lines and grades shown or as required to accomplish the Work. Perform all excavation regardless of the type, nature, or condition of the material encountered. Shore and brace (e.g., driven sheet piles, trench bracing) excavations as required. Protect adjacent utility facilities to remain. Remove all debris and sort material to be reused as Engineered Fill. The method of excavation used is optional; however, no heavy equipment shall be operated within 4 feet of existing structures or newly completed construction, except as approved by the Engineer. Excavation that cannot be accomplished without endangering existing or new structures shall be performed with hand tools. All benching, shoring and sloping of excavations shall be at the Contractor's expense.

### 3.8 REMOVAL OF WATER

- A. See Section 31 23 19 – Dewatering.
- B. Water disposal shall meet Federal, State, and local requirements and as specified.

### 3.9 SUBGRADE STABILIZATION

- A. Any base or soft areas shall be brought to the attention of the Engineer for evaluation of over-excavated depth and stabilized. Stabilization may be accomplished by excavating to firm, native material and replacing with engineered fill. If unsuitable materials are observed within the excavation bottom by the Engineer over-excavation will be required.

- B. Areas receiving fill shall be prepared according to the following, unless noted otherwise on the Drawings:
  - 1. Scarified to a depth of at least 12-inches.
  - 2. Moisture conditioned to within 2 percent of optimum moisture content.
  - 3. Compacted to at least 90 percent relative compaction.

### 3.10 OVER-EXCAVATION

- A. If groundwater or excessive soil moisture prevents operations described in 3.9.B, the bottom of the excavation may require over-excavation and a layer of subgrade stabilization fabric and aggregate base placed on the excavation bottom to provide a firm base on which to place and compact subsequent fill. The thickness of the aggregate base layer and/or need for subgrade stabilization fabric shall be evaluated by the Engineer at the time of excavation.
- B. If the bottom of an excavation is found to consist of soft or unstable material that is incapable of properly supporting the pipe or structure, the Engineer shall be advised immediately in writing.
- C. The Contractor shall obtain the Engineer's approval prior to performing any over-excavation. Any over-excavating and resultant backfill and compaction without such approval shall be at the Contractor's expense. The quantity of approved unsuitable material excavated and its replacement shall be paid for as extra work only with the authorization of the Engineer and in accordance with the Contract Documents.
- D. Where undocumented fill is encountered during construction, Contractor shall over-excavate and recompact per requirements of Paragraph 3.12.D.

### 3.11 ROCK EXCAVATION

- A. Rock excavation shall include removal and disposal of the following: (1) all boulders measuring 1/3 of a cubic yard or more in volume; (2) all rock material in ledges, bedding deposits, and unstratified masses; (3) concrete or masonry structures which have been abandoned; and (4) conglomerate deposits which are so firmly cemented that they possess the characteristics of solid rock.
- B. Rock excavation is not anticipated for this project.
- C. Explosives and Blasting: Use of Explosives and Blasting will not be permitted.

### 3.12 MOISTURE CONDITIONING AND COMPACTING

- A. The term "moisture conditioning" as used in these Specifications, is defined to refer to any approved method of obtaining a required moisture content for materials to be compacted. Included under moisture conditioning requirements shall be the furnishing of all required water and the furnishing of all other necessary labor, materials and equipment required to provide the approved or required percent of moisture content. Moisture conditioning, as required, shall be performed for all materials specified to be compacted regardless of whether or not such requirement is specifically stated. No separate payment will be made for any or all operations of the Contractor pertaining to moisture conditioning or from delays occasioned thereby.
- B. Prior to and during compaction, all earthwork materials specified to be compacted, including but not limited to backfill, refill and foundation subgrade, shall have an approved moisture content which shall be uniform in each layer of material compacted. If the moisture content is less than the approved requirement, compaction operations shall not proceed until the Contractor has added the necessary amount of water. If the moisture content is greater than

the approved requirement, compaction operations shall not proceed until such time as the materials have dried sufficiently or have been otherwise mechanically dewatered or replaced with materials having the approved moisture content. The soil should be mixed after water is added to distribute the water evenly throughout the lift. Sufficient time should be allowed between water application and compaction to allow the water to penetrate the soil clods and reach a uniform value in the lift. If the soil is too moist, aeration will be required to lower moisture content to the desired level.

- C. Contractor shall be responsible to demonstrate throughout the duration of all earthwork operations, that required moisture conditioning limits are being obtained. Care must be exercised to ensure that the moisture content is not above moisture requirements. This is to ensure that the structural stability of the material is not affected.
- D. For general engineered fill construction, the following compaction requirements apply:
  - 1. Place material and compact in accordance with Caltrans Standard Specification Section 19-6.03C and County of Sonoma Requirements.
  - 2. Maximum 8-inch lifts of uncompacted thickness.
  - 3. Compact to a minimum 90% relative compaction as determined by ASTM D1557 for fills less than 5 feet in thickness. For fills 5 feet or thicker, the fill shall be entirely compacted to at least 95% relative compaction.
- E. The upper 3 feet of on-site trench backfill in slab and pavement areas should be compacted to at least 95% relative compaction. Jetting is not acceptable for compaction of trench backfill.
- F. Nuclear density testing should be performed on each lift of compacted fill to confirm compaction at a frequency of at least one test:
  - 1. Per 5,000 cubic yards for mass fill
  - 2. per 5,000 square feet for building pad, tank pad, and parking lot subgrade
  - 3. per 300 feet for trench or wall backfill
  - 4. per 300 feet for roadway subgrade (<40 feet wide)

### 3.13 SITE GRADING

- A. Perform all earthwork to the lines and grades as shown and/or established by the Engineer. Shape, trim, and finish slopes to conform to the lines, grades, and cross sections as shown or approved. Make slopes free of all exposed roots and stones exceeding 3 inches in diameter which are loose and liable to fall. Round tops of banks to circular curves, in general, not less than a 6-foot radius. Rounded surfaces shall be neatly and smoothly trimmed.
- B. Work that has been suspended by weather, scheduling or for any other reason, shall be protected against the effects of such weather or other conditions. Grading which has been considered acceptable, but which has been subsequently damaged shall be re-worked to meet the requirements of the Specifications.
- C. Slopes shall be re-dressed as required to mitigate any erosion that may occur prior to establishment of the erosion control mitigation measures.
- D. All grades shown on the Plans are expressed as finished elevations.
- E. Permanent cut and fill slopes shall be no steeper than 2H:1V. Fill slopes should be laterally overbuilt at least one foot, and the slope face trimmed back to firm, compacted material.
- F. Fills placed on slopes with inclinations of 6H:1V or steeper shall be benched during placement of engineered fill. The benches shall consist of a level surface excavated at least 4 feet

horizontally into native subgrade. The benches shall continue progressively up the slope at vertical increments of not greater than 3 feet.

- G. Fill placed on slopes steeper than 4H:1V shall be keyed into firm native soil at the toe of the fill slope. The bottom of the keyway shall extend a minimum of 3 feet below the downslope grade at the toe of the proposed fill and have a minimum width of 10 feet extending beneath the toe of the fill slope with a gradient of no less than 5% toward the back of keyway.
- H. Upon field observations at the time of construction, the Engineer may determine subdrainage of the keyways is necessary.

### 3.14 CONCRETE SLABS ON GRADE

- A. Excavate to subgrade, scarify 6-inches and compact to at least 90% of the ASTM D1557 maximum dry density with a moisture content within 2 percent of the ASTM D1557 optimum moisture content.
- B. Install structural aggregate layer to the thicknesses shown on the Drawings and compact to a minimum of 90 percent of the ASTM D1557 maximum dry density with a moisture content within 2 percent of the ASTM D1557 optimum moisture content.

### 3.15 CONTAMINATED SOILS HANDLING

- A. Contaminated soils are not anticipated to be encountered during construction.
- B. If contaminated soil is discovered during construction activities, notify the Engineer and City.
- C. Contractor to maintain separate stockpiles for potentially contaminated soil such that potentially contaminated soil is not commingled with non-contaminated soil.
- D. Contractor to prepare a 10-mil, polyethylene plastic sheeting lined containment area for stockpiling and covering of potentially contaminated soils. Overlap the plastic sheeting a minimum of two feet to prevent run off underneath the plastic sheeting.
- E. Collect soil samples to fully characterize excavated soil for disposal and manage accordingly. Sample, according to protocols set forth in ASTM E1903-97, Standard Guide for Environmental Site Assessments: Phase II Environmental Site Assessment Process, any soils generated as a result of excavations in these areas, as well as the bottoms and side walls of any such excavations.
- F. Contractor to hire a California-certified laboratory to sample and test the potentially contaminated soil in accordance with sampling requirements of the nearest Class II or III landfill that accepts contaminated soils, or other type of disposal means preapproved by the City, as laboratory results indicate. In general, for gasoline and diesel contaminated soils, this includes the collection of one 4-point composite for every 100 cubic yards of excavated contaminated soil, and analysis for TPH-gas and TPH-diesel by EPA 8015, and for volatile organic compounds by EPA 8260.
- G. Should the laboratory testing confirm the presence of contaminated soil, submit test results and any additional reporting requirements to the Class II or III landfill at least three working days prior to the planned disposal date.
- H. Upon review of the test results, the Class II or III landfill will determine if the contaminated soil may be disposed of at the facility.

- I. If the test results exceed the acceptance limits of the Class III landfill, Contractor shall submit test results and any additional reporting requirements to the nearest Class II landfill.
- J. Upon review of the test results, the Class II landfill will determine if the contaminated soil may be disposed at the facility or if additional testing is required.
- K. If additional testing is necessary, Contractor shall hire a California-certified laboratory to sample and test the contaminated soil in accordance with the additional sampling requirements.
- L. If characterization determines that wastes are hazardous under RCRA or CalEPA Hazardous Waste guidelines, treat and/or dispose of all contaminated soils at properly permitted facilities approved by the City and all other controlling regulatory agencies for such purposes.
- M. Complete disposal facility applications as necessary to obtain preapproval for disposal of all contaminated soil.

### 3.16 ADDITIONAL EXCAVATION IF CONTAMINATION IS DISCOVERED

- A. If contaminated soil is discovered during construction activities, notify the Engineer and City.
- B. Call upon an OSHA-certified, trained personnel, experienced in identifying unknown contaminants (such as a Professional Geologist or Registered Civil Engineer) to collect confirmation samples. Identify possible contaminated areas, and notify the Engineer or City. If warranted or directed by the Engineer or City, perform additional remedial excavation of soil and collect confirmation soil samples.
- C. In areas where additional remedial excavation is required, complete excavation and backfilling as requested by the Engineer, City, or trained personnel prior to continuing with project.
- D. If additional soils are excavated, follow the same protocol for stockpiling, characterizing, reloading, and disposal as described in other sections of this specification.
- E. This work will be completed as an extra scope, once total contaminated soil exceeds estimations for the project.

### 3.17 DISCOVERED CONTAMINATION NOT PREVIOUSLY KNOWN TO EXIST

- A. If contaminated soil is discovered where not expected and contaminants cannot be identified, call upon an OSHA-certified, trained personnel experienced in identifying unknown contaminants (such as a Professional Geologist/Engineer) to collect samples and field identify possible contaminated areas.

### 3.18 WASTE MINIMIZATION

- A. Minimize the generation of contaminated waste. Take all necessary precautions to avoid mixing clean and contaminated wastes.

### 3.19 CONTAMINATED MATERIAL STORAGE AREA MAINTENANCE

- A. When contaminated materials are present and require stockpiling, complete the following tasks:
  - 1. Stockpile Site Locations
  - 2. Liner Maintenance: Maintain a stockpile area bottom to prevent tears or holes in the plastic. Any tears shall be patched or the area relined with 10-mil plastic within 24 hours.

- Sweep clean roadways leading to stockpile areas and repair all surface damage caused by the stockpile traffic.
3. Dust Control: Control all dust that may arise during stockpiling activities by keeping roads swept or wet, as necessary.
  4. Conduct: All activities will be conducted in a manner that minimizes litter, nuisances, dust, noise impacts, and mud.
  5. Access: Unauthorized access will be prevented within potentially contaminated soil areas.
  6. Traffic Control: Traffic will be controlled in a safe manner.
  7. Emergency Communications: The Contractor using the stockpile area shall provide telephone or radio communication capacity for emergency purposes.
  8. Record Keeping: Maintain a log book in which storage dates, quantity of material accepted and leaving, and concentrations of constituents are tracked and any special occurrences such as written public complaints will be recorded.
  9. Length of Use/Site Closure: When Contractor completes the use of the stockpile area, he shall ensure the area is clean of any potentially contaminated soils and have approval from City prior to leaving the site.

### 3.20 TRANSPORTATION OF CONTAMINATED SOIL

- A. With preapproval from the City and the disposal facility, reload, transport, and dispose of contaminated materials in accordance with all local, state, and federal laws, rules, and regulations for transporting contaminated soil.
- B. Contractor shall arrange the hauling and disposal of the contaminated soil at the accepted landfill licensed to accept such soil.
- C. Transport all contaminated soil off site only to appropriate permitted Treatment and/or Disposal Facilities, approved by the City. The Contractor performing the work of this Section shall be licensed for the transportation and hauling of hazardous wastes. The firm shall provide a route plan, which clearly identifies the routes he proposes to follow while transporting soil to the off-site disposal facility.
- D. Compliance with Federal Motor Carrier Safety Regulations: A motor carrier driver or other person must comply with the rules when he/she is transporting hazardous materials by a motor vehicle, which must be marked or placarded in accordance with DOT 177.823.
- E. Transport drivers will offload soil only at the approved disposal facilities.
- F. Ensure contaminated soil is free of debris, concrete, or asphalt rubble. Ensure no free water is ponding or leaking from trucks.

### 3.21 REPORT, MANIFESTS, AND RECORDS

- A. Provide the Engineer or City with a compliance certificate verifying that all waste soils were received by the approved landfill has been properly disposed.
- B. Provide copies of all manifests, permits, or other documents currently in effect relating to the specific wastes to be transported, treated, and disposed hereunder except as otherwise stated in this Section.
- C. As the waste generator, the City shall furnish completed State of California Hazardous Waste Manifests (or the Uniform Manifest - 40 CFR Parts 260, 262, 271 - if effective at time of preparation) for all contaminated soils to be removed from the project area for transportation to an appropriate disposal facility. These manifests shall accompany the waste loads to

disposal and be properly completed by the hauler and disposal agent as required by federal and state hazardous waste management law. The final manifest shall then be returned by registered mail to the City within the designated time period specified by federal law.

- D. The contract work will not be considered complete nor will the City make final payment until the Engineer or City receives certifications of treatment and/or disposal.

### 3.22 NON-CONTAMINATED SOIL REUSE

- A. Soil containing very low levels of contamination may be considered for reuse as backfill, but must be cleared with the Engineer or City for reuse, prior to reuse.
- B. Non-contaminated soil may be reused for backfill, if preapproved by the Engineer or City, and is permitted in other sections of the specifications.

### 3.23 DISPOSAL OF UNSUITABLE AND EXCESS EXCAVATED MATERIAL

- A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off project site.
- B. Location of disposal site and length of haul are the Contractor's responsibility.
- C. Soil characterization testing required for hauling and off-site disposal or reuse of excess excavated material are the Contractor's responsibility.
- D. Place excess excavated materials suitable for fill and/or backfill on site where directed by Engineer.
- E. Remove from site and dispose of any excess excavated materials after all fill and backfill operations have been completed.
- F. Segregate all excavated contaminated soil designated by the Engineer from all other excavated soils, and stockpile on site on two 6 mil polyethylene sheets with a polyethylene cover. A designated area shall be selected for this purpose. Provide and maintain temporary erosion controls on and around soil stockpiles until they are removed from site. Dispose of excavated contaminated material in accordance with State and Local requirements.

### 3.24 CLEAN UP

- A. Upon completion of earthwork operations, clean areas within contract limits, remove tools, and equipment. Provide site clear, clean, free of debris, and suitable for subsequent construction operations. Remove debris, rubbish, and excess material from the site.

END OF SECTION



SECTION 31 01 40

SHORING AND TRENCH SAFETY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Shoring required for general safety, worker protection, and protection of adjacent property from the hazards of caving ground.
- B. Shoring for trench excavations.
- C. Shoring for structural excavations.
- D. Contractor's responsibilities.
- E. Contractor's trench safety plan.
- F. Contractor's supervisor.

1.2 RELATED WORK SPECIFIED ELSEWHERE:

- A. Division 01 – Requirements for temporary facilities, controls, public safety, and convenience.
- B. Section 02 01 00 - Site Conditions
- C. Section 02 01 10 - Existing Utilities and Underground Structures
- D. Section 31 00 00 - Earthwork
- E. Section 31 23 00 - Trench Excavation and Backfill
- F. Section 31 23 19 - Dewatering
- G. Section 33 05 17 - Precast Concrete Meter and Valve Boxes
- H. Section 33 11 00 - Recycled Water Utilities

1.3 CONTRACTOR'S RESPONSIBILITIES FOR SAFETY

- A. The Contractor shall be solely and completely responsible for conditions of the job site, including safety of all persons (including employees) and property during performance of the work. This requirement shall apply continuously and not be limited to normal working hours.
- B. Safety provisions shall conform to U.S. Department of Labor (OSHA), the California Occupational Safety and Health Act, and all other applicable Federal, State, county, and local laws, ordinances, codes, the requirements set forth below, and any regulations that may be detailed in other parts of these Specifications.
- C. Contractor is advised that Part 1926 of 29 CFR, subpart P, has been revised. This regulation governs excavations, trenching and protective systems, sloping, benching, wood, and aluminum shoring for various types of soils, and depths of excavations. The Contractor shall follow these regulations (including the latest revisions) for this project.

- D. Where any of these are in conflict, the more stringent requirement shall be followed.

#### 1.4 PERMIT

- A. For trenches or excavations of depth five (5) feet or deeper, the Contractor shall obtain from the State Division of Industrial Safety a permit for such excavation; submit a copy of the permit to the Engineer, prior to initiating any work requiring said permit.

#### 1.5 CONTRACTOR SUBMITTALS

- A. Submit all plans, product data, shop drawings, laboratory test results, material source information, and certificates of compliance listed in this Section under a single submittal cover for review. Incomplete submittals will not be reviewed.
- B. The Contractor's attention is directed to the provisions for "Shoring and Bracing Drawings" in Section 6705 of the California Labor Code. The Contractor, prior to beginning any trench or structure excavation five (5) feet deep or greater, shall submit to the Engineer for review for compliance with Section 6705 the Contractor's detailed plan showing design of all shoring, bracing, sloping of the sides of excavation, or other provisions for worker protection against the hazard of caving ground during the excavation of such trenches or structure excavation. If such plan varies from the shoring system standards established in the Construction Safety Orders of the State of California, such alternative system plans shall be prepared, stamped and signed by a civil or structural engineer licensed in the State of California at the Contractor's expense.
- C. Certificates of Compliance: Certificates of Compliance shall be provided for all products and materials proposed to be used under this Section.
- D. For all materials that are not pre-approved by the City the Contractor shall designate the source and/or submit samples of all materials in advance of their use for required testing and Engineer's approval. All testing costs shall be at the Contractor's expense.

#### 1.6 SAFETY ORDERS

- A. The Contractor shall have at the work site, copies or suitable extracts of the Construction Safety Orders of Cal-OSHA, and Part 1926 of 29 CFR, subpart P.
- B. All work shall comply with the provisions of these and all other applicable laws, ordinances and regulations.

#### 1.7 TRENCH SAFETY PLAN

- A. For trenches and excavations five feet or more in depth, the Contractor shall submit to the Engineer a detailed plan, design of shoring, bracing, sloping, or other provisions to be made for worker protection from the hazards of caving ground.
- B. If such plan varies from the shoring system standards established by the Construction Safety Orders, or Part 1926 of 29 CFR, Subpart P, the plan shall be prepared, sealed and signed by a civil or structural engineer registered in California. Signed and sealed copies of calculations necessary to qualify the system shall also be submitted.
- C. Nothing herein shall be deemed to allow the use of shoring, sloping, or protective system less effective than that required by the Construction Safety Orders of the Division of Industrial Safety, or Part 1926 of 29 CFR, subpart P.

- D. If Contractor proposes to use trench jacks or speed shores, submittals shall show length and type of shoring vertical and horizontal spacing, vertical or horizontal wales and planks. Shields, when proposed or used, shall show depth allowed in the soils expected to be encountered.

#### 1.8 ENGINEER'S REVIEW

- A. The duty of the Engineer to conduct construction review of the Contractor's performance is not intended to include a review or approval of the adequacy of the Contractor's safety supervisor, the safety program, or any safety measures taken in, on, or near the construction site.
- B. The Engineer will review the submittal of the Contractor's proposed shoring system to verify the general scope of the Work, to determine that qualified professional engineering services are used and to determine that appropriate construction techniques are proposed for use. This review shall not in any way be construed to relieve the Contractor from sole responsibility for the design and safety of such shoring.

#### 1.9 CONTRACTOR'S SUPERVISOR

- A. The Contractor shall appoint a qualified supervisory employee who shall be responsible to determine the sloping or shoring system which shall be used depending on local soil type, water table, stratification, depth, etc.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

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SECTION 31 09 14

GEOTECHNICAL INSTRUMENTATION AND MONITORING

PART 1 GENERAL

1.1 Description

- A. This section specifies the requirements for geotechnical instrumentation consisting of one or more of the following: survey control point, settlement monitoring point, and utility monitoring point.
- B. The Work includes furnishing, maintaining, monitoring, reading, recording, and removing all instrumentation associated with the Work, specified herein, and shown on the Approved Plans.
- C. The instrumentation is supplemented using high quality pre-construction condition photographs and similar post-construction condition photographs as part of a Building and Structures Assessment Plan as specified herein.
- D. All Work under this section is part and incidental to shaft excavation and tunneling which is included and paid under their specific bid items. No separate payment shall be made for Instrumentation and Monitoring.
- E. Contaminated soils and contaminated groundwater are not anticipated to be encountered in this project.
- F. Tunnels located within Caltrans (CT) ROW are subject to CT review, acceptance, and inspection. This includes associated work required to complete the work.

1.2 Related Work Specified Elsewhere

- A. All related work specified elsewhere, or in other codes or standards, will be as last revised at time of bid, unless a specific date of issuance is called out in opposition to later revision date(s).
- B. Other sections of the technical specifications, not referenced below, shall also apply to the extent required for proper performance of this work.

1.3 Related Documents

- A. Section 01 10 00 Summary of Work
- B. Section 01 30 00 Administrative Requirements: Construction Surveying
- C. Section 01 33 00 Submittal Procedures
- D. Section 02 01 00 Existing Utilities and Underground Structures
- E. Section 31 00 00 Earthwork: Contaminated Soil Excavation & Groundwater, Removal, Treatment, Hauling, and Disposal
- F. Section 31 23 19 Dewatering

G. Section 33 05 23.13 Horizontal Directional Drilling (HDD)

1.4 Specifications and Standards

The publications listed below form a part of this specification to the extent referenced.

- A. Type II Portland cement, ASTM C150
- B. Standard Specification for Standard Sand, ASTM C778
- C. Standard Test Method for Monitoring Ground Movement Using Probe-Type Inclinedometers, ASTM D6230
- D. Drinking Water Treatment Chemicals – Health Effects NSF/ANSI Standard 060
- E. Standard Specifications for Public Works Construction (SSPWC)
- F. California Code of Regulations (CCR), Title 8, Tunnel Safety Orders
- G. Caltrans (CT) Manual for Encroachment Permits on California State Highways
- H. CT Trenching and Shoring Manual

1.5 Definitions

- A. See Section 33 05 23.13 Horizontal Directional Drilling.
- B. Response value: Predetermined value when attained Contractor stops the Work and provides written notice and written plan discussing operational changes made to avoid attaining the Shutdown Value. Operational changes shall include a discussion at what conditions the Contractor will replace the tunnel equipment operator. Operations shall not resume until operational changes are implemented.
- C. Shutdown value: Predetermined level when attained Contractor stops Work until submittal and City's acceptance of a written plan detailing corrective actions and restoration.
- D. Survey control point: Temporary location established outside the zone of influence of any construction activities and used as a fixed reference or control point to monitor by optical survey methods the occurrence and amount of vertical and horizontal displacements at instrument locations.
- E. Threshold value: Predetermined level at where Contractor provides immediate written notice of condition.

1.6 Performance Requirements

- A. Locate all utilities before commencing excavation.
- B. Install all instruments within 100 feet tunnels before tunnel excavation commences.
- C. Obtain permits and submit as required for instrumentation installation.
- D. Drill, grout and dispose of resultant spoils.
- E. Prepare and submit bore log of as-built instrument.

- F. Prepare ground and surfaces for instrument installation and testing.
- G. Provide access, such as temporary or mobile platforms, and assistance to the City during instrumentation installation on or in the temporary works as directed by the City.
- H. Protect instrumentation from damage during construction and maintain instruments and components. Repair or replace instruments and components damaged during performance of Work, to the satisfaction of the City. Immediately provide written notice to City of any damage or maintenance problems.
- I. Monitor instrumentation; provide data to City as specified herein.
- J. Perform and submit written visual observation records of the ground surface during construction operations and note observations and note changes. Document using pictures and measurements.

#### 1.7 Quality Assurance

##### A. Qualifications:

1. Geotechnical Instrumentation Specialist: Individual shall be a professional engineer registered in the State of California with experience in the installation and maintenance of geotechnical instrumentation similar to that specified herein on at least two prior projects similar in scope and size to this Project. Instrumentation specialist shall prepare and stamp instrumentation shop drawings and supervise and direct instrument installation, instrument readings, and interpretations.
  - a. Surveyor: Individual shall be a land surveyor licensed in the State of California for at least five years.
  - b. Technicians: Individuals shall be qualified with a minimum of two (2) years of experience in the installation and reading of geotechnical instrumentation similar to those specified herein.
  - c. Drillers: Personnel employed for drilling instrumentation boreholes shall have at least four (4) years of direct field experience in drilling boreholes.
2. Product Data: Includes manufacturer's product description, installation requirements, shop drawings, operation, maintenance procedures, and samples where applicable, as well as description of methods and materials for installing and protecting the instruments, including post installation acceptance tests.
3. Sources of information: All sources shall be widely available within the industry, specific to the purpose, and acceptable to the City. Reference shall be specific and include page number.
4. Survey Control Point Installation Procedure: Includes the following:
  - a. Method for cleaning the inside of casing.
  - b. Grout mix design, including commercial names, proportions of admixtures and water, mixing sequence, mixing methods and duration, pumping methods and tremie pipe type, size and quantity.
  - c. Drill casing or auger type and size.
  - d. Depth increments for backfilling boreholes with sand and granular bentonite.
  - e. Method for overcoming buoyancy of instrumentation components during grouting.
5. Settlement Surveying and Monitoring Plan: The plan shall identify the location of all instruments; survey control points; surface monitoring points; and survey schedules, procedures, and reporting formats.
6. Drill logs: Log boreholes under the supervision of a geologist or engineer with a minimum of three (3) years of experience. Logs shall be on an accepted format and include the depth, angle and orientation of hole, station and offset (if any) from the trenchless installation, trenchless installation description, geologic log, and notes of any inflows of water or other material, if encountered.

7. Installation:
  - a. Provide written notice to the City not less than five (5) workdays before inclinometer installation and not less than one (1) workday for all other instrument installations. Label all instruments with the same identifying instrument number as shown on the Approved Plans or in a manner acceptable to the City.
  - b. Installation Tolerances: Position all instruments within 12 inches of the horizontal location as specified herein. Position instrumentation to within 6 inches of the bottom elevation or deeper as specified herein. Position settlement monitoring points and instrument casings to the more restrictive of two degrees of vertical for the entire depth of each instrument or as required by the manufacturer.
  - c. When actual field conditions prevent installation of instruments at the location and elevations specified herein, obtain prior acceptance from the City for new instrument location and elevation. The proposed location is to provide similar information.
  - d. Shop Drawings: Show installed locations, the instrument identification number, the instrument type, the installation date and time, established elevations, initial elevations, offset and stationing, initial coordinates and boring log, and the anchor to tip elevation and instrument length, when applicable. Shop drawings include as-built shop drawings showing each instrument including installation records, depths, lengths, elevations, and dimensions of all key elements.
  - e. Perform a baseline reading for each instrument. Baseline readings shall include at least two readings from each instrument before commencing underground construction. The two readings are to be completed on two different workdays each requiring a separate set-up. The readings are to provide statistically valid reproducible results allowing for temperature adjustments to both atmosphere and facility. If results are not valid, perform additional daily readings or re-install instrument until readings are reproducible.
  - f. Submit results within two (2) workdays following readings and not less than three (3) workdays preceding the commencement of excavation.
8. SMPs come in various configurations and are installed in the settlement array or as a single point along the tunnel alignment.
9. Surveys for monitoring geotechnical instrumentation shall be referenced to the same control points and benchmarks established for setting out the work. Control points shall be tied to benchmarks and other monuments outside of the zone of influence of the underground excavations.
10. UMPs measure movement of a known utility from the surface. UMPs are to be located over the tunnel alignment.

B. Submittals

1. Submittals shall be in accordance with Section 01 33 00 and as specified herein.
2. Submittals shall be coordinated with all cross-referenced sections, assembled, and submitted as a single, complete, and comprehensive submittal.
3. Where calculations are required, they shall be signed and sealed by a Professional Civil Engineer registered in the State of California. Calculations shall clearly identify all parameters used, state all assumptions made in the calculation, and identify all sources of information.
4. All shop drawings shall be legible with dimensions accurately shown and clearly marked in English.
5. Provide written notifications as specified herein or within one workday.
6. Preconstruction submittals:
  - a. Name and qualifications for the following:
    - Geotechnical Instrumentation Specialist
    - Technicians
    - Surveyors
    - Drillers
  - b. Sample drilling logs for instrumentation drilling



- c. Schedule for installation of survey control points as specified herein or at least two (2) weeks prior to installation
  - d. Site specific shop drawings indicating the layout and designation of all control points and monitoring points as specified herein
  - e. Survey control point installation procedure
  - f. The Settlement Survey and Monitoring Plan should describe the proposed methods for monitoring each instrument type
  - g. All instrument manufacturer's product data at least two (2) weeks prior to installation
  - h. All permits required for instrument installation
  - i. Contingency plan in the event ground movement reaches the prescribed Response Values as specified herein
  - j. All instrument baseline readings
7. Construction submittals:
- a. Shop drawings and as-built drawings within five (5) workdays following installation of each instrument.
  - b. All instrument readings in a cumulative record on the same workday as the readings are taken or as soon as data is known if excessive ground movement is suspected.
  - c. All interpretations within two (2) workdays following readings
8. Post-Construction submittals:
- d. Signed and sealed cumulative records and interpretations within 4 weeks following instrument removal.
  - e. Record of legal destruction of instruments within 4 weeks of instrument removal.
9. Construction Submittals:
- a. Notifications: Provide all written notifications within one working day unless otherwise specified herein.
  - b. Immediately notify the City upon implementation of any contingency plan.
  - c. Provide daily drilling reports as specified herein.
  - d. The automated data recording system shall record the same operating parameters as specified for manual recording, unless otherwise specified by the City.
  - e. Provide contemporaneous log of all line and grade checks.
  - f. Provide log daily.
  - g. Provide all manual and automated records and logs by 9 AM the following workday. Provide hard copy and electronic copy of automated records in formats acceptable to the City.
10. Post-Construction Submittals:
- a. Provide as-built survey. Provide results in both tabular format and AutoCAD format acceptable to the City. Scale to be acceptable to the City. Survey shall confirm that carrier pipe can be installed within design tolerances.
  - b. Provide a final copy of all project records organized in a systematic system acceptable to the City and in a format acceptable to the City.  
All documents not yet received.  
Daily logs  
Photographs, videos, and recording media  
Any report or test results
- 1.8 Project conditions
- A. See Section 33 05 23.13.
- 1.9 Safety
- A. See Section 33 05 23.13.
- 1.10 Access
- A. See Section 33 05 23.13.

### 1.11 Permits

- A. See Section 33 05 23.13.
- B. As-Built Drawings
  - 1. Review and provide comments to ensure as-built drawings reflect the as-built conditions and conform to the design intent.
- C. Compliance With Specifications
  - 2. Deficiencies: Any deficiencies or omissions in materials or workmanship found by inspection, review of documentation, or otherwise, shall be rectified.

## PART 2 MATERIALS

### 2.1 Materials

- A. Sand: Compatible with manufacturer's written recommendations and ASTM C778.
- B. Cement: Shall be Type II Portland cement and water in accordance with ASTM C150 and compatible with instrument manufacturer's written recommendations.
- C. Water: Potable including source.
- D. Drilling fluid:
  - 1. High yield sodium bentonite.
  - 2. Water furnished from a potable water source.
  - 3. Test all water for pH and treat with soda ash, or accepted equal, to adjust the pH of the water as required in the accepted mix design(s).
    - a. Bentonite, polymers, and additives, other than soda ash, shall be NSF/ANSI Standard 060 compliant.
- E. Cement-Bentonite Grout: 22 lbs. cement; 12 lbs. bentonite; 1.5 gallons water.
- F. Bentonite Slurry Grout: 50 lbs. sodium bentonite sealing and plugging agent; 7 lbs. sodium bentonite drilling mud; 32 gallons of water.

### 2.2 Equipment

- A. Provide as shown on the Approved Plans, specified herein, and acceptable to the City.
- B. Utility Monitoring Points (UMPs): Provide sensor with accuracy of at least  $\pm 0.01$  foot.
- C. Settlement Monitoring Points (SMPs): Provide sensor with accuracy of at least  $\pm 0.01$  foot.

## PART 3 EXECUTION

### 3.1 General

- A. Perform all work in accordance with accepted submittals.
- B. Do not commence any HDD operation until all submittals, including submittals for all related work specified elsewhere, are reviewed and accepted by the City.

- C. All work within Caltrans ROW requires Caltrans review and acceptance of submittals before work commences.
- D. All work within Caltrans ROW is subject to Caltrans inspection and acceptance before acceptance by City.
- E. Maintain a copy of the Contract Documents in the HDD control container or other location acceptable to the City and accessible to the HDD operator.
- F. Protect all instruments, components, systems, and utilities from damage.
- G. If any instrument is to be located on private property then the Contractor shall provide a right of entry and waiver in a form acceptable to the City from said property owner. Include picture before instrument placement and instrument in-place. At end of project include similar pictures of instrument in-place, upon removal of instrument, and following all restoration work. Ensure lighting is similar in all cases.
- H. Provide the City with access to the instrument locations. Installation of the instrumentation by the Contractor does not preclude the City, through an independent Contractor, from installing instrumentation in, on, near, or adjacent to the Work.
- I. Maintain a copy of the Contract Documents in a location acceptable to the City and accessible to the geotechnical instrumentation specialist and the City.
- J. Treat and dispose of all water in accordance with the requirements specified in Section 31 23 19.
- K. Ensure each instrument is functional for its intended purpose and installed in manner that protects the instrument from damage and the public from injury.
- L. Place all instruments a minimum of ten (10) workdays prior to start of excavation unless otherwise specifically stated otherwise.
- M. Locate and avoid drilling into or damaging conduits and other underground facilities.
- N. Perform and record baseline readings.
- O. Remove and replace any damaged instrument or component that affects the fit, form, or function of the instrument.
- P. Markings for each instrument identifying instrumentation name, location, and numbering shall be refreshed weekly or more frequently to ensure legible visibility of its location and unique identifier marking

### 3.2 Survey

- A. Adhere to the following requirements concerning survey oversight:
  - 1. Perform initial survey and record the horizontal coordinates and elevations within an accuracy of 0.005 feet (1/16 inch) for each survey point location and all subsequent surveys. Reference survey points so that they are accurately re-established if lost or destroyed.
  - 2. Perform a final survey, with two readings similar to the initial survey, of all control points and instruments upon completion of construction operations. Submit final readings as specified herein.

### 3.3 Drilling, grouting, preparation, access, and protection

- A. Drill holes of appropriate size and depth in masonry, concrete and asphalt and cased holes in fills and ground for installation of instruments.
- B. Clean holes to remove debris. Holes which the City considers unsatisfactory because of misalignment or other irregularities shall be re-drilled as directed by the City.
- C. Withdraw the casing or auger minimizing ground collapse into the excavated hole.
- D. Provide access and temporary facilities, such as power and sufficient general area lighting necessary for installing instruments.
- E. Mix grout using equipment capable of thoroughly mixing grout material so that grout is of uniform consistency with no unsuspended solids. Place grout using a tremie method, where applicable, with side discharge ports on tremie pipe.

### 3.4 UTILITY MONITORING POINTS (UMPS)

- A. Provide one (1) UMP for each utility crossed by the trenchless methods.
- B. Remove pavement over utility by coring or cutting. Minimize area of pavement removal.
- C. Excavate to top of utility using vacuum truck, hand auger, or other suitable method. Do not damage utility during excavation.
- D. Construct temporary casing, trench box, or similar protective equipment as required to provide safe support and access for installation of point.
- E. Construct bar and pipe riser to protect the UMPs. Maintain centralized alignment throughout installation. Do not allow the bar to contact the inside of the riser pipe.

### 3.5 SETTLEMENT MONITORING POINTS (SMPS)

- A. SMPs shall be located as in the accepted submittals.
- B. Grout the casing housing so it is in intimate contact with the ground and as shown in the Contract Drawings.
- C. Provide up to six (6) additional surface monitoring points at locations to be determined in the field by the City.

### 3.6 MONITORING

- A. Frequency: As a minimum, follow the following schedule to determine frequency and duration of the monitoring:

Instrument Type	Monitoring Frequency within Active Zone <sup>(1)</sup>	Monitoring Frequency outside Active Zone <sup>(1)</sup>
Utility Monitoring Point (UMP)	Prior to start of work, every two hours continuously throughout project, and upon completion	Weekly/Monthly <sup>(2)</sup>
Settlement Monitoring Point (SMP)	Prior to start of work, every two hours continuously throughout project, and upon completion	Weekly/Monthly <sup>(2)</sup>

**NOTES:**

(1) *The active zone for tunneling is measured parallel to the tunnel alignment and is 100 feet in front and behind the tunnel face. The active zone for shaft excavation is 100 feet from the open shaft and covers the duration from the start of shaft construction and for four weeks following shaft restoration.*

(2) *Weekly until movement substantially stops and monthly thereafter. Movement substantially stops when four consecutive, regularly scheduled measurements remain unchanged.*

(3) *Monitor and report weekly for four weeks following shaft restoration.*

- B. Perform additional monitoring as necessary to control construction and to ensure the safety of the Work.
- C. Provide a report with the following:
  1. Data sheets containing a cumulative history of readings; including weather conditions, temperature, and proximity of the excavation to the instrument location itself at the time of each reading.
  2. A plot of measured values versus time, including a time history of construction activity likely to influence such readings.
  3. Interpretation: Data or interpretation shall not be published or disclosed to other parties without advance written permission of the City. Provide instrument readings and interpretations of monitoring data to the City within the times specified herein.

**3.7 RESPONSE VALUES**

- A. Instrument Response Values:

<b>Instrument Response Level by Requirement</b>	
<b>Instrument</b>	<b>Caltrans</b>
Settlement Monitoring Point (SMP)	±0.008 inch*(H), H or V (H= excavation depth in feet)

- B. When a given Response Value is reached, the Contractor shall provide verbal notice within one hour upon occurrence, confirming written notice within 1 workday, and respond in accordance with the following:

<b>Contractor Response Level Values</b>		
<b>Threshold Value</b>	<b>Response Value</b>	<b>Shutdown Value</b>
50%	80%	100%

1. **Threshold Value:** Provide written notice within 24 hours of occurrence and meet with the City within 24 hours of providing notice to discuss means and method to determine what changes, if any, shall be made to better control ground movement. Instrument readings shall be made on a daily basis until five consecutive workdays of readings remain unchanged; at which point the readings will revert to the reading frequency specified herein.
  2. **Response Value:** Provide written notice and meet with the City within 24 hours to discuss means and methods to determine what changes shall be made to better control ground movement. Actively control ground movement in accordance with the accepted plan to prevent reaching the Shutdown Value. Instrument readings shall be made on a daily basis until five consecutive workdays of readings remain unchanged; at which point the readings will revert to the reading frequency specified herein.
  3. **Shutdown Value:** Stop all Work immediately and provide immediate written notice. Meet with the City to develop a plan of action before any Work resumes.
- C. All measured deflection values are relative to the baseline value identified at the start of construction. Baselines shall not be reset after each bore and shall remain the same for the duration of this Contract.
- D. The required responses specified herein shall apply to any visualization of ground movement between monitoring points including sinkholes, rat holes, and other visual forms of ground movement.

3.8 Removal and site restoration

- A. Verify with City that instrumentation is no longer required.
- B. Remove the instrument prior to substantial completion of the Work, unless otherwise indicated.
- C. Remove and/or abandon the instrumentation in accordance with the permit.
- D. Backfill surface excavations with unshrinkable fill, when within apron, roadways, or sidewalks, and with selected fill when outside of such areas up to the underside of surface restoration. Steel casings, if any shall be removed to a minimum depth of five (5) feet below ground surface.
- E. Surfaces affected by installation of instruments shall be restored to their original condition prior to completion of Work.

END OF SECTION

SECTION 31 23 00

TRENCH EXCAVATION AND BACKFILL

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes: The Work covered in this section consists of performing all operations necessary to excavate all earth, regardless of character and subsurface conditions, from the trench or adjacent thereto and to place stabilization, bedding, cover, water removal, backfill, base, and compaction as shown on the Drawings and as specified, or as may be ordered by the Engineer.
- B. Such earthwork shall include, but may not necessarily be limited to, the loosening, removing, loading, transporting, depositing, and compacting in its final location of all materials wet and dry, as required for the purposes of completing the Work, which shall include, but not necessarily be limited to, the furnishing, placing, and removing of sheeting, shoring and bracing necessary to safely support the sides of all excavations; all pumping, ditching, draining and other required measures for the removal or exclusion of water from the excavation; the supporting of structures above and below the ground; all backfilling around structures and all backfilling of trenches and pits; the disposal of excess excavated materials; borrow of materials to make up deficiencies for fills; and all other incidental earthwork.
- C. General intent:
  - 1. It is the general intent of these specifications to specify conduct of the Work in such manner as to cause no exposure to unsafe conditions during construction and to provide a trench that will properly support and protect the pipe and only minor settlement in areas where such settlement will not be noticed, or compensation made for any expected settlement. The degree of compaction and type of material will vary in accordance with type of pipe, and soil and surface conditions.
  - 2. The Contractor shall comply with all applicable Sonoma County standards and encroachment permit requirements.
  - 3. The Contractor shall obtain compaction and install base and temporary paving. He shall keep access roads clean and free of dust, mud or debris by providing cleanup as necessary.
  - 4. If the Contractor does not properly clean up, (to preconstruction conditions) the City shall have the option of using outside equipment and labor to perform the Work and such costs will be deducted from the contract.
  - 5. Stabilization material will be required only where soil conditions warrant and as directed by the Engineer.
  - 6. No backfilling shall be done until the installation to be covered has been inspected and approved for covering. Compaction of backfill shall proceed immediately after backfilling, in appropriate layers.
  - 7. During construction, heavy rains may be encountered causing wet backfill and other unsuitable working conditions. During these periods the City will have authority to shut down the Work to avoid poor working conditions, wet unsuitable backfill, damage to base and paving, unsafe conditions, etc.
- D. Contaminated soil and groundwater shall be handled in accordance with Section 31 00 00, "Earthwork," and all regulatory agency requirements.
- E. Related Work:
  - 1. Section 02 01 10 - Existing Utilities and Underground Structures
  - 2. Section 31 00 00 - Earthwork
  - 3. Section 31 01 40 - Shoring and Trench Safety
  - 4. Section 31 23 19 - Dewatering
  - 5. Section 33 11 00 - Recycled Water Utilities

## 1.2 QUALITY ASSURANCE

- A. Qualifications of workmen: Provide sufficient skilled workmen and supervisors who shall be present at all times during execution of this portion of the Work and who shall be thoroughly familiar with the type of construction involved and the materials and techniques specified.
- B. Codes and standards:
  - 1. Wherever a test method is referenced in this section it shall be made in accordance with the most current test methods in use by the California Department of Transportation (Caltrans).
  - 2. Where reference is made to the State Standard Specifications, reference shall mean: State of California, Business and Transportation Agency, Department of Transportation (Caltrans), Standard Specifications, 2018, excluding measurement and payment Sections.

## 1.3 GUARANTEES

- A. The Contractor shall guarantee his Work against settlement for a period of one year after the Notice of Completion has been filed and shall repair all damage caused by settlement within that time. For the purpose of this specification, settlement will be deemed to have occurred if the following conditions exist:
  - 1. Along unpaved portions, a depression of 1 inch below the average of the sides of the uncut portion shall be deemed a settlement.
  - 2. In paved areas, the depression of 1/4 inch below the average of the sides of the uncut portion will be deemed a settlement.

## 1.4 CONTRACTOR SUBMITTALS

- A. Submit all product data, shop drawings, laboratory test results, material source information, and certificates of compliance listed in this Section under a single submittal cover for review. Incomplete submittals will not be reviewed.
- B. The Contractor's attention is directed to the provisions for "Shoring and Bracing Drawings" in Section 6705 of the California Labor Code. The Contractor, prior to beginning any trench or structure excavation five (5) feet deep or over, shall submit to the Engineer for review for compliance with Section 6705 the Contractor's detailed plan showing design of all shoring, bracing, sloping of the sides of excavation, or other provisions for worker protection against the hazard of caving ground during the excavation of such trenches or structure excavation. If such plan varies from the shoring system standards established in the Construction Safety Orders of the State of California, such alternative system plans shall be prepared, stamped and signed by a civil or structural engineer licensed in the State of California at the Contractor's expense.
- C. Certificates of Compliance: Certificates of Compliance shall be provided for all products and materials proposed to be used under this Section.
- D. For all materials, the Contractor shall designate the source and/or submit samples of all materials in advance of their use for required testing and Engineer's approval, if requested. All testing costs shall be at the City's expense.

## 1.5 QUALITY ASSURANCE

- A. General: All soils testing will be performed by the City.
- B. Where soil material is required to be compacted to a percentage of maximum density the maximum density at optimum moisture content will be determined in accordance with the standards outlined ASTM D1557. Field density in-place tests will be performed by the City.



- C. The Contractor shall notify the Engineer at least 2 working days prior to performing any utility excavation.

PART 2 PRODUCTS

2.1 EXCAVATION

- A. The Contractor shall complete all excavation regardless of type, nature, or condition of the material encountered. The Contractor shall make his own estimate of the kind and extent of the various materials to be excavated in order to accomplish the Work. The Contractor should refer to the available Geotechnical Engineering Investigation report (soils report) for anticipated excavation conditions. Native backfill shall not be used for any utility trench backfill, unless noted otherwise on the Drawings.

2.2 BEDDING AND COVER MATERIAL

- A. Pipe Bedding Material: Section 31 00 00, "Earthwork."

2.3 TRENCH BACKFILL

- A. Trench Backfill Material: Section 31 00 00, "Earthwork."

2.4 PERMEABLE MATERIAL

- A. Permeable Material: Section 31 00 00, "Earthwork."
- B. Permeable material shall be used in over-excavated areas of trenches, including where the bottom of excavations is unstable, disturbed or wet.

2.5 GEOTEXTILE FABRICS

- A. Filter Fabric: Section 31 00 00, "Earthwork."
- B. Subgrade Stabilization Fabric: Section 31 00 00, "Earthwork."

2.6 SLURRY CEMENT BACKFILL

- A. Slurry Cement Backfill: Standard Specifications Section 19-3.02E.

2.7 STEEL PLATE

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

Trench Width	Minimum Plate Thickness
(10") 0.25 m	(1/2") 13 mm
(1' - 11") 0.58 m	(3/4") 19 mm
(2' - 7") 0.80 m	(7/8") 22 mm
(3' - 5") 1.04 m	(1") 25 mm
(5' - 3") 1.60 m	(1 1/4") 32 mm

- B. For spans greater than 5 feet-3 inches, a structural design shall be prepared by a California registered civil engineer.
- C. Plates to be coated with a "no slip" surface.

## PART 3 EXECUTION

### 3.1 GENERAL

- A. The Contractor shall perform all excavation of whatever substance is encountered to the lines and grades shown on the plans. All excavated materials shall become the property of the Contractor and disposed of in accordance with local and state requirements.
- B. Not more than 300 feet of excavation trench will remain unbackfilled at the end of each day of Work. The maximum amount of open trench permitted in any one location shall be the length necessary to accommodate the amount of pipe installed and backfilled in a single day. All trenches shall be fully backfilled at the end of each day or, in lieu thereof, shall be covered by heavy steel plates adequately braced and capable of supporting vehicular traffic in those locations where it is impractical to backfill at the end of each day. The above requirements for backfilling or use of steel plate may be waived in cases where the trench is located further than 100 feet from any traveled roadway or occupied structure. In such cases, however, barricades and warning lights meeting safety requirements shall be provided and maintained. All operations shall be carried out in an orderly fashion. Backfilling, compacting, base, and cleanup will be accomplished as sections of the pipe are installed.
- C. Where abandoned underground structures are encountered, remove to sufficient depth to allow underground lines to cross, backfill and compact during rough grading. The Engineer may require further work to be done if visual inspection indicates during construction.

### 3.2 WIDTH OF TRENCH

- A. Except where otherwise specifically noted or directed, excavation for pipelines and utilities shall be open-cut trenches, sides of trenches shall be vertical, shored as required, and shall be uniform width from top to bottom. Trenches shall be of a width as shown on the Drawings.
- B. If trench widths exceed those shown on the Drawings, install all additional stabilization material, special bedding and cover, backfill, base and paving or higher strength pipe in conformance with these specifications and as directed by the Engineer at no additional cost to the City.
- C. Subgrade: The surface of the subgrade after compaction shall be hard, uniform, smooth, self-draining, and true to grade and cross section.
- D. Trench Bottom: The pipe bedding shall be given a final trim establishing grade such that each pipe section when first laid will be continually in contact with the bedding along the extreme bottom of the pipe. Rounding out the trench bottom or bedding to form a cradle for the pipe will not be allowed. The Contractor shall hand excavate for bell holes and fittings.

### 3.3 NOT USED

### 3.4 REMOVAL OF WATER

- A. Dewatering: Section 31 23 19 – Dewatering.
- B. Water disposal shall meet federal, state, and local requirements and as specified.

### 3.5 SHORING, SHEETING AND BRACING

- A. See Section 31 01 40 - Shoring and Trench Safety. The Contractor shall furnish and install all shoring, sheeting and bracing required to support adjacent earth banks and structures for the protection and safety of all personnel working in the trench. All shoring, sheeting and bracing shall conform to the requirements of the State or local agents having jurisdiction over such matters. Remove shoring, sheeting and bracing in a manner that will protect the workman and prevent

caving of banks and damage to the pipe, grade, sidewall support, bedding compaction, excavation, backfill or adjacent property.

### 3.6 OVER-EXCAVATION

- A. If the bottom of an excavation is found to consist of soft or unstable material that is incapable of properly supporting the pipe or structure, the Engineer shall be advised immediately.
- B. The Contractor shall obtain the Engineer's approval prior to performing any over-excavation. Any over-excavating and resultant backfill and compaction without such approval shall be at the Contractor's expense. The quantity of approved unsuitable material excavated and its replacement shall be paid for as extra work only with the authorization of the Engineer and in accordance with the Contract Documents.

### 3.7 ROCK EXCAVATION

- A. Rock excavation shall include removal and disposal of the following: (1) all boulders measuring 1/3 of a cubic yard or more in volume; (2) all rock material in ledges, bedding deposits, and unstratified masses; (3) concrete or masonry structures which have been abandoned; and (4) conglomerate deposits which are so firmly cemented that they possess the characteristics of solid rock.
- B. The Contractor shall obtain the Engineer's approval prior to performing any rock excavation. Any rock excavation and resultant backfill and compaction without such approval shall be at the Contractor's expense. The quantity of approved rock excavated and its replacement with suitable fill material shall be paid for as extra work only with the authorization of the Engineer and in accordance with the Contract Documents.
- C. Rock excavation is not anticipated for this project. If the Contractor encounters rocks during earthwork activities, the Engineer shall be advised immediately.
- D. Explosives and Blasting: Use of Explosives and Blasting will not be permitted.

### 3.8 TRENCH BACKFILL IN THE PIPE ZONE

- A. The Contractor shall backfill the pipe zone with the bedding and cover materials specified to the dimensions shown on the Drawings. The trench shall be final-graded by hand to provide a secure bedding full length with hand excavation made for bells or collars.
- B. Trench backfill in the pipe zone shall be moisture conditioned to within 2 percent of the ASTM D1557 optimum moisture content and compacted to achieve a minimum relative compaction of 90 percent of the ASTM D1557 maximum dry density, unless noted otherwise on the Drawings.
- C. Additional backfill shall then be installed and the sides of the pipes moisture conditioned to within 2 percent of the ASTM D1557 optimum moisture content. Backfill on the sides of the pipe shall be shovel sliced to remove voids and tamped to not less than 90 percent compaction to secure full-length bedding and proper pipe wall support. After this, cover material shall be added and mechanically compacted to a relative compaction not less than 90 percent.

### 3.9 TRENCH BACKFILL IN THE TRENCH ZONE

- A. The Contractor shall backfill the trench zone with the trench cover materials specified to the dimensions shown on the Drawings. The trench shall be final-graded by hand to provide a secure bedding full length with hand excavation made for bells or collars.
- B. Trench backfill in the trench zone shall be moisture conditioned to within 2 percent of the ASTM D1557 optimum moisture content, placed in maximum 8 inch thick loose lifts prior to compacting,

and compacted to achieve a minimum relative compaction of 95 percent of the ASTM D1557 maximum dry density.

- C. Trench backfill within 12 inches of subgrade in non-vehicular areas shall be moisture conditioned to within 2 percent of the ASTM D1557 optimum moisture content, placed in maximum 6 inch thick loose lifts prior to compacting, and compacted to achieve a minimum relative compaction of 95 percent of the ASTM D1557 maximum dry density.
- D. Trench backfill within 12 inches of subgrade in vehicular areas shall be moisture conditioned to within 2 percent of the ASTM D1557 optimum moisture content, placed in maximum 6 inch thick loose lifts prior to compacting, and compacted to achieve a minimum relative compaction of 95 percent of the ASTM D1557 maximum dry density.

### 3.10 PLACING AND SPREADING OF BACKFILL MATERIALS

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

### 3.11 COMPACTION OF BACKFILL MATERIALS

- A. Specification Section 31 00 00 - Earthwork. Each layer of backfill material as defined herein, shall be mechanically compacted to the specified percentage of maximum density. Equipment that is

consistently capable of achieving the required degree of compaction shall be used and each layer shall be compacted over its entire area while the material is at the required moisture content range.

- B. Flooding, ponding, or jetting shall not be used.
- C. Equipment weighing more than 10,000 pounds shall not be used closer to structure walls than a horizontal distance equal to the depth of the fill against the structure wall at that time or 5-feet, whichever is greater. Hand operated power compaction equipment shall be used where use of heavier equipment is impractical or restricted due to weight limitations.
- D. Trench Backfill Requirements:
  - 1. The Contractor shall maintain the specified trench width up to a horizontal plane lying 12 inches above the top of the pipe.
  - 2. If, at any location under said horizontal plane, the Contractor slopes the trench walls or exceeds the maximum trench widths indicated the Pipe Zone backfill shall be "improved" or the pipe class improved at no additional cost to the City. "Improved" backfill shall mean Slurry Cement Backfill or other equivalent materials acceptable to the Engineer.

### 3.12 COMMUNICATIONS/ELECTRICAL

- A. Bed and backfill in accordance with the Drawings.

### 3.13 STEEL PLATE

- A. General: When backfilling operations of an excavation in the traveled way, whether transverse or longitudinal, cannot be properly completed within a work day, steel plate bridging with a non-skid surface and shoring may be required to preserve unobstructed traffic flow.
- B. When steel plate bridging is required, the following conditions shall apply:
  - 1. Steel plates used for bridging must extend a minimum of 12 inches beyond the edges of the trench.
  - 2. Steel plate bridging shall be installed to operate with minimum noise.
  - 3. The trench shall be adequately shored to support the bridging and traffic loads.
  - 4. Bridging shall be secured against displacement by using adjustable cleats, shims or other devices.
- C. Steel plate bridging should not exceed 4 consecutive working days in any given week.

### 3.14 TESTING

- A. Relative compaction shall be to the densities specified and referenced herein. All testing will be performed by the City.

END OF SECTION

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SECTION 31 23 19

DEWATERING

PART 1 GENERAL

1.1 DESCRIPTION

- A. Groundwater is anticipated in this project. The Contractor is advised that groundwater may be present in some of the proposed excavations, depending on site location, depth of excavation, soil conditions and time of year. As necessary, the Contractor shall keep excavations free from water during construction.
- B. The Contractor shall provide all labor, materials, and equipment necessary to dewater trench and structure excavations, in accordance with the requirements of the Contract Documents, to enable the pipes and structures to be installed in excavations that are free from standing or flowing water that may be due to groundwater, surface water, stormwater or precipitation.
- C. The preferred disposal method for water removed from trenches and other excavations is through discharge to the sanitary sewer.
- D. The Contractor shall be responsible for all permits and fees associated with such discharges.
- E. The Contractor shall develop an excavation dewatering plan in accordance with paragraph 1.5.A of this Section.
- F. The Contractor shall qualitatively monitor for odor or visual discrepancies indicative of hydrocarbon contamination in groundwater during dewatering operations. The Contractor shall notify the Owner immediately if potential contamination is encountered.
- G. The Contractor's dewatering operations shall not interfere with vehicle or pedestrian traffic. Under no circumstances shall dewatering water be allowed to flood streets and cause hazardous conditions for vehicular or pedestrian traffic. Dewatering pump noise shall be mitigated, especially at night. Any mitigating measures taken to conform to these requirements shall be at no extra expense to the Owner.
- H. The Contractor shall obtain any and all permits required in conjunction with dewatering operations, including permits for construction of dewatering wells.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 02 01 00 - Site Conditions
- B. Section 31 01 40 - Shoring and Trench Safety
- C. Section 31 23 00 - Trench Excavation and Backfill

1.3 DEFINITIONS

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

#### 1.4 DISCHARGE TO COLLECTION SYSTEM

- A. Contractor shall obtain a permit, pay all fees and comply with all conditions necessary for any discharges to the City of Petaluma sanitary sewer collection system.
- B. No water shall be discharged into sanitary sewers without the prior written consent of the Engineer and 24 hours advance notice to the City of Petaluma.
- C. If the turbidity requirements above are not met by tank settling alone, a filter must be employed to remove soil particles from the groundwater prior to discharge.
- D. Testing of water samples for turbidity shall be performed and documented daily for the first week, then at weekly intervals during the remaining period of discharge. Water shall only be discharged if the sample test results meet the specified turbidity requirements. A log of the monitoring and sampling results shall be maintained.
- E. The Contractor shall coordinate groundwater discharge into the collection system with the Owner, including verifying water quality requirements, discharge flow limitations into the collection system, and location of discharges into the collection system. Discharged flows into the collection system shall be limited to 100 gpm.
- F. In no case shall the Contractor's groundwater disposal operation surcharge the collection system (i.e., full pipe flow).
- G. The costs associated with any damage caused as a result of Contractor's groundwater disposal operation surcharging the collection system shall be the Contractor's sole responsibility.

#### 1.5 SUBMITTALS

- A. Submit all plans, product data, shop drawings, laboratory test results, material source information, and certificates of compliance listed in this Section under a single submittal cover for review. Incomplete submittals will not be reviewed.
- B. Dewatering Plan
  - 1. Dewatering systems shall be designed and maintained by the Contractor and shall be coordinated with the design of shoring specified in Section 31 01 40, "Shoring and Trench Safety." The plans should contain at a minimum the sizes of pumps, tanks, filtration devices, and the points of disposal. The plan should also include alternate (contingent) systems, and the Contractor should be prepared to alter the initial dewatering or shoring systems to meet the specified requirements.
  - 2. The plan shall also include the water quality requirements specified herein.
  - 3. Section 01 33 00 – Submittals.
- C. Product Data: Submit data for each of the following:
  - 1. Dewatering Pumps: Indicate sizes, capacities, priming methods, and engine or motor characteristics.
  - 2. Pumping equipment for control of discharge.
  - 3. Size of tank(s) used for storage.
  - 4. Specifications and size and type of filters and any other materials used for filtration.

#### 1.6 CLOSEOUT SUBMITTALS

- A. Section 01 33 00 – Submittals.



- B. Once the storage tank(s) are no longer needed, clean and remove from the site and return the area to original condition.

#### 1.7 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 – Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this Section.

#### 1.8 SEQUENCING

- A. Section 01 10 00 – Summary of Work: Requirements for sequencing.

#### 1.9 COORDINATION

- A. Coordinate work to permit the following construction operations to be completed on stable substrate.
  - 1. Excavation for structures and pipelines as specified in Section 31 23 00 “Trench Excavation and Backfill.”
- B. Coordinate with the Engineer prior to the commencement of any soil excavation and groundwater discharge.
- C. All dewatering operations shall be adequate to assure the integrity of the finished project.

### PART 2 PRODUCTS

#### 2.1 DEWATERING EQUIPMENT

- A. Select dewatering equipment to meet specified performance requirements.

### PART 3 EXECUTION

#### 3.1 DEWATERING OPERATIONS

- A. Install dewatering system in accordance with the approved Dewatering Plan.
  - 1. Secure City approved areas for siting of groundwater storage tanks and treatment systems. Located system components to allow continuous dewatering operations without interfering with the excavation work.
  - 2. Install the dewatering system in accordance with State, local and Unified Building Code standards.
- B. Remove water from the excavation in accordance with the approved Dewatering Plan.
  - 1. Keep excavations free from water during construction.
  - 2. Draw down the static water level a minimum of 2 feet below the bottom of excavations to maintain the undisturbed state of natural soils and allow the placement of any fill to the specified density.
  - 3. Operate dewatering systems continuously until backfill has been completed to 1-foot above the normal static groundwater level.
  - 4. Control the release of groundwater to its static level to prevent disturbance of the natural foundation soils or compacted fill and to prevent floatation or movement of structures and pipelines.

5. Control groundwater to prevent softening of the bottom of excavations, or formation of “quick” conditions. Dewatering systems shall not remove natural soils.
  6. At all times, site grading shall promote drainage away from excavations. Surface runoff shall be diverted from excavations.
  7. Dewatering in such a manner as to preserve the undisturbed bearing capacity of the subgrade soils at proposed bottom of excavation.
  8. Control surface runoff to prevent entry or collection of water in excavations.
- C. Notify the Engineer and stop excavation work should the dewatering system not adequately control water within the excavation.
1. Supplement or modify dewatering system and provide other remedial measures to control water within excavation.
  2. Demonstrate dewatering system operation complies with performance requirements before resuming excavation operations.
- D. Notify the Engineer and stop excavation work if potentially contaminated groundwater is encountered.
1. Upon notification from the Contractor regarding potential groundwater contamination, the City will sample and analyze to verify the existence and extent of contamination.
- E. Notify the Engineer and stop excavation work if settlement or ground movement is detected.
1. Contractor shall control the rate and effect of the dewatering in such a manner as to avoid all settlement and subsidence.
  2. Where critical structures or facilities exist immediately adjacent to areas of proposed dewatering, reference points shall be established and observed at daily intervals to detect any settlement or ground movement that may develop. The Contractor shall conduct the dewatering operation in a manner that protects adjacent structures and facilities. The cost of repairing any damage to adjacent structures and restoration of facilities shall be the responsibility of the Contractor.
- F. Maintain all equipment in an operable state.
1. Inspect equipment daily and repair or replace as needed.
  2. Clean accumulated sediment from tanks as needed.
- G. Remove dewatering systems after dewatering operations are discontinued.
1. The Contractor shall be responsible for sampling and disposal of sediments collected in storage tanks, as well as other waste materials related to groundwater discharge.
  2. Repair damage caused by dewatering systems or resulting from failure of systems to protect property.

END OF SECTION

SECTION 31 25 00

EROSION CONTROL

PART 1 GENERAL

1.1 REFERENCES

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.
  - 1. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)
    - a. ASTM D 4439-14 Standard Terminology for Geosynthetics
    - b. ASTM D 4491-14 Water Permeability of Geotextiles by Permittivity
    - c. ASTM D 4533-11 Trapezoid Tearing Strength of Geotextiles
    - d. ASTM D 4632-13 Grab Breaking Load and Elongation of Geotextiles
    - e. ASTM D 4751-12 Determining Apparent Opening Size of a Geotextile
    - f. ASTM D 4873-09 Identification, Storage, and Handling of Geosynthetic Rolls
- B. California Department of Transportation, Standard Specifications, Section 13 Water Pollution Control.
- C. Field Guide for Construction Site Dewatering.
- D. Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual (June 2011).
- E. Construction Site Best Management Practices (BMP) Manual.
- F. Construction Site Monitoring Program (CSMP) Guidance Manual.
- G. Manuals and templates are available at Caltrans Division of Construction website: <http://www.dot.ca.gov/hq/construc/stormwater/>.

1.2 GENERAL

- A. A Storm Water Pollution Prevention Plan (SWPPP) document is not required for this project.
- B. The Contractor shall prepare a Water Pollution Control Plan (WPCP) for review and approval by the Engineer, and implement water pollution prevention measures outlined in the approved WPCP, specified in this specification section, in Standard Specification Section 13, and the requirements of the National Pollution Discharge Elimination System (NPDES).
- C. The Contractor shall become fully informed of, and comply with the applicable Federal, State and local regulations that govern the Contractor's operations and storm water discharges from both the project site and areas of disturbance outside the project limits during construction.
- D. Unless arrangements for disturbance of areas outside the project limits are made by the City and made part of the contract, it is expressly agreed that the City assumes no responsibility to the Contractor or property owner whatsoever with respect to any arrangements made between the Contractor and property owner to allow disturbance of areas outside the project limits.

- E. The Contractor shall be responsible for the costs and for any liability imposed by law as a result of the Contractor's failure to comply with the requirements set forth in this section including, but not limited to, compliance with the applicable provisions of Federal, State and local regulations. For the purposes of this paragraph, costs and liabilities include but are not limited to fines, penalties and damages whether assessed against the State or the Contractor, including those levied under the Federal Clean Water Act and the State Porter Cologne Water Quality Act.
- F. Conformance with the requirements of this section "Erosion Control," shall not relieve the Contractor from the Contractor's responsibilities, as provided in Section 5-1.36, "Property and Facility Preservation," Section 7-1.05, "Indemnification," and Section 7-1.06, "Insurance," of the Standard Specifications.
- G. Heavy equipment shall be placed outside of drainage channels except when necessary to perform the Work.
- H. Upon completion of construction activities, drainage channels shall be restored and re-contoured as nearly as practicable to pre-project conditions, and shall match adjacent natural channel contours.
- I. All cleared and grubbed materials shall be removed from the project sites and disposed of by the Contractor. Refer to Specification Section 02 41 10 "Demolition, Salvage, and Abandonment" for additional details and requirements.

### 1.3 EROSION AND SEDIMENT CONTROLS

- A. The controls and measures required by the Contractor include but are not limited to the items below.
  - 1. Structural Practices: Structural practices shall be implemented to divert flows from exposed soils, temporarily store flows, or otherwise limit runoff and the discharge of pollutants from exposed areas of the site. Structural practices shall be implemented in a timely manner during the construction process to minimize erosion and sediment runoff. Structural practices shall include the following devices:
    - a. Silt Fences. The Contractor shall provide silt fences as a temporary structural practice to minimize erosion and sediment runoff. Silt fences shall be properly placed and installed to effectively retain sediment immediately after completing each phase of work where erosion would occur in the form of sheet and rill erosion (e.g. clearing and grubbing, excavation, embankment, and grading). Silt fences shall be installed in the locations indicated on the drawings. Final removal of silt fence barriers shall be upon approval by the Owner.
    - b. Fiber Rolls (sediment logs or wattles): Contractor shall provide fiber rolls as temporary structural practice to minimize erosion and sediment runoff. Fiber rolls shall be properly placed and installed to effectively retain sediment immediately after completing each phase of work (e.g., clearing and grubbing, excavation, embankment, and grading) in each independent runoff area (e.g., after clearing and grubbing in an area between a ridge and drain, fiber rolls shall be placed as work progresses; fiber rolls shall be removed/replaced/relocated as needed for work to progress in the drainage area). Areas where fiber rolls are to be used are shown on the drawings. Final removal of fiber roll barriers shall be upon approval by the Owner. Fiber Rolls shall be provided as follows:
      - c. Along the downhill perimeter edge of all areas disturbed.
      - d. Along the top of the slope or top bank of drainage ditches, channels, swales, etc. that traverse disturbed areas.
      - e. Along the toe of all cut slopes and fill slopes of the construction areas.

- f. Perpendicular to the flow in the bottom of existing drainage ditches, channels, swales, etc. that traverse disturbed areas or carry runoff from disturbed areas. Rows shall be spaced a maximum of 100 feet apart.
- g. Perpendicular to the flow in the bottom of new drainage ditches, channels, and swales. Rows shall be spaced a maximum of 100 feet apart.
- h. At the entrance to culverts that receive runoff from disturbed areas.
- i. Diversion Dikes. Diversion dikes shall have a maximum channel slope of 2 percent and shall be adequately compacted to prevent failure. The minimum height measured from the top of the dike to the bottom of the channel shall be 18 inches. The minimum base width shall be 6 feet and the minimum top width shall be 2 feet. The Contractor shall ensure that the diversion dikes are not damaged by construction operations or traffic. Diversion dikes shall be located as shown on the drawings.
- j. A stabilized vehicular entrance/exit shall be provided where required in accordance with Stabilized Construction Entrance/Exit Detail TC-1 of the Caltrans Construction Site Best Management Practices Manual. (Caltrans Storm Water Quality Handbooks, Construction Site Best Management Practices Manual, March 1, 2003).

#### 1.4 SUBMITTALS

- A. Prepare and submit a Water Pollution Control Plan, including a minimum of one (1) 11"x17" figure showing the details of the water pollution control measures and Best Management Practices (BMPs) that will be implemented.
  - 1. As part of the water pollution control work, a Water Pollution Control Program, hereafter referred to as the "WPCP," is required for this contract. The WPCP shall conform to the requirements in Section 13-2, "Water Pollution Control Program," of the Standard Specifications, the requirements in the Caltrans manuals, and these Construction Details.
  - 2. No work having potential to cause water pollution, as determined by the Engineer, shall be performed until the WPCP has been approved by the Engineer.
  - 3. Within 30 calendar days after the approval of the contract, the Contractor shall submit 3 copies of the WPCP to the Engineer. The Contractor shall allow 10 days for the Engineer to review the WPCP. If revisions are required, as determined by the Engineer, the Contractor shall revise and resubmit the WPCP within 7 days of receipt of the Engineer's comments and shall allow 7 days for the Engineer to review the revisions. Upon the Engineer's approval of the WPCP, 3 additional copies of the WPCP incorporating the required changes shall be submitted to the Engineer. Minor changes or clarifications to the initial submittal may be made and attached as amendments to the WPCP. In order to allow construction activities to proceed, the Engineer may conditionally approve the WPCP while minor revisions or amendments are being completed. The objectives of the WPCP shall be to identify pollution sources that may adversely affect the quality of storm water discharges associated with the project and to identify, construct, implement and maintain water pollution control measures, hereafter referred to as control measures, to reduce to the extent feasible pollutants in storm water discharges from the construction site during construction under this contract.
  - 4. The WPCP shall incorporate control measures and minimum requirements in the following categories:
    - a. Soil stabilization practices;
    - b. Sediment control practices;
    - c. Wind Erosion Control practices;
    - d. Tracking control practices;
    - e. Non-storm water management and waste management and materials disposal control practices.

5. Specific objectives and minimum requirements for each category of control measures are contained in the Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual.
  6. The Contractor shall consider the objectives and minimum requirements presented in the SWPPP-WPCP Preparation Manual for each of the above categories. When minimum requirements are listed for any category, the Contractor shall incorporate into the WPCP and implement on the project, one or more of the listed minimum controls required in order to meet the pollution control objectives for the category. In addition, the Contractor shall consider other control measures presented in the SWPPP-WPCP Preparation Manual and shall incorporate into the WPCP and implement on the project the control measures necessary to meet the objectives of the WPCP. The Contractor shall document the selection process in accordance with the procedure specified in the SWPPP-WPCP Preparation Manual.
  7. The following contract items of work, as shown on the project Plans, shall be incorporated into the WPCP as critical temporary control measures:
    - a. During construction and as part of the erosion control measures:
      - 1) Place silt fence 1' minimum beyond all grading limits.
      - 2) Place fiber rolls around all soil stock piles and at the grading limits.
      - 3) Place straw bales or rock bags around all storm drain inlets.
      - 4) The Contractor shall consider other control measures to supplement these critical temporary control measures when necessary to meet the pollution control objectives of the WPCP.
  8. The Contractor shall maintain and protect the temporary control measures throughout the duration of the project and shall restore these controls to the lines and grades shown on the Plans prior to acceptance of the project.
  9. The WPCP shall include, but not be limited to, the following items as described in the Handbook:
    - a. Project description and Contractor's certification;
    - b. Project information;
    - c. Pollution sources, control measures, and water pollution control drawings; and
    - d. Amendments, if any.
  10. The Contractor shall amend the WPCP, graphically and in narrative form, whenever there is a change in construction activities or operations which may affect the discharge of significant quantities of pollutants to surface waters, ground waters, municipal storm drain systems, or when deemed necessary by the Engineer. The WPCP shall also be amended if the WPCP has not achieved the objective of reducing pollutants in storm water discharges. Amendments shall show additional control measures or revised operations, including those in areas not shown in the initially approved WPCP, which are required on the project to control water pollution effectively. Amendments to the WPCP shall be submitted for review and approval by the Engineer in the same manner specified for the initially approved WPCP. Amendments shall be dated and attached to the on-site WPCP document.
  11. The Contractor shall keep a copy of the WPCP, together with updates, revisions and amendments at the project site.
- B. Submit all product data, laboratory test results, material source information, and certificates of compliance listed in this Section under a single submittal cover for review. Incomplete submittals will not be reviewed.
- C. Product Data:
1. Submit data for erosion control materials listed in this section indicating properties, test methods, and manufacturer's installation instructions.
- D. Material Source: Submit name of imported fill materials supplied.

- E. Manufacturer's Certificate: Submit Certifications that products meet or exceed specified requirements.

## PART 2 PRODUCTS

### 2.1 TEMPORARY CONSTRUCTION FENCE

- A. General:
  - 1. Fence height shall be 4 feet located from top of ground to top of fence.
  - 2. Fence shall extend from the top of ground. No gaps between the fence and the top of ground shall be permitted.
- B. Fabric:
  - 1. Fence material shall be plastic.
  - 2. Fence material shall be orange in color.
  - 3. Fence material shall be resistant to temperature change and shall be UV protected.
- C. Framing and Accessories:
  - 1. Provide posts and accessories necessary to erect fence in location desired.
  - 2. Posts shall be either fiberglass or steel, specifically made for the installation of fencing.
  - 3. Fencing shall be secured to the posts through the use of nylon ties or nylon wire (minimum 12 gauge). Steel wire shall not be used.

### 2.2 TEMPORARY SILT FENCES

- A. The filter fabric shall meet the requirements of Section 88-1.02E of the State Standard Specifications.
  - 1. Type: Woven.
- B. Mill Certificate or Affidavit. A mill certificate or affidavit shall be provided attesting that the fabric and factory seams meet chemical, physical, and manufacturing requirements specified above.
- C. The Contractor may use either wooden stakes or steel posts for silt fence construction. Wooden stakes utilized for silt fence construction, shall have a minimum cross section of 2 inches by 2 inches when oak is used and 4 inches by 4 inches when pine is used. Steel posts (standard "U" or "T" section) utilized for silt fence construction, shall have a minimum weight of 1.33 pounds per linear foot.

### 2.3 TEMPORARY FIBER ROLLS (sediment logs or wattles)

- A. Standard Specifications, Section 21-1.02P Fiber Rolls.
  - 1. Type A or Type B
  - 2. 8 – 10 inches in diameter, 10 – 20 feet long.
- B. Standard Specifications, Section 13-6.03E Temporary Fiber Rolls.
- C. The Contractor shall use wooden stakes for fiber roll installation. Wooden stakes utilized for fiber roll installation, shall have a minimum cross section of 1 inch by 2 inches, or as suggested by the fiber roll manufacturer.

### 2.4 EROSION CONTROL BLANKETS

- A. Standard Specifications, Section 21-1.02O Jute Mesh or Netting.

## 2.5 TEMPORARY COVERS

- A. Standard Specifications, Section 13-5.02F Temporary Covers.
- B. Standard Specifications, Section 88-1.02H Temporary Covers.

## 2.6 GRAVEL-FILLED BAGS

- A. Standard Specifications, Section 13-5.02G Gravel-Filled Bags.
- B. Standard Specifications, Section 88-1.02F Gravel-Filled Bags.

## 2.7 SEDIMENT FILTER BAGS

- A. Standard Specifications, Section 88-1.02G Sediment Filter Bag.

## 2.8 TEMPORARY HYDRAULIC MULCH

- A. Standard Specifications, Section 13-5.03E Temporary Hydraulic Mulch (Bonded Fiber Matrix).
- B. Standard Specifications, Section 13-5.03F Temporary Hydraulic Mulch (Polymer-Stabilized Fiber Matrix).

## 2.9 TEMPORARY TACKED STRAW

- A. Standard Specifications, Section 13-5.03H Temporary Tacked Straw.

## 2.10 TEMPORARY HYDROSEED

- A. Standard Specifications, Section 13-5.03I Temporary Hydroseed.

## PART 3 EXECUTION

### 3.1 GENERAL

- A. Upon approval of the WPCP, the Contractor shall be responsible throughout the duration of the project for installing, constructing, inspecting and maintaining the control measures included in the WPCP and any amendments thereto and for removing and disposing of temporary control measures. Unless otherwise directed by the Engineer or specified in these construction details, the Contractor's responsibility for WPCP implementation shall continue throughout any temporary suspension of work ordered in accordance with Section 8 1.06, "Suspensions," of the Standard Specifications. Requirements for installation, construction, inspection, maintenance, removal and disposal of control measures are specified in the Handbook and these construction details.
- B. Soil stabilization practices and sediment control measures, including minimum requirements, shall be provided throughout the duration of the project.
- C. Implementation of soil stabilization practices and sediment control measures for soil-disturbed areas of the project site shall be completed prior to the start of any other construction activities.



- D. Throughout the winter season, the active, soil-disturbed area of the project site shall be no more than 0.04 acres. The Engineer may approve, on a case-by-case basis, expansions of the active, soil-disturbed area limit. The Contractor shall demonstrate the ability and preparedness to fully deploy soil stabilization practices and sediment control measures to protect soil-disturbed areas of the project site before the onset of precipitation. The Contractor shall maintain a quantity of soil stabilization and sediment control materials on site equal to 30 percent of that sufficient to protect unprotected, soil-disturbed areas on the project site and shall maintain a detailed plan for the mobilization of sufficient labor and equipment to fully deploy control measures required to protect unprotected, soil-disturbed areas on the project site prior to the onset of precipitation. The Contractor shall include a current inventory of control measure materials and the detailed mobilization plan as part of the WPCP.
- E. Soil-disturbed areas of the project site shall be considered to be non-active whenever soil disturbing activities are expected to be discontinued for a period of 10 or more days and the areas are fully protected. Areas that will become non-active shall be fully protected with soil stabilization practices and sediment control measures within 5 days of the discontinuance of soil disturbing activities or prior to the onset of precipitation, whichever is first to occur.
- F. Active soil-disturbed areas of the project site shall be fully protected at the end of each day with soil stabilization practices and sediment control measures unless fair weather is predicted through the following work day. The weather forecast shall be monitored by the Contractor on a daily basis.
- G. The National Weather Service (<http://www.weather.gov/>) forecast shall be used. If precipitation is predicted prior to the end of the following work day, construction scheduling shall be modified, as required, and the Contractor shall deploy functioning control measures prior to the onset of the precipitation.
- H. The Contractor shall implement, year-round and throughout the duration of the project, control measures included in the WPCP for sediment tracking, wind erosion, non-stormwater management and waste management and disposal.
- I. The Engineer may order the suspension of construction operations which create water pollution if the Contractor fails to conform to the requirements of this section "Erosion Control" as determined by the Engineer.

### 3.2 INSTALLATION OF TEMPORARY CONSTRUCTION FENCE

- A. Posts:
  - 1. Posts shall be installed plumb and in straight alignment.
  - 2. Posts shall be spaced every 6.5 feet maximum, unless otherwise approved by the Engineer.
- B. Fabric:
  - 1. Fabric shall be stretched taut between fence posts. Equal tension shall be applied so that fence remains straight and taut between posts.
  - 2. Install fabric on security side of fence and anchor to posts so that fabric remains in tension after pulling force is released.
  - 3. Fasten fabric to posts with nylon ties or nylon wire spaced 12 inches maximum.
- C. Maintenance:
  - 1. Fence shall not be allowed to be in disrepair. All breaks or tears in the fence fabric will be repaired immediately.

2. All posts shall remain plumb and in straight alignment. All fallen posts shall be reset immediately.
3. Contractor shall maintain temporary construction fencing in such a manner as to protect Work from damage and to protect the safety of the general public.
4. No Contractor personnel or equipment shall be allowed outside of the fenced construction easement area.

### 3.3 INSTALLATION OF SILT FENCES

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

### 3.4 INSTALLATION OF FIBER ROLLS (sediment logs or wattles)

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

### 3.5 INSTALLATION OF OTHER SEDIMENT AND EROSION CONTROLS

- A. Install other sediment and erosion controls in accordance with project SWPPP and Standard Specification Section 13.

### 3.6 MAINTENANCE

- A. The Contractor shall maintain the temporary and permanent vegetation, erosion and sediment control measures, and other protective measures in good and effective operating condition by performing routine inspections to determine condition and effectiveness, by restoration of destroyed vegetative cover, and by repair of erosion and sediment control measures and other protective measures. The following procedures shall be followed to maintain the protective measures.
  1. Silt Fence Maintenance. Silt fences shall be inspected in accordance with paragraph INSPECTIONS. Any required repairs shall be made promptly. Close attention shall be paid to the repair of damaged silt fence resulting from end runs and undercutting. Should the fabric on a silt fence decompose or become ineffective, and the barrier is still necessary, the fabric shall be replaced promptly. Sediment deposits shall be

removed when deposits reach one-third of the height of the barrier. When a silt fence is no longer required, it shall be removed. The immediate area occupied by the fence and any sediment deposits shall be shaped to an acceptable grade. The areas disturbed by this shaping shall be re-vegetated.

2. Fiber Roll Maintenance. Fiber roll barriers shall be inspected in accordance with paragraph INSPECTIONS. Close attention shall be paid to the repair of damaged rolls, end runs and undercutting beneath rolls. Necessary repairs to barriers or replacement of rolls shall be accomplished promptly. Sediment deposits shall be removed when deposits reach one-half of the height of the barrier. Roll rows used to retain sediment shall be turned uphill at each end of each row. When a fiber roll barrier is no longer required, it shall be removed. The immediate area occupied by the roll and any sediment deposits shall be shaped to an acceptable grade. The areas disturbed by this shaping shall be re-vegetated.

### 3.7 INSPECTIONS

- A. General. The Contractor shall inspect disturbed areas of the construction site, areas used for storage of materials that are exposed to precipitation that have not been finally stabilized, stabilization practices, structural practices, other controls, and area where vehicles exit the site at least once every seven (7) calendar days, within two (2) calendar days of forecasted rains, and within 24 hours of the end of any storm that produces 0.5 inches or more rainfall at the site. Where sites have been finally stabilized, such inspection shall be conducted at least once every month.
- B. Inspections Details. Disturbed areas and areas used for material storage that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the drainage system. Erosion and sediment control measures identified in the Storm Water Pollution Prevention Plan or Water Pollution Control Plan shall be observed to ensure that they are operating correctly. Discharge locations or points shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Locations where vehicles exit the site shall be inspected for evidence of offsite sediment tracking.
- C. Inspection Reports. For each inspection conducted, the Contractor shall prepare a report summarizing the scope of the inspection, name(s) and qualifications of personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the Storm Water Pollution Prevention Plan, maintenance performed, and actions taken. The report shall be furnished to the Engineer within 24 hours of the inspection as a part of the Contractor's work. A copy of the inspection report shall be maintained on the job site.

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## HOT MIX ASPHALT PAVING

### PART 1 GENERAL

#### 1.1 DESCRIPTION

- A. Work included: Work covered in this section consists of performing all operations necessary for producing and placing hot mix asphalt (HMA) by mixing aggregate and asphalt binder at a mixing plant and spreading and compacting the HMA mixture.
- B. General intent: All roadway surfaces shall be replaced in a manner which will result in a surface equal to or better than that existing prior to the trenching operations. HMA shall be replaced with a minimum thickness equal to the existing plus 1 inch, or 4 inches total, whichever is greater. See details on the Drawings.
- C. Section Includes:
  - 1. Quality Control Plan.
  - 2. Quality Control Testing.
  - 3. Acceptance Testing.
  - 4. Asphalt Binder and Tack Coat.
  - 5. Aggregate Materials.
  - 6. Hot Mix Asphalt.
- D. HMA shall be provided in accordance with the Standard HMA construction process and conform to the latest Caltrans Section 39 of the 2018 Standard Specifications and County of Sonoma Standards and as detailed on the Plans and in this specification.
- E. Related Work described elsewhere:
  - 1. Section 31 00 00 - Earthwork
  - 2. Section 31 23 00 - Trench Excavation and Backfill
- F. References
  - 1. AMERICAL ASSOCIATION OF STATE HIGHWAY TRANSPORTATION OFFICIALS (AASHTO)
    - a. M 17 (2011) Standard Specification for Mineral Filler for Bituminous Paving Mixtures
    - b. M 323 (2017) Standard Specification for Superpave Volumetric Mix Design
    - c. R 30 (2002) Standard Practice for Mixture Conditioning of Hot Mix Asphalt (HMA)
    - d. R 59 (2011) Standard Practice for Recovery of Asphalt Binder from Solution by Abson Method
    - e. T 27 (2020) Standard Method of Test for Sieve Analysis of Fine and Coarse Aggregates
    - f. T 49 (2015) Standard Method of Test for Penetration of Bituminous Materials
    - g. T 59 (2016) Standard Method of Test for Emulsified Asphalts
    - h. T 164 (2014) Standard Method of Test for Quantitative Extraction of Asphalt Binder from Hot Mix Asphalt (HMA)
    - i. T 176 (2017) Standard Method of Test for Plastic Fines in Graded Aggregates and Soils by Use of the Sand Equivalent Test
    - j. T 209 (2020) Standard Method of Test for Theoretical Maximum Specific Gravity (G mm) and Density of Asphalt Mixtures

- k. T 269 (2014) Standard Method of Test for Percent Air Voids in Compacted Dense and Open Asphalt Mixtures
  - l. T 275 (2017) Standard Method of Test for Bulk Specific Gravity (Gmb) of Compacted Asphalt Mixtures Using Paraffin-Coated Specimens
  - m. T 283 (2021) Standard Method of Test for Resistance of Compacted Asphalt Mixtures to Moisture-Induced Damage
  - n. T 304 (2017) Standard Method of Test for Uncompacted Void Content of Fine Aggregate
  - o. T 305 (2014) Standard Method of Test for Determination of Draindown Characteristics in Uncompacted Asphalt Mixtures
  - p. T 308 (2021) Standard Method of Test for Determining the Asphalt Binder Content of Asphalt Mixtures by the Ignition Method
  - q. T 312 (2019) Standard Method of Test for Preparing and Determining the Density of Asphalt Mixture Specimens by Means of the Superpave Gyrotory Compactor
  - r. T 313 (2019) Standard Method of Test for Determining the Flexural Creep Stiffness of Asphalt Binder Using the Bending Beam Rheometer (BBR)
  - s. T 315 (2020) Standard Method of Test for Determining the Rheological Properties of Asphalt Binder Using a Dynamic Shear Rheometer (DSR)
  - t. T 324 (2019) Standard Method of Test for Hamburg Wheel-Track Testing of Compacted Asphalt Mixtures
  - u. T 329 (2015) Standard Method of Test for Moisture Content of Asphalt Mixtures by Oven Method
  - v. T 335 (2009) Standard Method of Test for Determining the Percentage of Fracture in Coarse Aggregate
2. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)
- a. ASTM B117 (2019) Standard Practice for Operating Salt Spray (Fog) Apparatus.
  - b. ASTM D36 (2020) Standard Test Method for Softening Point of Bitumen (Ring-and-Ball Apparatus).
  - c. ASTM D92 (2018) Standard Test Method for Flash and Fire Points by Cleveland Open Cup Tester
  - d. ASTM D150 (2018) Standard Test Methods for AC Loss Characteristics and Permittivity (Dielectric Constant) of Solid Electrical Insulation.
  - e. ASTM D217 (2021) Standard Test Methods for Cone Penetration of Lubricating Grease
  - f. ASTM D297 (2019) Standard Test Methods for Rubber Products—Chemical Analysis
  - g. ASTM D445 (2021) Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and Calculation of Dynamic Viscosity)
  - h. ASTM D412 (2021) Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension.
  - i. ASTM D822 (2018) Standard Test Method for Tensile Properties of Thin Plastic Sheeting.
  - j. ASTM D1856 (2021) Standard Test Method for Recovery of Asphalt from Solution by Abson Method
  - k. ASTM D2007 (2019) Standard Test Method for Characteristic Groups in Rubber Extender and Processing Oils and Other Petroleum-Derived Oils by the Clay-Gel Absorption Chromatographic Method
  - l. ASTM D2041 (2019) Standard Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures.
  - m. ASTM D2074 (2019) Standard Test Methods for Total, Primary, Secondary, and Tertiary Amine Values of Fatty Amines by Alternative Indicator Method
  - n. ASTM D2240 (2021) Standard Test Method for Rubber Property—Durometer Hardness

- o. ASTM D2995 (2014) Standard Practice for Estimating Application Rate and Residual Application Rate of Bituminous Distributors
  - p. ASTM D4791 (2019) Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.
  - q. ASTM D5329 (2020) Standard Test Methods for Sealants and Fillers, Hot-Applied, for Joints and Cracks in Asphalt Pavements and Portland Cement Concrete Pavements
  - r. ASTM D7741 (2018) Standard Test Method for Measurement of Apparent Viscosity of Asphalt-Rubber or Other Asphalt Binders by Using a Rotational Handheld Viscometer
3. State of California, Business and Transportation Agency, Department of Transportation (Caltrans), Standard Specifications, 2018 edition excluding measurement and payment items.

## 1.2 QUALITY CONTROL PLAN

- A. Establish, implement and maintain a Quality Control Plan (QCP) to ensure materials and work comply with the specifications and the corrective actions required to control the quality of work. The QCP shall comply with these specifications and Section 39-2 "Standard" of the Caltrans Standard Specifications.
- B. Attend a pre-paving conference with the Engineer to discuss methods of performing the production and paving work and how quality control will be performed throughout.
- C. Notify the County of Sonoma Department of Transportation and Public Works a minimum of two weeks prior to the placement of any HMA of which asphalt plant will be used to supply the HMA. HMA shall be supplied from a single plant.
- D. In place Nuclear Gage density tests field test may be performed during HMA operations to meet compaction requirements per Standard Specifications. The frequency of testing shall be in accordance with Caltrans Standards.
- E. Qualifications of workers: Provide sufficient skilled workers and supervisors who shall be present at all times during execution of this portion of the Work and who shall be thoroughly familiar with the type of construction involved and the materials and techniques specified.
- F. Codes and standards:
  - 1. Wherever a test method is referenced in this section, it shall be made in accordance with the most current test method in use by the California Department of Transportation (Caltrans) in the State Standard Specifications, latest edition.
  - 2. For references made to the Standard Specifications, reference shall mean State of California, Business and Transportation Agency, Department of Transportation (Caltrans), Standard Specifications, latest edition, excluding measurement and payment items.

## 1.3 SUBMITTALS

- A. Submit all product data, shop drawings, laboratory test results, material source information, and certificates of compliance listed in this Section under a single submittal cover for review. Incomplete submittals will not be reviewed.
- B. The Contractor shall provide the Engineer with the following information a minimum of 10 days prior to commencing the Work:
  - 1. Hot mix asphalt job mix formula (JMF) in accordance with Caltrans Standard Specifications.

- a. Proposed JMF on Form CEM-3511.
    - 1) Include percentage of reclaimed asphalt pavement (RAP)
  - b. Mix design documentation, data and aggregate quality on Form CEM-3512 dated within 12 months of submittal.
  - c. JMF verification on Form CEM-3513, if applicable
  - d. JMF renewal on Form CEM-3514, if applicable
  - e. Materials Safety Data Sheets (MSDS) for:
    - 1) Asphalt binder
    - 2) Supplemental fine aggregate except fines from dust collectors
    - 3) Antistrip additives
2. Written confirmation from the supplier that the JMF to be supplied meets all specified requirements.

C. Tack Coat

1. Submit asphalt binder tack coat and asphaltic emulsion tack coat.

D. The Contractor shall develop and submit a Quality Control (QC) Plan for the project in accordance with Section 39-2.01A(3)(c) and Section 39-202A(4)(b). The Contractor shall not begin hot mix asphalt production or placement without written approval from the Engineer of the QC Plan and an approved JMF. Approval of the QC Plan and JMF by the Engineer does not relieve the contractor of responsibility for quality control or work methods.

1. Quality control sampling and acceptance testing shall be performed by the Contractor in accordance with Section 39-2.01A(4)(h) and Section 39-202A(4)(b).

#### 1.4 ENGINEER'S ACCEPTANCE

- A. In addition to the QC Plan, the Engineer may perform independent quality control to perform independent sampling and acceptance testing in accordance with Section 39-2.01A(4) of the Standard Specifications.
- B. Start-up evaluation will be performed in accordance with the Standard Specifications. Sampling and testing may occur at a minimum for the following:
  1. Aggregate
  2. Asphalt binder
  3. RAP
  4. HMA
- C. Acceptance testing (Quality Assurance) may be performed by the Engineer.
- D. In place Nuclear Gage density field test may be performed during HMA operations by the Engineer to meet compaction requirements per Standard Specifications.

#### 1.5 PRODUCT HANDLING

- A. All products described herein shall be handled in conformance to the applicable provisions of the Standard Specifications.

#### 1.6 PROJECT CONDITIONS

- A. Weather Limitations:
  1. No HMA shall be placed when weather conditions prevent the proper handling, finishing, or compaction of the mixtures.
  2. Do not apply when underlying surface is muddy, frozen or wet.
  3. Do not place tack coat when temperature is below 45° F.



4. Do not place hot mix asphalt when air temperature is below 45° F and surface temperature is below 50° F.
- B. Traffic Striping and Pavement Markers
1. Do not apply pavement marking paint within 8 hours of fog or rain or when below 40 Degrees F.
  2. Contractor shall guarantee that all traffic lane pavement markers be in place and adhered to the pavement for a period of not less than 90 days from the date of acceptance of the work by the City.
  3. All new traffic striping and pavement markings shall be thermoplastic, unless otherwise shown on the Drawings.
  4. No pavement markings shall be applied to any roadway surface until new hot mix asphalt surface has cured for a minimum of seven (7) days when hot melt bituminous adhesive is used, and not less than 14 days when epoxy adhesive is used.

## PART 2 PRODUCTS

### 2.1 TACK COAT

- A. Tack Coat, Grade PG 64-16, conforming to the provisions of Sections 39 and 92 of the Standard Specifications shall be used between layers of each lift of HMA, and on curbs, gutters and construction joints.

### 2.2 PRIME COAT AND TACK COAT

- A. Prime coat shall consist of either SC-70 or MC-70 grade liquid asphalt as directed by the Engineer and shall be furnished and applied in accordance with the provisions in Section 93, "Liquid Asphalts" of the Caltrans Standard Specifications.
- B. Tack coat shall be diluted SS1 or CSS1, or undiluted RS-1 or CRS-1 type asphalt emulsion.

### 2.3 ASPHALT BINDER

- A. Asphalt binder to be mixed with aggregate for asphalt concrete surface, leveling or open graded courses shall be AR-4000, conforming to the provisions of Sections 39 and 92 of the Standard Specifications and Sonoma County Standard Road Specifications.

### 2.4 AGGREGATE

- A. Aggregate shall be clean and free from deleterious substances and conform to the following gradings in accordance with Section 39 of the Standard Specifications.
  1. Surface Course: Type A 1/2 inch or 3/4 inch
  2. Leveling Course: Type A 3/4 inch
  3. Asphalt Concrete Base: Type A or B 3/4 inch
  4. Open Graded: 3/8 inch

### 2.5 HOT MIX ASPHALT

- A. HMA batch plant shall be Department-qualified under the Department's Materials Plant Quality Program of the Standard Specifications.
- B. Reclaimed asphalt pavement shall be acceptable in accordance with the Standard Specifications not exceeding 15.0 percent of the aggregate blend.

## PART 3 EXECUTION

### 3.1 .PROTECTION OF EXISTING STREET SURFACE

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

### 3.2 PAVING REMOVAL

- A. Sawcutting shall be required for all roads. See Section 31 23 00 "Trench Excavation and Backfill" for paving removal requirements.
- B. Subgrade shall be compacted to a firm and unyielding condition prior to placement of HMA.
- C. Grade tolerance shall be in accordance with Section 39-1.04 of the Standard Specifications.
- D. Clean and dry subgrade area prior to commencing with placement of HMA.

### 3.3 AGGREGATE BASE

- A. Aggregate base shall be spread and compacted according with Section 26 of the Standard Specifications. Compact to 95 percent relative compaction.

### 3.4 PRIME COAT AND TACK COAT

- A. Ensure the area is clean and dry. All material accumulations which would interfere with the adhesion of the tack coat or with the placing and performance of the HMA shall be removed, including dust, loose aggregate, soil, leaves, and pieces or lumps of other foreign material deposited on the surface.
- B. A tack coat shall be applied to existing pavement including planed surfaces, between HMA layers, and to vertical surfaces of curbs, gutters and construction joints at the minimum residual rates specified in Section 39 of the Standard Specifications.
- C. Before placing HMA, a tack coat shall be furnished and applied uniformly to contact surfaces of all cold pavement joints, curbs, gutters, pavement reinforcing fabric and all existing pavement to be surfaced in conformance with Section 39 of the Standard Specifications.
- D. Tack coat shall be applied to any course in advance of spreading the next course unless the surface temperature is at least 140 °F.
- E. Hot mix asphalt shall not be placed until tack coat has cured.

- F. Immediately in advance of placing HMA, apply additional tack coat to damaged areas or where loose or extraneous material is removed.
- G. Close areas receiving tack coat to traffic. Do not track tack coat onto pavement surfaces beyond the job site.
- H. The cost of applying tack coat will be considered included in the Contract Price and no additional compensation will be allowed therefore.

### 3.5 TRANSPORTING HOT MIX ASPHALT

- A. From mixing site in trucks having tight, clean compartments.
- B. Coat hauling compartments with lime-water mixture to prevent sticking.
- C. Elevate and drain compartment of excess solution before loading mix.
- D. Provide covers over asphalt concrete mixture to protect from weather and to prevent loss of heat.
- E. During periods of cold weather or for long distance deliveries, pre-insulation around entire truck bed surfaces.
- F. Do not use petroleum products such as kerosene or diesel fuel to release HMA from trucks, spreaders, or compactors.

### 3.6 HOT MIX ASPHALT

- A. HMA surfacing shall conform to the provisions of Section 39 of the Standard Specifications. Placing HMA shall be done under suitable weather conditions for such operations. Rain, snow or other inclement weather will be cause for discontinuing paving Work. The Engineer shall have the authority for determining whether weather conditions are sufficient cause to postpone work.

### 3.7 SPREADING AND COMPACTING

- A. Spreading and compacting shall be performed in accordance with Section 39 of the Standard Specifications and Section 39-1.07, Section 39-1.08.
- B. Longitudinal joints in the top layer must match specified lane edges shown on the striping plans. Longitudinal joints in lower HMA layers shall be offset at least 0.5 feet from each side of the specified lane edges.
- C. Finish rolling shall be completed before pavement surface temperature is below 150 degrees F.
- D. Traffic shall not be allowed on HMA until mid-depth temperature is below 160 degrees F and the pavement surface temperature is below 140 degrees F.

### 3.8 SMOOTHNESS AND DRAINAGE

- A. Verify smoothness and drainage using a water truck. Spray sufficient quantity of water to cause surface runoff from the entire newly paved surface. Any puddles and birdbaths deeper than 1/4 inch shall be corrected by sawcutting, removing and replacing HMA a sufficient distance from puddles and birdbaths to correct them, or by grinding. All smoothness and

drainage corrections to HMA shall be at the Contractor's expense and to the satisfaction of the Engineer.

### 3.9 TRENCH PATCHING

- A. All trench patches shall be limited to the width of the trench plus 6 inches on either side of the trench.

### 3.10 STREET MAINTENANCE

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

### 3.11 CONTRACTOR'S RESPONSIBILITY

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

END OF SECTION

SECTION 33 05 17

PRECAST CONCRETE METER AND VALVE BOXES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
  - 1. Valve boxes.
  - 2. Blow-off boxes.
  - 3. ARV boxes.
  
- B. Related Sections:
  - 1. Section 33 11 00 – Recycled Water Utilities.

1.2 REFERENCES

- A. ASTM International:
  - 1. ASTM A48/A48M - Standard Specification for Gray Iron Castings.
  - 2. ASTM A185/A185M - Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
  - 3. ASTM A536 - Standard Specification for Ductile Iron Castings.
  - 4. ASTM A615/A615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
  - 5. ASTM C33 - Standard Specification for Concrete Aggregates.
  - 6. ASTM C150 - Standard Specification for Portland Cement.
  - 7. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
  - 8. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
  - 9. ASTM C478 - Standard Specification for Precast Reinforced Concrete Manhole Sections.
  - 10. ASTM C497 - Standard Test Methods for Concrete Pipe, Manhole Sections, or Tile.
  - 11. ASTM C890 - Standard Practice for Minimum Structural Design Loading for Monolithic or Sectional Precast Concrete Water and Wastewater Structures.
  - 12. ASTM C913 - Standard Specification for Precast Concrete Water and Wastewater Structures.
  - 13. ASTM C990 - Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joints Sealants.
  - 14. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)).
  - 15. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 kN-m/m<sup>3</sup>)).
  - 16. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
  - 17. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).
  - 18. ASTM D4104 - Standard Test Method (Analytical Procedure) for Determining Transmissivity of Nonleaky Confined Aquifers by Overdamped Well Response to Instantaneous Change in Head (Slug Test)

1.3 DESIGN REQUIREMENTS

- A. Design Criteria:

1. Watertight precast reinforced air-entrained concrete structures designed to ASTM C890 AASHTO HS-20 live loading and installation conditions and manufactured to conform to ASTM C913.
2. Minimum 28-day Compressive Strength: 5,000 psi.
3. Honeycombed or re-tempered concrete is not permitted.

#### 1.4 SUBMITTALS

- A. Section 01 33 00 - Submittals: Requirements for submittals.
- B. Shop Drawing: Indicate plan, location, and inverts of connecting piping.
- C. Product Data: Submit design data on valve vaults and meter boxes.
- D. Manufacturer's Certificates: Submit Statement of Compliance, supporting data, from materials suppliers attesting that precast concrete valve vaults and meter boxes provided meet or exceed ASTM Standards and specified requirements.
- E. Manufacturer's Installation Instructions: Submit special procedures for precast concrete valve vaults and meter boxes installation.

#### 1.5 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 - Project Closeout: Requirements for close out submittals.
- B. Project Record Documents: Accurately record actual locations and inverts of buried pipe, components, and connections.

#### 1.6 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Pre-installation Meeting.
- B. Convene minimum one week prior to commencing work of this section.

#### 1.7 DELIVERY, STORAGE AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing and protecting products.
- B. Transport and handle precast concrete units with equipment designed to protect units from damage.
- C. Do not place concrete units in position to cause overstress, warp or twist.

#### 1.8 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordinate work with City and utilities within construction area.

## PART 2 PRODUCTS

### 2.1 VALVE BOXES

- A. Valve boxes:
  - 1. Manufacturer: Christy Model G5 Traffic Box.
  - 2. Substitutions: Section 01 60 00 - Product Requirements.

### 2.2 BLOW-OFF BOXES

- A. Blow-off boxes:
  - 1. Manufacturer: Christy Model B24 Traffic Box.
  - 2. Substitutions: Section 01 60 00 - Product Requirements.

### 2.3 ARV BOXES

- A. Blow-off boxes:
  - 1. Manufacturer: Christy Model B36 Traffic Box.
  - 2. Substitutions: Section 01 60 00 - Product Requirements.

### 2.4 BEDDING AND BACKFILL

- A. Install bedding and backfill as shown on the Drawings and as described in the Specifications.
- B. Maintain optimum moisture content of bedding material to attain required compaction density.

### 2.5 FABRICATION AND MANUFACTURER

- A. Fabricate precast reinforced concrete structures in accordance with ASTM C913, to dimensions indicated on Drawings, and to specified design criteria.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify piping connection, size, location, and invert as indicated on Drawings.

### 3.2 PREPARATION

- A. Ream pipe ends and remove burrs.
- B. Remove scale and dirt from components before assembly.
- C. Establish invert elevations for each component in system.
- D. Hand trim excavation to suit valve vaults and meter boxes. Remove stones, roots, or other obstructions.

### 3.3 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.

B. Request inspection by Engineer prior to placing aggregate cover over piping.

3.4 PROTECTION OF FINISHED WORK

A. Section 01 70 00 - Project Closeout: Protecting finished work.

END OF SECTION



## SECTION 33 05 23.13

### HORIZONTAL DIRECTIONAL DRILLING

#### PART 1 GENERAL

##### 1.1 REQUIREMENTS

- A. This section specifies minimum design and performance requirements for the construction of a potable water pipeline by the horizontal directional drilling (HDD) method.
- B. Furnish all designs, tools, equipment, materials, and supplies, and perform all labor required to complete the Work as indicated on the Contract Drawings and specified herein.
- C. Select, furnish, and maintain the drilling and ancillary equipment in proper and safe working order.
- D. Successfully complete final acceptance testing of the installed potable water pipeline as specified in Section 33 11 00.

##### 1.2 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. Comply with the applicable reference Specifications:
  - 1. Section 01 11 00 - Summary of Work
  - 2. Section 01 30 00 - Administrative Requirements
  - 3. Section 01 33 00 - Submittals
  - 4. Section 01 70 00 - Project Closeout
  - 5. Section 02 01 10 - Existing Utilities and Underground Structures
  - 6. Section 31 09 13 - Geotechnical Instrumentation and Monitoring
  - 7. Section 31 00 00 - Earthwork
  - 8. Section 31 23 19 - Dewatering
  - 9. Section 33 11 00 - Recycled Water Utilities
  - 10. Section 33 11 13 - Fusible PVC Pipe
- B. Comply with the following industry standards effective at time of bid:
  - 1. NSF/ANSI Standard 060 – Drinking Water Treatment Chemicals – Health Effects

##### 1.3 DEFINITIONS

- A. Bent Sub: A specially manufactured piece of drill steel behind the drilling tools that is inclined at an angle of one to three degrees from the axis of the bore in the desired direction of steering. The bent sub is used for steering of the drilling tools.

- B. Conductor/Surface Casing: A steel casing pipe installed at the entry and/or exit locations of the borehole to stabilize the borehole. Drilling Fluid/Mud: A mixture of water, bentonite, and/or polymers continuously pumped to the drilling tool or bit to facilitate the removal of soil cuttings and the stabilization of the bore. These fluids also cool the drilling tools, cool the drill steel, cool the guidance electronics, and lubricate the pipe string.
- C. Drill Steel: Specialty manufactured steel drill rod segments used to provide forward thrust and rotation to the drill tool. The drill rod is extended, as the excavation process advances, by joining the individual drill rod segments to become the drill string. The drill string also transports drilling fluids from the surface to the point of excavation. The drill string is pushed upon during pilot bore drilling and forward reaming and is pulled upon during back-reaming, swabbing, and pipe pullback.
- D. Drilling Tool/Bit: Any rotating tool or system of tools on a common support which excavates and/or provides directional control.
- E. Entry Pit: Location where the pilot bore begins with the drill tool entering the ground.
- F. Exit Pit: Location where the pilot bore ends with the drill tool exiting the ground.
- G. Horizontal Directional Drilling (HDD): A guided, steerable drilling system used for the trenchless installation of pipes, conduits, and cables. A pilot bore path is excavated in a shallow arc from a surface-launched drill rig. Excavation takes place with fluid assisted cutting from a drilling tool on the drill string. The pilot bore is directed by the positioning of a bent sub. The bore is filled with drilling mud/fluid for stabilization. The bore path is enlarged with subsequent reaming passes until the desired diameter is achieved. As a final step, the carrier pipe, conduit, or cable is pulled into the fluid-stabilized bore.
- H. Hydrolock: A condition that occurs when the drilling fluid in the bore becomes trapped behind the reamer and/or casing and exerts counter pressure during pullback to the extent where it cannot be overcome by the pulling force and the pullback cannot be advanced.
- I. Mud Motor: Motor located on the drilling tool that uses pressurized drilling mud introduced through the drill steel to provide rotational power to the cutting drill tool.
- J. Pilot Bore: The action of creating the first guided pass of the HDD process which is then reamed in one or more passes to the size required to allow pullback of the carrier pipe.
- K. Pullback: That part of a horizontal directional drilling process in which the drill string and carrier pipe are pulled back through the bore to the entry.
- L. Pullback Loads: The tensile load (force) applied to a drill string and carrier pipe during the pullback process.
- M. Pre-Reaming/Reaming: The HDD operational sequence where the pilot bore is being enlarged. Back reaming has the operational forces exerted towards the HDD equipment in a "pulling" manner and forward reaming has the operational forces exerted away from the HDD equipment in a "pushing" manner. Reaming can also be accomplished by two HDD rigs connected to the same drill steel pushing and pulling in unison.
- N. Swab: An HDD operational sequence where the hole is stabilized and cleared by the passing of a special hole-sized tool. This step is typically performed just before the pullback. This operation typically has the operational forces exerted towards the HDD equipment.

## 1.4 DESIGN REQUIREMENTS

- A. Provide HDD systems with the following:
  - 1. Directional control to construct the carrier pipe within the design tolerances.
  - 2. Down-hole surveying equipment with pitch, roll, depth, and azimuth information for real time monitoring, tracking, and surveying of the drill head. Provide guidance system with a minimum accuracy of  $\pm 0.40$  degree of azimuth and  $\pm 0.10$  degree of inclination.
  - 3. Provide HDD rig with pulling capacity equal to or greater than 1.5 times the static weight of the entire assembled pipe string including ballast.
  - 4. Provide HDD rig with torque capacity at least 20 percent greater than the maximum anticipated torque calculated for each pass.
  - 5. Provide a spoil separation plant sized to accommodate 120 percent of the maximum allowable instantaneous excavation rate and solids tonnage based upon 120 percent of the maximum allowable instantaneous advance rate, and anticipated ground conditions for each drilling pass.
- B. Locate the entry and exit points and drill the entrance and exit angles as indicated on the Contract Drawings, unless otherwise accepted by the Engineer.
- C. Conductor casing:
  - 1. Construct conductor as shown on the Contract Drawings.
  - 2. Construct the conductor casing until firmly embedded in the identified formation.
  - 3. Construct the conductor casing to the designed entry angle as shown on the Contract Drawings.
  - 4. The conductor casing shall remain in place during pilot bore drilling, reaming, and pullback operations.
  - 5. Methods used to construct and remove the conductor casing shall prevent ground settlement and heave.
- D. Size each reaming pass so as not to exceed 80 percent of the maximum torque of the drill rigs.
- E. Calculate the maximum anticipated construction loads acting on the conductor casing and demonstrate that the anticipated loads are implemented in the manufacturer's design of the conductor casing, subject to the Engineer's review. Provide a minimum factor of safety of 2.0.
- F. Calculate the maximum anticipated construction loads acting on the casing and carrier pipe and show that the anticipated loads are implemented in the manufacturer's design of the casing and carrier pipe, subject to the Engineer's review. Provide a minimum factor of safety of 2.0.
- G. State as built to plan or prepare and provide HDD calculations using industry accepted methods such as ASTM or API, or other standard acceptable to the Engineer. Use conservative assumptions.
- H. All process water shall be removed and legally disposed.

## 1.5 PERFORMANCE REQUIREMENTS

- A. Directional tolerances of the pilot bore:
  - 1. Provide a minimum of 6.0 feet separation from existing utilities and other obstacles.
- B. Guidance System Tolerance:
  - 1. Vertical Tolerance shall not exceed  $\pm 3.0$  percent of depth.
  - 2. Horizontal Tolerance shall not exceed  $\pm 3.0$  percent of depth.
- C. At no location shall the pilot bore create a path that locates the carrier pipe or excavates in violation of any permit or easement.
- D. The carrier pipe shall be capable of meeting the design flow.
- E. Drill a radius of curvature no less than that shown on the Contract Drawings, unless otherwise accepted by the Engineer. The minimum drill radius shall be calculated over three continuous drill steel segments or 30 feet, whichever is less.
- F. Ground movements above the alignment shall not exceed those specified in Sections 31 09 13.

## 1.6 QUALITY CONTROL

- A. Requirements outlined below shall be met at the time of bid and remain in force through completion of the project. Subcontracted work does not qualify as experience.
  - 1. The Contractor shall have demonstrated experience in constructing pipelines with similar pipe diameters, installation lengths, and depths using HDD. At least four (4) years of recent experience constructing HDD projects is required in similar ground conditions, as measured by soil type, N value and hydrostatic head, as anticipated for this project. The Contractor shall have demonstrated experience using similar HDD equipment proposed for use on this project.
  - 2. The Contractor shall employ skilled, experienced superintendent(s), drill rig operator and drilling fluid and separation plant specialist. The project superintendent shall have completed at least five (5) projects of 18-inch diameter (or greater) with pull lengths of 1,000 feet (or greater) in similar soil conditions, as measured by soil type, N value and hydrostatic head, as anticipated on this project, in the last five (5) years. The drill rig operator must have completed at least three (3) projects of 18-inch diameter (or greater) with pull lengths of 1,000 feet (or greater) in similar ground conditions, as measured by soil type, N value and hydrostatic head, as anticipated on this project, in the last five (5) years. The drilling fluid and separation plant specialist must have at least five (5) years of experience in the design of drilling fluid mixes and separation plants based on anticipated ground conditions. The drilling fluid and separation plant specialist must have completed at least three (3) projects of 18-inch diameter (or greater) with pull lengths of 1,000 feet (or greater) in similar ground conditions, as measured by soil type, N value and hydrostatic head, as anticipated on this project, in the last five (5) years.
  - 3. Contractor's HDD engineer, if required by HDD design, shall be a Professional Engineer registered in the State of California. Experience shall include HDD design calculations on five (5) HDD projects with reaches over 1,000 feet long within the last five (5) years.

4. Contractor's surveyor shall be a Professional Land Surveyor registered in the State of California.
  5. Experience records shall list the five (5) most recent HDD projects, including all HDD projects completed for the City, and all projects demonstrating the specified experience. The experience record shall include name of project; owner of the project; names of contacts including all contact information; pilot bore diameter, carrier pipe diameter, ground conditions as measured by soil type, N value, and hydrostatic head; longest reach planned and completed; and total footage planned and completed.
  6. The Engineer will be the sole judge in determining if the prospective contractor, HDD project superintendent, HDD operator and surveyor meet the work and project experience requirements.
- B. If an automated data acquisition system is provided with the system operate the automated data acquisition system for the duration of the project.
- C. Surveying:
1. Establish survey control points sufficiently far from the HDD excavation so as not to be affected by ground movement or damaged by any Work on the project.
  2. The position of the drill head shall be continuously tracked capable of maintaining the design tolerances specified herein.
  3. All surveying equipment shall be inspected and calibrated by the equipment manufacturer prior to use on the Project.

#### 1.7 CONTRACTOR SUBMITTALS

- A. Submittals shall be made in accordance with Section 01 33 00 and as specified herein.
- B. HDD submittals shall be coordinated with all relevant submittals, assembled, and submitted as a single, comprehensive submittal.
- C. Where calculations are required to be submitted, they shall be signed and sealed by a Professional Civil Engineer registered in the State of California. Calculations shall clearly identify all parameters used, state all assumptions made in the calculation, and identify all sources of information.
- D. All shop drawings shall be legible with dimensions accurately shown and clearly marked in English.
- E. Pre-Construction Submittals:
1. Submit qualifications and experience records for the following:
    - a. HDD contractor performing the Work.
    - b. HDD project superintendent.
    - c. HDD and guidance operator.
    - d. Drilling fluid and separation plant specialist.
    - e. Contractor's Engineer.
    - f. Contractor's Surveyor.
  2. Provide HDD Work Plan including set-up of equipment, guidance set-up, number of passes, size and type of tooling for each pass etc.

3. Provide detailed method of conductor casing installation.
4. At least 15 workdays prior to mobilization, provide detailed schedule for the HDD installation showing all major construction activities and durations, with starting and completion dates shown. The schedule shall be updated weekly, or as directed by the Engineer, and shall include:
  - a. "One call" utility locate requests and visual confirmation of all crossing utilities and all parallel utilities within 20 feet laterally of the bore centerline.
  - b. Site preparation.
  - c. Rig mobilization and setup.
  - d. Installation of conductor casing.
  - e. Pilot bore drilling.
  - f. Pre-reaming and reaming.
  - g. Layout and thermal butt fusing of carrier pipe.
  - h. Pressure testing of pipe prior to pullback.
  - i. Filling the pipe with water during pullback.
  - j. Final reaming and pullback of pipe.
  - k. Pressure testing of pipe after installation.
  - l. Cutting of conductor casing stick-out into drill rig pit.
  - m. Annulus grouting of conductor casing.
  - n. Mandrel/pig test.
  - o. Cleanup, surface restoration, and demobilization.
5. Provide plan of entry and exit sites including pit, set-up of all HDD and ancillary equipment, spoils handling, carrier pipe and conductor casing staging area, and methods of maintaining and protecting the jobsite.
6. Provide a profile shop drawing showing the lift height for the carrier pipe during pullback including any overhead conflicts and safe separation at a scale acceptable to the Engineer.
7. Provide any proposed deviations from the design geometry as shown on the Contract Drawings, Proposed deviations are subject to acceptance by the Engineer.
8. HDD equipment manufacturer's preprinted specifications and data sheets or letter from manufacturer demonstrating that HDD rig meets minimum pullback and torque requirements as specified herein.
9. Provide HDD Work Plan including set-up of equipment, guidance set-up, number of passes, size, and type of tooling for each pass etc.
10. Provide detailed method of conductor casing installation.
11. At least 15 workdays prior to mobilization, provide detailed schedule for the HDD installation showing all major construction activities and durations, with starting and completion dates shown. The schedule shall be updated weekly, or as directed by the Engineer, and shall include:
  - a. "One call" utility locate requests and visual confirmation of all crossing utilities and all parallel utilities within 20 feet laterally of the bore centerline.
  - b. Site preparation.
  - c. Rig mobilization and setup.
  - d. Installation of conductor casing.

- e. Pilot bore drilling.
  - f. Pre-reaming and reaming.
  - g. Layout and thermal butt fusing of carrier pipe.
  - h. Pressure testing of pipe prior to pullback.
  - i. Filling the pipe with water during pullback.
  - j. Final reaming and pullback of pipe.
  - k. Pressure testing of pipe after installation.
  - l. Cutting of conductor casing stick-out into drill rig pit.
  - m. Annulus grouting of conductor casing.
  - n. Mandrel/pig test.
  - o. Cleanup, surface restoration, and demobilization.
12. Provide plan of entry and exit sites including pit, set-up of all HDD and ancillary equipment, spoils handling, carrier pipe and conductor casing staging area, and methods of maintaining and protecting the jobsite.
13. Provide a profile shop drawing showing the lift height for the carrier pipe during pullback including any overhead conflicts and safe separation at a scale acceptable to the Engineer.
14. Provide any proposed deviations from the design geometry as shown on the Contract Drawings, Proposed deviations are subject to acceptance by the Engineer.
15. HDD equipment manufacturer's preprinted specifications and data sheets or letter from manufacturer demonstrating that HDD rig meets minimum pullback and torque requirements as specified herein
16. A complete list of all drilling fluid additives that will be on site with material safety data sheets (MSDS) and manufacturer's description and warranties.
17. Provide drilling fluid mixture and content of additives including mixing instructions for each ground type to be encounter along the HDD profile.
18. Plan for monitoring alignment control to design.
19. Plan for monitoring for inadvertent returns.
20. Provide a sample of daily HDD report and HDD operator's manual log.
21. Provide a sample of driller fluid mixing and batching report.
22. Provide a sample of surveyor's location and alignment report.
23. Provide a sample of the automated data acquisition record, in English, with information available for recording, variations in data acquisition frequency, and available formats for Engineer to select operating parameters for automated recording.
24. Method statement for filling the carrier pipe with potable water prior to pullback. Identify the source of potable water.
25. Provide electrical system, lighting system, and onsite power generation details.
26. Contingency Plans addressing the following:
- a. Spoils do not settle/separate with the spoils separation equipment on site.

- b. Drill steel or carrier pipe cannot be advanced or retrieved with the drill rig onsite.
- c. Drill tool becomes lost in the hole.
- d. Guidance control system fails to provide accurate information.
- e. Loss of steering or inability to steer.
- f. Installation forces start to increase rapidly, raising concerns about completing the pipe pull back installation.
- g. Swivel breaks during carrier pipe installation.
- h. Frac-Out and Surface Spill Contingency Plan: Describe procedures for preventing drilling fluid losses or spills and/or fluid returns to the surface. The plan shall address roles and responsibilities of involved parties, monitoring, prevention, containment, cleanup, and documentation procedures, and observations to be made and plans for containment and cleanup, if spills or hydrofracture occur. The plan will address changes that will be made to Contractor's operations to avoid recurrences. Containment and cleanup equipment shall be provided at both entry and exit locations and shall include at a minimum:
  - 1) Heavy weight plastic gravel filled and sealed bags.
  - 2) Geotek filter bags.
  - 3) Splash board.
  - 4) Several 5-gallon hard plastic pails.
  - 5) Heavy duty push brooms and several flat blade shovels.
  - 6) Silt fence and T-post or straw bales.
  - 7) Straw logs.
  - 8) Portable pumps.
  - 9) Hose.
  - 10) Vacuum truck available for response within one (1) hour of a frac-out event.
- i. Obstructions encountered.
- j. Utility strike.
- k. Loss of drill fluid circulation.
- l. Deviation from design bore path exceeds tolerances.
- m. Pipe collapses or pipe deformations exceed maximum allowable tolerances.
- n. Hydrolock

F. Construction Submittals to be submitted as construction progresses:

- 1. Notifications:
  - a. All notifications are to be provided in writing and within one workday unless otherwise specified herein.
  - b. Immediately notify the Engineer when the HDD pilot bore is out of design tolerance by 75 percent of the maximum allowed. Include written description of the operational changes being made to avoid attaining the maximum allowed.
  - c. Immediately stop drilling and notify the Engineer when the HDD pilot bore is out of design tolerance by 100 percent of the maximum allowed. Include written description of the operational changes being made and acceptable to the Engineer before the resumption of drilling.
  - d. Immediately notify the Engineer upon encountering an object that impedes advancement during HDD operations. Notify the Engineer of proposed measures to attempt to advance past the object, prior to initiating the attempt.



- e. Immediately notify the Engineer upon implementation of any contingency plan.
2. Provide daily HDD reports with the following information for each shift:
  - a. Date;
  - b. Project name;
  - c. Printed name and signature of operator.
  - d. Start and finish times for each crew each workday.
  - e. Start time of each activity;
3. Provide HDD operator's manual log:
  - a. One recorded measurement for every drill rod or every 30-foot advance, whichever is more frequent. For each of the recording points, record the following measurements along with the unit of measure:
    - 1) Time of measurement
    - 2) Surface station
    - 3) Drilling length
    - 4) Drill rod lengths
    - 5) Drilling time required for each drilling rod
    - 6) Advance rate
    - 7) Maximum force and direction of force, push or pull
    - 8) Maximum torque
    - 9) Drilling fluid pressures and flow rates
    - 10) Drilling fluid losses
    - 11) Pitch
    - 12) Inclination
    - 13) Roll
    - 14) Azimuth
    - 15) Any instances of retraction and re-drilling
4. Provide drilling fluid mixing and batching report: Measure and record drilling fluid viscosity and density (mud weight) with no more than 2 hours between readings, using calibrated Marsh funnel and mud balance, also include types and quantities of additives used.
5. For automated data recording, provide the operating parameters selected by the Engineer for recording. At a minimum, include the operating parameters specified for manual recording.
6. Perform and record results of 360-degree test roll of the guidance system in the drill string before initiation of drilling operations.
7. Surveying:
  - a. Record the position of the drill bit every drill rod or every 30-foot advance or every 30 minutes, whichever is more frequent.
  - b. Submit plot of the actual location of the bore path at the end of the shift by 9 AM the following workday, or as directed by the Engineer.
  - c. Submit as-built location of the pilot bore within 24 hours of completion of the pilot bore at a scale acceptable to the Engineer.
  - d. Submit survey reports in both hard copy and electronic format acceptable to the Engineer.
8. Provide hydrostatic pre-test record of carrier pipe performed prior to pullback.

G. Post-Construction Submittals:

1. Provide as-built survey of the installed pipe in both tabular format and AutoCAD format acceptable to the Engineer. Scale to be acceptable to the Engineer.
2. Provide final acceptance test records.

1.8 PROJECT CONDITIONS

- A. Refer to: Final Geotechnical Investigation Report, Proposed Recycled Water Pipeline Project, Adobe Road, Petaluma, California  
Date: February 24, 2020  
Author: Kleinfelder.

PART 2 PRODUCTS

2.1 MATERIALS

A. Carrier pipe:

1. Provide Fusible PVC pipe in accordance with Section 33 11 13.
2. Pipe thickness and strength shall conform to the conservative design with respect to anticipated construction and operational loads.

B. Conductor casing:

1. Provide steel pipe conforming to ASTM A-139, Grade B with minimum yield strength of 35,000 psi and shall not be spiral wound steel pipe.
2. Provide Permalok™ mechanical joining system or welded beveled ends prepared for full penetration butt-welds.
3. Provide conductor casing to the following dimensional criteria:
  - a. Circumference < 0.5%
  - b. Exterior Roundness < 0.5%
  - c. End Squareness +/- 1.5 mm
  - d. Straightness < 3 mm

C. Drilling fluid:

1. High yield sodium bentonite.
2. Water furnished from a potable water source.
3. Test all water for pH and treat with soda ash, or accepted equal, to adjust the pH of the water as required in the accepted mix design(s).
4. Bentonite, polymers, and additives, other than soda ash, shall be NSF/ANSI Standard 060 compliant.

D. Cementitious backfill grout for casing:

1. Provide Type V Portland cement conforming to ASTM C150.
2. Provide sand that conforms to ASTM C144, except for the following grading requirements:

Sieve Sizes	Percentage Passing by Weight
No. 8	100
No. 16	95 - 100
No. 30	60 - 85
No. 50	20 - 50
No. 100	10 - 30
No. 200	0 - 5

3. Provide potable water.

## 2.2 EQUIPMENT

### A. HDD equipment:

1. Provide directional drilling rig with all ancillary equipment, including drill pipe, drilling fluid, drilling tools, reaming bits, swivels, expanders, motors, generator, pumps, hoses, mixing equipment, drilling fluid processing equipment (cuttings separation equipment), fluid pressure and flow rate monitoring equipment, spare parts, pipe handling equipment, crane, backhoe, roller, side boom tractors, control cabin, control equipment, and office equipment.

### B. Spoil Separation Equipment:

1. Adequately separate the spoil from drilling fluid so that drilling fluid within the operating parameters can be returned to the drilling tool and hole for reuse. Use a mechanical separation plant, including scalping screens, shaker screens, de-sanding cones, de-silting cones, and centrifuge as deemed necessary by the operating parameters.
2. Monitor the composition of the drilling fluid to maintain the drilling fluid weight, gel strength, and viscosity limits defined by the operating parameters.

### C. Guidance Control System:

1. Provide active steering information to the operator showing the three dimensional position of the drill tool in relation to the designed alignment.
2. Maintain alignment to the tolerances specified herein.

### D. Provide and maintain a bore tracking system that locates the position of the drill head in the x, y, and z axis during the pilot bore.

### E. Provide a common grounding system to the HDD rig to prevent electrical shock in the event of high voltage underground cable strike. The grounding system shall connect all pieces of interconnecting machinery to a common ground. The drill rig shall be equipped with an "electrical strike" audible and visual warning system that notifies the system operators of an electrical strike.

### F. Provide all temporary fittings and pressure testing heads and work necessary to complete pressure testing of the pipe string as assembled for pullback and post installation. All tests shall be 100 percent passing for all required inspections before commencing pullback.

## PART 3 EXECUTION

### 3.1 GENERAL

- A. Perform all work in accordance with accepted submittals.
- B. Do not commence any HDD operation until all submittals, including submittals for all related work specified elsewhere, are reviewed and accepted by the Engineer.
- C. Maintain a copy of the Contract Documents on site.
- D. Provide the Engineer and City with full access during HDD operations.
- E. Locate all utilities in accordance with Section 02 01 10 before commencing with HDD required excavation.
- F. No excavation deeper than four (4.0) feet shall be permitted within 100 feet of the HDD alignment until after the HDD work is completed, except:
  - 1. Entry and exit pits required for HDD;
  - 2. Potholing to locate utilities or other subsurface features;
  - 3. Construct instrumentation as specified in Section 31 09 13.
- G. Protect in-place or relocate existing utility. Remove and replace in-kind any damaged utility.

### 3.2 WORK AREA PREPARATION AND MAINTENANCE

- A. Limit staging and work operations to the staging areas shown on the Contract Drawings.
- B. Organize work area to always enable safe and proper operation and minimize impacts to property owners.
- C. Contain separated spoils and drilling fluid for removal from the site.
- D. Combustible materials (fuel, oil, lubricants, etc.) shall be stored off-site or in a well-ventilated storage facility removed from the immediate vicinity of the drilling area by at least 20 feet.
- E. Provide a suitable containment basin made of plastic lining and sandbags for any equipment operating with fuel, hydraulic, or lubrication oils.
- F. Maintain and keep all equipment in working order. All oil, hydraulic, or fuel leaks shall be repaired upon discovery. Any leaking equipment shall not be used until repaired. Any fluid shall be contained and cleaned up upon discovery.
- G. The exit area shall have a drilling fluid pit lined to prevent fluid seepage into the ground and for containing drilling fluids and cuttings
- H. Provide temporary drainage facilities during construction.
- I. Treat and dispose of all water in accordance with the requirements specified in Section 31 23 19.

### 3.3 INSTALLATION

- A. Alignment Establishment:

1. Perform surveying in accordance with Section 01 30 00 and as specified herein.
2. Contractor's surveyor shall check line and grade shown on the Contract Drawings before commencing HDD operations and immediately report any errors or discrepancies to the Engineer.
3. Use the line and grade shown on the Contract Drawings to furnish and maintain reference control lines and grades for the potable water pipe construction.
  - a. Line and grade are shown as center line based upon the pilot pass.
- B. Establish and maintain constant communication between the entry and exit locations once pilot bore drilling has commenced and until the carrier pipe is completely pulled into place.
- C. Complete a full proof ream/swab pass prior to pullback.
- D. Perform hydrostatic water pressure test prior to pullback in accordance with Section 33 11 00.
- E. Isolate pipe from excessive torsional and axial stresses by a swivel device with a pre-established breakaway tensile capacity that is lower than the allowable tensile strength of the pipe.
- F. Fill pipe with potable water as it enters the bore during pullback.
- G. Provide adequate supports and rollers along the lay-down and carrier pipe build-up space to support the pipe during assembly and installation to prevent damage.
- H. Handle the carrier pipe in accordance with accepted submittals and as specified herein. Lift all piping using fabric slings with sufficient strength and width to safely pick up the pipe without strap failure and without causing scrapes or cuts to damage the pipe. Lifting with cable or chain shall not be permitted. Lifting one end of the pipe and dragging the pipe into position shall not be permitted. Protect the carrier pipe from impact and abrasion.
- I. Cease pullback operations if the pipe is damaged and remove pipe from the bore. Repair pipe using the manufacturer's recommended procedure or replace the damaged pipe before resuming installation.
- J. Remove the top portion of the conductor casing as shown on the Contract Drawings following carrier pipe installation.
- K. Backfill grout, as a minimum, the remaining top 5.0 feet of the conductor casing with cementitious material as specified herein.
- L. Do not cut the ends of the installed carrier pipe for at least 24 hours following completion of the pullback and relaxation of the tensile load.
- M. Perform final acceptance testing of the completed pipeline in accordance with Sections 33 11 00.
- N. If an object is encountered that impedes the advancement of HDD operations, make all diligent and reasonable efforts to advance past the object by drilling slowly through the object, pulling back, and drilling along a new bore path that avoids the object, or excavating and exposing and removing the object, and all other reasonable attempts to continue the bore. If attempt is made to pullback and re-drill, adhere to line and grade tolerances, unless the Engineer accepts the variance in writing, prior to the attempt. The

Contractor and Engineer shall investigate the cause and together determine an appropriate response. Appropriate response to address, at a minimum, the following subject matter; revisions to equipment and methods, retraction and re-drilling of a portion of the bore, and abandonment of the hole. If abandonment is deemed necessary, the Contractor shall recover, to the extent practicable, any drill pipe, product pipe, and tools in the bore, and properly abandon the bore, unless otherwise directed in writing by the Engineer. If the bore is abandoned, pressure-grout the abandoned bore with a lean cement-sand grout mixture, or other accepted material. If the bore is abandoned, begin a second attempt to install the pipeline at an alternate location subject to acceptance, in writing, by the Engineer. Take all reasonable actions to complete the installation with minimal delays. The extra costs and payments associated with encountering a confirmed obstruction will be negotiated between the Owner and Contractor, based on reasonable time and materials.

- O. For the removal and disposal of spoils, drilling fluids, all excavated material, unused soil, aggregate and other materials subcontract through Lee Graham or other Graham Equipment representative in accordance with Section 01 11 00.

### 3.4 SITE RESTORATION

- A. Remove all equipment, materials, drilling fluids, muck, waste, and debris from the site and restore the site to its original condition upon completion of the installation. Restoration shall be completed by the Contractor as specified within Section 31 00 00. Restore disturbed areas in accordance with Section 01 70 00.

END OF SECTION

SECTION 33 11 00

RECYCLED WATER UTILITIES

PART 1 GENERAL

1.1 DESCRIPTION

- A. Section includes: The Contractor shall provide all materials, equipment, and labor necessary to furnish and install all water pipe with all necessary fittings and coupling systems and all appurtenant work, complete and operable, including all connections as shown on the Drawings and as specified herein.
- B. All recycled water piping materials, equipment and installation shall be in accordance with the AWWA Standards.
- C. Section includes:
  - 1. Water Main Piping.
  - 2. Couplings.
  - 3. Restrained Joints for DI Piping.
  - 4. Restrained Joints for PVC Piping.
  - 5. Tracer Wire.
  - 6. Detectable Pipe Warning Tape.
  - 7. Bedding and Cover Materials.
  - 8. Gate Valves.
  - 9. Butterfly Valves.
  - 10. Air Release / Vacuum Valves.
  - 11. Bolts for Underground Piping and Valves.
  - 12. Mechanical Seals and Water Stops.
  - 13. Non-shrink Grout.
  - 14. Recycled Water System Labeling.

1.2 RELATED WORK

- A. Contract General Conditions.
- B. Section 31 01 40 - Shoring and Trench Safety.
- C. Section 31 23 00 - Trench Excavation and Backfill.
- D. Section 31 23 19 - Dewatering.

1.3 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. American Public Works Association (APWA)
  - 1. Uniform Color Code for Marking of Underground Utility Locations.
- B. American Society of Testing and Materials (ASTM)
  - 1. ASTM A193-90a – Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High Temperature or High Pressure Service and Other Special Purpose Applications
  - 2. ASTM A194-22 – Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both
  - 3. ASTM A536-84(2019)e1 – Standard Specification for Ductile Iron Castings

4. ASTM D2737-21 – Standard Specification for Polyethylene (PE) Plastic Tubing
  5. ASTM F477-14(2021) – Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe
- C. American Water Works Association (AWWA)
1. AWWA C104-22 – Standard for Cement–Mortar Lining for Ductile-Iron Pipe and Fittings
  2. AWWA C105-18 – Polyethylene Encasement for Ductile-Iron Pipe Systems
  3. AWWA C110-21 – Standard for Ductile-Iron and Gray-Iron Fittings
  4. AWWA C111-23 – Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
  5. AWWA C153-19 – Standard for Ductile-Iron Compact Fittings for Water Service
  6. AWWA C509-23 – Resilient-Seated Gate Valves for Water Supply Service
  7. AWWA C550-17 – Protective Interior Coatings for Valves and Hydrants
  8. AWWA C600-17 – Installation of Ductile Iron Water Mains and their Appurtenances.
  9. AWWA C901-20 – Standard for Polyethylene (PE) Pressure Pipe and Tubing, ½ In. (13 mm) through 3 In. (76 mm), for Water Service – PE material designations PE 2708, PE 3608, and PE 4710.
  10. AWWA C906-21 – Polyethylene (PE) Pressure Pipe and Fittings, 4 in. Through 65 in. (100 mm Through 1,650 mm), for Waterworks
- D. National Fire Protection Association (NFPA):
1. 24-22 – Installation of Private Fire Service Mains and Their Appurtenances
  2. 291-22 – Fire Flow Testing and Marking of Hydrants
- E. NSF International:
1. 61-22 – Drinking Water System Components-Health Effects (Sections 1-9)
- F. American Welding Society (AWS):
1. A5.8 04      Brazing Filler Metal
- G. Foundation for Cross-Connection Control and Hydraulic Research-2005
- H. Copper Development Association's Copper Tube Handbook-2005

#### 1.4 QUALITY ASSURANCE

- A. Standards: The materials and work performed in this Section shall conform to the applicable standards of:
1. The American National Standards Institute (ANSI).
  2. The American Society for Testing and Materials (ASTM).
  3. American Water Works Association Inc. (AWWA).
  4. The National Sanitation Foundation (NSF).
  5. The American Society of Mechanical Engineers, Boiler and Pressure Vessel Code (ASME).
  6. Plumbing and Drainage Institute (PDI).
  7. Underwriters Laboratories Inc. (UL).
  8. Uniform Plumbing Code (UPC).
  9. National Fire Protection Association (NFPA).
  10. Factory Mutual Research Corporation (FMRC).
- B. Tests: All materials used in the manufacture of the pipe shall be tested in accordance with the requirements of AWWA and NSF-61, and the referenced standards, as applicable, in addition to national, local, and state codes.
- C. Contractor shall coordinate with and provide a minimum 48 hour notice to the City for all inspections.



- D. All costs of inspection and tests shall be borne by the Contractor.
- E. The pipe shall be subjected to the specified hydrostatic strength tests, flexure tests, and crushing tests. The crushing tests shall be made on samples taken from the center of full-length sections of pipe.
- F. The Contractor shall verify with the pipe manufacturer all connection details.
- G. Qualification of manufacturers:
  - 1. The material shall be the product of a supplier regularly engaged in the manufacturing of pipe and plumbing products.
  - 2. All materials shall be new and of current manufacture and shall be guaranteed against defects or workmanship in accordance with the General Conditions.
- H. Qualification of installers:
  - 1. For the actual assembly, installation, and testing of the work in this Section, use only thoroughly trained and experienced personnel who are completely familiar with the requirements for this work and with the installation recommendations of the manufacturers of the specified items.
  - 2. In acceptance or rejection of installed materials, no allowance will be made for lack of skill on the part of installers.

#### 1.5 CONTRACTOR SUBMITTALS

- A. Submittals shall be in accordance with Section 01 33 00, "Submittal Procedures". Submit complete shop drawings including layouts, elevations, and details to the Engineer.
- B. Submit all product data, shop drawings, laboratory test results, material source information, and certificates of compliance listed in this Section under a single submittal cover for review. Incomplete submittals will not be reviewed.
- C. Material List:
  - 1. In accordance with the provisions of Section 01 33 00 "Submittal Procedures" of the Specifications, submit with the shop drawings a complete list of all materials and equipment proposed to be furnished and installed under this portion of the work, giving manufacturer's name, catalog number, and catalog cuts for each item where applicable.
- D. Manufacturers' Literature and Data (Submit all items as one submittal package for review):
  - 1. Ductile Iron Pipe shall be in accordance with ANSI/AWWA C151/A21.51; and shall be provided to Engineer for approval.
  - 2. C900 PVC Pipe.
  - 3. Schedule 80 PVC Pipe.
  - 4. Piping.
  - 5. Gaskets.
  - 6. Valves.
  - 7. Check Valves.
  - 8. Service line products.
  - 9. Valve boxes.
  - 10. Joint restraint.
  - 11. Coupling.
  - 12. Disinfection products.
  - 13. Detection Wire
- E. Testing Certifications:

1. Hydrostatic Testing.
  2. Certification of Disinfection, including free chlorine residuals, and bacteriological examinations.
- F. Temporary Water Supply Plan: Submit plan outlining the steps that the Contractor will take to provide water to properties where the water supplies have been disrupted.
- G. Manufacturer's recommendations:
1. Accompanying the materials list and shop drawings, submit four copies of the manufacturer's current recommended method of installation.
- H. Certificates of Compliance: Certificates of Compliance shall be provided for all products and materials proposed to be used under this Section.

## 1.6 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate the Work with termination of water connections inside and outside building, trenching, connection to municipal water system, and connection to treatment and backwash system.

## 1.7 DELIVERY, STORAGE, AND HANDLING:

- A. Coated pipe shall be shipped on bunks, and secured with nylon belt tied down straps or padded banding located approximately over braces. Coated pipe shall be stored on padded skids, sand or dirt berms, sand bags, old tires or other suitable means so that coating will not be damaged. Coated pipe shall be handled with the wide belt slings, padded forks, or other means that will not damage the pipe or coating. Chains, cables or other equipment likely to cause damage to the pipe or coating shall not be used. Prior to shipment, the pipe shall be visually inspected for damage to the coating. Any damaged areas shall be repaired at the Contractor's expense in accordance with the standard to which the coating was applied.
- B. Deliver and store valves and other materials and appurtenances in shipping containers with labeling in place.

## PART 2 PRODUCTS

### 2.1 GENERAL

- A. These Specifications are intended to be standard specifications and they may therefore contain specifications for materials not required for this project or allowed on any or various parts of it. Certain materials, which are applicable for only one portion or a small portion, may be shown on the plans and not particularly specified herein.
- B. All materials shall conform to sizes, capacity, quality and quantities as shown on the drawings or described in these Specifications. Materials shall be from new stock, delivered in good condition. No damage to stock shall be used.
- C. Where no method of tests for materials is specified, the latest applicable test specified by ASTM or AWWA shall be followed.
- D. After delivery to the site, all materials shall be carefully unloaded, protected against breakage, rusting, accumulation of foreign matter, disintegration, and injury. The Contractor

shall be responsible for all lost or damaged material supplied and work done under this contract.

## 2.2 RECYCLED WATER MAIN PIPING

- A. Polyvinyl Chloride (PVC) Pipe:
1. Size: As shown on plans.
  2. Color: Purple.
  3. Pipe: Less than 4": Schedule 80 PVC.
    - a. Fittings: Schedule 80 PVC.
    - b. Joints: Solvent weld, use heavy duty PVC cement and primer.
  4. Pipe: 4" through 16": AWWA C900 DR 18 Pressure Class 235, Cast-Iron Pipe Size
    - a. Fittings: See Ductile Iron Fittings.
    - b. Joints:
      - 1) ASTM D3139 and ASTM F477 PVC flexible elastomeric seals. Solvent-cement couplings are not permitted, except in sizes less than 3" in diameter.
      - 2) All joints shall be integral, bell, and spigot gasketed joints or plain end with rubber ring couplings.
      - 3) All joints shall be supplied from the manufacturer with an assembly mark for use in installation so joints are not over-stabbed.
      - 4) When the spigot end of pipe is to be inserted into a mechanical joint fitting, the beveled end of the pipe shall be removed prior to insertion.
- B. Ductile Iron Pipe (DIP):
1. Size: As shown on plans.
  2. Pipe: ANSI/AWWA C151/A21.51, Pressure Class 350.
  3. Below Grade Pipe:
    - a. Mechanical Joint Pipe.
    - b. Restrained Joints:
      - 1) Boltless, push-on type, joint restraint independent of joint seal.
      - 2) Gaskets: rubber ring type push-on TYTON gasketed joints.
      - 3) Jackets: ANSI/AWWA C105/A21.5 polyethylene jacket.
        - a) Color: Purple
        - b) Provide a polyethylene encasement around pipe, fittings, and valves.
        - c) Make provisions to keep the polyethylene from direct exposure to sunlight prior to installation. Backfill following installation without delay to avoid exposure to sunlight.
    - c. Interior Lining:
      - 1) Cement mortar lining interior in accordance with ANSI/AWWA C104/A21.4.
    - d. Exterior Coating:
      - 1) Asphaltic coating in accordance with ANSI/AWWA C151/A21.51.
    - e. Manufacturer:
      - 1) U.S. Pipe.
      - 2) American.
      - 3) Clow Water Systems Co.
      - 4) Approved equivalent.
  4. Above Grade Pipe and Fittings:
    - a. Flanged Joints: AWWA C115.
    - b. Gaskets: rubber gasketed joints, 1/8 inch thick.
    - c. Interior Lining: Fusion-bonded epoxy in accordance with ANSI/AWWA C116/A21.16.
    - d. Exterior Coating: Fusion-bonded epoxy in accordance with ANSI/AWWA C116/A21.16.
    - e. Exterior Top Coat Hi-Solids Polyurethane (Dry Film Thickness per ct.: 3.0 – 5.0 Mils).

- 1) Manufacturer: Sherwin Williams or approved equivalent.

C. Ductile Iron Fittings (below grade):

- a. Ductile iron: ANSI/AWWA C110/A21.10.
- b. Compact fittings ANSI/AWWA C153/A21.53.
- c. Coating and Lining:
  - 1) Above Ground: Cement-mortar lining in accordance with AWWA-C104 and fusion-bonded epoxy coating in accordance with ANSI/AWWA C116/A21.16. Provide a polyurethane top coat on all above ground piping not made of stainless steel.
  - 2) Below Ground: Cement-mortar lining in accordance with AWWA-C104, and an exterior bituminous coating in accordance with AWWA C203.
  - 3) Jackets for Below Ground: ANSI/AWWA C105/A21.5 polyethylene jacket.

## 2.3 COUPLINGS

A. Restrained Coupling

1. Type: AWWA C219, NSF 61 listed.
2. Body:
  - a. Ductile Iron; ASTM A536.
  - b. Carbon Steel; ASTM A513, ASTM A53 or ASTM A283C.
3. Gaskets: Virgin Styrene Butadiene Rubber (SBR) for water services; ASTM D2000 MBA 710.
4. Bolts: 316 stainless steel.
5. Coating: Fusion-bonded epoxy in accordance with ANSI/AWWA C116/A21.16, or approved equivalent.
6. Pressure rating: meet or exceed adjacent piping system rating.
7. System compatible with connecting pipe; verify connecting pipe O.D.

B. Restrained Flange Coupling Adaptor

1. System: restrain plain end of pipe to a flange, conforming to AWWA C110.
2. Body:
  - a. Ductile Iron; ASTM A536
  - b. Carbon Steel; ASTM A513, ASTM A53 or ASTM A283C.
3. Gaskets: Virgin Styrene Butadiene Rubber (SBR) for water services; ASTM D2000 MBA 710.
4. Bolts: 316 stainless steel.
5. Coating: Fusion-bonded epoxy in accordance with ANSI/AWWA C116/A21.16, or approved equivalent.
6. Pressure rating: meet or exceed adjacent piping system rating.
7. System compatible with connecting pipe; verify connecting pipe O.D.

C. Reducing Coupling

1. System: restrain plain end of pipe to a flange, conforming to AWWA C110.
2. Body:
  - a. Ductile Iron; ASTM A536.
  - b. Carbon Steel; ASTM A513, ASTM A53 or ASTM A283C.
3. Gaskets: Virgin Styrene Butadiene Rubber (SBR) for water services; ASTM D2000 MBA 710.
4. Bolts: 316 stainless steel.
5. Coating: Fusion-bonded epoxy in accordance with ANSI/AWWA C116/A21.16, or approved equivalent.
6. Pressure rating: meet or exceed adjacent piping system rating.
7. System compatible with connecting pipe; verify connecting pipe O.D.

D. Manufacturers:

1. ROMAC Industries, Inc.
2. Smith-Blair.
3. Approved Equivalent.

#### 2.4 RESTRAINED JOINTS FOR DUCTILE IRON PIPING

- A. Manufacturer:
  1. EBAA Iron - Series 1100.
  2. Romac Industries, Inc. - Romagrip.
  3. Substitutions: Section 01 60 00 - Product Requirements.
- B. Materials: Ductile Iron, ASTM A536.
- C. Coating: MEGA-BOND or approved equivalent.
- D. Pressure rating: minimum working pressure rating equivalent to the pipe.

#### 2.5 RESTRAINED JOINTS FOR POLYVINYL CHLORIDE PIPING

- A. Bell Restraint Harness for C900:
  1. EBAA Iron, Inc., Series 1600.
  2. Romac Industries, Inc., 600 Series, Style 611.
  3. Approved Equivalent.
- B. Bell Restraint Harness for C905 (C.I. OD):
  1. EBAA Iron, Series 2800.
  2. Approved Equivalent.
- C. Mechanical Joint Fittings for C900 and C905:
  1. EBAA Iron, Inc., Series 2000PV.
  2. Romac Industries, Inc., PVC – RomaGrip.
  3. Approved Equivalent.

#### 2.6 TRACER WIRE

- A. Manufacturers:
  1. Pro-Line.
  2. Substitutions: Section 01 60 00 - Product Requirements.
- B. Characteristics:
  1. Type: THWN.
  2. Gage: No. 12.
  3. Materials: Copper conductor, PVC insulation, nylon jacket.

#### 2.7 WARNING TAPE

- A. Tape shall be an inert plastic film (non-metallic) formulated for prolonged underground use that will not degrade when exposed to alkalis, acids and other destructive substances commonly found in soil.
- B. Tape shall be puncture-resistant and shall have an elongation of two times its original length before parting.
- C. Tape shall be installed with the printed side up and run continuously along the entire length of the utility intended for identification. Tape shall be installed on the main piping

and all appurtenant laterals, including blowoffs, air valve assemblies, fire hydrants, and services. Tape splices shall overlap a minimum of twenty-four (24) inches for continuous coverage.

- D. Tape shall be colored blue to identify the waterline with printed message: "Caution: Waterline Buried Below". Ink used to print messages shall be permanently fixed to tape and shall be black in color with message printed continuously throughout.
- E. Tape shall be minimum 0.004 inches (or 4 mil) thick x six (6) inches wide with a printed message on one side. Tape used with the installation of onsite potable shall be a minimum of three (3) inches wide.

## 2.8 BEDDING AND COVER MATERIALS

- A. Unless otherwise specified or shown, all material used for pipe embedment shall be as specified in Section 31 23 00, "Trench Excavation and Backfill."
- B. For pipe bedding and backfill, refer to Section 31 00 00, "Earthwork."

## 2.9 GATE VALVES

- A. Resilient Wedge Gate Valves: AWWA C509.
  - 1. Body Material: ductile iron.
  - 2. Working Pressure: 250psig.
  - 3. Seat: Resilient.
  - 4. Stem: Non-rising bronze stem.
  - 5. Underground Installation: Operating Nut: 2-inch square; open counterclockwise unless otherwise indicated.
  - 6. Aboveground Installation: Hand wheel.
  - 7. Ends: Mechanical joint end connections for underground installation. Flanged joint end connections for aboveground installation.
  - 8. Coating: 12-mil holiday-free epoxy AWWA C550; interior/exterior.
  - 9. Bolting: 304 stainless steel
- B. Manufacturers:
  - 1. Mueller Company
  - 2. Clow Eddy - Iowa
  - 3. American Flow Control
  - 4. Substitutions: Section 01 60 00 - Product Requirements.

## 2.10 BUTTERFLY VALVES

- A. Butterfly valves shall be manufactured and tested in accordance with AWWA Standard C504 for Class 150B.
  - 1. Ductile iron body, stainless steel shaft and discs with stainless steel seating edge.
  - 2. Valve seats shall be vulcanized, bonded, mechanically secured, or clamped to the body.
  - 3. Valves shall be the stub or through shaft design type.
  - 4. Wafer type valves shall not be permitted.
  - 5. Valves shall be the traveling nut type and open with a counterclockwise rotation.
  - 6. Valve discs shall rotate 90 degrees from the full open position to the tight shut position.
  - 7. Valve seat shall provide a seal at a pressure differential of 150 psi upstream and 0 psi downstream in either direction.
  - 8. Valves shall have a fully line rubber inner body or have corrosion resistant fusion-bonded epoxy coating internally and externally.

- B. Manufacturers:
  - 1. Mueller Company
  - 2. Clow Valve
  - 3. DeZurik
  - 4. Substitutions: Section 01 60 00 - Product Requirements.

#### 2.11 AIR RELEASE / VACUUM VALVE

- A. Size: Per plan.
- B. Well Service Air Valves, Hydrostatically tested to ANSI/AWWA C512 standards.
- C. Stainless steel floats, cast iron body and cover, Buna-N seat, stainless steel needle.
- D. Stainless steel protection screens.
- E. NSF/ANSI 61 Certified.
- F. Enclosure:
  - 1. Material: 14 gauge steel with 10 gauge steel top with one expanded metal face, 2-3 mil powder coated.
  - 2. Base Frame made from 2"x 2" angle, 3/16" thick.
  - 3. Stainless steel internal hinges. No exterior hinges or anchor fasteners.
  - 4. Stainless steel recessed single lock hasp for security.
  - 5. Exterior handles for accessibility.
  - 6. Full access service ability.
  - 7. Top surfaces crowned for drainage.
  - 8. Manufacturer:
    - a. Placer Waterworks, Inc. R-Model.
    - b. Approved Equivalent.
- G. Manufacturers:
  - 1. ValMatic 800 Series.
  - 2. APCO clean water air release valve.
  - 3. Substitutions: Section 01 60 00 - Product Requirements.

#### 2.12 BOLTS FOR UNDERGROUND PIPING, FITTINGS AND VALVES

- A. Bolts: Type 316 Stainless Steel, heavy hex head.
- B. Nuts: Type 316 Stainless Steel, heavy hex nuts.
- C. Plastic washers and sleeves for dielectric joints shall be provided.

#### 2.13 MECHANICAL SEALS AND WATERSTOPS

- A. Mechanical Seals:
  - 1. Description: Shall be modular, mechanical type for core drilled applications, consisting of inter-locking synthetic elastomeric rubber links shaped to continuously fill the annular space between the pipe and the wall opening.
  - 2. Seal Element: EPDM.
  - 3. Pressure Plates: Reinforced Nylon Polymer
  - 4. Bolts, Nuts and Hardware: 316 Stainless Steel.
  - 5. Manufacturer: Link-Seal.
  - 6. Substitutions: Section 01 60 00 - Product Requirements.

- B. Silicone Sealants: High-performance waterproof silicone sealant specifically designed for below grade and submerged applications.
- C. Waterstops:
  - 1. Manufacturer: Volclay Waterstop-RX.
  - 2. Substitutions: Section 01600 - Product Requirements.

2.14 NON-SHRINK GROUT

- A. Pre-mixed ready for use formulation requiring only addition of water; non-shrink, non-corrosive, non-metallic, non-gas forming, no chlorides.
- B. Properties: Certified to maintain initial placement volume or expand after set and meet the following minimum properties when tested in accordance with CRD-C621, for Type D non-shrink grout:

Property	Test	Time	Result
Setting Time	ASTM C191	Initial	2 hours (Approx)
		Final	3 hours (Approx)
Expansion			0.10% - 0.4% Maximum
Compressive Strength	CRD-C621	1 day	4,000 psi
		7 days	7,000 psi
		28 days	10,000 psi to 10,800 psi

2.15 RECYCLED WATER SYSTEM LABELING

- A. Below Grade Pipe:
  - 1. Pipe Color: Purple
  - 2. Pipe Label: "RECYCLED WATER - DO NOT DRINK"
  - 3. Label Location: Opposite sides of the pipe.
  - 4. Where purple pipe cannot be used, the pipes shall be installed with warning tape. The plastic warning tape shall be an inert plastic film specifically formulated for prolonged underground use and shall be prepared with black printing on a purple field having the words, "RECYCLED WATER - DO NOT DRINK". The minimum thickness shall be 4 mils and the overall width of the tape shall be a minimum of 3-inches.
- B. Identification Tags and Labels:
  - 1. Material: Permanent inert material specifically formulated for prolonged exposure to weather, UV, and immersion without fading or deterioration
  - 2. Label: Black printing on a purple field with the words: "WARNING - RECYCLED WATER - NOT FOR DRINKING" on one side and "AVISO - NO ES PARA BEBER" on the other side.
  - 3. Size: The minimum height of letters shall be 1/2-inch. The minimum tag thickness shall be 4 mils for adhesive backed labels and 10 mils for tag type labels. Tag type labels shall have reinforced tie holes.
  - 4. Submit sample of each label type to Engineer for approval prior to procuring labels.
  - 5. The type of label, location and attachment method shall be as follows and subject to acceptance by the Engineer:

Item	Label Type	Label Location	Attachment Method
Valve (below grade)	Tag	Top of riser pipe	Heavy-duty nylon fasteners
Valve (above grade)	Tag	Hand wheel	Heavy-duty nylon fasteners
Valve Box	Lettering	Top of cover	Factory Cast



Item	Label Type	Label Location	Attachment Method
ARV	Tag	Front of cabinet	Rivets or bolts
Blow-off	Tag	Top of riser pipe	Heavy-duty nylon fasteners
Blow-off Box	Lettering	Top of cover	Factory Cast
Meter Box	Lettering	Top of cover	Factory Cast
Angle Meter Valve	Tag	Valve body	Heavy-duty nylon fasteners
Backflow Assembly	Tag	Valve body	Heavy-duty nylon fasteners

### PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify existing utility water main size, location, and inverts are as indicated on Drawings.

#### 3.2 PREPARATION

- A. Cut pipe ends square, ream pipe and tube ends to full pipe diameter, remove burrs. Use only equipment specifically designed for pipe cutting. Use of chisels or hand saws will not be permitted. Grind edges smooth with beveled end for push-on connections.
- B. Remove scale and dirt on inside and outside before assembly.
- C. Prepare pipe connections to equipment with flanges or unions.

#### 3.3 BEDDING AND BACKFILL

- A. For pipe bedding and backfill, refer to Section 31 00 00, "Earthwork."
- B. Maintain optimum moisture content of bedding material to attain required compaction density.

#### 3.4 INSTALLATION - PIPE

- A. Install pipe in accordance with manufacturer's installation instructions. Provide copy of manufacturer's installation instructions to Engineer.
- B. Install ductile iron pipe in accordance with manufacturer's instructions and AWWA C600.
- C. Install PVC pipe in accordance with manufacturer's instructions and AWWA C900.
- D. Maintain separation from potable water main in accordance with State of California Department of Public Health and Division of Drinking Water code.
- E. Install pipe to indicated elevation to within tolerance of 5/8 inches.
- F. Install tracer wire on the top of the installed pipe. Tape tracer wire to pipe at minimum 10 foot intervals.
- G. Route pipe in straight line.

- H. Curvature of PVC pipe shall be accomplished through longitudinal bending of the pipe barrel only. Deflection of joints is not allowed.
- I. When curving pipe, do not deflect joints in PVC pipe. Joints in DIP may be deflected within allowable limits specified by manufacturer.
- J. When stabbing bell and spigot pipe, verify that the manufacturer's assembly mark on the pipe joint is flush with the end of the bell.
- K. Install pipe with no high points, except where shown on Plans. If unforeseen field conditions arise which necessitate high points, install air release valves as directed by Engineer.
- L. Install pipe to have bearing along entire length of pipe. Excavate bell holes to permit proper joint installation. Do not lay pipe in wet or frozen trench.
- M. Install pipe to allow for expansion and contraction without stressing pipe or joints.
- N. Close pipe openings with watertight plugs during work stoppages.
- O. Install access fittings to permit disinfection of water system.
- P. Form and place concrete for thrust restraints at each elbow or change of direction of pipe main.
- Q. Establish elevations of buried piping with not less than 4 feet of cover. Measure depth of cover from final surface grade to top of pipe barrel.
- R. Install pipe warning tape continuous over top of pipe buried 12 inches below finish grade, above pipe line.

### 3.5 INSTALLATION - VALVES

- A. Gate Valves: Install valves per Plan.
- B. Set valves on solid bearing compacted soil.
- C. Center and plumb valve box over valve. Set box cover flush with finished grade.
- D. Install tracer wire from pipe on both sides of valve into PVC riser and to within 2 inches of the top of the valve box.

### 3.6 POLYETHYLENE ENCASEMENT

- A. Encase ductile iron pipe fittings in polyethylene to prevent contact with surrounding backfill material.
- B. Install in accordance with AWWA C105.
- C. Terminate encasement 3 to 6 inches above ground where pipe is exposed.

### 3.7 PIPE SLEEVES:

- A. Install where water lines pass through retaining walls, building foundations and floors. Seal with modular mechanical type link seal. Install piping so that no joint occurs within a sleeve. Split sleeves may be installed where existing lines pass through new construction.

### 3.8 THRUST RESTRAINT

- A. Install clamps, set screw retainer glands, or restrained joints. Protect metal restrained joint components against corrosion by applying a bituminous coating, or by concrete mortar encasement of metal area. Do not encase pipe and fitting joints to flanges.
- B. Install thrust blocks as shown on the Drawings. Concrete for thrust blocks shall be in accordance with Section 03 30 00 Cast-in-Place Concrete.

### 3.9 WATER METERS

- A. Install water meter box and water meter per Drawings.

### 3.10 PRESSURE TESTING

- A. Prior to acceptance of the Work by the City, the Contractor shall perform pressure testing on potable water distribution systems in accordance:
  - 1. AWWA C600 for ductile iron pipe.
  - 2. AWWA C605 for PVC pipe.
  - 3. AWWA C901 for Polyethylene pressure pipe.
- B. Prior to acceptance and initial operation, inspect and test the piping system to ensure that the design, materials, fabrication, and installation are in accordance with these specifications.
- C. Test piping prior to being enclosed, covered-up, or treated externally with insulation, tape wrapping, mastic coating, and like treatments, unless noted otherwise in other sections.
- D. When existing water mains are used to supply test water, they shall be protected from backflow contamination by temporarily installing a double-check-valve assembly between the test and supply main or by other approved means. Before pressure testing, the temporary backflow protection shall be removed and the main under test isolated from the supply main.
- E. Notify the Engineer at least 48 hours prior to testing, and conduct tests in the presence of Engineer.
- F. Piping systems shall show no pressure loss, unless noted otherwise, while being tested in accordance with this section. When leakage or other defects are located, repair or replace the affected portion of the piping system and retest. In the event repairs, replacement, or additions are made following the pressure test, retest the affected piping. In the case of very minor repairs, replacement, or additions, the Engineer may, solely at its discretion, omit retesting provided precautionary measures are taken to assure sound construction.
- G. When tests indicate Work does not meet specified requirements, remove Work, replace and retest at the Contractor's expense.
- H. General Test Procedures:
  - 1. All valves shall be in full-open position during the test. Do not include components (gauges, relief valves, instrumentation, and like items) as part of the tests that are not rated for the testing pressure.
  - 2. Do not attempt to modify a piping system when it is pressurized, including tightening leaking joints. Do not repair, replace, or retighten leaking joints or components until the pressure has been reduced to ambient level.
  - 3. Measure test pressure with a manometer or with a pressure-measuring device designed and calibrated to read, record, or indicate the maximum test pressure.

Record pressure loss due to leakage during the pressure test period while the system is pressurized but isolated from the pressure source.

4. Test at a minimum of 150 percent of their maximum sustained working pressure using clean water. The test allowance shall not be less than the amount determined using AWWA C605 for any segment of pipe tested. The Engineer must witness hydrostatic testing. The test pressure shall be not less than the following values, irrespective of the design maximum allowable working pressure:
  - a. Maximum Sustained Working Pressure: 167 psi
  - b. Test Pressure: 250 psi (minimum)
  - c. Test duration: 2 hours (minimum)
5. Prepare test records of inspection and tests performed. Indicate which portions of the piping system are in accordance these specifications. Briefly document test procedures, instruments and media used, and test pressures. Before requesting final approval of a piping installation, submit copies of test records for Engineer's approval.

### 3.11 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Compaction Requirements: In accordance with Section 31 23 00.
- C. When tests indicate Work does not meet specified requirements, remove Work, replace and retest at the Contractor's expense.

END OF SECTION

SECTION 33 11 13

FUSIBLE PVC PIPE

PART 1 - GENERAL

1.1 THE REQUIREMENT

- A. The Contractor shall furnish all tools, equipment, materials, and supplies and shall perform all labor required to complete the Work as indicated in the Contract Documents.
- B. The Contractor shall furnish, install, and test fusible polyvinylchloride (FPVC) pipe, fittings, and appurtenances of the dimensions and to the lines and grades shown in the Contract Documents.
- C. This section covers the furnishing and installation of fusible polyvinylchloride pipe as carrier pipe and casing pipe and fittings for recycled water pipelines, as specified and shown in the Contract Documents.
- D. All FPVC joints shall be de-beaded as specified herein.
- E. Excavation and backfill, including the pipe bedding, shall conform to the provisions of Section 33 00 00, Earthwork, of these Specifications.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. The requirements of the following sections and divisions apply to the Work of this section. Other sections and divisions of the Specifications, not referenced below, shall also apply to the extent required for proper performance of this Work.
  - 1. Section 01 10 00 Summary of Work.
  - 2. Section 31 00 00 Earthwork.
  - 3. Section 33 05 23.13 Horizontal Directional Drilling.
  - 4. Section 33 11 00 Recycled Water Utilities.

1.3 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. All Work specified herein shall conform to or exceed the applicable requirements of the referenced portions of the following publications to the extent that the provisions thereof are not in conflict with other provisions of these Specifications.
- B. Comply with the current provisions of the following codes and standards.
  - AWWA C110 Standard for Ductile-Iron and Gray-Iron Fittings.
  - AWWA C111 Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
  - AWWA C153 Standard for Ductile-Iron Compact Fittings.
  - AWWA C605 Standard for Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings.
  - AWWA C900-22 Standard for Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 inch through 60 inch. (100 mm through 1,500 mm).

AWWA M23	AWWA Manual of Supply Practices PVC Pipe - Design and Installation, Third Edition.
ASTM D1784	(2020) Standard Classification System and Basis for Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds.
ASTM D1785	(2021) Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
ASTM D2152	(2017) Standard Test Method for Adequacy of Fusion of Extruded Poly(Vinyl Chloride) (PVC) Pipe and Molded Fittings by Acetone Immersion.
ASTM D2241	(2020) Standard Specification for Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).
ASTM D3034	(2016) Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
ASTM F477	Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
ASTM F679	(2016) Standard Specification for Poly(Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings.
SSPWC	(2021) "Green Book", Standard Specifications for Public Works Construction.

- C. Comply with the applicable reference specifications as directed in the General Conditions.

#### 1.4 CONTRACTOR SUBMITTALS

- A. Submittals shall be made in accordance with the Standard Specifications, General Conditions and Special Conditions and as specified herein.
- B. The following product data is required from the pipe supplier and/or fusion provider:
1. Pipe Size.
  2. Dimensionality.
  3. Pressure Class per applicable standard.
  4. Color.
  5. Recommended Minimum Bending Radius.
  6. Recommended Maximum Safe Pull Force.
  7. Fusion technician qualification indicating conformance with this Specification.
  8. Recommendations for shipping, handling, lifting, fusing, surface testing, and final testing.
  9. Recommendations for HDD installation including maximum scouring and gouging of the sidewall during installation.
  10. Manufacturer's technical data showing complete information on material composition, physical properties, pressure rating and dimensions of the FPVC pipe. Manufacturer's recommendations for transport, handling, storage, and repair of the FPVC pipe shall be included.
  11. Specifications of fusing machine and fusing procedures and restrictions, including machine cut sheet.
  12. Fusion machine data logger with temperature, date and pressure recording elements.

13. Submittals shall include complete design calculations for each pipe size and pipe DR to be furnished.
  14. Pipe manufacturers' joint assembly procedure including cool down time and data logger equipment.
  15. Detailed Pipe Laying Schedule.
  16. FPVC fusion technician's experience and qualifications demonstrating conformance with Quality Assurance requirements.
  17. Written certification from the FPVC pipe fusion equipment supplier that the fusion technician has received training in the proper use of the fusion equipment and the manufacturer's recommended fusion equipment.
  18. Fusion Data (heater plate temperature, hydraulic cylinder interface pressures, time/duration, etc.) shall be submitted to the Engineer within 48 hours of the day the fusion was performed. Submittal shall be in format easy to understand and read with clear designation of the joint under review.
  19. Shop drawings and cut sheets providing information on fittings, including dimensions, compliance with standards and pressure rating.
  20. Information on pipe accessories, including but not limited to special adaptors for connections to ductile iron fittings.
  21. FPVC pipe manufacturer shall furnish an affidavit of compliance that all delivered materials comply with the requirements of these specifications.
  22. Contractor preconstruction submittals for HDD installation.
- C. Certifications: The Contractor shall furnish a certified affidavit of compliance for all pipe and other products or materials furnished under this section, as specified in the referenced standards and the following supplemental requirements:
1. Hydrostatic test reports.
  2. Three-edge bearing strength test reports.

#### 1.5 CARE AND HANDLING

- A. All pipe shall be bundled or packaged in such a manner as to provide adequate protection of the ends during transportation to the site. Any pipe damaged in shipment shall be replaced as directed by the Engineer.
- B. Pipe shall be loaded, off-loaded, and otherwise handled in accordance with AWWA M23, and all the pipe supplier's guidelines shall be followed.
- C. Any scratch or gouge greater than 10% of the wall thickness will be considered significant and will be rejected.
- D. Pipe lengths should be stored and placed on level ground. Pipe should be stored at the job site in the unit packaging provided by the manufacturer. Caution should be exercised to avoid compression, damage, or deformation to the ends of the pipe. The interior of the pipe, as well as all end surfaces, should be kept free from dirt and foreign matter.
- E. The Contractor shall not store pipe upon the roadway or parkway of residential streets for more than 5 days or upon commercial streets for more than 3 days.
- F. Pipe shall be stored and stacked per the pipe supplier's guidelines.

#### 1.6 QUALITY ASSURANCE

- A. General
  1. All piping shall be made from PVC compound conforming to cell classification 12454 per ASTM D1784.

2. Fusion Technician shall be certified by the pipe supplier to fuse fusible polyvinyl chloride pipe of the type(s) and size(s) being used. Qualification shall be current as of the actual date of fusion performance on the project.
3. Fusible polyvinyl chloride pipe shall be used as manufactured under the trade names Fusible C-900®, and FPVC®, for Underground Solutions, Inc., Poway, CA, (858) 679-9551 or Engineer approved equal. Fusion process shall be as patented by Underground Solutions, Inc., Poway, CA, Patent No. 6,982,051.
4. The pipe shall be warranted for one year per the pipe supplier's standard terms.
5. In addition to the pipe warranty, the fusion services shall be warranted for one year per the fusion service provider's standard terms.

## PART 2 - PRODUCTS

### 2.1 FUSIBLE POLYVINYLCHLORIDE PIPE

- A. Fusible polyvinyl chloride pipe for recycled water shall conform to AWWA C900, ASTM D2241 or ASTM D1785 as applicable. Testing shall be in accordance with the referenced AWWA standards for all pipe types.
- B. Fusible polyvinyl chloride pipe for recycled water shall conform to AWWA C900, AWWA ASTM D2241 or ASTM D1785 for standard dimensionality, as applicable. Testing shall be in accordance with the referenced AWWA standards.
- C. Fusible polyvinyl chloride pipe for recycled water pipeline shall conform to ASTM D3034, ASTM F679, AWWA C900, ASTM D2241, or ASTM D1785 for standard dimensions as applicable. Testing shall be in accordance with the applicable standard used.
- D. Fusible polyvinyl chloride pipe shall be extruded with plain ends. The ends shall be square to the pipe and free of any bevel or chamfer. There shall be no bell or gasket of any kind incorporated into the pipe.
- E. Fusible polyvinyl chloride pipe shall be manufactured in a standard 40 foot or 45-foot nominal length or custom lengths as specified.
- F. Fusible polyvinyl chloride pipe shall be purple in color for recycled water pipeline application.
- G. Pipe generally shall be marked per AWWA C900, ASTM D2241, or ASTM D1785 as applicable, and shall include as a minimum:
  1. Nominal pipe size.
  2. FPVC.
  3. Dimension Ratio, Standard Dimension Ratio or Schedule.
  4. AWWA pressure class or standard pressure rating for non-AWWA pipe.
  5. AWWA standard designation number or pipe type for non-AWWA pipe.
  6. Extrusion production-record code.
  7. Trademark or trade name.
  8. Cell Classification 12454 and/or PVC material code 1120 shall be included.
  9. Designated with the following wording on the pipe: "RECYCLED WATER PIPELINE."



- H. Pipe shall be homogeneous throughout and be free of visible cracks, holes, foreign material, blisters, or other visible deleterious faults. External beads shall be removed for pipe designated for directional drilling installation methods.
- I. The Contractor shall coordinate the requirements of this Specification with the requirements of Section 33 05 23.13, Horizontal Directional Drilling.

## 2.2 FUSION JOINTS

- A. Unless otherwise specified, fusible polyvinylchloride pipe lengths shall be assembled in the field with butt-fused joints. The fusion technician shall follow the pipe supplier's written procedures. All fusion joints shall be completed as described in this Specification.
- B. Casing pipe joint fusion beads, internal and external, shall be de-beaded according to manufacturer's written recommendations.
- C. Carrier pipe joint fusion beads, external, shall be de-beaded according to manufacturer's written recommendations.

## 2.3 FUSIBLE POLYVINYL CHLORIDE FITTINGS AND SWEEPS

- A. All fittings shall be ductile iron pipe fittings of the same pressure class as the pipe with appropriate coating to resist corrosion. Fittings shall conform to the same sizing convention, diameter, dimensional tolerances, and pressure class of the pipe being joined.
- B. All fittings shall not be greater than 22.5 degrees with a straight section of FPVC not less than 2.0 times the pipe OD in length on both sides of the fitting.

## 2.4 CONNECTIONS

- A. Fusible polyvinylchloride pipe shall be connected to other structures to provide a leak-free, properly graded transition.
- B. Connections to existing manholes and structures shall be as indicated in the construction documents.
  - 1. For a cored or drilled opening provide a flexible, watertight connection that meets and/or exceeds ASTM C923.
  - 2. For a knockout opening, provide a watertight connection (waterstop or other method) meeting the material requirements of ASTM C923 that is securely attached to the pipe with stainless steel bands or other means.
  - 3. Grout opening in manhole wall with non-shrink grout. Pour concrete collar around pipe and outside manhole opening. Provide flexible pipe joint or flexible connector within 2 feet of the collar.
- C. Connections to a new manhole or structure shall be as indicated in the construction documents.
  - 1. A flexible, watertight gasket per ASTM C 923 shall be cast integrally with riser section(s) for all precast manhole and structures.
  - 2. Drop connections shall be required where shown on drawings.
  - 3. Grout internal joint space with non-shrink grout.

## 2.5 BEDDING AND ENCASUREMENT MATERIALS

- A. All bedding and encasement materials shall be as shown on the Contract Drawings and in Section 31 00 00, Earthwork, of these Specifications.

## PART 3 - EXECUTION

### 3.1 GENERAL

- A. Pipe shall be off loaded, loaded, installed, handled, stored and stacked per the pipe supplier's guidelines. These guidelines include compliance with the minimum recommended bend radius and maximum safe pull force for the specific pipe being used.
- B. The general best practices of the industry per AWWA M23 shall also be observed.
- C. Trench excavation, bracing methods, foundation preparation, pipe bedding, trench backfill, and related operations shall be in accordance with the requirements of Section 31 00 00, Earthwork.
- D. The recycled water pipeline shall be constructed to the alignment and grade shown. The grade line shown on the profile is the centerline of the pipe. The excavation shall be made a sufficient distance below the grade line to allow for placing the recycled water pipeline and the supporting bedding if such bedding is shown. Should the trench be excavated to a depth greater than required, the Contractor shall refill such excess excavation with the same fill material as specified for the overlying fill or bedding and compacted as required for such overlying fill or bedding.
- E. Recycled water pipeline shall never be used as drains for removing water that has infiltrated into the trenches.
- F. Field Pressure testing procedure shall be per Manufacturer's written recommendations, AWWA Standards, or as follows:
  - 1. Fill line slowly with water. Maintain flow velocity less than 2.0 feet per second.
  - 2. Expel air completely from the line during filling and again before applying test pressure. Air shall be expelled by means of taps at points of highest elevation.
  - 3. Apply initial test pressure and allow to stand without makeup pressure for two to three hours, to allow for diametric expansion or pipe stretching to stabilize.
  - 4. After this equilibrium period, apply the specified test pressure and turn the pump off. The final test pressure shall be held for one to three hours.
- G. Upon completion of the test, the pressure shall be bled off from a location other than the point where the pressure is monitored. The pressure drop shall be witnessed by the resident project representative at the point where the pressure is being monitored and shall show on the recorded pressure read-out submitted to the Engineer.
- H. Factory Witnessed Testing
  - 1. Notify Engineer of start date and location of pipe manufacture at least 30 days prior to commencing pipe production. Should the Owner elect to witness the

manufacture of specific pipes during any phase of the manufacturing process, the manufacturer shall provide the Owner with at least 30 days advance notice of when and where the production of those pipes will take place. If Owner elects to witness pipe production or testing provide the following for the Owner's use:

2. Notify Engineer of start date and location of pipe manufacture at least 30 days prior to commencing pipe production. Should the Owner elect to witness the manufacture of specific pipes during any phase of the manufacturing process, the manufacturer shall provide the Owner with at least 30 days advance notice of when and where the production of those pipes will take place. If Owner elects to witness pipe production or testing provide the following for the Owner's use:
  - a. A work desk including telephone and computer with internet access near the manufacturing line.
  - b. Free access to the manufacturing line to witness production, and the testing facilities to witness testing.
  - c. Free access to manufacturing controls and instrumentation.
  - d. Free access to testing tools and instrumentation.
  - e. Access to take random samples for testing by an outside testing laboratory.
  - f. Certified lab data upon request to verify the physical properties of the witnessed pipe.
3. Markings
  - a. Marking shall include the following:
    - 1) Each pipe shall also have the pipe number designation referenced on the laying diagram.
    - 2) Pipe ID, OD and DR.
    - 3) Cell classification.
    - 4) Standard specification pipe was built to AWWA C900.
    - 5) All markings shall be legible and indelible.
    - 6) Any factor performed test reference numbers and dates.
    - 7) The following wording shall be on the pipe: "RECYCLED WATER PIPELINE."

### 3.2 FUSION PROCESS

- A. Fusible polyvinyl chloride pipe will be handled in a safe and non-destructive manner before, during, and after the fusion process and in accordance with this specification and pipe supplier's written procedures.
- B. Fusible polyvinyl chloride pipe will be fused by certified fusion technicians holding current qualification credentials for the pipe size being fused, as documented by the pipe supplier.
- C. Pipe supplier's procedures shall be followed at all times during fusion operations.

- D. For each set up, the Contractor shall provide a sample joint and conduct testing to verify fusion.
- E. Each fusion joint shall be recorded and logged by an approved electronic monitoring device (data logger) connected to the fusion machine, which utilizes a current version of the pipe supplier's recommended and compatible software.
- F. Only appropriately sized and outfitted fusion machines that have been approved by the pipe supplier shall be used for the fusion process. This includes requirements for safety, maintenance, and operation with modifications made for PVC.
- G. The FPVC shall not be placed in tension or compression for installation until the pipe has cooled to within 5°F of the ambient pipe temperature.

### 3.3 GENERAL INSTALLATION

- A. Installation guidelines from the pipe supplier shall be followed for all installations.
- B. The fusible polyvinyl chloride pipe will be installed in a manner so as not to exceed the recommended bending radius guidelines.
- C. Where fusible polyvinyl chloride pipe is installed by pulling in tension, the recommended maximum safe pulling force, established by the pipe supplier, shall not be exceeded.
- D. Internal and external rolled up beads formed at joints during fusion process shall be removed from the inside and outside of the pipe. Removal shall take place immediately after welding is complete. Contractor shall exercise caution to avoid damage to the joint and pipe while removing the bead and shall be responsible for repairs and/or replacement of any damaged joint or pipe.

### 3.4 FIELD WELDING QUALITY CONTROL

- A. General: Contractor shall be responsible for employing a rigorous quality control procedure for field welding quality control and documentation. All field-welding shall be accomplished with Engineer-Approved Equipment. Documentation of each field weld shall be submitted to the Engineer for record within two days of weld completion.
- B. Data Collector and Recording Device: Contractor shall utilize data collection and recording equipment to verify proper fusion procedures have been followed prior to installation. The Data collector shall consist of a rugged computer to record and report key weld parameters including the heater temperature and fusion pressure profile over time. Data Collector and Recording Devices shall be Datalogger™ as manufactured by McElroy, or Engineer-Approved Equal.
- C. Weld Quality Control Documentation: Contractor shall produce and submit field weld reports within two days of welding activity. Report shall provide the following information, at a minimum:
  - 1. Date, time, and ambient temperature.
  - 2. Joint Number that correlates to Project pipeline stationing.
  - 3. Employee Identification that is unique to Project approved FPVC Fusion Technician.
  - 4. Equipment Identification and specifications including piston area.

5. Pipe Data including material, size, Dimension Ratio
6. Interfacial Pressure in pounds per square inch (psi) including Heat, Soak, Fuse, and Cool.
7. Recommended Gauge Pressures in pounds per square inch (psi) including Heat, Soak, Fuse, and Cool.
8. Recorded Data including Drag pressure, weld temperature.
9. Graphs of pressure and temperature over time. Provide one graph for the first five minutes of weld procedure and a summary plot of the entire weld and cool down process.

### 3.5 DAMAGED PIPE

- A. Pipe sections with gouges or cuts deeper than ten percent (10%) of the wall thickness shall be cut out, removed, and replaced. Undamaged pipe portions longer than 3 times the pipe's OD may be rejoined using butt-fusion joining methods. No three fused joints are to be within any continuous run of 10.0 feet.

### 3.6 TESTING AND ACCEPTANCE

- A. Pipeline testing shall be performed once fusion process is completed on the pipeline reach prior to installation while it is on the surface and again after the completion of the installation.
- B. General: It is the intent of the Contract Documents that the completed recycled water pipeline shall be watertight.
- C. Testing of FPVC pipelines shall be performed as specified in Section 33 11 00 Recycled Water Utilities system testing.
- D. Even though a section of recycled water pipeline may have previously passed the leakage or infiltration test, each section of pipe shall be tested subsequent to the last backfill compacting operation thereon. If, in the opinion of the Engineer, heavy compaction equipment or any of the operations of the Contractor may have affected the required watertight integrity of the pipe, structure, or appurtenances, additional leak testing is required. The Contractor shall furnish all materials required for the tests and bear all associated costs in connection therewith. Tests shall be made in the presence of the Engineer.

END OF SECTION

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SECTION 33 11 13

FUSIBLE HDPE PIPE

PART 1 GENERAL

1.1. DESCRIPTION:

A. Scope:

1. Provide high density polyethylene pipe (PE 4710) (HDPE) as specified herein and all labor, equipment, materials, fittings, and incidentals to install an operational pipeline as shown on the contract drawings using horizontal directional drilling (HDD) in conformance with Section 33 05 23.13, Horizontal Directional Drilling.
  2. Fusion weld, inspect, and pressure test HDPE as specified herein.
- B. Pipe Description: HDPE shall be as follows: Nominal Diameter (20 in.) DR 9 Color Pressure Class (psi) Required Inner Diameter (16.51 in.).

1.2. REFERENCE STANDARDS:

A. Referenced documents are a part of this section as specified and modified.

1. Referenced document containing references to other standards are included as references under this section as if referenced directly.
2. In the event of a conflict between the requirements of this section and those of the referenced documents, the requirements of this section shall prevail.
3. Reference documents are effective as of the date of bid.
4. Discontinued documents shall mean the replacement.
5. Unreplaced documents shall use the last version of the document before it was discontinued.

B. Related Work Specified Elsewhere:

1. Section 33 05 23.13      Horizontal Direction Drilling.
2. Section 33 11 00      Recycled Water Utilities.

C. References

1. ASTM D2837-22 – Standard Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials or Pressure Design Basis for Thermoplastic Pipe Products.
2. ASTM D3035-21 – Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter.
3. ASTM D3350-21 – Standard Specification for Polyethylene Plastics Pipe and Fittings Materials.

4. ASTM F714-22 – Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Outside Diameter.
5. ASTM F1962-22 – Standard Guide for Use of Maxi-Horizontal Directional Drilling for Placement of Polyethylene Pipe or Conduit Under Obstacles, Including River Crossings.
6. AWWA C906-21 – Polyethylene (PE) Pressure Pipe and Fittings, 4 in. Through 65 in. (100 mm Through 1,650 mm), for Waterworks.
7. NSF 14 – Plastics Piping System Components and Related Materials.
8. NSF-61 – Drinking Water System Components--Health Effects. PPI TR-2 PVC Range Composition Listing of Qualified Ingredients.

1.3. QUALITY ASSURANCE:

- A. Specified Pipe Supplier: HDPE pipe shall be PE4710 manufactured for HDD in accordance with ASTM D2837, D3035, D3350, F714, and F1962.
- B. Fusion Data Recording Software acceptable to Pipe Supplier/Manufacturer.
- C. Warranty.
  1. The pipe shall be warranted for one year per the pipe supplier's standard terms.
  2. Fusion welding services shall be warranted for one year per the fusion welding service provider's standard terms.
- D. Experience Record Requirements:
  1. Trenchless Project list to include:
    - a. Project Name, Project Owner, and contact information.
    - b. Project location including nearest City, State.
    - c. Date of start and completion.
    - d. If subcontractor provide Contractor's name, Contact's name and contact information.
    - e. Type of trenchless installation listing pipe size and DIPS/IPS, DR, fusion welds planned and performed, and de-beading as specified herein.
    - f. All previous projects completed for this Owner.
    - g. Additional details as specified below.
  2. Fusion Welding Technician:
    - a. Technician shall be qualified by the pipe supplier for the pipe size and DIPS/IPS, and DR being fused.
    - b. Qualification shall be current as of the date of qualifying and fusing.
    - c. Five (5) years' experience.



- 1) 10 trenchless projects of at least 40 fusion welds per project.
- 2) 50 fusion welds for trenchless installation of each size and DR proposed on this project.

1.4. SUBMITTALS:

A. Submittals: in accordance with Section 01 30 00 Submittals.

1. Qualifying Submittals:

a. Fusion Welding Operator Experience Record.

b. Pipe.

- 1) Pipe Size by DR and DIPS/IPS and segment length.
- 2) Manufacturer's certification of PE4710 compound property values and cell classification values.
- 3) Color, OD, ID, W/T, and pounds per foot.
- 4) Recommended Maximum Safe Pull Force.
- 5) Recommended Minimum Bending Radius (Radius of Curvature).
- 6) Pipe manufacturer's written handling procedure to cover shipping through installation.
- 7) Pipe manufacturer's written fusion welding procedure for each unique pipe size including de-beading as specified herein.

c. Fusion Welding Equipment

- 1) Machine Manufacturer, Model, Year of Manufacture.
- 2) Machine Size for specified pipe.
- 3) Compatible Automated Data Recorder and fusion welding process software.
- 4) Anticipated fusion weld duration in Hours.
- 5) Fusion welding machine manufacturer's written fusion welding procedure including estimated durations for each step for each unique pipe size.

2. Pre-Construction Submittals

a. Sample Fusion Welding Data Record in electronic and hard copy including:

- 1) Machine Size and Pipe Size by DR and DIPS/IPS.
- 2) Project Name.
- 3) Date of Work.

- 4) Weather Conditions.
  - 5) Fusion Welding Technician Name.
  - 6) Fusion Welding Technician's Identification from Certification.
  - 7) Fusion Weld Joint Number.
  - 8) Fusion Weld Heating and Drag Pressure Settings.
  - 9) Heat Plate Temperature with Start and Stop Time Stamp.
  - 10) Heating and Cool Down Time of fusion weld with Start and Stop Time Stamp.
  - 11) Ambient Temperature with Time Stamp.
- b. Work plan for pressure tests.
- 1) Surface pressure test.
  - 2) In ground pressure test.
- c. Work plan for inspection for 10-foot test section.
- 1) Sample report.
  - 2) Photographs noting damage.
3. Construction Submittals: Submit within one workday.
- a. Submit as built Fusion Welding datalogger reports.
  - b. Provide data on unsuccessful fusion welds including.
    - 1) Removal length.
    - 2) Disposition of removed pipe.
  - c. Results of surface pressure test.
  - d. Results of in ground pressure test.
4. Post-Construction Submittals: Submit before requesting Final Payment.
- a. Submit as built drawing mark-ups including Contractor's notes.
  - b. Submit all photograph and records of construction.
  - c. Submit results of inspection for 10-foot test section.

## PART 2 PRODUCTS

### 2.1. HDPE PRESSURE PIPE FOR POTABLE WATER:

- A. HDPE pipe shall conform to AWWA C906, ASTM F714 or ASTM D3035 for standard dimensions, as applicable.

- B. Testing shall be in accordance with the referenced AWWA standards for all pipe types.
- C. HDPE pipe shall be:
  - 1. Manufactured with polyethylene compounds that have hydrostatic design basis (HDB) ratings at 73 degrees F and at 140 degrees F, and hydrostatic design stresses (HDS) rating at 73 degrees F, determined in accordance with ASTM D2837 and PPI TR-3.
  - 2. Polyethylene compounds used in potable water applications shall be classified as Oxidative Resistance Category CC3 per ASTM D3350, Section 10.1.11. See also Table 1 in AWWA C906-21 for required PE4710 compound property values and cell classification values.
  - 3. Extruded with plain ends.
  - 4. Manufactured with ends that are square to the pipe and free of any bevel or chamfer.
  - 5. Manufactured with no bell or gasket.
  - 6. Manufactured in a standard 40-foot nominal length, or custom lengths as specified.
- D. HDPE pipe shall be black in color with a purple stripe for recycled water use.
- E. Pipe shall be marked as follows:
  - 1. Nominal pipe size and DIPS/IPS.
  - 2. HDPE 4710.
  - 3. Dimension Ratio (DR) 9, Standard Dimension Ratio, or Schedule.
  - 4. AWWA pressure class, or standard pressure rating for non-AWWA pipe, as applicable.
  - 5. AWWA standard designation number, or pipe type for non-AWWA pipe, as applicable.
  - 6. Extrusion production-record code.
  - 7. Trademark or trade name.
- F. Pipe shall be homogeneous throughout and be free of visible cracks, holes, foreign material, blisters, or other visible deleterious faults.

2.2. FUSION WELDED JOINTS:

- A. Assembled in the field with butt-fused joints.
- B. Fusion welding shall be as required by pipe manufacturer and as specified herein.

2.3. PIPE PULL HEADS: Use HDPE pipe pull heads that employ a positive through-bolt design and as recommended by the pipe supplier.

PART 3 EXECUTION

3.1. HDPE PIPE HANDLING AND STORAGE:

- A. Pipe shall be handled, stored, and installed as specified herein and in accordance with the pipe manufacturer's written recommendations.
- B. All damaged or otherwise defective pipe, upon discovery shall be immediately removed from site.
- C. Pipe will be inspected upon delivery and during unloading.
- D. Pipe sizes shall be separated by use, pipe size, length, and DR.

3.2. FUSION WELDING PROCESS:

A. General:

- 1. Notify the Engineer in writing:
  - a. One workday before making any changes.
  - b. One workday after unacceptable fusion welding results.
  - c. Perform test fusion weld following unacceptable results and before resuming production fusion welding.
- 2. All fusion welding shall be performed in accordance with the accepted submittals.
- 3. HDPE pipe will be fusion welded by qualified fusion welding technicians.
- 4. Each operator shall perform a test fusion weld of each pipe size and type before commencing production fusion welding.
- 5. De-bead the exterior of each joint.
- 6. De-bead the interior of each joint unless fusion welding of sub-assemblies.
- 7. Each fusion welded joint shall be recorded, logged, and submitted within one workday in electronic and hard copy format.
- 8. Any fusion welded joint found unacceptable is to be cut out and immediately removed from the project site with fusion welding data report noted as "FAIL" and submitted.
- 9. Fusion welding shall only be performed using equipment in proper repair.

B. Fusion Welding Joint Data Recording:

- 1. Fusion welding report shall be reviewed by operator and signed.
- 2. Fusion welding report shall be reviewed and signed by qualified supervisor.
- 3. Submit dually signed fusion welding report within one workday in electronic and hard copy format.

3.3. PIPE AWAITING PULL-BACK:

- A. Pipe entry area shall be graded as needed to provide support for the pipe and to allow free movement into the bore hole.

- B. Pipe shall be fusion welding prior to insertion, if the site and conditions allow, into one continuous length.
- C. Damaged portions of the pipe shall be removed and replaced and submitted as previously noted.
- D. Pressure test pipe in as few sections as possible.
  - 1. Leave pipe under low pressure, 5 -10 psig to ensure pipe integrity until pullback commences.
  - 2. Relieve pressure and drain before pullback.
- E. See Section 33 05 23.13 HDD for installation.

#### 3.4. FINAL TESTING:

- A. Allow HDPE pipe to rest for 24 hours without any end restraining force.
- B. On HDD rig side, remove the first 10 feet of pipe.
  - 1. Pipe has been pulled through the entire drill path.
  - 2. Inspect and note for gouges and other detrimental damage.
  - 3. Submit inspection and test report and allow two workdays for Engineer's review before final pressure testing and burial or making tie-ins.
  - 4. Pressure test as specified elsewhere.
  - 5. If left for future work, seal ends to prevent intrusion and inflow before burial.
  - 6. Provide in writing for each end of installed pipe, the coordinates and burial depth. Include detectable subsurface marker and surface marker acceptable to Engineer.

END OF SECTION

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**SECTION V**

**CONSTRUCTION AGREEMENT**

## CONSTRUCTION AGREEMENT

FY \_\_\_\_\_ Fund \_\_\_\_\_ Cost Center \_\_\_\_\_ Object Code \_\_\_\_\_ Project # \_\_\_\_\_ Amount \$ \_\_\_\_\_

For multi-year contracts or contracts with multiple accounts:

FY \_\_\_\_\_ Fund \_\_\_\_\_ Cost Center \_\_\_\_\_ Object Code \_\_\_\_\_ Project # \_\_\_\_\_ Amount \$ \_\_\_\_\_

FY \_\_\_\_\_ Fund \_\_\_\_\_ Cost Center \_\_\_\_\_ Object Code \_\_\_\_\_ Project # \_\_\_\_\_ Amount \$ \_\_\_\_\_

FY \_\_\_\_\_ Fund \_\_\_\_\_ Cost Center \_\_\_\_\_ Object Code \_\_\_\_\_ Project # \_\_\_\_\_ Amount \$ \_\_\_\_\_

THIS AGREEMENT is dated as of the \_\_\_\_\_ day of \_\_\_\_\_ in the year 20\_\_\_\_, by  
(city use only)

and between CITY OF PETALUMA (hereinafter called "CITY") and \_\_\_\_\_ (hereinafter called "CONTRACTOR").

CITY and CONTRACTOR, in consideration of the mutual covenants hereinafter set forth, agree as follows:

### ARTICLE 1. WORK

CONTRACTOR shall complete the WORK as specified or indicated in the CITY'S Contract Documents entitled \_\_\_\_\_.

### ARTICLE 2. COMPLETION OF WORK

The WORK shall be completed to the satisfaction of CITY within \_\_\_\_\_ (\_\_\_\_\_) working days from the commencement date stated in the Notice to Proceed. In no event, however, shall the WORK to be performed under this contract be considered to be complete until all construction items called for on the drawings, and specifications have been completed and the contract price paid in full.

### ARTICLE 3. LIQUIDATED DAMAGES

A. CITY and the CONTRACTOR recognize that time is of the essence of this Agreement and that the CITY will suffer financial loss if the WORK is not completed within the time specified in Article 2 herein, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. It is hereby understood and agreed that it is and will be difficult and/or impossible to ascertain and determine the actual damage which the CITY will sustain in the event of and by reason of the CONTRACTOR's failure to fully perform the WORK or to fully perform all of its contract obligations that have accrued by the time for completion as specified in Article 2 herein and/or as specified for completion of any scheduled operations or works described in the Special Provisions. It is, therefore, agreed in accordance with California Government Code Section 53069.85 that the CONTRACTOR will forfeit and pay to the CITY liquidated damages in the sum of \_\_\_\_\_ Dollars (\$\_\_\_\_\_) per day for each and every calendar day that expires after the time for completion specified in Article 2 herein and/or as specified for completion of any scheduled operations or works described in the Special Provisions except as



otherwise provided by extension of time pursuant to Article 12 of the General Conditions. It is further understood and agreed in accordance with California Government Code Section 53069.85 that the liquidated damages sum specified in this provision is not manifestly unreasonable under the circumstances existing at the time this contract was made, and that the CITY may deduct liquidated damages sums in accordance with this provision from any payments due or that may become due the CONTRACTOR.

- B. Liquidated damages will continue to accrue at the stated rate until final completion of the WORK. Accrued liquidated damages may be deducted by the CITY from amounts due or that become due to the CONTRACTOR for performance of the WORK. Liquidated damages may not be waived or reduced by CITY unless expressly waived or reduced in writing by the ENGINEER.

#### ARTICLE 4. PREVAILING WAGES

- A. Pursuant to California Labor Code Section 1771, CONTRACTOR and any subcontractor shall pay all workers employed in execution of the WORK in accordance with the general rate of per diem wages specified for each craft, classification, or type of worker needed to execute the WORK. Copies of the prevailing rates of per diem wages are on file at the City Clerk's office and shall be made available to any interested party on request.
- B. CONTRACTOR is required to pay all applicable penalties and back wages in the event of violation of prevailing wage law, and CONTRACTOR and any subcontractor shall fully comply with California Labor Code Section 1775, which is incorporated by this reference as though fully set forth herein.
- C. CONTRACTOR and any subcontractor shall maintain and make available for inspection payroll records as required by California Labor Code Section 1776, which is incorporated by this reference as though fully set forth herein. CONTRACTOR is responsible for ensuring compliance with this section. CONTRACTOR and any subcontractor shall maintain and make available for inspection payroll records as required by California Labor Code Section 1776, which is incorporated by this reference as though fully set forth herein. CONTRACTOR is responsible for ensuring compliance with this section. In addition, CONTRACTOR and any subcontractor shall submit certified payroll records to the Labor Commissioner online: <http://www.dir.ca.gov/Public-Works/Certified-Payroll-Reporting.html>.
- D. CONTRACTOR and any subcontractor shall fully comply with California Labor Code Section 1777.5, concerning apprentices, which is incorporated by this reference as though fully set forth herein. CONTRACTOR is responsible for ensuring compliance with this section.
- E. In accordance with California Labor Code Section 1810, eight (8) hours of labor in performance of the WORK shall constitute a legal day's work under this Agreement. CONTRACTOR and any subcontractor shall pay workers overtime pay as required by California Labor Code Section 1815. CONTRACTOR and any subcontractor shall, as a penalty to the CITY, forfeit Twenty-Five Dollars (\$25) for each worker employed in the

execution of the contract by the respective contractor or subcontractor for each calendar day during which the worker is required or permitted to work more than 8 hours in any one calendar day and 40 hours in any one calendar week in violation so the provisions of Article 3 of Chapter 1 of Part 7, Division 2 of the California Labor Code, which is incorporated by this reference as though fully set forth herein.

#### ARTICLE 5. CONTRACT PRICE

- A. CITY shall pay CONTRACTOR for completion of the WORK the sum of \_\_\_\_\_ Dollars (\$\_\_\_\_\_), based on the bid price of same and in accordance with the Contract Documents.
- B. Notwithstanding any provisions herein, CONTRACTOR shall not be paid any compensation until such time as CONTRACTOR has on file with the City Finance Department a current W-9 form available from the IRS website ([www.irs.gov](http://www.irs.gov)) and has obtained a currently valid Petaluma business license pursuant to the Petaluma Municipal Code.
- C. In no case shall the total contract compensation exceed \_\_\_\_\_ Dollars (\$\_\_\_\_\_ ) without the prior written authorization by the City Manager. Further, no compensation for a section or work program component attached with a specific budget shall be exceeded without the prior written authorization of the City Manager.

#### ARTICLE 6. BONDS

- A. Before entering upon the performance of the WORK, the CONTRACTOR shall furnish Performance and Labor and Materials Bonds, each in the amount of one hundred percent (100%) of the contract price, as security for the faithful performance and payment of all the CONTRACTOR's obligations under the Contract Documents. These Bonds shall remain in effect at least until one year after the date of Completion, except as otherwise provided by Law or Regulation or by the Contract Documents. The CONTRACTOR shall also furnish such other Bonds as are required by the Supplementary General Conditions.
- B. The CONTRACTOR shall guarantee the WORK to be free of defects in material and workmanship for a period of one (1) year following the CITY's acceptance of the WORK. The CONTRACTOR shall agree to make, at the CONTRACTOR's own expense, any repairs or replacements made necessary by defects in material or workmanship which become evident within the one-year guarantee period. The CONTRACTOR's guarantee against defects required by this provision shall be secured by a Maintenance Bond, in the amount of ten percent (10%) of the contract price, which shall be delivered by the CONTRACTOR to the CITY prior to acceptance of the WORK. The Maintenance Bond shall remain in force for one (1) year from the date of acceptance of the contracted WORK. The CONTRACTOR shall make all repairs and replacements within the time required during the guarantee period upon receipt of written order from the ENGINEER. If the CONTRACTOR fails to make the repairs and replacements within the required time, the CITY may do the work and the CONTRACTOR and the

CONTRACTOR's surety for the Maintenance Bond shall be liable to the CITY for the cost. The expiration of the Maintenance Bond during the one-year guarantee period does not operate to waive or void the one-year guarantee, as set forth herein.

- C. The form of the Performance, Labor and Materials, and Maintenance Bonds are provided by the CITY as part of the Contract Documents. Only such bond forms provided by the CITY are acceptable and shall be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Audit Staff, Bureau of Government Financial Operations, U.S. Treasury Department. All Bonds signed by an agent must be accompanied by a certified copy of such agent's authority to act.
- D. If the surety on any Bond furnished by the CONTRACTOR is declared a bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the WORK is located, the CONTRACTOR shall within 7 days thereafter substitute another Bond and surety, which must be acceptable to the CITY.
- E. All Bonds required by the Contract Documents to be purchased and maintained by CONTRACTOR shall be obtained from surety companies that are duly licensed or authorized in the State of California to issue Bonds for the limits so required. Such surety companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary General Conditions.

#### ARTICLE 7. PAYMENT PROCEDURES

CONTRACTOR shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by ENGINEER as provided in the General Conditions.

#### ARTICLE 8. RETENTION

- A. Pursuant to Section 22300 of the California Public Contract Code, the CONTRACTOR may substitute securities for any money withheld by the CITY to ensure performance under the Contract. At the request and expense of the CONTRACTOR, securities equivalent to the amount withheld shall be deposited with the CITY or with a state or federally chartered bank in California as to the escrow agent, who shall return such securities to the CONTRACTOR upon satisfactory completion of the Contract.
- B. Alternatively, the CONTRACTOR may request and the CITY shall make payment of retentions earned directly to the escrow agent at the expense of the CONTRACTOR. At the expense of the CONTRACTOR, the CONTRACTOR may direct the investment of the payments into securities and the CONTRACTOR shall receive the interest earned on the investments upon the same terms provided for in this section for securities deposited by the CONTRACTOR. The CONTRACTOR shall be responsible for paying all fees for the expenses incurred by the escrow account and all expenses of the CITY. These expenses and payment terms shall be determined by the CITY's Finance Director or his/her designee and the escrow agent. Upon satisfactory completion of the Contract, the

CONTRACTOR shall receive from the escrow agent all securities, interest, and payments received by the escrow agent from the CITY, pursuant to the terms of this section. The CONTRACTOR shall pay to each subcontractor, not later than 20 days of receipt of the payment, the respective amount of interest earned, net of costs attributed to retention withheld from each subcontractor, on the amount of retention withheld to ensure the performance of the CONTRACTOR.

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

#### ARTICLE 9. CONTRACT DOCUMENTS

The Contract Documents which comprise the entire agreement between the CITY and the CONTRACTOR concerning the WORK consist of this Agreement and the following attachments to this Agreement:

- Notice Inviting Bids
- Instructions to Bidders
- Bid Forms including the Bid, Bid Schedule(s), Information Required of Bidder, Bid Bond, and all required certificates and affidavits
- Labor and Materials Bond
- Performance Bond
- Maintenance Bond
- General Conditions
- Supplementary General Conditions (if any)
- Specifications
- Special Provisions
- Drawings
- Federal Wage Rates dated \_\_\_\_\_ (if applicable)
- Form FHWA-1273 (if applicable)
- Addenda (if any)
- Change Orders which may be delivered or issued after Effective Date of the Agreement and are not attached hereto.

There are no Contract Documents other than those listed in this Article 9. The Contract Documents may only be amended by Change Order as provided in Paragraph 3.5 of the General Conditions.

#### ARTICLE 10. INSURANCE

The applicable insurance requirements, as approved by the City's Risk Manager, are set forth in **Exhibit B**, attached hereto and incorporated by reference herein. *[City use: check one.]*

## ARTICLE 11. INDEMNIFICATION

- A. CONTRACTOR shall indemnify, defend with counsel acceptable to CITY, and hold harmless to the full extent permitted by law, CITY and its officers, officials, employees, agents and volunteers from and against any and all alleged liability, loss, damage, claims, expenses and costs (including, without limitation, attorney fees and costs and fees of litigation) (collectively, "Liability") of every nature arising out of or in connection with CONTRACTOR's performance of the WORK or its failure to comply with any of its obligations contained in this Agreement, except such Liability caused by the active negligence, sole negligence or willful misconduct of the CITY. Such indemnification by the CONTRACTOR shall include, but not be limited to, the following:
1. Liability or claims resulting directly or indirectly from the negligence or carelessness of the CONTRACTOR, its subcontractors, employees, or agents in the performance of the WORK, or in guarding or maintaining the same, or from any improper materials, implements, or appliances used in its construction, or by or on account of any act or omission of the CONTRACTOR, its employees, or agents;
  2. Liability or claims arising directly or indirectly from bodily injury, occupational sickness or disease, or death of the CONTRACTOR's, or Supplier's own employees, or agents engaged in the WORK resulting in actions brought by or on behalf of such employees against the CITY and/or the ENGINEER;
  3. Liability or claims arising directly or indirectly from or based on the violation of any Laws or Regulations, whether by the CONTRACTOR, its subcontractors, employees, or agents;
  4. Liability or claims arising directly or indirectly from the use or manufacture by the CONTRACTOR, its subcontractors, employees, or agents in the performance of this Agreement of any copyrighted or uncopyrighted composition, secret process, patented or unpatented invention, article, or appliance, unless otherwise specified stipulated in this Agreement;
  5. Liability or claims arising directly or indirectly from the breach of any warranties, whether express or implied, made to the CITY or any other parties by the CONTRACTOR, its subcontractors, employees, or agents;
  6. Liability or claims arising directly or indirectly from the willful misconduct of the CONTRACTOR, its subcontractors, employees, or agents;
  7. Liability or claims arising directly or indirectly from any breach of the obligations assumed in this Agreement by the CONTRACTOR;
  8. Liability or claims arising directly or indirectly from, relating to, or resulting from a hazardous condition created by the CONTRACTOR, Subcontractors, Suppliers, or any of their employees or agents, and;
  9. Liability or claims arising directly, or indirectly, or consequentially out of any action, legal or equitable, brought against the CITY, the ENGINEER, their consultants, subconsultants, and the officers, directors, employees and agents of each or any of them, to the extent caused by the CONTRACTOR's use of any premises acquired by permits, rights of way, or easements, the Site, or any land or area contiguous thereto or its performance of the WORK thereon.

- B. The CONTRACTOR shall reimburse the CITY for all costs and expenses, (including but not limited to fees and charges of engineers, architects, attorneys, and other professionals and court costs of appeal) incurred by said CITY in enforcing the provisions of this Paragraph.
- C. The indemnification obligation under this Article 11 shall be in addition to, and shall not be limited in any way by any limitation on the amount or type of insurance carried by CONTRACTOR or by the amount or type of damages, compensation, or benefits payable by or for the CONTRACTOR or any Subcontractor or other person or organization under workers' compensation acts, disability benefit acts, or other employee benefit acts. The CONTRACTOR's responsibility for such defense and indemnity obligations shall survive the termination or completion of this Agreement for the full period of time allowed by law.
- D. Pursuant to California Public Contract Code Section 9201, City shall timely notify Contractor of receipt of any third-party claim relating to this Agreement.

ARTICLE 12. DISCLAIMER AND INDEMNITY  
CONCERNING LABOR CODE SECTION 6400

By executing this agreement the CONTRACTOR understands and agrees that with respect to the WORK, and notwithstanding any provision in this contract to the contrary, the CONTRACTOR, and/or its privities, including, without limitation, subcontractors, suppliers and other engaged by the CONTRACTOR in the performance of the WORK shall be "employers" for purposes of California Labor Code Section 6400 and related provisions of law, and that neither CITY nor its officials, officers, employees, agents, volunteers or consultants shall be "employers" pursuant to California Labor Code Section 6400 with respect to the performance of the WORK by the CONTRACTOR and/or its privities.

The CONTRACTOR shall take all responsibility for the WORK, shall bear all losses and damages directly or indirectly resulting to the CONTRACTOR, any subcontractors, the CITY, its officials, officers, employees, agents, volunteers and consultants, on account of the performance or character of the WORK, unforeseen difficulties, accidents, or occurrences of other causes predicated on active or passive negligence of the CONTRACTOR or of any subcontractor, including, without limitation, all losses, damages or penalties directly or indirectly resulting from exposure to hazards in performance of the WORK in violation of the California Labor Code. The CONTRACTOR shall indemnify, defend and hold harmless the CITY, its officials, officers, employees, agents, volunteers and consultants from and against any or all losses, liability, expense, claim costs (including costs of defense), suits, damages and penalties (including, without limitation, penalties pursuant to the California Labor Code) directly or indirectly resulting from exposure to hazards in performance of the WORK in violation of the California Labor Code, except such liability or costs caused by the active negligence, sole negligence or willful misconduct of the CITY.

ARTICLE 13. INDEPENDENT CONTRACTOR

It is understood and agreed that in the performance of this Agreement, CONTRACTOR (including its employees and agents) is acting in the capacity of an independent contractor, and not as an agent or employee of the CITY. CONTRACTOR has full control over the means and methods of performing said services and is solely responsible for its acts and omissions, including the acts and omissions of its employees and agents.

ARTICLE 14. SUBCONTRACTORS

CONTRACTOR must obtain the CITY’s prior written consent for subcontracting any WORK pursuant to this Agreement. Any such subcontractor shall comply, to the extent applicable, with the terms and conditions of this Agreement. Any agreement between CONTRACTOR and a subcontractor pursuant to this Agreement shall provide that the subcontractor procure and maintain insurance coverage as required herein and which shall name CITY as an additional insured.

ARTICLE 15. COMPLIANCE WITH LAWS/NON-DISCRIMINATION

CONTRACTOR shall comply with all applicable local, state and federal laws, regulations and ordinances in the performance of this Agreement. CONTRACTOR shall not discriminate in the provision of service or in the employment of persons engaged in the performance of this Agreement on account of race, color, national origin, ancestry, religion, gender, marital status, sexual orientation, age, physical or mental disability in violation of any applicable local, state or federal laws or regulations.

ARTICLE 16. NOTICES

All notices required or permitted by this Agreement, including notice of change of address, shall be in writing and given by personal delivery or sent postage prepaid and addressed to the parties intended to be notified, as set forth herein. Notice shall be deemed given as of the date of delivery in person or as of the date deposited in any post office or post office box regularly maintained by the United States Postal Service, unless otherwise stated herein. Notice shall be given as follows:

CITY: City Clerk  
City of Petaluma  
Post Office Box 61  
Petaluma, California 94953  
Telephone: (707) 778-4360

CONTRACTOR: \_\_\_\_\_  
(Contact Name)  
\_\_\_\_\_  
(Business Name)  
\_\_\_\_\_  
(Address)

\_\_\_\_\_  
(City, State, Zip)

\_\_\_\_\_  
(Telephone)

\_\_\_\_\_  
(E-mail)

#### ARTICLE 17. GOVERNING LAW/VENUE

This Agreement shall be construed and its performance enforced under California law. Venue shall be in the Superior Court of the State of California in the County of Sonoma.

#### ARTICLE 18. NON-WAIVER

The CITY's failure to enforce any provision of this Agreement or the waiver of any provision in a particular instance shall not be construed as a general waiver of any part of such provision. The provision shall remain in full force and effect.

#### ARTICLE 19. THIRD PARTY BENEFICIARIES

The Parties do not intend, by any provision of this Agreement, to create in any third party any benefit or right owed by one party, under the terms and conditions of this Agreement, to the other party.

#### ARTICLE 20. ASSIGNMENT

No assignment by a party hereto of any rights under or interests in the Contract Documents will be binding on another party hereto without the written consent of the party sought to be bound; and specifically but without limitation monies that may become due and monies that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

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

#### ARTICLE 21. SEVERABILITY

If any term or portion of this Agreement is held to be invalid, illegal, or otherwise enforceable by a court of competent jurisdiction, the remaining provisions of this Agreement shall continue in full force and effect.

IN WITNESS WHEREOF, CITY and CONTRACTOR have caused this Agreement to be executed the day and year first above written.



CITY

CONTRACTOR \_\_\_\_\_

\_\_\_\_\_  
City Manager

By \_\_\_\_\_  
(CORPORATE SEAL)

ATTEST:

Attest: \_\_\_\_\_

\_\_\_\_\_  
City Clerk

Address for giving notices:  
\_\_\_\_\_  
\_\_\_\_\_

APPROVED AS TO FORM:

\_\_\_\_\_  
City Attorney

Agent for service of process:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
License Number

\_\_\_\_\_  
Taxpayer I.D. Number

\_\_\_\_\_  
Petaluma Business Tax Certificate Number

file name:

END OF AGREEMENT

AGREEMENT CERTIFICATE  
(if Corporation)

STATE OF CALIFORNIA    )  
  ) ss:  
COUNTY OF                    )

I HEREBY CERTIFY that a meeting of the Board of Directors of the \_\_\_\_\_  
\_\_\_\_\_ a  
corporation existing under the laws of the State of \_\_\_\_\_, held on  
\_\_\_\_\_, 20\_\_\_\_, the following resolution was duly passed and adopted:

“RESOLVED, that \_\_\_\_\_, as \_\_\_\_\_  
President of the Corporation, be and is hereby authorized to execute the  
Agreement dated \_\_\_\_\_, 20\_\_\_\_, by and between  
this Corporation and \_\_\_\_\_ and that his/her execution  
thereof, attested by the Secretary of the Corporation, and with the Corporate Seal  
affixed, shall be the official act and deed of this Corporation.”

I further certify that said resolution is now in full force and effect.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the official seal of  
the corporation this \_\_\_\_\_, day of \_\_\_\_\_, 20\_\_\_\_\_.

\_\_\_\_\_  
Secretary

(SEAL)





**FAITHFUL PERFORMANCE BOND**

WHEREAS, the City Council of the City of Petaluma, 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 \_\_\_\_\_, duly authorized to transact business under the laws of the State of California, as Surety, are held and firmly bound unto the City of Petaluma, hereinafter called "City," in the penal sum of \_\_\_\_\_ Dollars (\$\_\_\_\_) lawful money of the United States, for payment of which sum well and truly to be made, we bind ourselves, our heirs, successors, executors, and administrators, jointly and severally, firmly by these present. The conditions of this obligation are such that if the above-bound Principal, the Principal's 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 the City of Petaluma, its officers, agents, employees, and volunteers, 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 this obligation secured hereby and in addition to the face amount specified therefore, 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 this 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.

And the said Surety, for value received, hereby stipulates and agrees that upon termination of the Contract for cause, the Obligee reserves the right to refuse tender of the Principal by the Surety to complete the Contract work.

IN WITNESS WHEREOF, this instrument has been duly executed by the Principal and Surety above named, on \_\_\_\_\_, 20\_\_\_\_\_.

PRINCIPAL

SURETY

By \_\_\_\_\_

By \_\_\_\_\_

\_\_\_\_\_  
Name and Title

\_\_\_\_\_  
Name and Title

\_\_\_\_\_  
Address

\_\_\_\_\_  
City State Zip

\_\_\_\_\_  
Phone Number

###

NOTE: No substitution or revision to this bond form will be accepted. Be sure that all bonds submitted have a certified copy of the bonding agent's power of attorney attached. Also verify that Surety is an "Admitted Surety" (i.e., qualified to do business in California), and attach proof of verification (website printout from the California Department of Insurance website (<http://www.insurance.ca.gov/docs/index.html>) or certificate from County Clerk).

APPROVED AS TO AMOUNT:

APPROVED AS TO FORM:

\_\_\_\_\_  
City Manager

\_\_\_\_\_  
City Attorney

END OF FAITHFUL PERFORMANCE BOND

**LABOR AND MATERIALS BOND**

WHEREAS, the City of Petaluma, State of California, and \_\_\_\_\_ (hereinafter designated as “Principal”) have entered into an agreement whereby the Principal agrees to install and complete certain designated public improvements, which said agreements, dated \_\_\_\_\_, 20\_\_\_\_, and identified as project \_\_\_\_\_, is hereby referred to and made a part hereof; and,

WHEREAS, under the terms of said agreement Principal is required before entering upon the performance of the work, to file a good and sufficient payment bond with the City of Petaluma, to secure the claims to which reference is made in Title 15 (commencing with Section 3082) of Part 4 of Division 3 of the Civil Code of the State of California.

NOW, THEREFORE, said Principal and the undersigned, duly authorized to transact business under the laws of the State of California, as corporate surety, are held firmly bound unto the City of Petaluma, and all contractors, subcontractors, laborers, materialmen and other persons employed in the performance of the aforesaid agreement and referred to in the aforesaid Civil Code of the State of California, 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 such work or labor, that said 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 City in successfully enforcing such 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 15 (commencing with section 3082) of Part 4 of Division 3 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 said 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\_\_\_\_.

PRINCIPAL

SURETY

By \_\_\_\_\_

By \_\_\_\_\_

\_\_\_\_\_  
Name and Title

\_\_\_\_\_  
Name and Title

\_\_\_\_\_  
Address

\_\_\_\_\_  
City

\_\_\_\_\_  
State

\_\_\_\_\_  
Zip

\_\_\_\_\_  
Phone

###

NOTE: No substitution or revision to this bond form will be accepted. Be sure that all bonds submitted have a certified copy of the bonding agent's power of attorney attached. Also verify that Surety is an "Admitted Surety" (i.e., qualified to do business in California), and attach proof of verification (website printout from the California Department of Insurance website (<http://www.insurance.ca.gov/docs/index.html>) or certificate from County Clerk)..

APPROVED AS TO AMOUNT:

APPROVED AS TO FORM:

\_\_\_\_\_  
City Manager

\_\_\_\_\_  
City Attorney

END OF LABOR AND MATERIALS BOND



**MAINTENANCE BOND**

WHEREAS, the City Council of the City of Petaluma (“City”) 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 contract to furnish a maintenance bond for the correction of any defects due to defective materials or workmanship in the work performed under said agreement.

NOW, THEREFORE, we the Principal and \_\_\_\_\_ as Surety, are held and firmly bound unto the City of Petaluma 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, executors, administrators, successors, and assigns jointly and severally, firmly by these presents.

THE CONDITIONS OF THIS OBLIGATION ARE SUCH that if, during a maintenance period of one (1) year from the date of acceptance of the contracted work, the Principal upon receiving written notice of a need for repairs which are directly attributable to defective materials or workmanship, shall diligently take the necessary steps to correct said defects within seven (7) days from the date of said notice, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

As part of this 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 this 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.

IN WITNESS WHEREOF, this instrument has been duly executed by the Principal and Surety above named, on \_\_\_\_\_, 20\_\_\_\_\_.

PRINCIPAL

SURETY

By \_\_\_\_\_

By \_\_\_\_\_

\_\_\_\_\_  
Name and Title

\_\_\_\_\_  
Name and Title

\_\_\_\_\_  
Address

\_\_\_\_\_  
City State Zip

\_\_\_\_\_  
Phone Number

###

NOTE: No substitution or revision to this bond form will be accepted. Be sure that all bonds submitted have a certified copy of the bonding agent’s power of attorney attached. Also verify that Surety is an “Admitted Surety” (i.e., qualified to do business in California), and attach proof of verification (website printout from the California Department of Insurance website (<http://www.insurance.ca.gov/docs/index.html>) or certificate from County Clerk).

APPROVED AS TO AMOUNT:

APPROVED AS TO FORM:

\_\_\_\_\_  
City Manager

\_\_\_\_\_  
City Attorney

END OF MAINTENANCE BOND



## **EXHIBIT B**

### **INSURANCE REQUIREMENTS**

Contractor's performance of the Services under this Agreement shall not commence until Contractor shall have obtained all insurance required under this paragraph and such insurance shall have been approved by the City Attorney as to form and the Risk Manager as to carrier and sufficiency. All requirements herein provided shall appear either in the body of the insurance policies or as endorsements and shall specifically bind the insurance carrier.

Contractor shall procure and maintain for the duration of the contract all necessary insurance against claims now and in the future for injuries to persons or damages to property which may arise from or in connection with the performance of the Services by the Contractor, the Contractor's agents, representatives, employees and subcontractors.

#### **A. Required Minimum Scope of Insurance**

- Coverage shall be at least as broad as:  
Insurance Services Office Commercial General Liability coverage:
  - a. Personal injury;
  - b. Contractual liability.
- Insurance Services Office form covering Automobile Liability (any auto), if no company owned autos, non-owned and hired auto applies.
- Workers' Compensation insurance as required by the State of California and Employer's Liability Insurance.
- Professional Liability/Errors and Omissions
- Crime/Employee Blanket Fidelity Bond
- Property Insurance against all risks of loss to any tenant improvements or betterments.
- Pollution Liability Insurance
- Garage Liability
- Garagekeepers Insurance
- Technology Professional Liability Errors and Omissions Insurance (IT Consultant)/Cyber Liability
- Abuse or Molestation Liability Coverage

#### **A.1 Required for All Contracts**

- Policy Endorsements or Excerpts from the Policy Pursuant to Section D
- Copy of the Declarations and Policy Endorsements Page for the CGL Policy

#### **B. Minimum Limits of Insurance**

Consultant shall maintain limits no less than:

- General Liability: \$5,000,000 per occurrence for bodily injury, personal injury and property damage. If Commercial General Liability Insurance or other form with a general aggregate liability is used, either the general aggregate limit shall apply separately to this Agreement or the general aggregate limit shall be twice the required occurrence limit.
- Products/Completed Operations: \$1,000,000 per occurrence/aggregate.
- Automobile Liability: \$1,000,000 per accident for bodily injury and property damage.
- Employer's Liability: Bodily Injury by Accident - \$1,000,000 each accident.

Bodily Injury by Disease - \$1,000,000 policy limit.

Bodily Injury by Disease - \$1,000,000 each employee.

- Professional Liability/Errors and Omissions: \$1,000,000 per occurrence or claim. If the policy provides coverage on a claims-made basis, the retroactive date must be shown and must be before the date of the Agreement or the beginning of the contract work.
  - Crime/Employee Blanket Fidelity Bond - \$1,000,000: Contractor, at its own cost and expense, must maintain a Crime/Employee Blanket Fidelity Bond in the amount of \$1,000,000 per employee covering dishonesty, forgery, alteration, theft, disappearance, destruction (inside or outside).
  - All Risk Property Insurance: Full replacement cost.
  - Pollution legal liability with limits no less than \$1,000,000 per occurrence or claim and \$2,000,000 policy aggregate. If the policy provides coverage on a claims-made basis, the retroactive date must be shown and must be before the date of the Agreement or the beginning of the contract work.
  - Garage Liability: \$1,000,000 per occurrence.
  - Garagekeepers Insurance: \$1,000,000 per occurrence.
  - Technology Professional Liability Errors and Omissions Insurance appropriate to the Consultant's profession and work hereunder, with limits not less than \$1,000,000 per occurrence. Coverage shall be sufficiently broad to respond to the duties and obligations as is undertaken by the Vendor in this agreement and shall include, but not be limited to, claims involving infringement of intellectual property, copyright, trademark, invasion of privacy violations, information theft, release of private information, extortion and network security. The policy shall provide coverage for breach response costs as well as regulatory fines and penalties as well as credit monitoring expenses with limits sufficient to respond to these obligations.
1. The Policy shall include, or be endorsed to include, **property damage liability coverage** for damage to, alteration of, loss of, or destruction of electronic data and/or information "property" of the City in the care, custody, or control of the Consultant. If not covered under the Consultant's liability policy, such "property" coverage of the City may be endorsed onto the Consultant's Cyber Liability as covered property as follows:
  2. **Cyber Liability coverage** in an amount sufficient to cover the full replacement value of damage to, alteration of, loss of, or destruction of electronic data and/or information "property" of the City that will be in the care, custody, or control of the Consultant.
  3. The Insurance obligations under this agreement shall be the greater of 1) all the Insurance coverage and limits carried by or available to the Consultant; or 2) the minimum Insurance requirements shown in this Agreement. Any insurance proceeds in excess of the specified limits and coverage required, which are applicable to a given loss, shall be available to the City. No representation is made that the minimum Insurance requirements of this Agreement are sufficient to cover the indemnity or other obligations of the Consultant under this agreement.
- Abuse or Molestation Liability Coverage: \$1,000,000 per occurrence; \$2,000,000 aggregate.

### **C. 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 retentions as respects the City, its officers, officials, employees, and volunteers; or the Consultant shall procure a bond guaranteeing payment of losses and related investigations, claim administration and defense expenses. Policies containing any self-insured retention (SIR) provision shall provide or be endorsed to provide that the SIR may be satisfied by either the named insured (Contractor) or the City.

City reserves the right to review any and all of the required insurance policies, declaration pages, and/or endorsements, but has no obligation to do so. City's failure to demand evidence of full compliance with the insurance requirements set forth in this Agreement or City's failure to identify any insurance deficiency shall not relieve Contractor from, nor be construed or deemed a waiver of, its obligation to maintain the required insurance at all times during the performance of this Agreement.

### **D. Other Insurance Provisions**

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

1. Additional Insured: The City, its officers, officials, employees, agents and volunteers are to be covered as Additional Insureds as respects: liability arising out of activities performed by or on behalf of the Consultant; products and completed operations of the Consultant; premises owned, occupied or used by the Consultant; or automobiles owned, leased, hired or borrowed by the Consultant. The coverage shall contain no special limitations on the scope of protection afforded to the City, its officers, officials, employees, agents or volunteers.
2. Primary and Non-Contributory: For any claims related to this project, the Consultant'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 Consultant'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. The Consultant'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.
5. 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.
6. Waiver of Subrogation: Consultant agrees to waive subrogation rights for commercial general liability, automobile liability and worker's compensation against City regardless of the applicability of any insurance proceeds, and to require all contractors, subcontractors or others involved in any way with the Services to do likewise.
7. It shall be a requirement under this Agreement that any available insurance proceeds broader than or in excess of the specified minimum insurance coverage requirement and/or limits shall be available to the additional insured. Furthermore, the requirement for coverage and limits shall be (1) the minimum coverage and limits specified in this

Agreement, or (2) the broader coverage and maximum limits of coverage of any insurance policy or proceeds available to the named insured; whichever is greater.

8. The limits of insurance required in this Agreement may be satisfied by a combination of primary and umbrella or excess insurance. Any umbrella or excess insurance shall contain or be endorsed to contain a provision that such coverage shall also apply on a primary and non-contributory basis for the benefit of the City of Petaluma before the City of Petaluma's own insurance or self-insurance shall be called upon to protect it as a named insured.

**E. Acceptability of Insurers**

Insurance is to be placed with insurers with a current A.M. Best's rating of no less than A:VII.

**F. Verification of Coverage**

**NOTE: The City of Petaluma is now using an online insurance program, PINS Advantage. Once you have been awarded a contract with the City of Petaluma, you will receive an e-mail from PINS Advantage/City of Petaluma requesting that you forward the e-mail to your insurance agent(s).** Consultant shall furnish the City with Certificate of Insurance along with Declarations and Endorsements effecting coverage required by this clause. The endorsements are to be signed by a person authorized by that insurer to bind coverage on its behalf. All endorsements are to be received and approved by the City before the Services commence.

**\* \* \* PAGE LEFT INTENTIONALLY BLANK \* \* \***



**SECTION VI**

**PLANS**

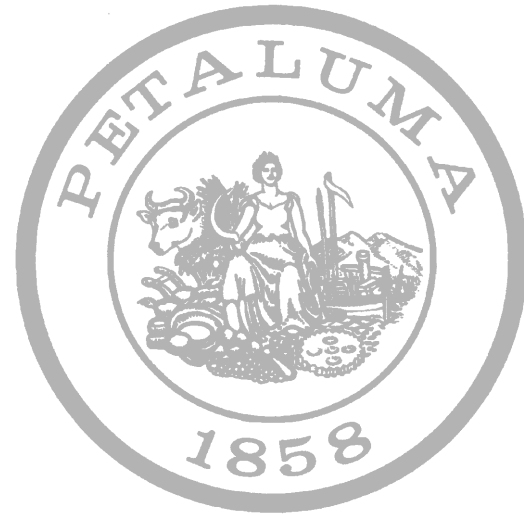
# City of Petaluma, California

## ADOBE ROAD RECYCLED WATER PIPELINE PROJECT

FRATES ROAD (5701) POST MILES: 11.18 - 11.44

ADOBE ROAD (5602) POST MILES: 16.27 - 17.45

C66501936



**MAYOR**

Kevin McDonnell

**COUNCIL MEMBERS**

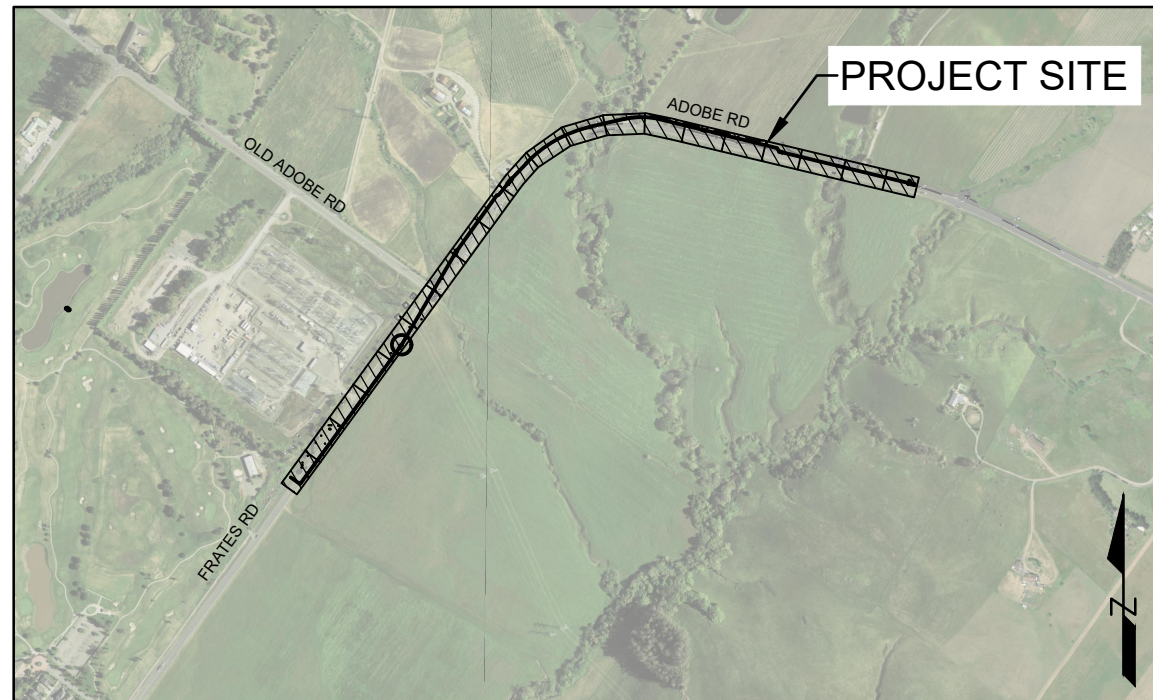
- Brian Barnacle
- Janice Cader-Thompson, Dist. 1
- Mike Healy
- Karen Nau, Dist. 3
- Dennis Pocekay
- John Shribbs, Dist. 2

**CITY MANAGER**

Peggy Flynn

**INTERIM DIRECTOR OF PUBLIC WORKS & UTILITIES**

Gina Benedetti-Petnic



**LOCATION MAP**  
SCALE: N.T.S.

**SHEET INDEX**

- G-001 TITLE SHEET, VICINITY MAP, AND LOCATION MAP
- G-002 GENERAL NOTES AND CITY STANDARDS
- G-003 LEGEND AND ABBREVIATIONS
- G-004 SURVEY CONTROL PLAN AND KEY MAP
- G-005 POTHOLE SCHEDULE
- C-101 PLAN AND PROFILE - FRATES ROAD (STA 10+00 to STA 12+50)
- C-102 PLAN AND PROFILE - FRATES ROAD (STA 12+50 to STA 15+00)
- C-103 PLAN AND PROFILE - FRATES ROAD (STA 15+00 to STA 17+50)
- C-104 PLAN AND PROFILE - FRATES ROAD (STA 17+50 to STA 20+00)
- C-105 OVERALL PLAN AND PROFILE - HDD SECTION 1
- C-106 PLAN AND PROFILE - FRATES ROAD (STA 20+00 to STA 22+50)
- C-107 PLAN AND PROFILE - FRATES ROAD (STA 22+50 to STA 25+00)
- C-108 PLAN AND PROFILE - ADOBE ROAD (STA 25+00 to STA 27+50)
- C-109 PLAN AND PROFILE - ADOBE ROAD (STA 27+50 to STA 30+00)
- C-110 PLAN AND PROFILE - ADOBE ROAD (STA 30+00 to STA 32+50)
- C-111 OVERALL PLAN AND PROFILE - HDD SECTION 2
- C-112 PLAN AND PROFILE - ADOBE ROAD (STA 32+50 to STA 35+00)
- C-113 PLAN AND PROFILE - ADOBE ROAD (STA 35+00 to STA 37+50)
- C-114 PLAN AND PROFILE - ADOBE ROAD (STA 37+50 to STA 40+00)
- C-115 PLAN AND PROFILE - ADOBE ROAD (STA 40+00 to STA 42+50)
- C-116 PLAN AND PROFILE - ADOBE ROAD (STA 42+50 to STA 45+00)
- C-117 PLAN AND PROFILE - ADOBE ROAD (STA 45+00 to STA 47+50)
- C-118 PLAN AND PROFILE - ADOBE ROAD (STA 47+50 to STA 50+00)
- C-119 OVERALL PLAN AND PROFILE - HDD SECTION 3
- C-120 PLAN AND PROFILE - ADOBE ROAD (STA 50+00 to STA 52+30)
- C-121 PLAN AND PROFILE - ADOBE ROAD (STA 52+30 to STA 55+00)
- C-122 PLAN AND PROFILE - ADOBE ROAD (STA 55+00 to STA 57+60)
- C-123 PLAN AND PROFILE - ADOBE ROAD (STA 57+60 to STA 59+13)
- C-501 DETAILS 1 - STANDARD THRUST BLOCK DETAIL
- C-502 DETAILS 2 - TEMPORARY SILT FENCE DETAIL
- C-503 DETAILS 3 - 219A SONOMA COUNTY PAVEMENT CUT POLICY
- C-504 DETAILS 4 - 219A SONOMA COUNTY PAVEMENT CUT POLICY
- C-505 DETAILS 5 - IRRIGATION SERVICE DETAILS

ALL PROJECT PLANS HAVE BEEN PREPARED AND REVIEWED TO COMPLY WITH CURRENT AMERICANS WITH DISABILITIES ACT (ADA) REQUIREMENTS AND/OR THE CALIFORNIA BUILDING STANDARDS CODE (CBCS).

THESE PROJECT PLANS CONTAIN ELEMENT(S) THAT ARE NOT "TECHNICALLY FEASIBLE" AND/OR CAN'T MEET THE APPLICABLE CBCS BECAUSE IT WOULD CREATE AN "UNREASONABLE HARDSHIP." PLEASE SEE THE WRITTEN ANALYSIS SUPPORTING THIS DETERMINATION FILED UNDER THE PROJECT FILE.

DESIGNED BY: *Matthew G. Kennedy* June 6, 2024  
SIGNATURE DATE

APPROVED BY: \_\_\_\_\_  
GINA BENEDETTI-PETNIC P.E. C42778  
INTERIM DIRECTOR OF PUBLIC WORKS & UTILITIES

DESIGNED BY: *Matthew G. Kennedy*  
MATTHEW G. KENNEDY P.E. C68304  
PRINCIPAL ENGINEER

	SIGNATURE	DATE
CITY ENGINEER		
ENGINEERING MANAGER		
FIRE MARSHAL		
PARKS		
PLANNING		
POLICE		
UTILITY MANAGER		

RECORD PLAN  
I \_\_\_\_\_ HEREBY STATE THAT THESE RECORD PLAN CHANGES ARE COMPLETE FROM INFORMATION FURNISHED BY THE PROJECT CONTRACTOR, SOILS ENGINEER AND MY OFFICE. I HEREBY STATE THAT TO THE BEST OF MY KNOWLEDGE THE THE WORK WAS DONE IN ACCORDANCE WITH THE FINAL APPROVED PLANS. THE ENGINEER AND THE CITY WILL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH HAVE BEEN INCORPORATED INTO THIS DOCUMENT AS A RESULT. FIELD VERIFICATION OF CRITICAL FACTS AND DATA SHOULD BE MADE IF THESE DOCUMENTS ARE TO BE USED AS A BASIS FOR FUTURE WORK. ENGINEER'S SIGNATURE \_\_\_\_\_ DATE: \_\_\_\_\_

DATE: JUNE 2024  
DESIGNED BY: SC/CC  
DRAWN BY: CB/DD  
CHECKED BY: MK

PROJECT NO.  
C66501936

**CITY OF PETALUMA**  
PUBLIC WORKS & UTILITIES  
202 N. McDowell Blvd., PETALUMA, CALIFORNIA, 94954  
PH. 707-778-4546 FAX. 707-778-4508

**PETALUMA 1858**

ADOBE ROAD RECYCLED WATER PIPELINE PROJECT  
TITLE SHEET AND VICINITY MAP

SHEET  
**G-001**  
1 of 32

**GENERAL NOTES**

1. CONTRACTOR SHALL POSSESS A CLASS "A" LICENSE.
2. EXCAVATIONS OVER FIVE FEET (5') DEEP REQUIRE AN EXCAVATION PERMIT FROM THE STATE DEPARTMENT OF INDUSTRIAL SAFETY.
3. CONTRACTOR SHALL CALL "UNDERGROUND SERVICE ALERT" AT 811 OR (800) 227-2600 AT LEAST 48 HOURS PRIOR TO START OF CONSTRUCTION FOR LOCATING UNDERGROUND UTILITIES. NOTE THAT WATER SERVICES, SEWER LATERALS, AND OTHER UTILITIES MAY NOT BE FIELD MARKED NOR IDENTIFIED ON THE PLANS. CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATION OF UNDERGROUND UTILITIES.
4. UNAUTHORIZED CHANGES AND USES: THE ENGINEER PREPARING THESE PLANS WILL NOT BE RESPONSIBLE FOR, OR LIABLE FOR, UNAUTHORIZED CHANGES TO OR USES OF THESE PLANS. ALL CHANGES TO THE PLANS MUST BE IN WRITING AND MUST BE APPROVED BY THE PREPARER OF THESE PLANS.
5. CONTRACTOR AGREES THAT IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONTRACTOR WILL BE REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY: THAT THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS, AND CONSTRUCTION CONTRACTOR FURTHER AGREES TO HOLD HARMLESS, INDEMNIFY AND DEFEND THE CITY OF PETALUMA, AND EACH OF THEIR OFFICERS, EMPLOYEES AND AGENTS.
6. ALL MATERIAL WORKMANSHIP AND CONSTRUCTION SHALL CONFORM TO THE CITY OF PETALUMA DESIGN AND CONSTRUCTION STANDARDS AND SPECIFICATIONS AND CONFORM TO THE LATEST EDITION OF THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS AND STANDARD PLANS EXCEPT AS NOTED ON PLANS.
7. ANY EXCESS MATERIALS SHALL BE CONSIDERED THE PROPERTY OF THE CONTRACTOR AND BE DISPOSED OF AWAY FROM THE JOB SITE IN ACCORDANCE WITH APPLICABLE LOCAL, STATE AND FEDERAL REGULATIONS.
8. CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING EXISTING FACILITIES AND IMPROVEMENTS FROM DAMAGE RESULTING FROM HIS WORK. ANY DAMAGE SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE AND TO THE SATISFACTION OF THE CITY.
9. PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR SHALL PROVIDE THE COUNTY OF SONOMA WITH A TRAFFIC CONTROL PLAN AND OBTAIN AN ENCROACHMENT PERMIT IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS. ADDITIONALLY, CONTRACTOR TO SUBMIT TRAFFIC CONTROL PLAN TO CITY.
10. THE CONTRACTOR SHALL MAINTAIN ACCESS TO ALL DRIVEWAYS DURING CONSTRUCTION. MAIL AND GARBAGE SERVICE SHALL BE MAINTAINED THROUGHOUT THE COURSE OF THIS PROJECT.
11. ALL CONSTRUCTION ACTIVITY SHALL CONFORM TO PROJECT MITIGATION MEASURES, AS APPLICABLE.
12. CONTRACTOR SHALL NOTIFY PROPERTY OWNERS AT LEAST 72 HOURS IN ADVANCE OF DRIVEWAY CLOSURES FOR CONSTRUCTION OF C/G, DRIVEWAY APRONS AND DRIVEWAY TRANSITIONS. DRIVEWAY CLOSURES ARE LIMITED TO 48 HRS MAXIMUM. CONTRACTOR SHALL CLOSE ONLY ONE DRIVEWAY AT A TIME FOR PROPERTIES WITH MORE THAN ONE DRIVEWAY ACCESS, & SHALL PROVIDE ALTERNATE ACCESS WHERE POSSIBLE FOR SINGLE DRIVEWAY PROPERTIES.
13. PROVIDE AND MAINTAIN EXCLUSION FENCING ADJACENT TO ALL OPEN EXCAVATIONS. WHERE EXCAVATION IS BETWEEN PAVED ROAD AND R/W BOUNDARY, PROVIDE EXCLUSION FENCING BETWEEN EXCAVATION AND R/W BOUNDARY. WHERE EXCAVATION IS WITHIN EASEMENT AREA, PROVIDE EXCLUSION FENCING ON ALL SIDES OF EXCAVATION. COVER OPEN EXCAVATIONS WITH TRENCH PLATE WHEN THERE IS NO ACTIVE WORK. COORDINATE WITH CITY PROVIDED BIOLOGIST ON SITE CLEARANCE FOR SPECIAL STATUS SPECIES. EXCLUSION FENCING SHALL BE COMPRISED OF A GEOTEXTILE FABRIC ANCHORED WITH POSTS, SIMILAR TO TEMPORARY SILT FENCE SHOWN ON DETAIL 1 ON DWG C-502. TEMPORARY SILT FENCE IS AN ACCEPTABLE ALTERNATIVE TO EXCLUSION FENCING.
14. COMPLY WITH COUNTY OF SONOMA DEPARTMENT OF TRANSPORTATION AND PUBLIC WORKS STANDARD NOTES. SEE TECHNICAL SPECIFICATIONS APPENDIX A.
15. REMOVE AND REPLACE ALL SIGNS AS REQUIRED FOR TRENCHING.

**RECYCLED WATER NOTES**

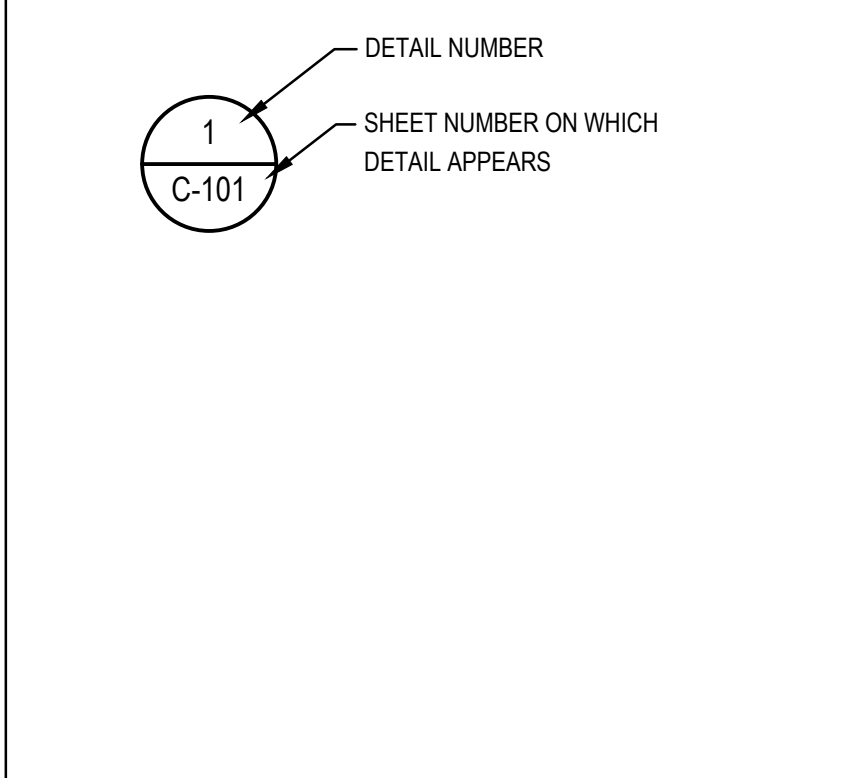
1. LOCATION OF EXISTING UTILITIES AND STRUCTURES ARE FROM INFORMATION AVAILABLE AT THE TIME OF DESIGN. EXACT LOCATION AND COMPLETENESS ARE NOT GUARANTEED. CONTRACTOR SHALL NOTIFY THE OWNER AND UNDERGROUND SERVICES ALERT 811 OR (800) 227-2600 A MINIMUM OF 48 HOURS PRIOR TO EXCAVATION AND SHALL POTHOLE FOR EXACT LOCATION. CONTRACTOR IS RESPONSIBLE FOR LOCATING EXISTING UTILITIES.
2. THE MINIMUM ALLOWABLE PIPE COVER OVER ALL PIPES 4" NOMINAL DIAMETER AND LARGER SHALL BE 36" AS MEASURED FROM FINISH GRADE TO THE TOP OF THE PIPE. COVER OVER ALL PIPES 16" NOMINAL DIAMETER AND LARGER SHALL BE 48".
3. PROVIDE A MINIMUM OF 12" VERTICAL CLEARANCE BETWEEN (E) WATER UTILITY AND (N) RECYCLED WATER MAIN. BACKFILL BETWEEN UTILITIES WITH CONTROLLED DENSITY FILL SLURRY, MIN 5' FROM CROSSING EACH WAY.
4. PROVIDE A MINIMUM OF 6" VERTICAL CLEARANCE BETWEEN EXISTING UNDERGROUND STORM, SEWER, POWER, TELECOMMUNICATIONS, AND. PROVIDE A MINIMUM OF 36" CLEARANCE ON ALL SIDES OF GAS UTILITIES.
5. THE MINIMUM ALLOWABLE RADIUS ON 16" NOMINAL DIAMETER PIPE SHALL BE 400 FEET OR AS RECOMMENDED BY THE PIPE MANUFACTURER. CURVATURE OF THE PIPE SHALL BE ACCOMPLISHED THROUGH LONGITUDINAL BENDING OF THE PIPE BARREL. DEFLECTION OF JOINTS IS NOT ALLOWED.
6. PRIOR TO BACKFILLING, VERIFY THAT THE MANUFACTURER'S ASSEMBLY MARK ON THE PIPE JOINT IS FLUSH WITH THE END OF THE BELL.
7. ALL ELBOWS, BENDS, TEES, VALVES, AND OTHER DUCTILE IRON FITTINGS INSTALLED ON THE RECYCLED WATER PIPELINE SHALL BE MECHANICALLY RESTRAINED AND POLYETHYLENE WRAPPED.
8. PROVIDE ALL FITTINGS AND TRANSITION COUPLINGS TO PROVIDE A COMPLETE AND WORKING SYSTEM.
9. INSTALL RECYCLED WATER MAIN IN TRENCH WHERE SHOWN ON DRAWINGS WITH BEDDING IN ACCORDANCE WITH CITY STANDARD NUMBERS 219.1 AND 219.2. TRENCH BACKFILL, COMPACTION AND RESURFACING REQUIREMENTS SHALL BE IN ACCORDANCE WITH COUNTY OF SONOMA STANDARD DRAWING NUMBERS 219A AND 219B.
10. TRENCH BACKFILL IN PAVED AREAS SHALL BE IN ACCORDANCE WITH COUNTY OF SONOMA STANDARD DRAWING NUMBER 219B, TYPE A1 OR ALTERNATIVE TRENCH.
11. PAVEMENT CUTTING AND FULL DEPTH PAVEMENT RESTORATION SHALL BE IN ACCORDANCE WITH COUNTY OF SONOMA STANDARD DRAWING NUMBER 219A.
12. TRENCH AND HDD PIT BACKFILL AND RESURFACING REQUIREMENTS IN SHOULDER AREAS SHALL BE IN ACCORDANCE WITH COUNTY OF SONOMA STANDARD DRAWING NUMBER 219B, TYPE B TRENCH
13. WHERE RECYCLED WATER MAIN IS INSTALLED UNDER AN EXISTING UTILITY, CONSTRUCT PER PLAN DIMENSIONS AND CITY STANDARD DRAWING NO. 855.01 WATER MAIN UNDER STRUCTURE. WHERE RECYCLED WATER MAIN IS INSTALLED OVER AN EXISTING UTILITY, CONSTRUCT PER PLAN DIMENSIONS AND CITY STANDARD DRAWING NO. 855.02 WATER MAIN OVER STRUCTURE.



14. PROVIDE CONCRETE THRUST BLOCKS IN ACCORDANCE WITH CITY STANDARD NUMBERS 853, 854.01 AND 854.02, AND DETAIL 1 ON DRAWING C-501.
15. PROTECT EXISTING SHOULDER BACKING. REPLACE SHOULDER BACKING IN ACCORDANCE WITH STATE STANDARD SPECIFICATION SECTION 19-9 WHERE DISTURBED OR DAMAGED.
16. HDD PITS ARE SHOWN TO DEMONSTRATE CONCEPT ONLY. CONTRACTOR SHALL FIELD ADJUST PIT LOCATION, ORIENTATION AND DIMENSIONS AS NEEDED FOR SAFE OPERATION.

**REFERENCED CITY STANDARDS**

219.1	STANDARD TRENCH DETAILS
219.2	STANDARD TRENCH DETAILS (NOTES)
853	CONCRETE THRUST BLOCKS VERTICAL AND COMBINATION BEND APPLICATIONS
854.01	CONCRETE THRUST BLOCKS HORIZONTAL APPLICATIONS
854.02	CONCRETE THRUST BLOCKS HORIZONTAL APPLICATIONS NOTES
855.01	WATER MAIN UNDER STRUCTURE (LOWERING)
855.02	WATER MAIN OVER STRUCTURE
858.01	BLOW-OFF
877.01	GATE VALVE, STEM EXTENSION AND BOX WITH RISER
877.02	VALVE ANCHOR
877.03	VALVE STEM EXTENSION ASSEMBLY
878	TAPPING VALVE AND PIT
879	BUTTERFLY VALVE INSTALLATION (REQUIRED FOR 16" AND LARGER PIPE)
883	AUTOMATIC AIR & VACUUM AND AIR RELEASE VALVE

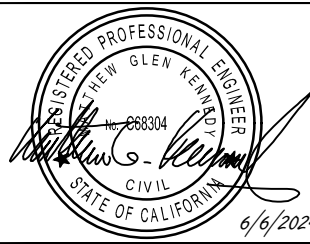
**DETAIL IDENTIFICATION**



GHD Inc.  
2235 Mercury Way Suite 150  
Santa Rosa California 95407 USA  
T 1 707 523 1010 F 1 707 527 8679  
www.ghd.com

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Bar is one inch on 11" x 17" sheet  
0 ————— 1"

No.	Issue	Checked	Approved	Date
Author	CB	Designer	SC/CC	
Drafting Check	MK	Design Check	MK	
Project Manager	MK	Project Director	AC	

Client  
**CITY OF PETALUMA**

Project  
**ADOBE ROAD RECYCLED WATER PIPELINE**

Date	10/26/2023	Scale	AS SHOWN
Project No.	11219037		

Title  
**GENERAL NOTES AND CITY STANDARDS**

Drawing No. **G-002** Sheet **2 of 33**

LEGEND

	SURVEY CONTROL POINT
	APPROXIMATE BORING LOCATION
	POTHOLE LOCATION
	APPROXIMATE PARCEL BOUNDARY/ RIGHT OF WAY
	RECYCLED WATER EASEMENT BOUNDARY
	(E) FENCE
	(E) WATER LINE
	(E) RECYCLED WATER LINE
	(E) SANITARY SEWER
	(E) GAS LINE
	(E) ELECTRICAL LINE
	(E) OVERHEAD ELECTRICAL LINE
	(E) TELEPHONE OR COMMUNICATIONS LINE
	(E) STORM DRAIN
	(E) CATCH BASIN
	(E) POWER POLE
	(E) ELECTRIC VAULT
	(E) SIGN
	(E) WATER VALVE
	MINOR CONTOUR
	MAJOR CONTOUR
	(E) TREES
	(E) EDGE OF PAVEMENT
	(N) RECYCLED WATER LINE
	(N) BLOW OFF
	(N) AIR RELEASE VALVE
	(N) WATER VALVE
	SILT FENCE
	(E) WETLAND AREA
	(E) RIPARIAN AREA
	(E) OTHER WATERS

ABBREVIATIONS

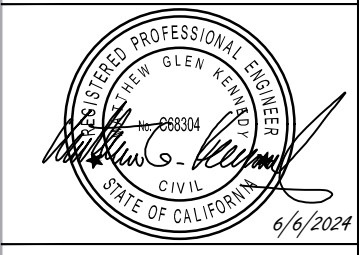
AB	AGGREGATE BASE, ABANDONED	FS	FINISHED SURFACE	R	RADIUS
ABAN	ABANDONED			RC	RELATIVE COMPACTION
AC	ASPHALTIC CONCRETE	G	GAS	RD	ROAD
	ASBESTOS CEMENT	GB	GRADE BREAK	RET	RETAINING
ACP	ASBESTOS CONCRETE PIPE	GV	GATE VALVE	ROW	RIGHT-OF-WAY
AGG	AGGREGATE			RPM	RAISED PAVEMENT MARKER
AL	ARC LENGTH	HDD	HORIZONTAL DIRECTIONAL DRILLING	RT	RIGHT OFFSET FROM CENTERLINE
APN	ASSESSORS PARCEL NUMBER	HDPE	HIGH DENSITY POLYETHYLENE	R/W	RIGHT OF WAY
ARV	AIR RELEASE/VACUUM VALVE	HMA	HOT MIX ASPHALT	RW	RECYCLED WATER
AVE	AVENUE	HP	HIGH PRESSURE		
		HZ	HORIZONTAL	S	SLOPE, SEWER
BC	BEGINNING OF CURVE			(S)	SOUTH
BLDG	BUILDING	IC	INTERCONNECT	SCH	SCHEDULE
BO	BLOW-OFF	INV	INVERT	SD	STORM DRAIN
BSW	BACK OF SIDEWALK	IRR	IRRIGATION	SDMH	STORM DRAIN MANHOLE
				SHT	SHEET
COM	COMMUNICATION	KV	KILOVOLT	SL	STREET LIGHT
C&G	CURB & GUTTER			SS	SANITARY SEWER
CATV	CABLE TELEVISION	L	LENGTH	SSCO	SANITARY SEWER CLEANOUT
CB	CATCH BASIN	LF	LINEAR FEET	SSMH	SANITARY SEWER MANHOLE
QDF	CONTROL DENSITY FILL	LG	LIP OF GUTTER	ST	STREET
	CENTERLINE	LN	LANE	STA	STATION
CL	CLASS	LT	LEFT OFFSET FROM CENTERLINE	STD	STANDARD
CO, C/O	CLEANOUT			SVC	SERVICE LATERAL
COL	COLUMN	MAX	MAXIMUM	(SE)	SOUTHEAST
CONC	CONCRETE	MB	MAILBOX	(SW)	SOUTHWEST
CT	COURT	ME	MATCH EXISTING	S/W	SIDEWALK
		MH	MANHOLE		
D	DEMOLISH	MI	MILE	T, TEL	TELEPHONE
DBL	DOUBLE	MIN	MINIMUM, MINUTE	TB	TOP OF BANK
DEPT	DEPARTMENT	MON	MONUMENT	TC	TOP OF CURB
DI	DROP INLET	MUTCD	MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES	TG	TOP OF GRADE
DIA, Ø	DIAMETER			TOC	TOP OF CONCRETE
DIP	DUCTILE IRON PIPE			TOE	TOE OF FEATURE
DR	DIMENSION RATIO	(N)	NEW, NORTH	TOP	TOP OF PIPE
DWG	DRAWING	(NE)	NORTHEAST	TOR	TOP OF RAMP
DWY	DRIVEWAY	(NW)	NORTHWEST	TOW	TOP OF WALL
		No	NUMBER	TP	TOP OF CONCRETE PAD, TIE POINT
(E)	EAST, EXISTING	NAVD	NORTH AMERICAN VERTICAL DATUM		
E	ELECTRICAL			TYP	TYPICAL
EC	END OF CURVE	NTS	NOT TO SCALE		
EG	EXISTING GRADE			UG	UNDERGROUND
EJ	EXPANSION JOINT	OH	OVERHEAD	UON	UNLESS OTHERWISE NOTED
EL, ELEV	ELEVATION	P	PAVEMENT		
ELEC	ELECTRIC	PB	POINT OF BEGINNING	VAR	VARIES
ENT	ENTRY	PC	POINT OF CURVATURE	VERT, VT	VERTICAL
EP	EDGE OF PAVEMENT	PCC	PORTLAND CEMENT CONCRETE	VLT	VAULT
EQ	EQUAL	PED	PEDESTRIAN		
EX, EXIST	EXISTING	PG&E	PACIFIC GAS AND ELECTRIC COMPANY	(W)	WEST
				W/	WITH
FC	FACE OF CURB	PI	POINT OF INTERSECTION	W	WATER
FCA	FLANGE COUPLING ADAPTER	PL	PROPERTY LINE / POWER LINE	WM	WATER METER, WATER MAIN
FEN	FENCE	PM	PAVEMENT MARKING	WS	WATER SERVICE
FG	FINISH GRADE (UNPAVED)	PP	POWER POLE	WV	WATER VALVE
FH	FIRE HYDRANT	PRC	POINT OF REVERSE CURVATURE		
FL	FLOWLINE	PT	POINT		
F/FLG	FACE OF, FLANGE	PT	POINT OF TANGENCY		
FND	FOUNDATION	P.U.E.	PUBLIC UTILITY EASEMENT		
FPVC	FUSIBLE PVC	PVC	POLYVINYL CHLORIDE		

NOTE:  
SOME ABBREVIATIONS MAY BE USED  
IN COMBINATION.



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Santa Rosa California 95407 USA  
T 1 707 523 1010 F 1 707 527 8679  
www.ghd.com

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Client  
**CITY OF PETALUMA**

Project  
**ADOBE ROAD RECYCLED WATER PIPELINE**

Date  
**10/26/2023**

Scale  
**AS SHOWN**

Project No.  
**11219037**

Title  
**LEGEND AND ABBREVIATIONS**

Size  
**ANSI B**

Status Code

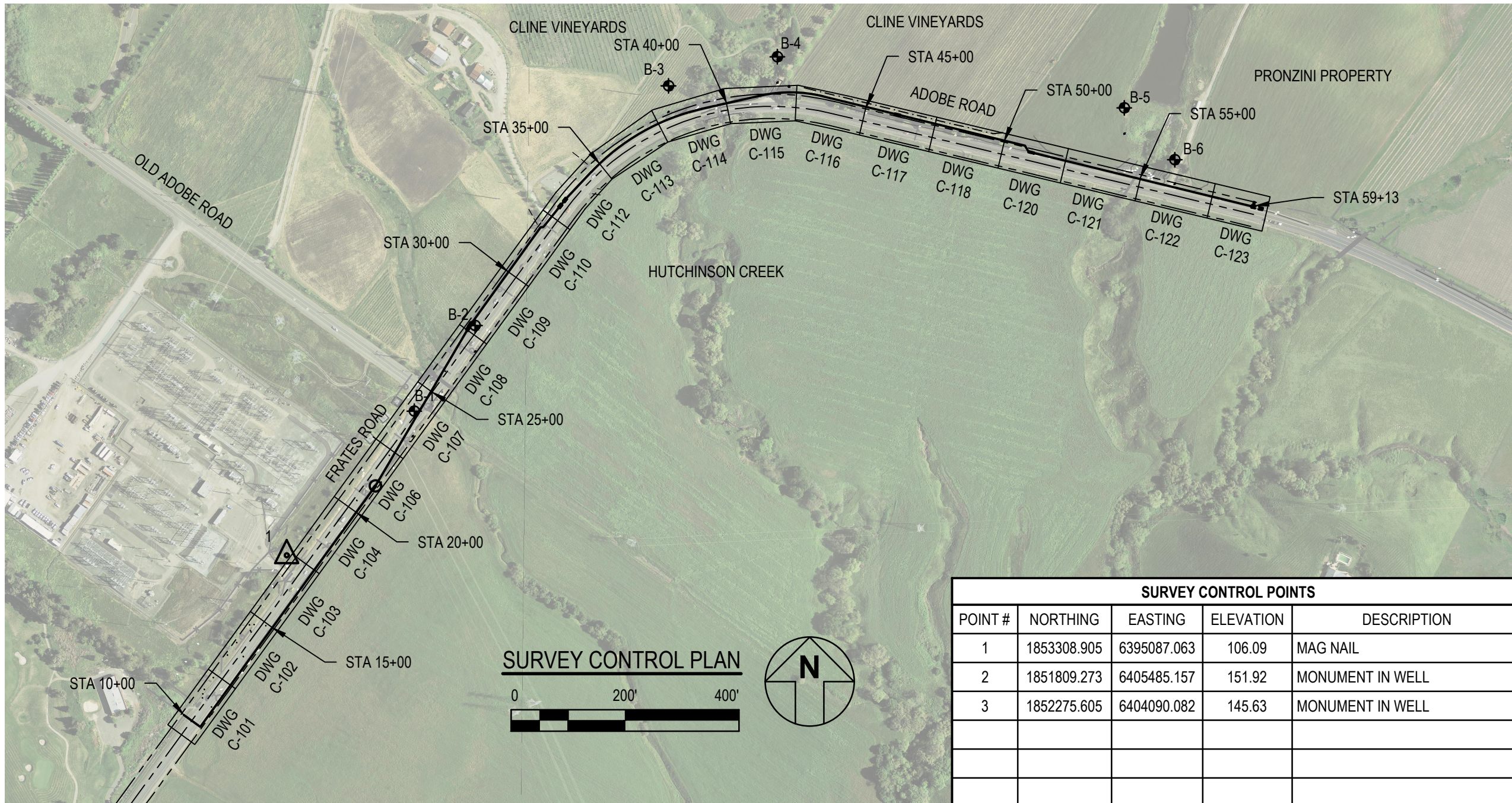
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SURVEY CONTROL POINTS				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
1	1853308.905	6395087.063	106.09	MAG NAIL
2	1851809.273	6405485.157	151.92	MONUMENT IN WELL
3	1852275.605	6404090.082	145.63	MONUMENT IN WELL

**SURVEY INFORMATION**

**BASIS OF BEARING:**  
CALIFORNIA COORDINATE SYSTEM '83

**BENCHMARK:**  
MAG NAIL, LOCATION SHOWN HEREON, ELEVATION 106.09'  
(DATUM NAVD 88 BY GPS OBSERVATIONS UTILIZING THE CALIFORNIA SURVEY & DRAFTING SUPPLY VSN)

**SHEET GENERAL NOTES**

- FIELD TOPOGRAPHIC SURVEY WAS COMPLETED BY BKF ENGINEERS ON APRIL 24, 2019.
- ALL ELEVATION INFORMATION IS IN FEET OR DECIMAL THEREOF.
- UNAUTHORIZED CHANGES AND USES: THE PROFESSIONAL PREPARING THIS MAP WILL NOT BE RESPONSIBLE FOR, OR LIABLE FOR, UNAUTHORIZED CHANGES TO OR USES OF THIS MAP. CHANGES TO THIS MAP MUST BE REQUESTED IN WRITING AND MUST BE APPROVED BY THE PROFESSIONAL.
- THE LOCATIONS OF EXISTING UNDERGROUND FACILITIES AND UTILITIES SHOWN ON THE DRAWINGS ARE APPROXIMATE AND BASED ON OBSERVED SURFACE FEATURES AND AVAILABLE INFORMATION. THE PROFESSIONAL PREPARING THIS MAP ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THESE FACILITIES OR FOR THE INADVERTENT OMISSION OF RELATED INFORMATION.
- BEARINGS AND DISTANCES ARE BASED ON SURVEY.
- SURVEY CONTROL POINT #2 AND #3 ARE LOCATED OUTSIDE THE PROJECT AREA.

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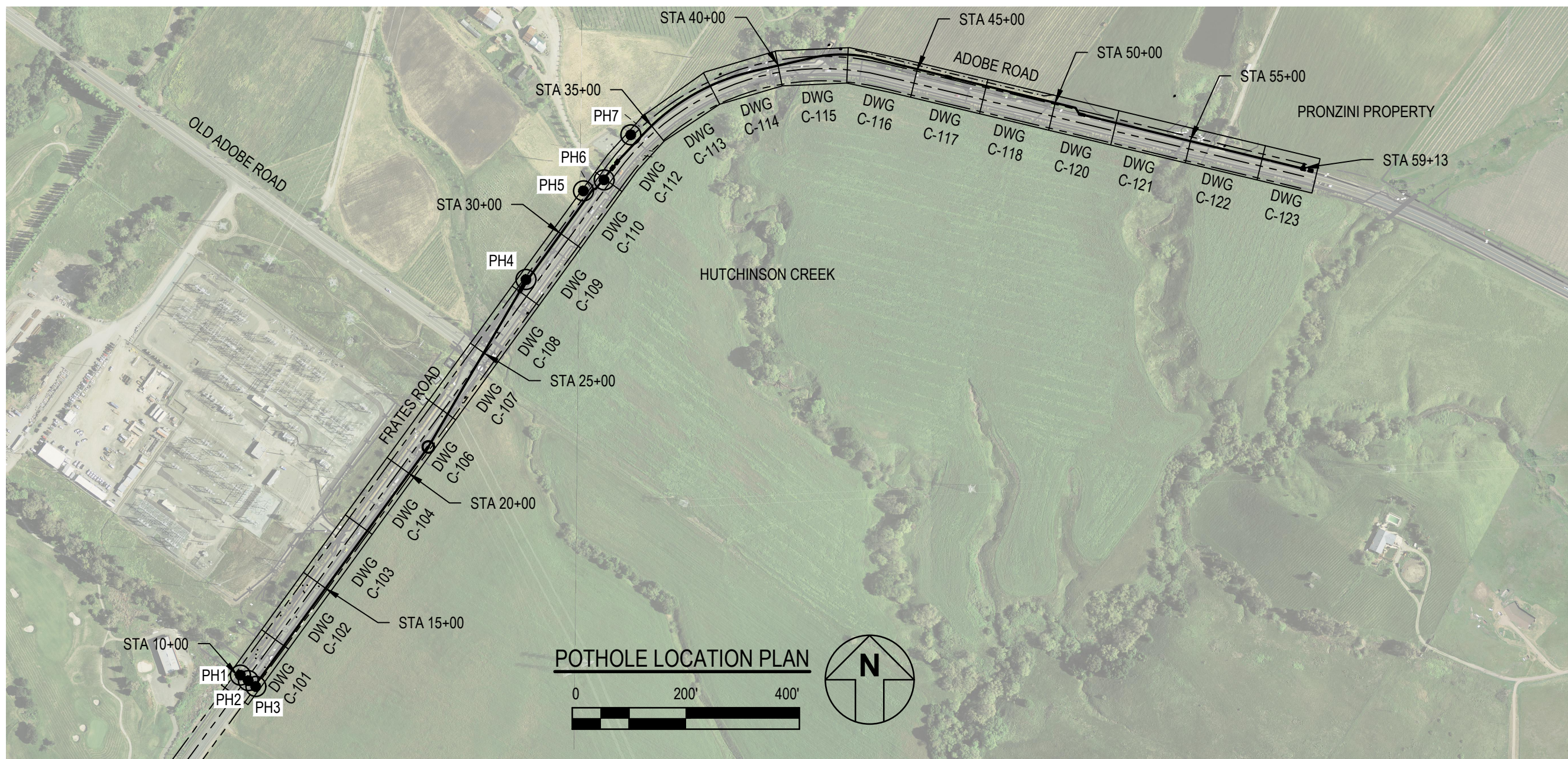
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Drawing No. G-004 Sheet 4 of 33

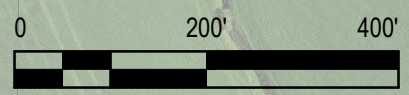
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**POTHOLE LOCATION PLAN**



**POTHOLE SCHEDULE**

POTHOLE ID	DATE	ASPHALT PAVEMENT	SOIL	UTILITY				DEPTH FROM SURFACE (FT)	DRAWING NUMBER	STATION	REMARKS
				TYPE	OWNER	SIZE	MATERIAL				
PH1	1/31/2023	0	ROCK	GAS	PG&E	12-INCH	STEEL	-3.0	C-101	10+09	PGE STANDBY CONFIRMED GAS
PH2	1/31/2023	5	ROCK	GAS	PG&E	16-INCH	STEEL	-8.7	C-101	10+41	ROCKS IN POTHOLE. GROUNDWATER IN POTHOLE
PH3	1/31/2023	0	DIRT	WATER	CITY	16-INCH	C900 WITH PLASTIC LINING	-3.2	C-101	10+64	ROCKS IN POTHOLE. GROUNDWATER IN POTHOLE
PH4	1/31/2023	0	ROCK	GAS	PG&E	12-INCH	STEEL WITH ASPHALT WRAP	-3.4	C-108	27+91	GROUND WATER IN POTHOLE. ENCOUNTERED SIDE OF PIPE, PGE STANDBY CONFIRMED GAS TRANSMISSION
PH5	1/31/2023	0	ROCK	GAS	PG&E	12-INCH	STEEL WITH GREEN WRAP	-3.7	C-109	31+81	GAS TRANSMISSION. GROUND WATER IN POTHOLE.
PH6	1/31/2023	0	DIRT	GAS	PG&E	16-INCH	N/A	-3.2	C-109	31+90	DUG DOWN ON USA MARKS. FOUND YELLOW CAUTION TAPE. SAND CAVE IN, GROUND WATER AT 38". PGE STANDBY CONFIRMED GAS LINE IN PH DUE TO SAND IN PH.
PH6	1/31/2023	0	N/A	GAS	PG&E	16-INCH	N/A	-6.3	C-109	32+21	SAND CAVE IN AND GROUND WATER IN POTHOLE. DEPTH TO PIPE BY ELECTRONIC DETECTION METHOD.
PH7	1/31/2023	0	DIRT	GAS	PG&E	N/A	N/A	-7.4	C-110	34+19	DUG DOWN ON USA MARKS, FOUND YELLOW CAUTION TAPE. SAND CAVE IN, GROUND WATER AT 89". PGE STANDBY CONFIRMED GAS LINE IN PH DUE TO SAND IN PH.
PH7	1/31/2023	0	N/A	GAS	PG&E	N/A	N/A	-8.4	C-110	34+19	SAND CAVE IN AND GROUND WATER IN PH. DEPTH TO PIPE BY ELECTRONIC DETECTION METHOD.

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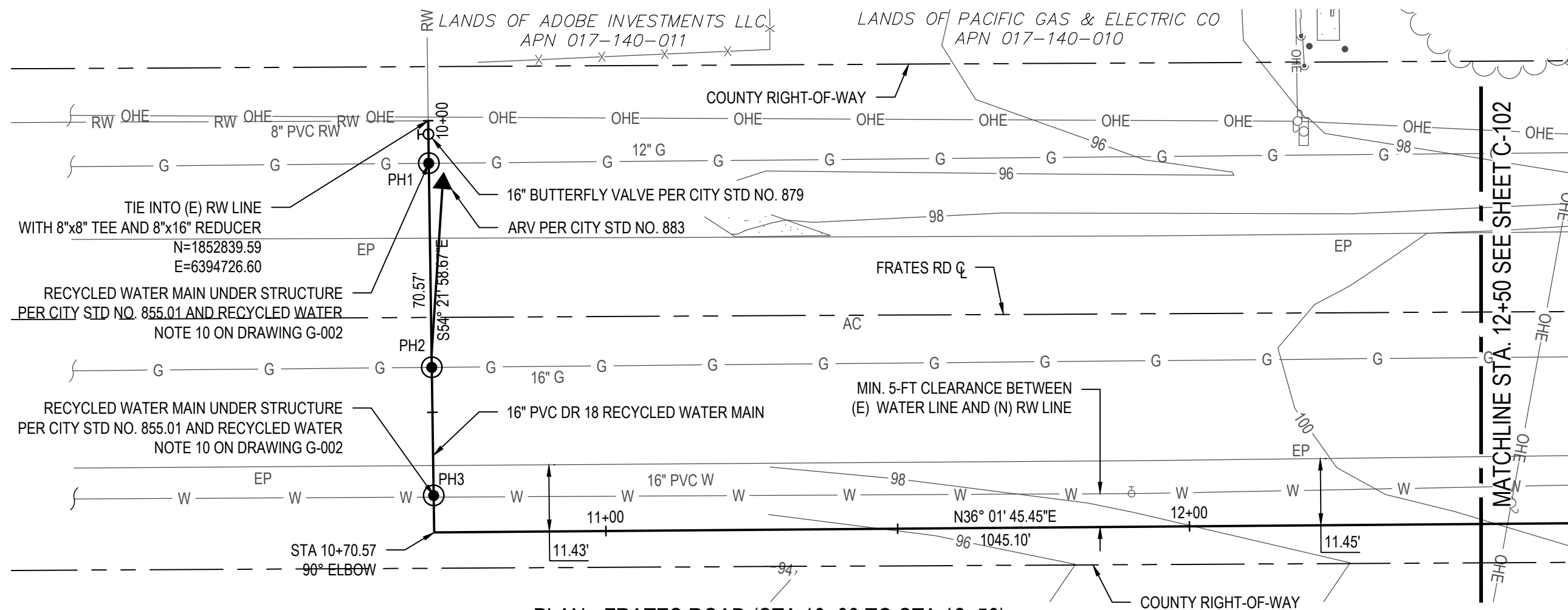
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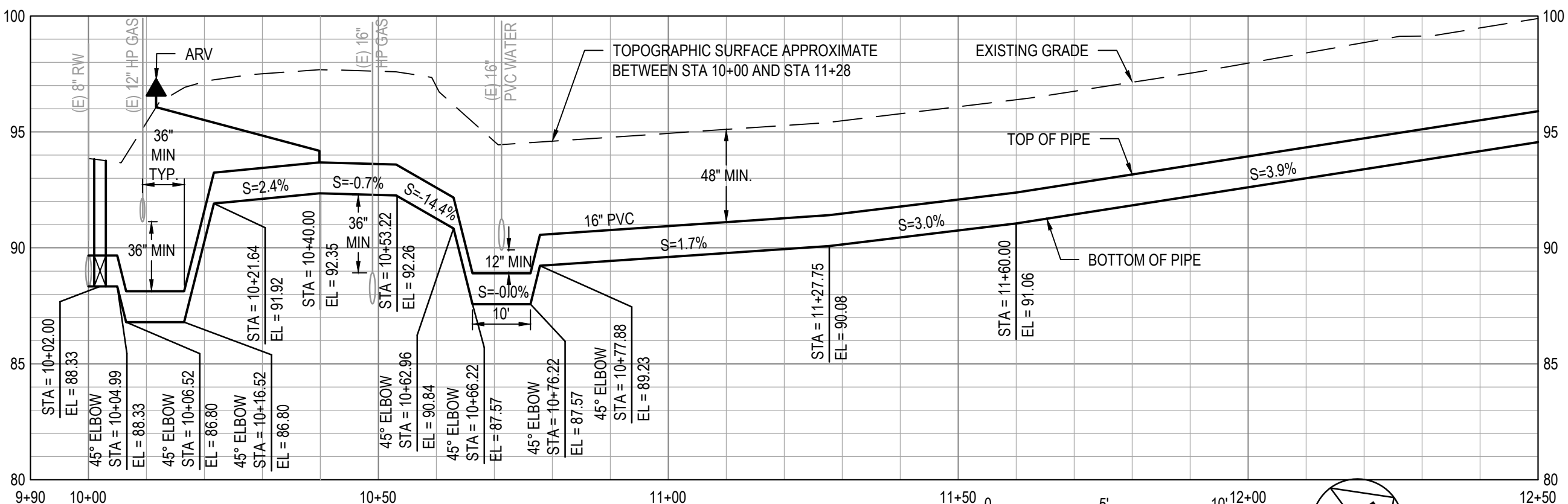
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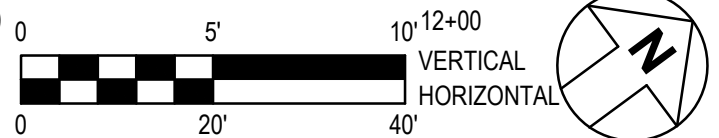
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PLAN - FRATES ROAD (STA 10+00 TO STA 12+50)



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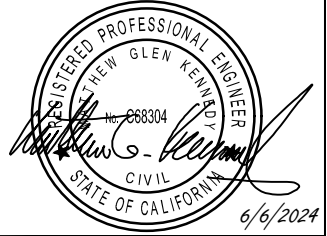
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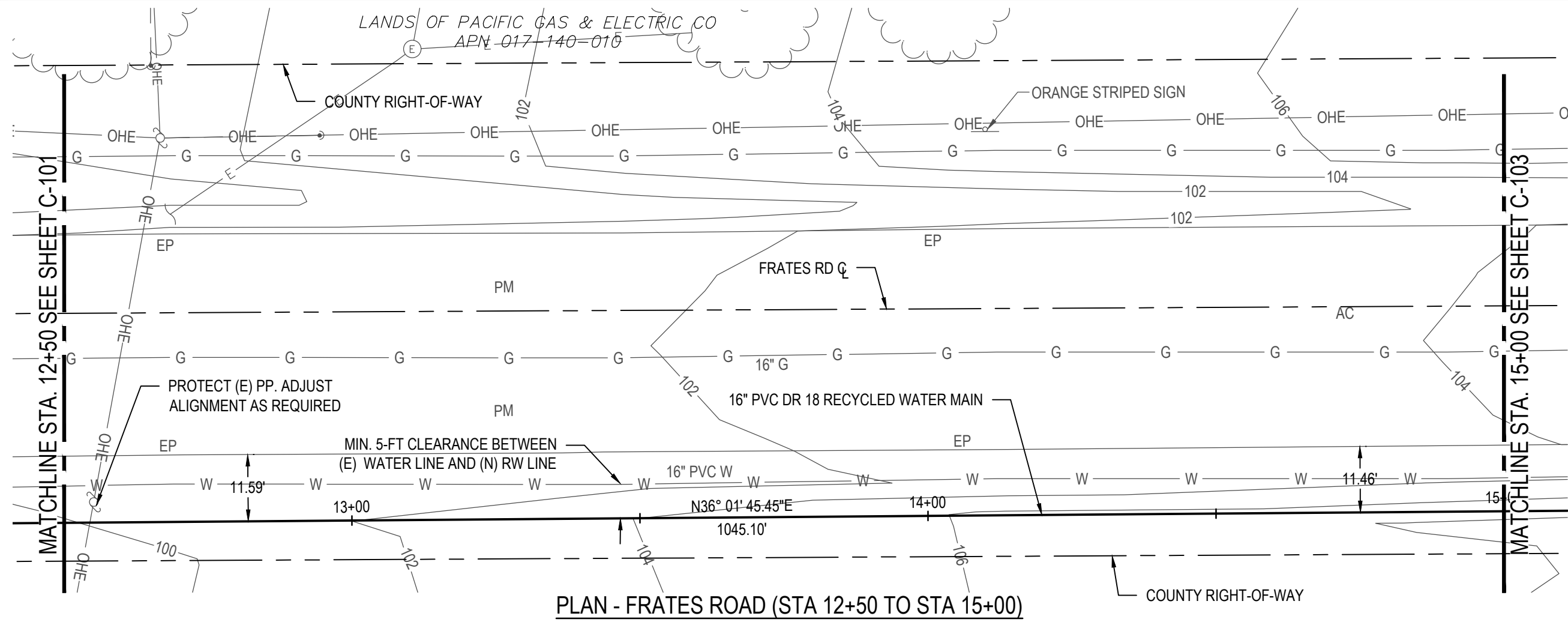
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**PLAN AND PROFILE - FRATES ROAD (STA 10+00 TO STA 12+50)**

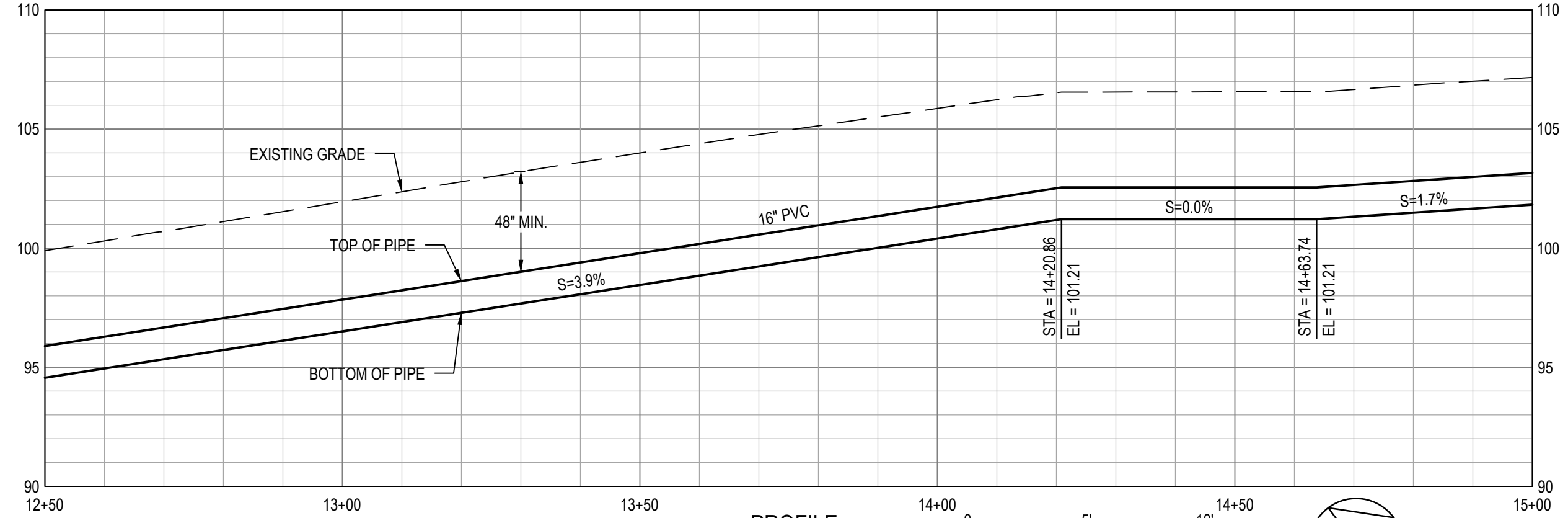
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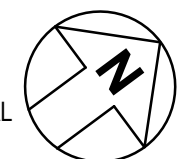
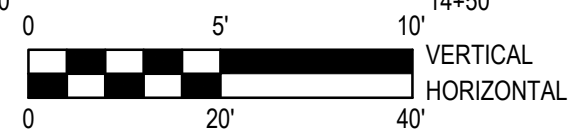
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PLAN - FRATES ROAD (STA 12+50 TO STA 15+00)



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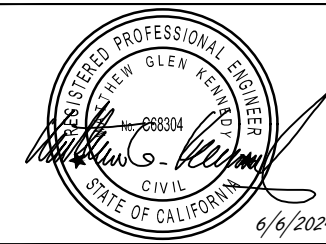
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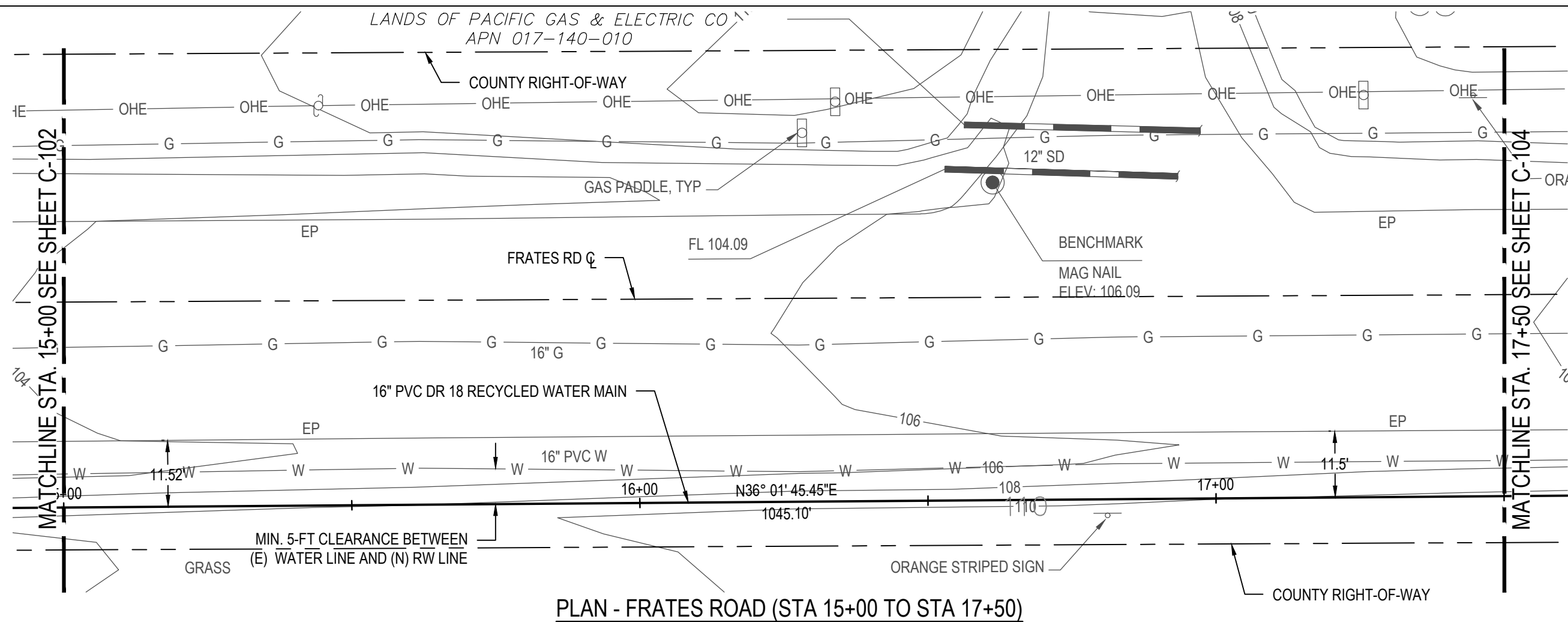
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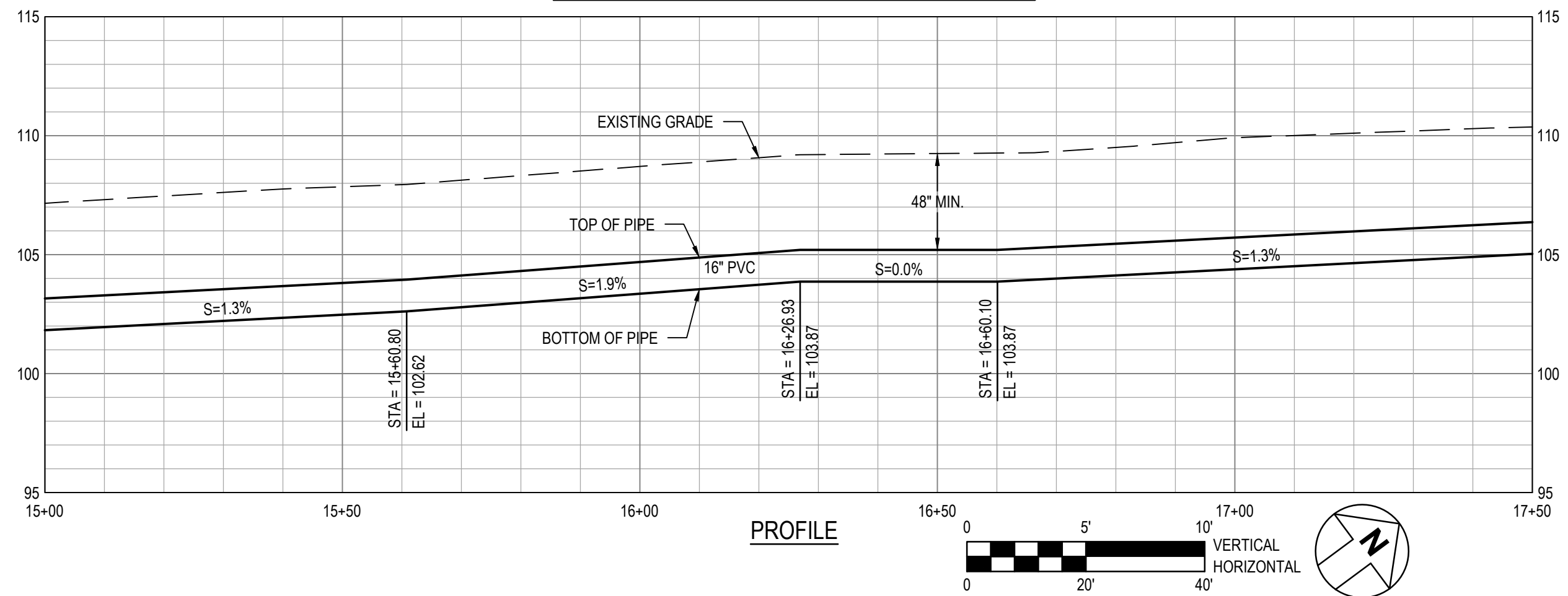
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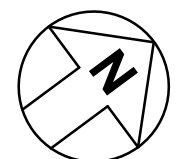
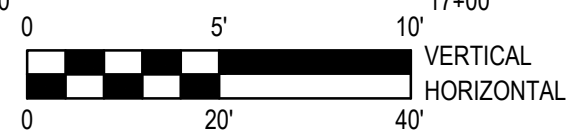
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**PLAN - FRATES ROAD (STA 15+00 TO STA 17+50)**



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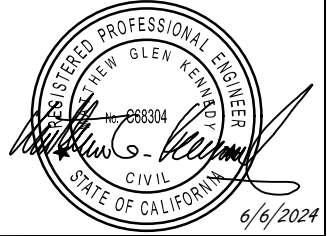
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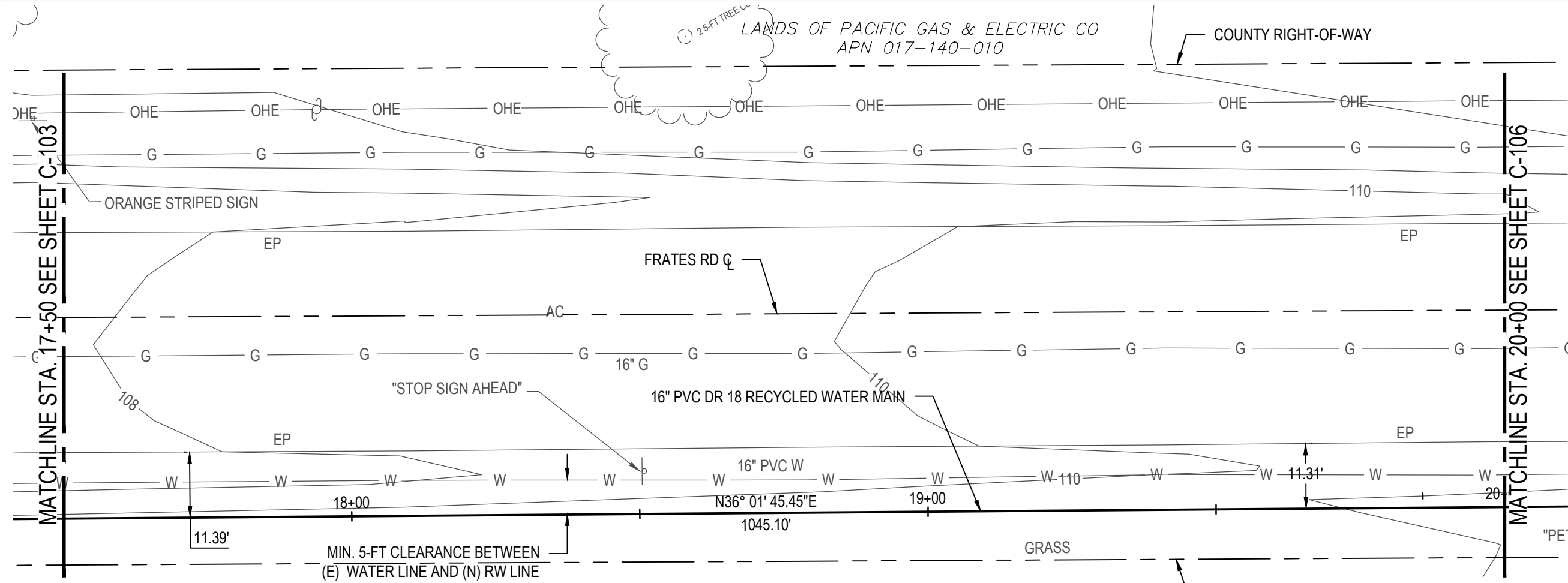
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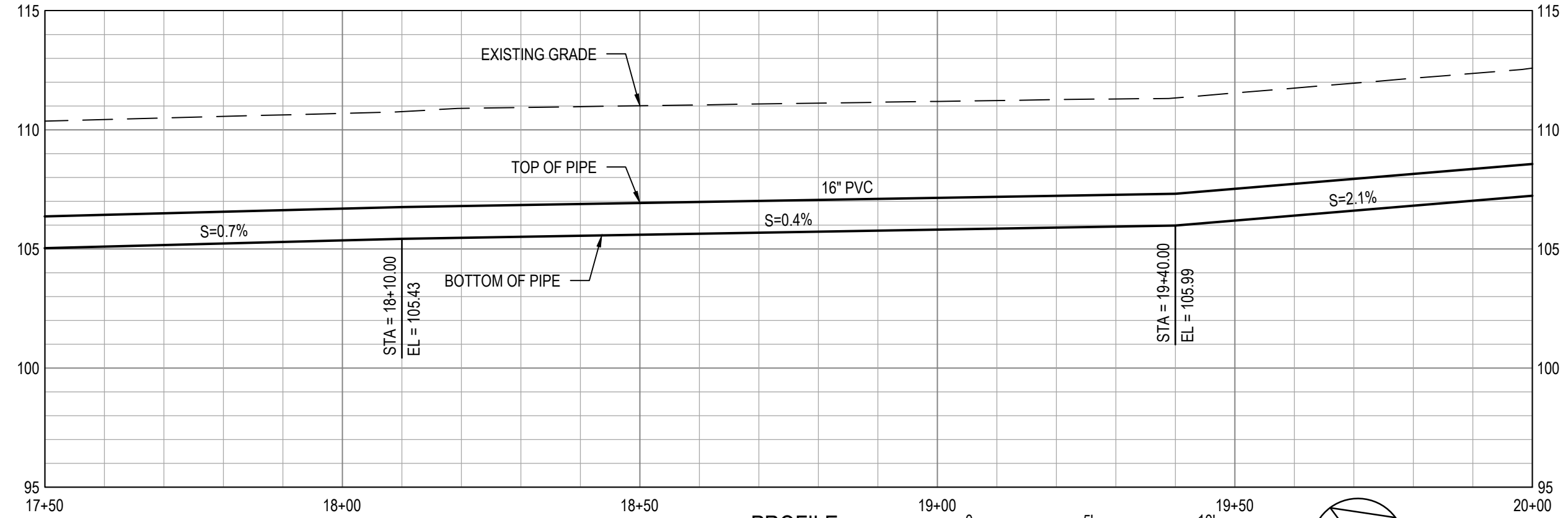
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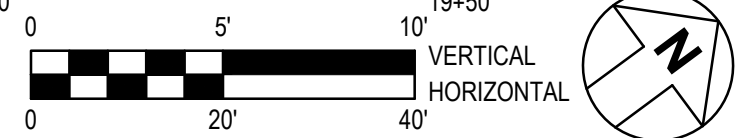
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PLAN - FRATES ROAD (STA 17+50 TO STA 20+00)



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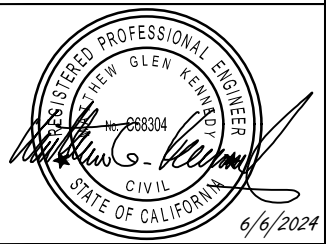
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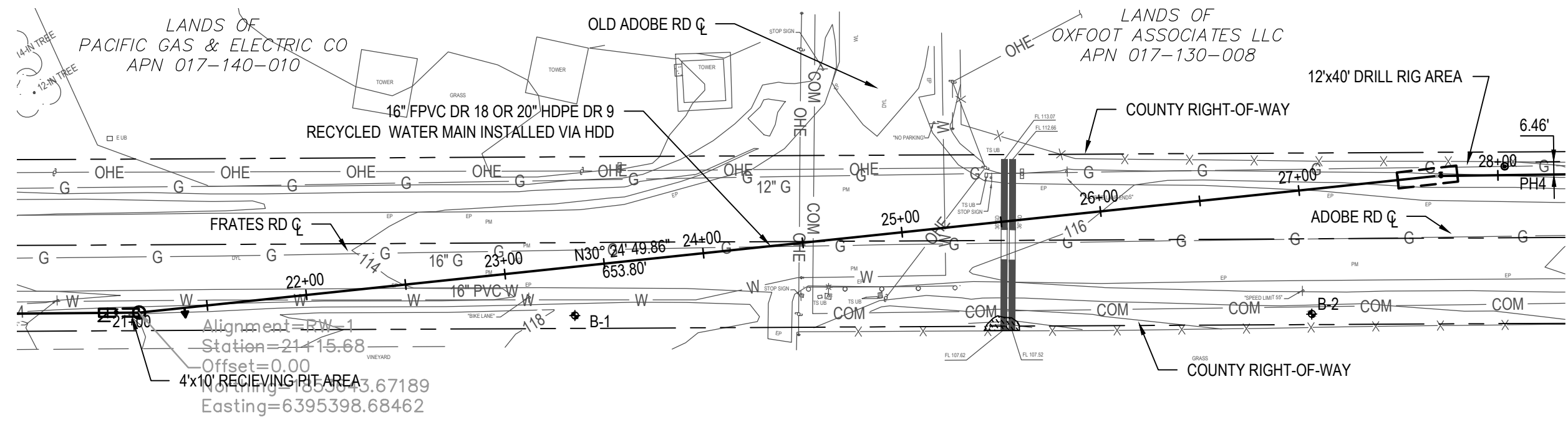
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**PLAN AND PROFILE - FRATES ROAD (STA 17+50 TO STA 20+00)**

Drawing No.: C-104 Sheet 9 of 33

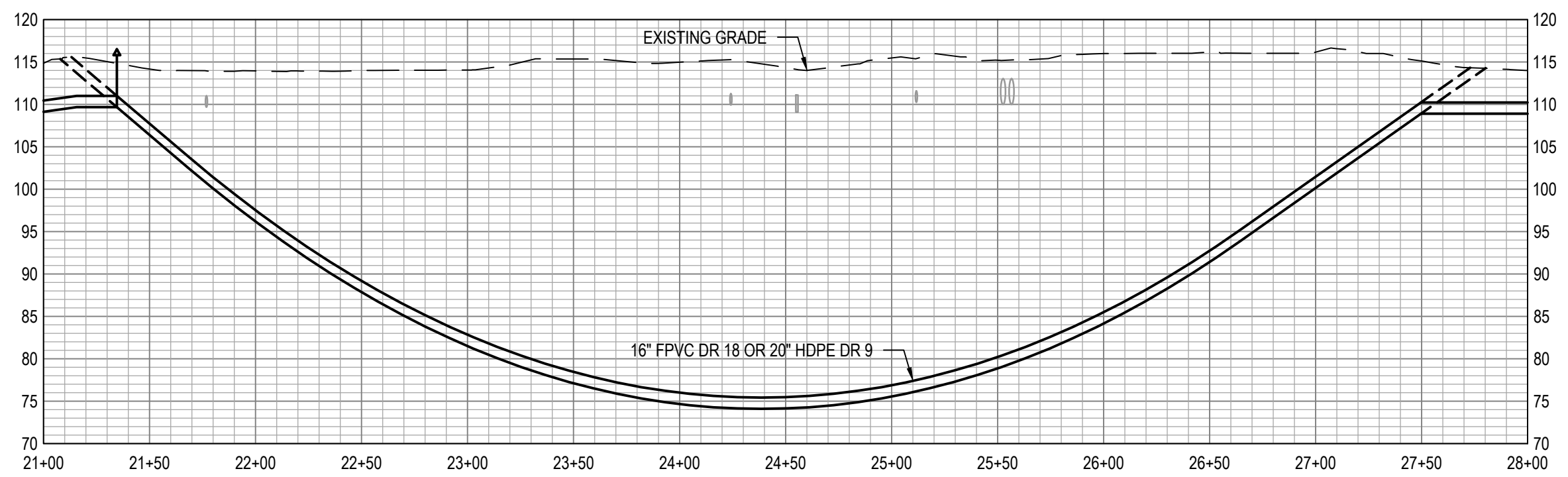
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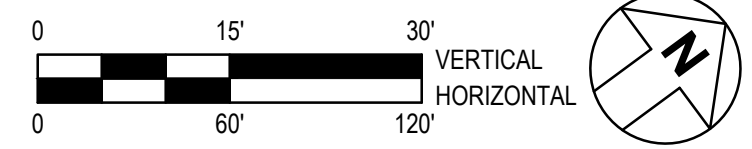
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**OVERALL PLAN - HDD SECTION 1 - FRATES ROAD / ADOBE ROAD (STA 21+00 TO STA 28+00)**



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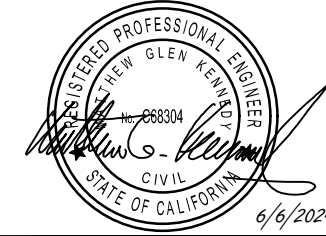
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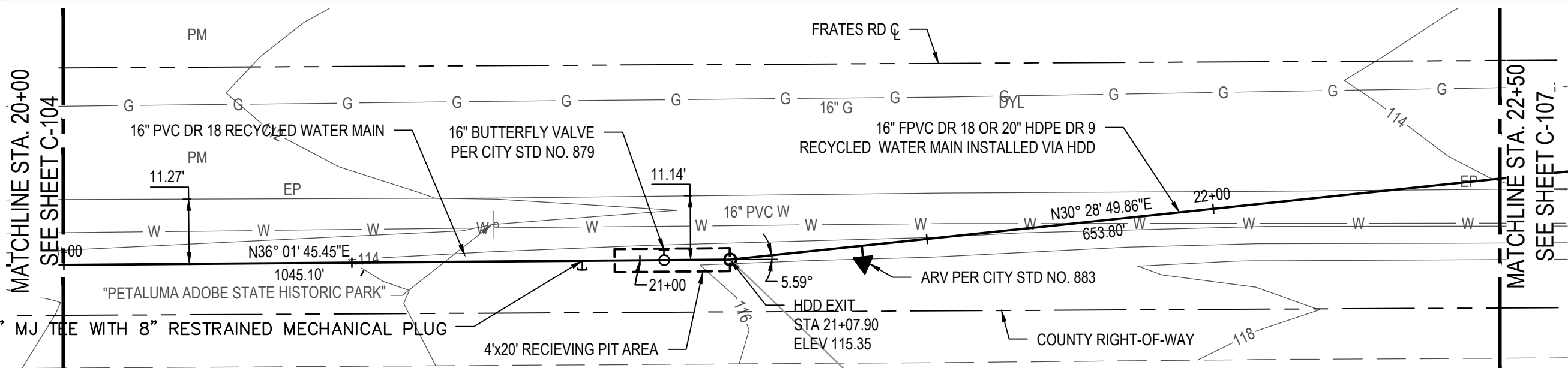
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Sheet  
**C-105** 10 of 33

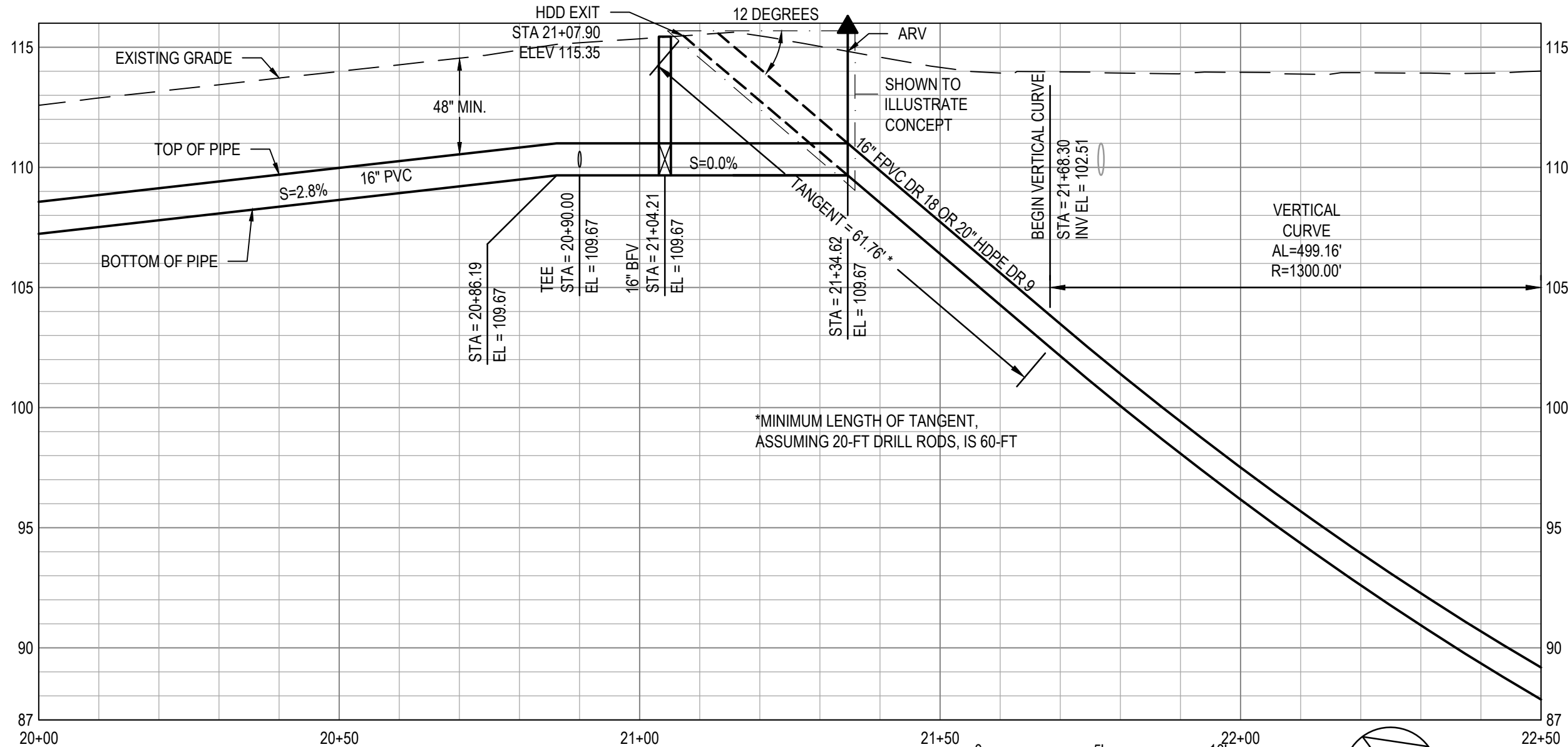
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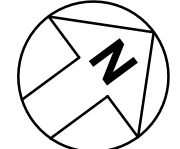
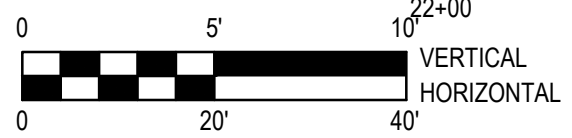
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PLAN - FRATES ROAD (STA 20+00 TO STA 22+50)



PROFILE



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**ADOBE ROAD RECYCLED WATER PIPELINE**

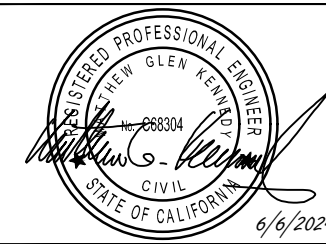
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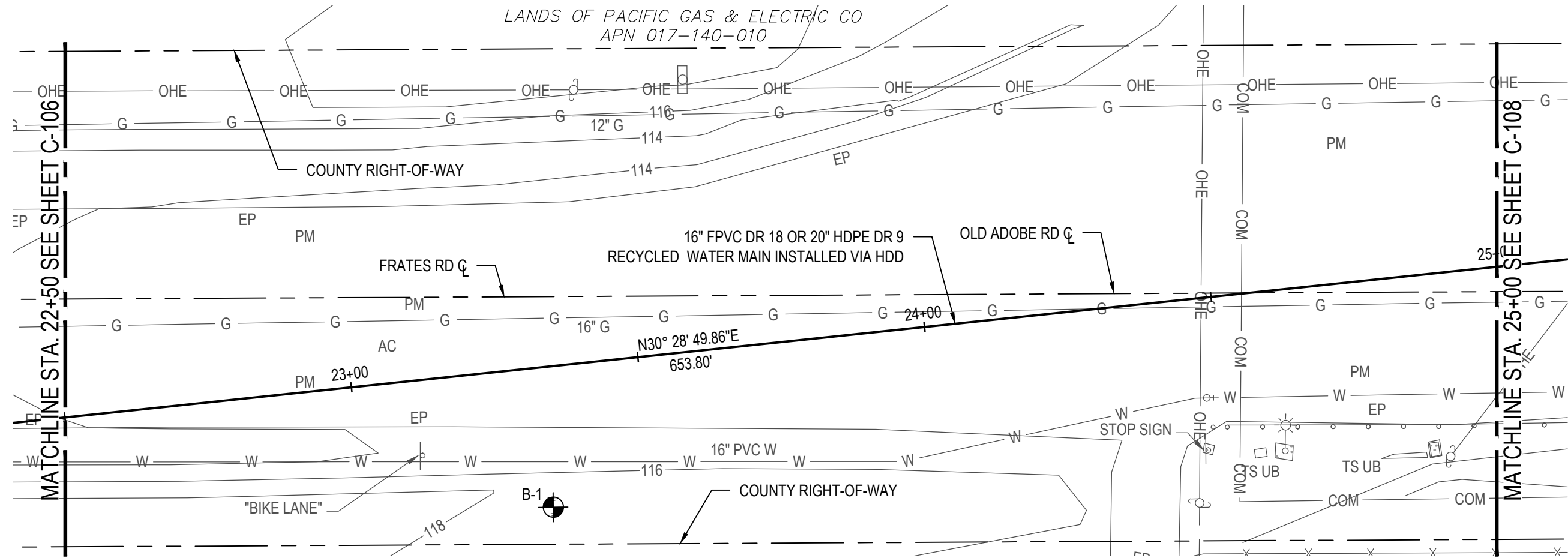
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11219037

Title  
**PLAN AND PROFILE - FRATES ROAD (STA 20+00 TO STA 22+50)**

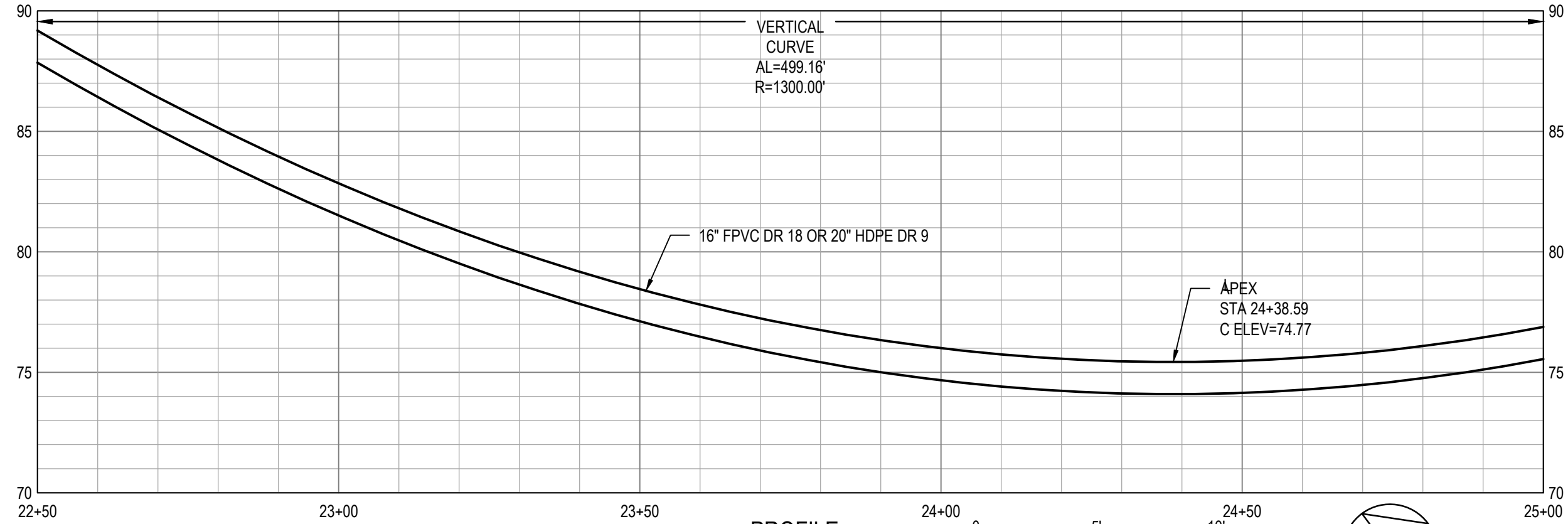
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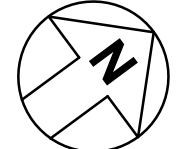
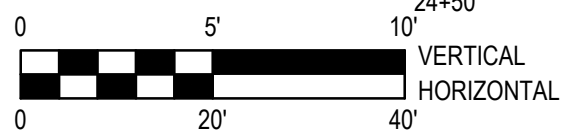
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**PLAN - FRATES ROAD (STA 22+50 TO STA 25+00)**



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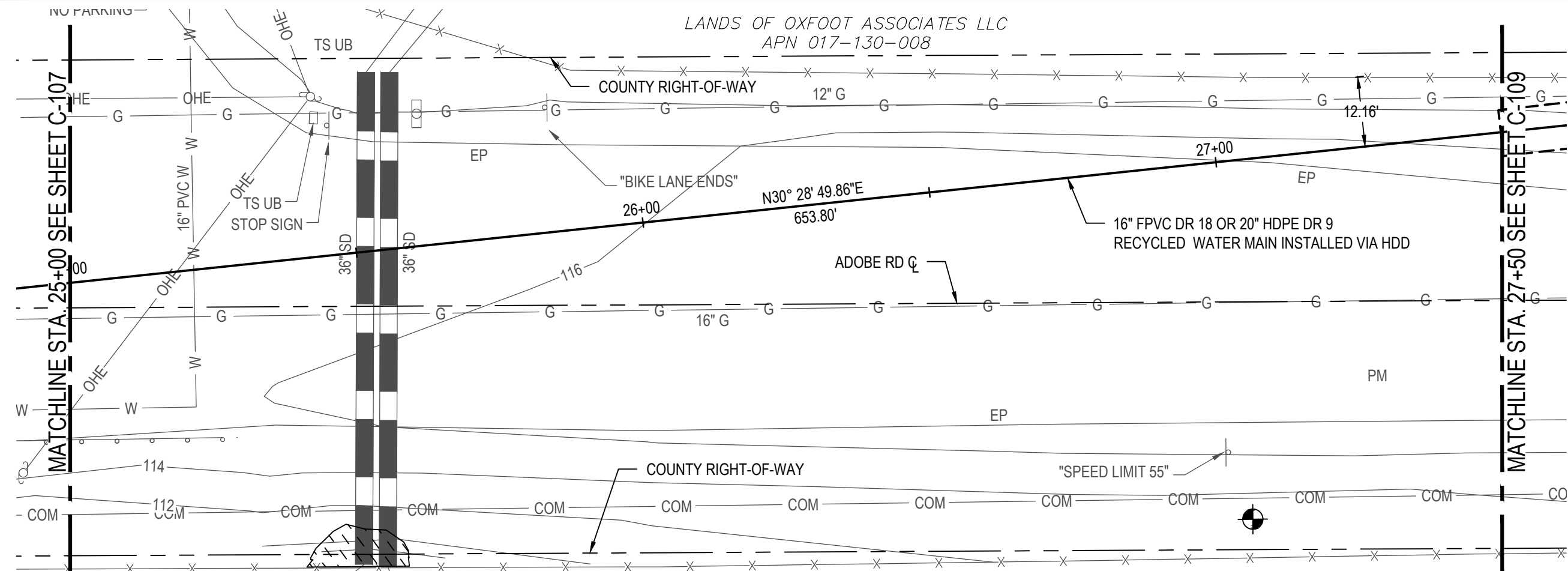
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**ADOBE ROAD RECYCLED WATER PIPELINE**

Date: 10/26/2023 Scale: AS SHOWN

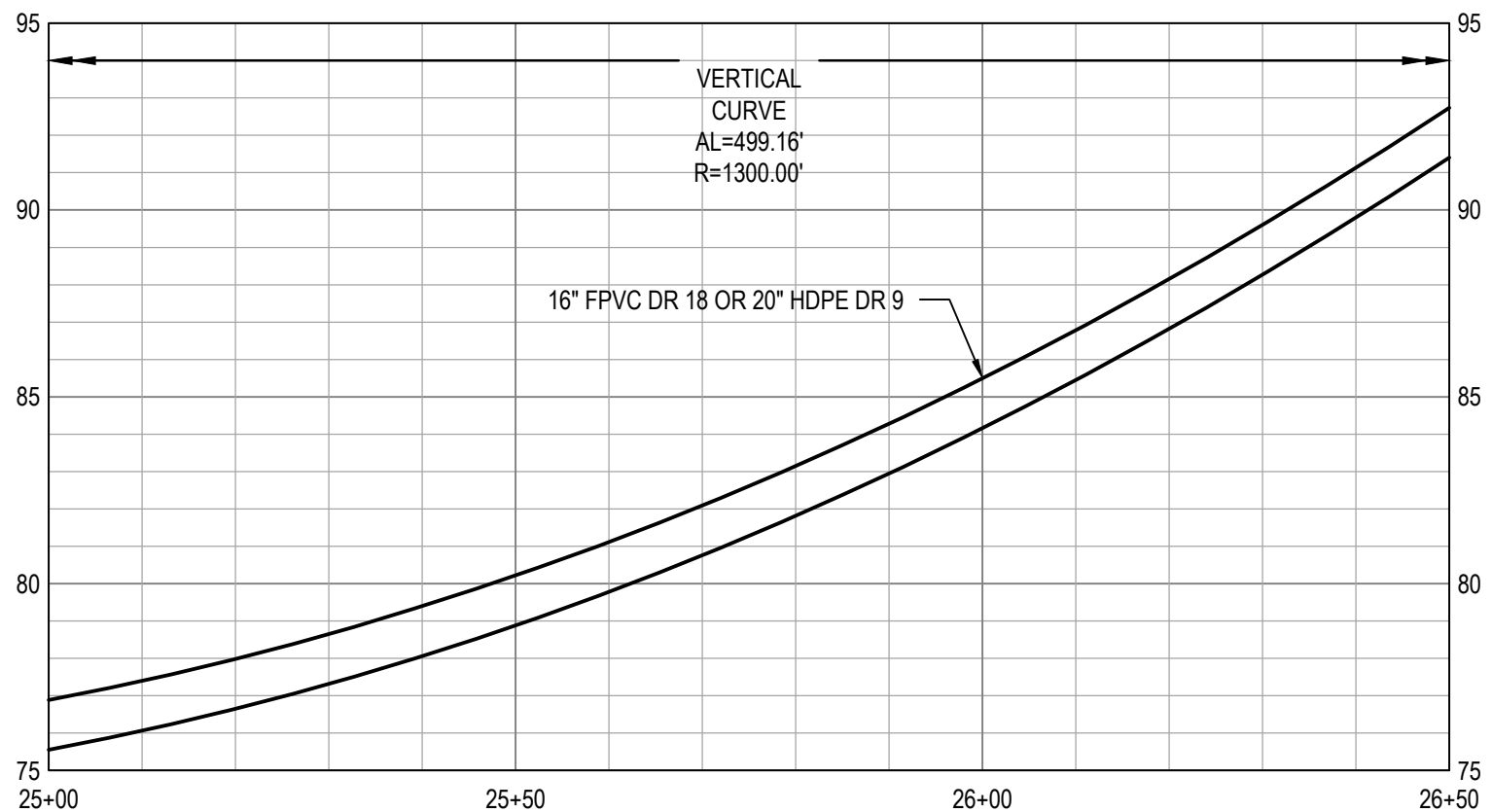
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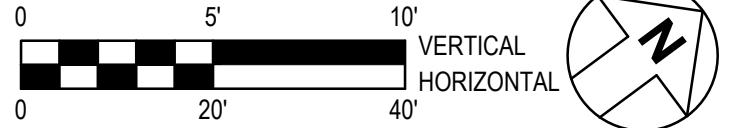
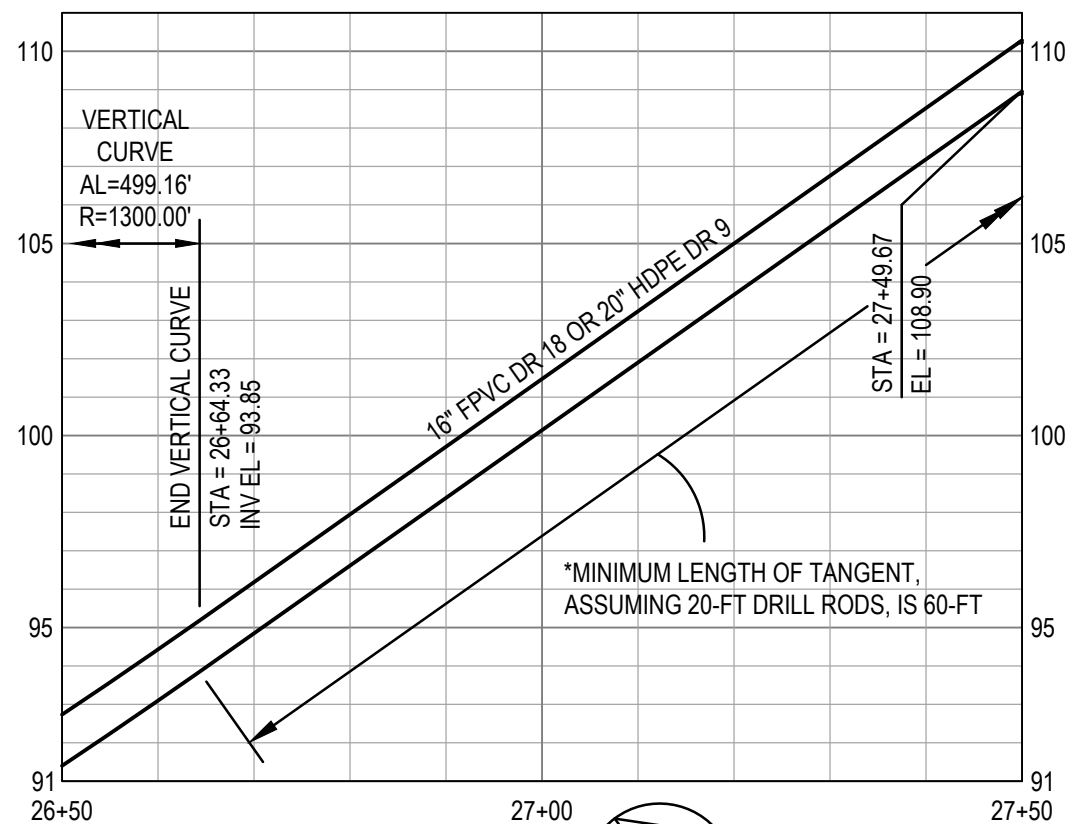
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PLAN - ADOBE ROAD (STA 25+00 TO STA 27+50)

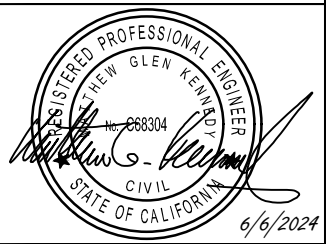


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 GHD Inc.  
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 Santa Rosa California 95407 USA  
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Date  
 10/26/2023

Scale  
 AS SHOWN

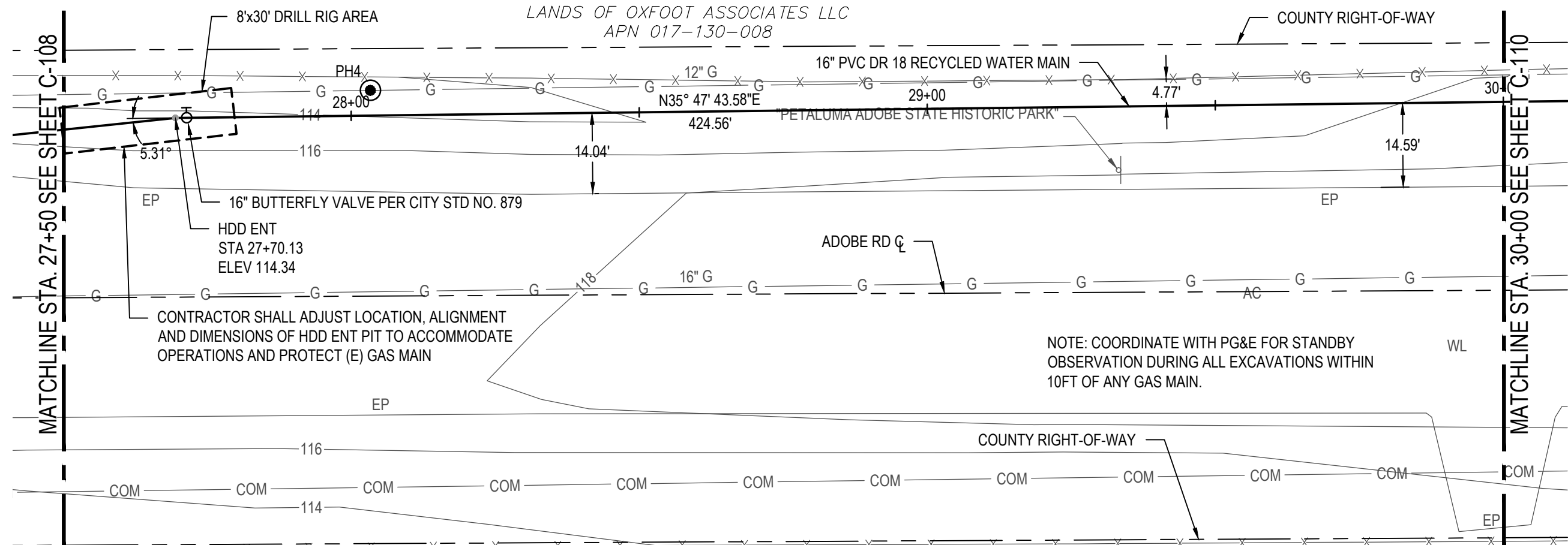
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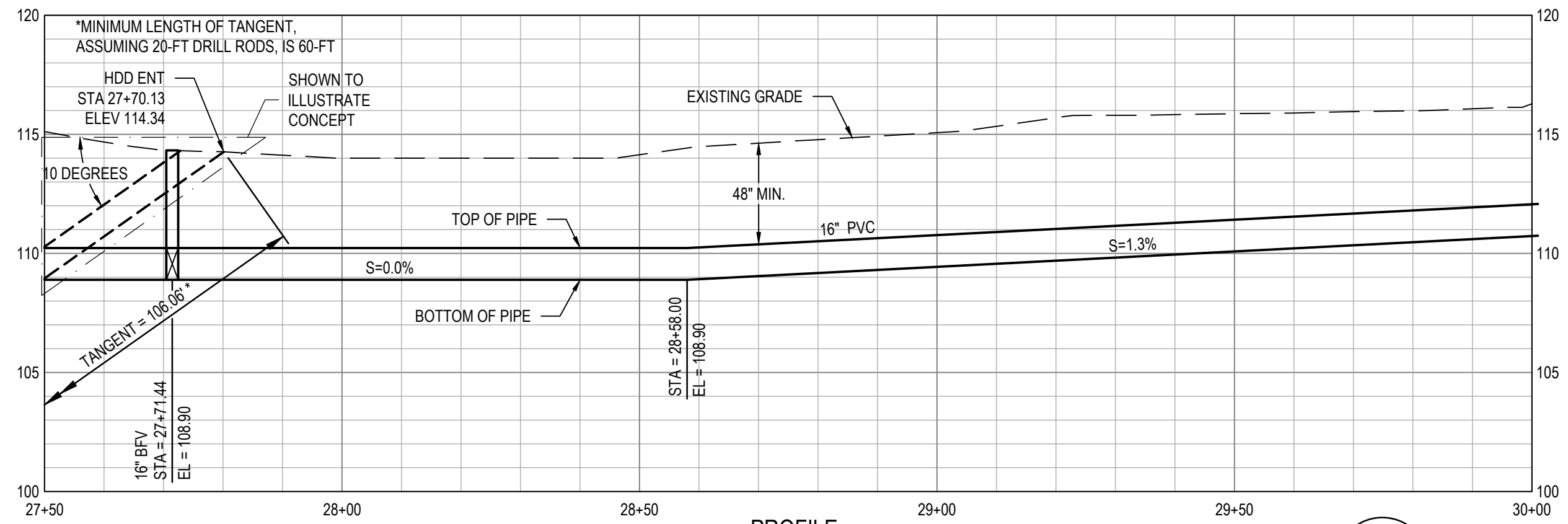
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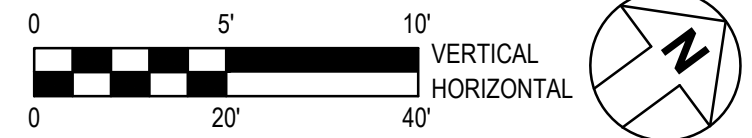
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PLAN - ADOBE ROAD (STA 27+50 TO STA 30+00)



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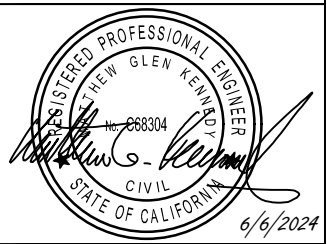
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**ADOBE ROAD RECYCLED WATER PIPELINE**

Date: 10/26/2023 Scale: AS SHOWN

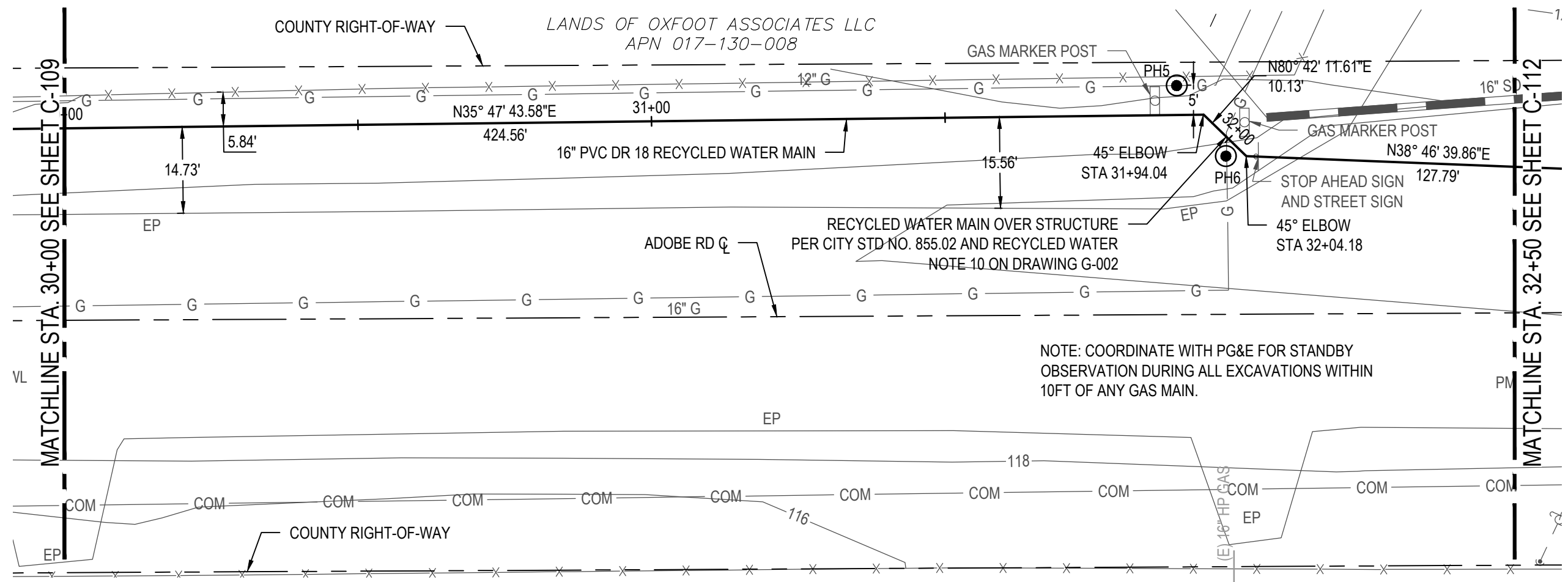
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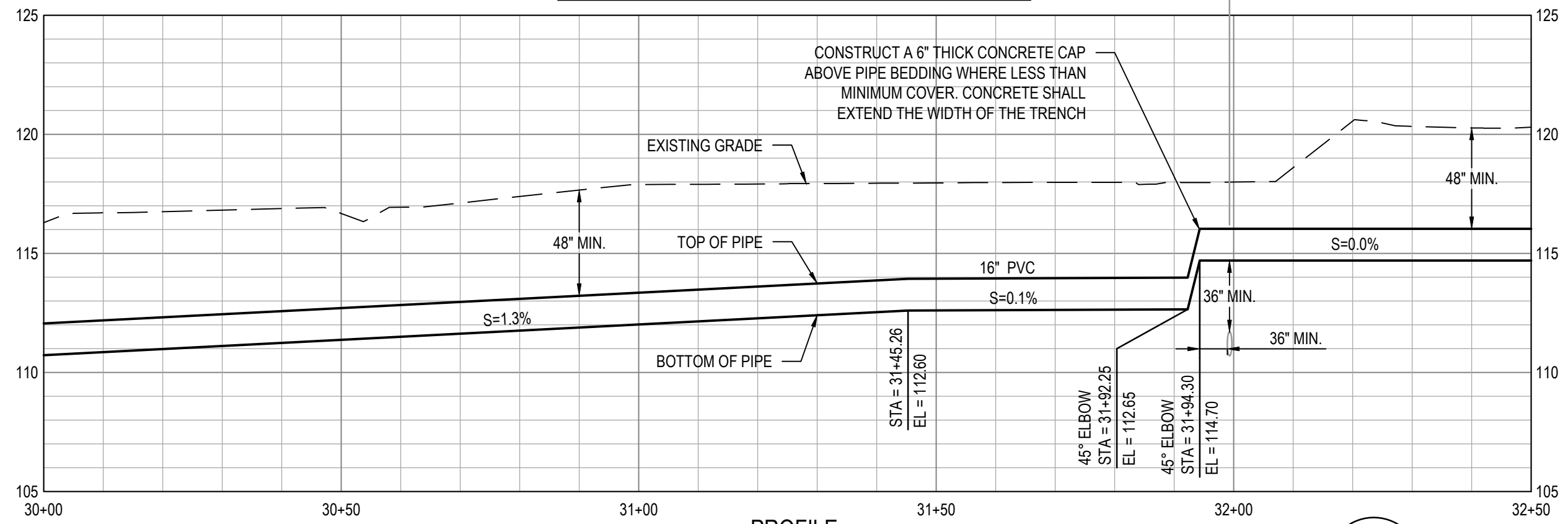


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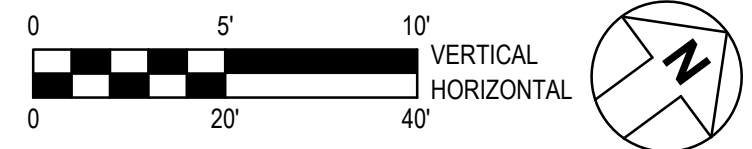


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**PLAN - ADOBE ROAD (STA 30+00 TO STA 32+50)**



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**ADOBE ROAD RECYCLED WATER PIPELINE**

Date  
**10/26/2023**

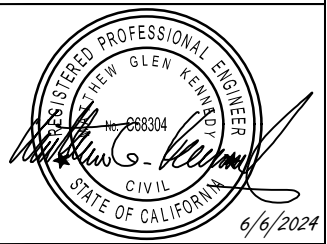
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**PLAN AND PROFILE - ADOBE ROAD (STA 30+00 TO STA 32+50)**



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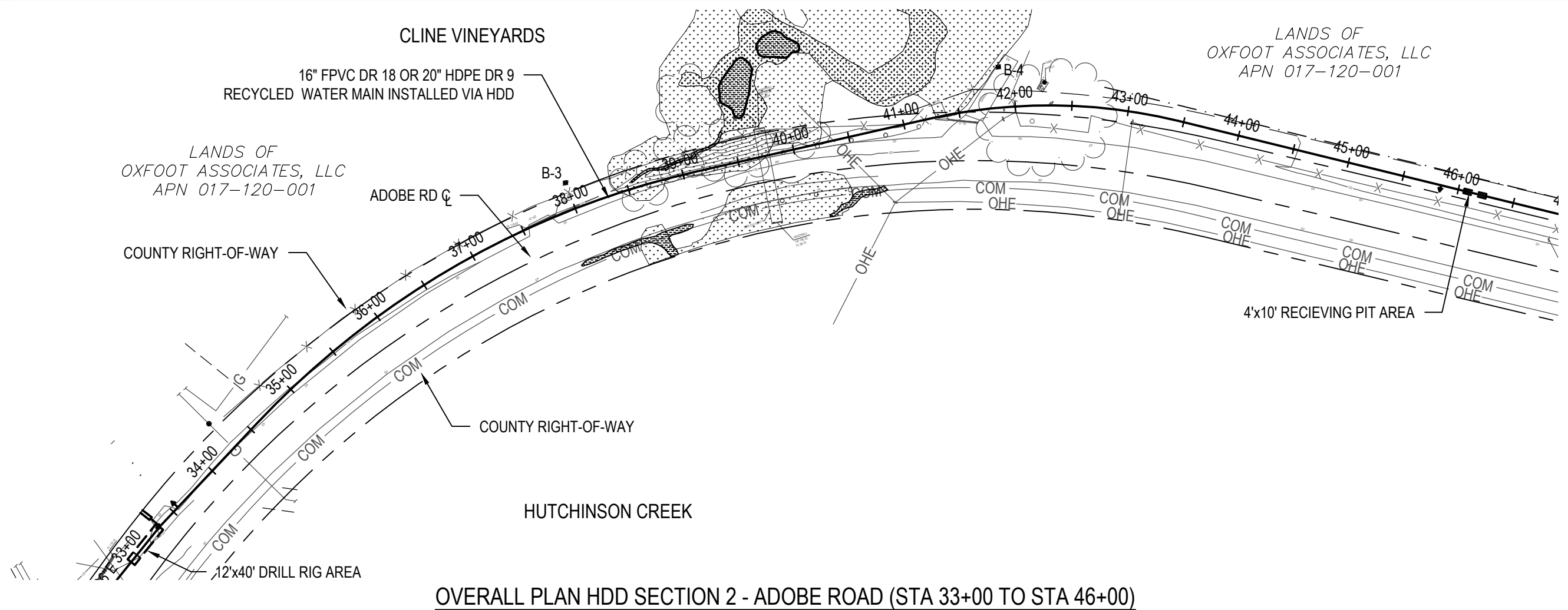
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Date  
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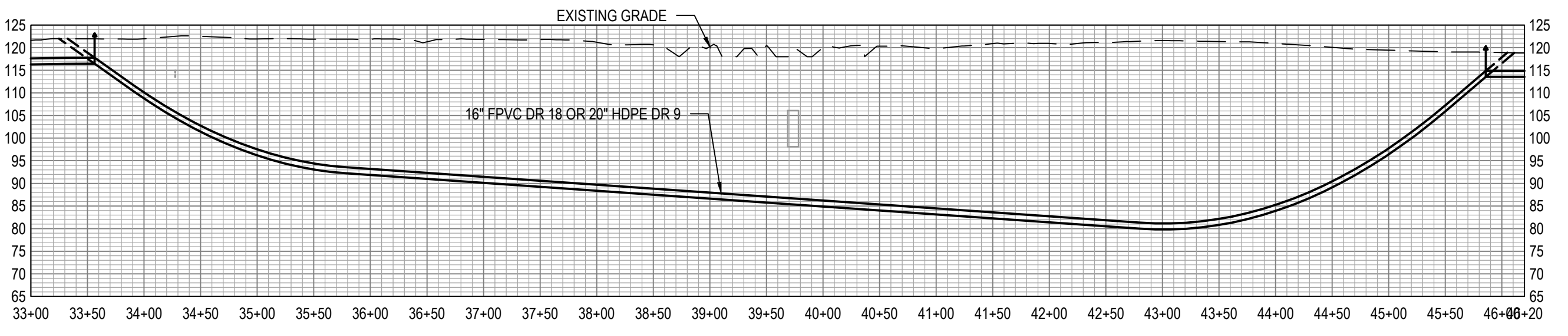
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**11219037**

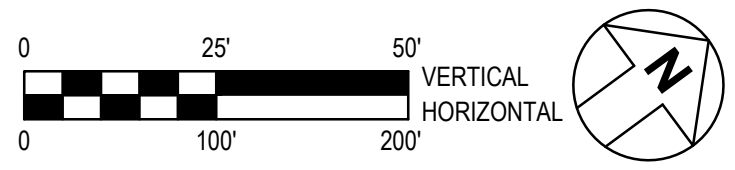
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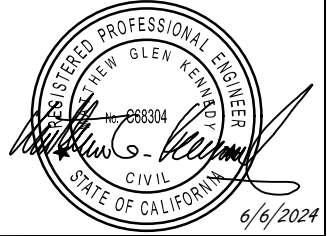
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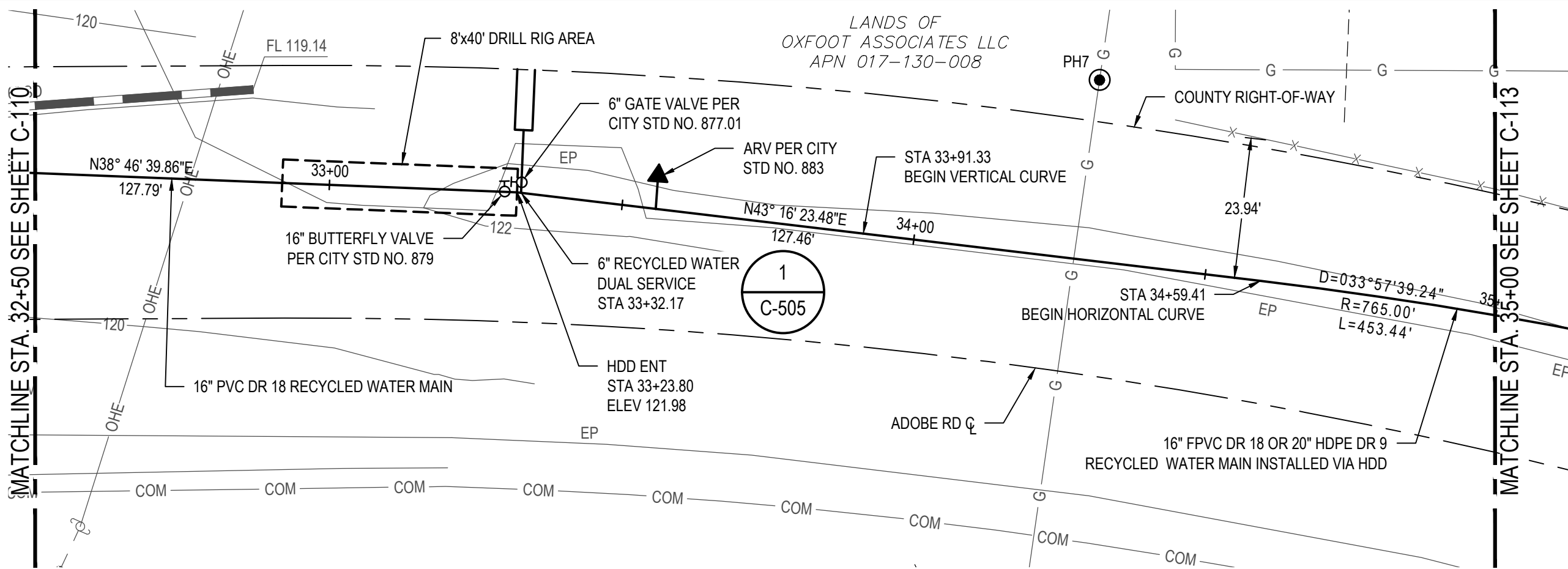
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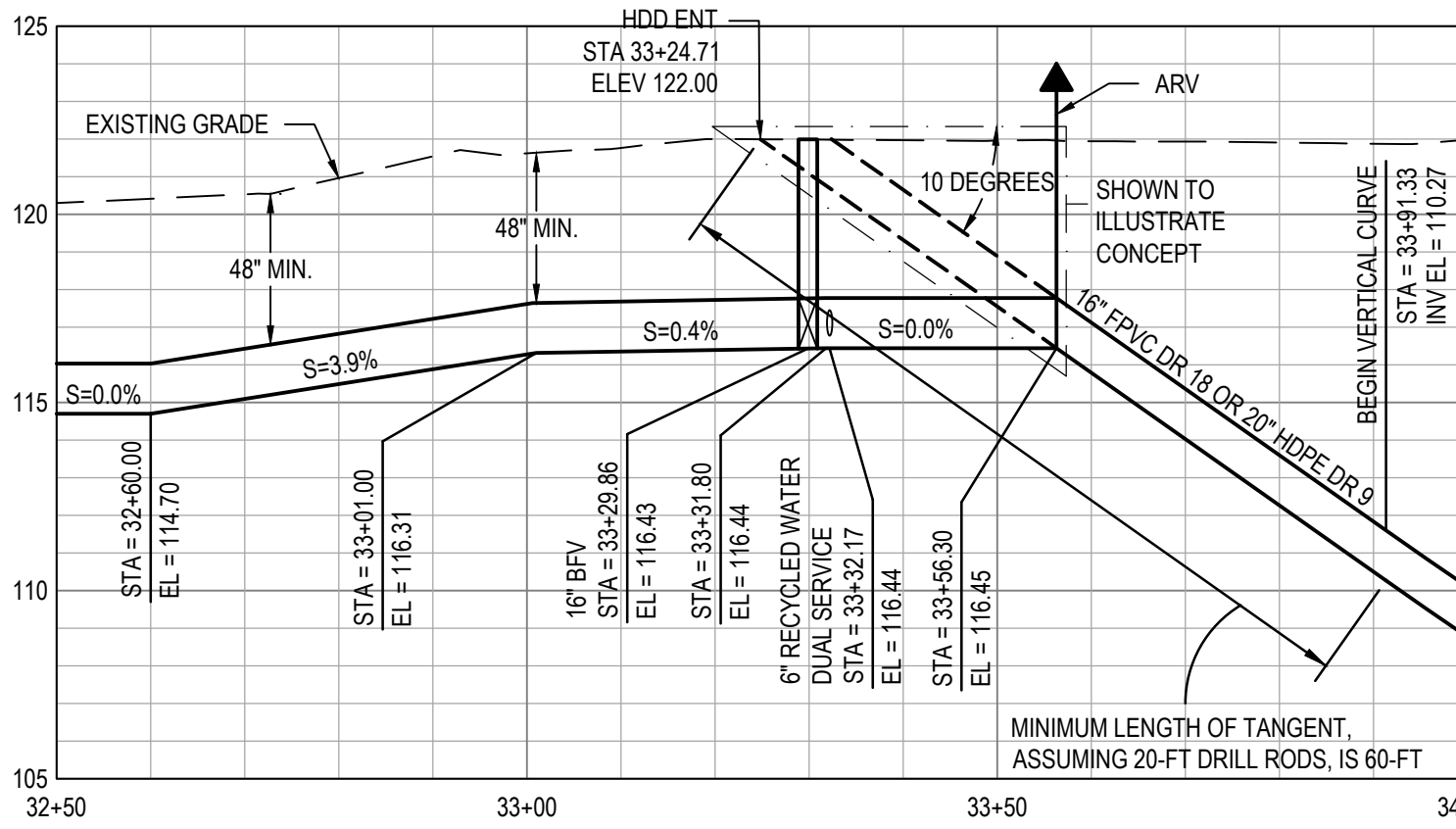
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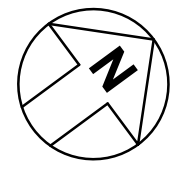
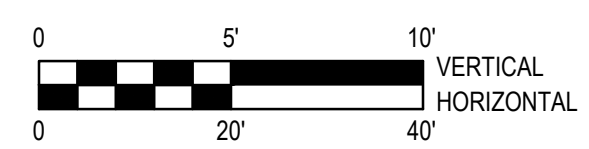
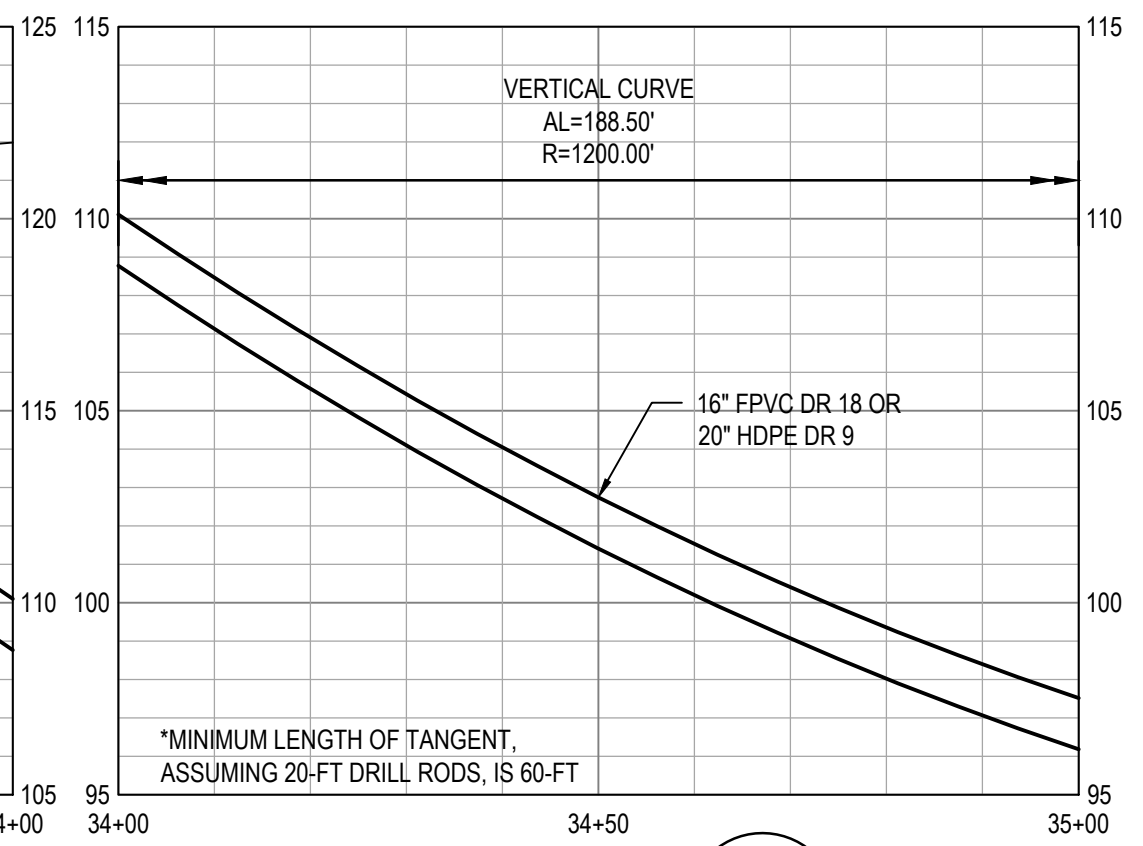
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PLAN - ADOBE ROAD (STA 32+50 TO STA 35+00)



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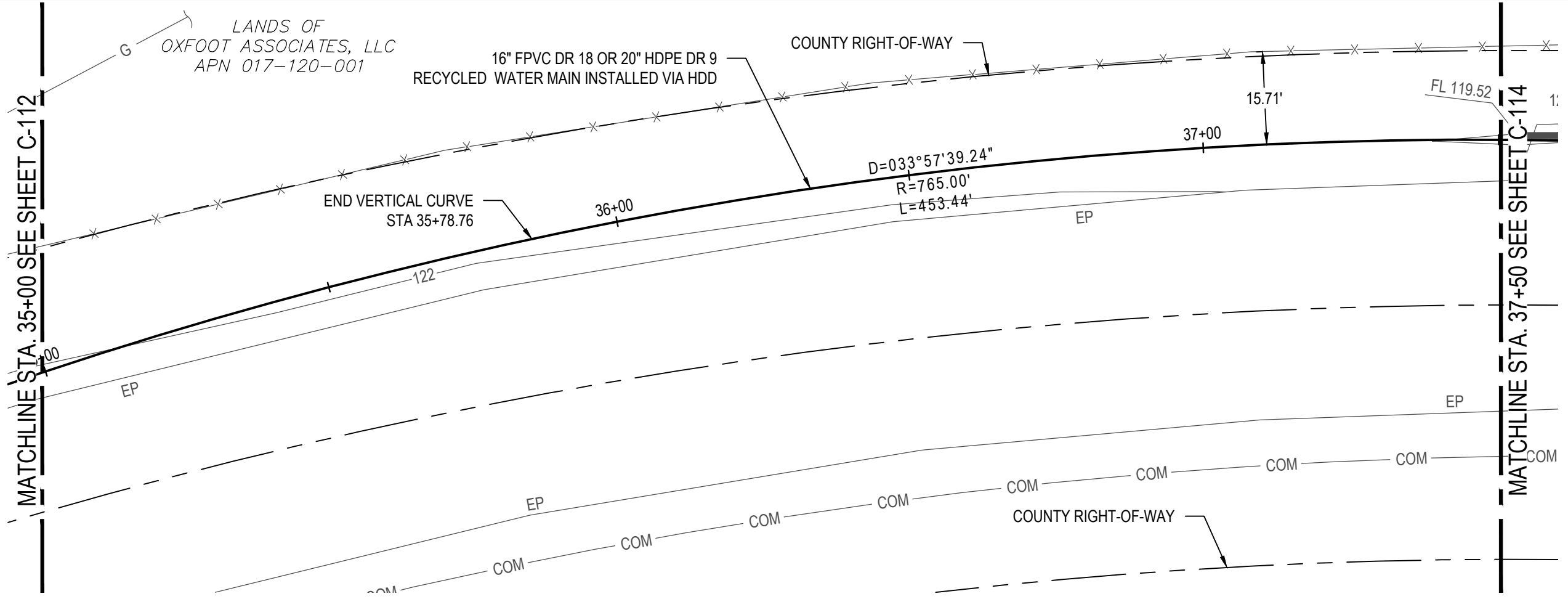
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Project No.: 11219037  
Title: **PLAN AND PROFILE - ADOBE ROAD (STA 32+50 TO STA 35+00)**

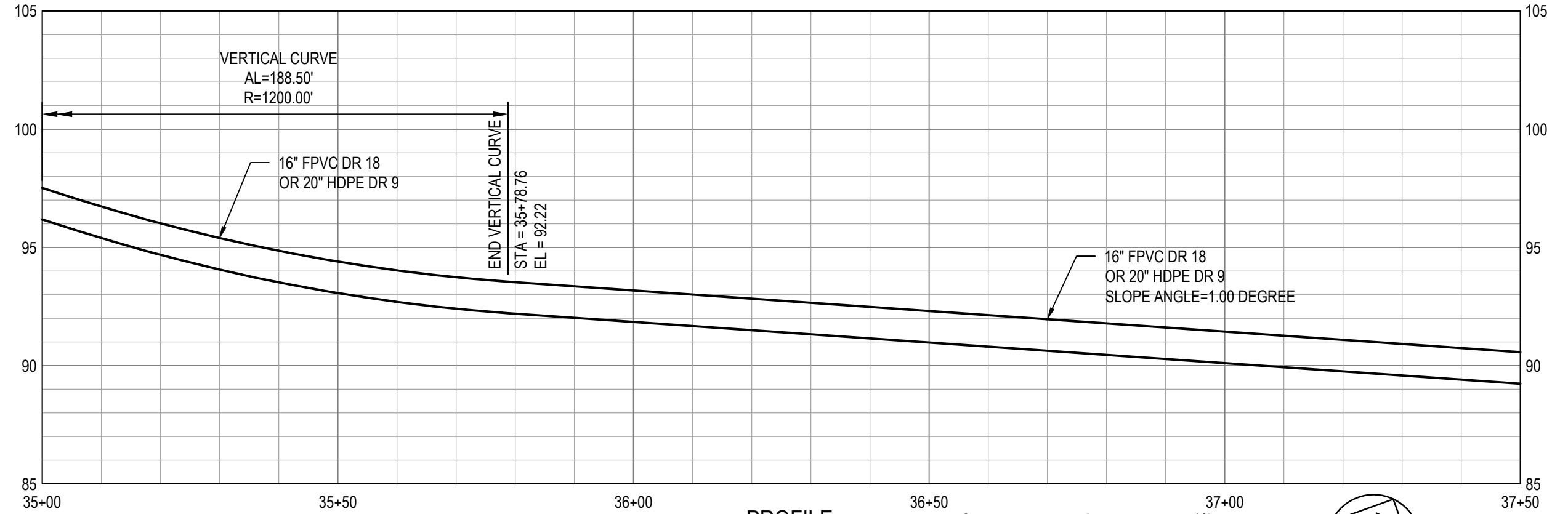
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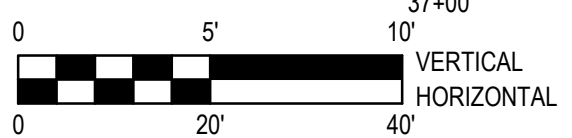
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**PLAN - ADOBE ROAD (STA 35+00 TO STA 37+50)**



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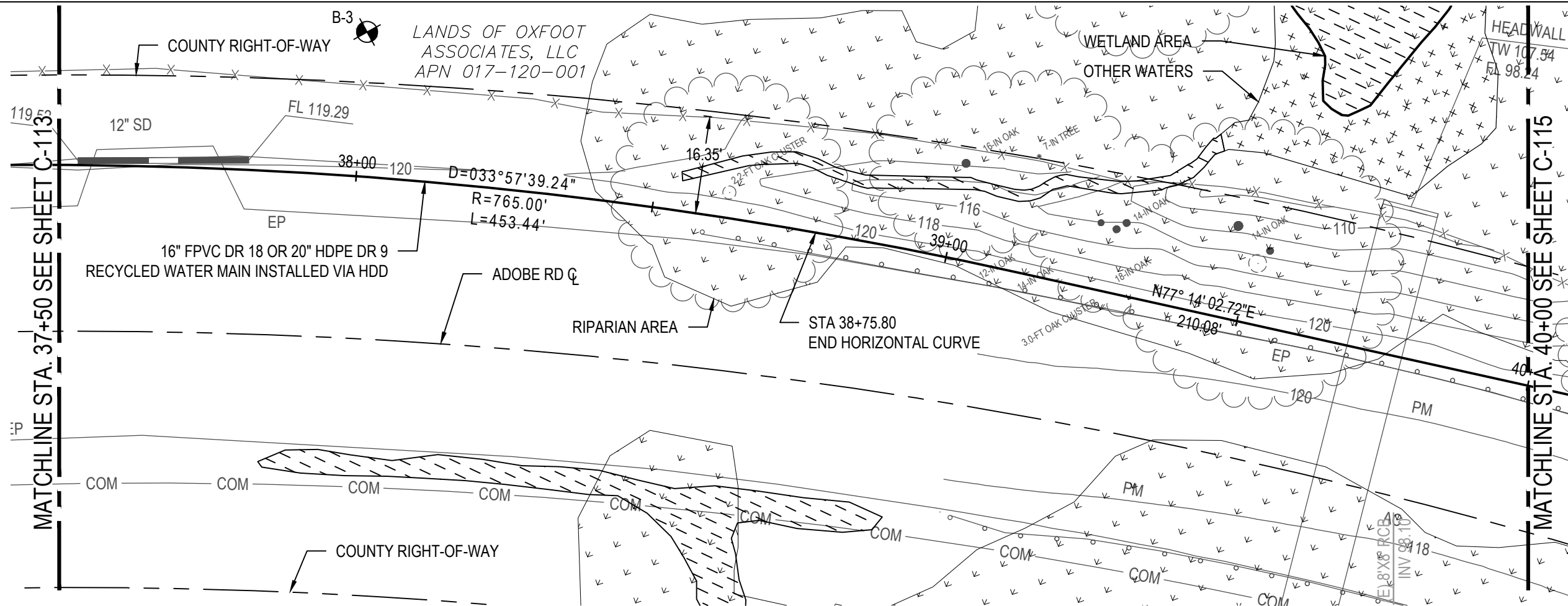
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**ADOBE ROAD RECYCLED WATER PIPELINE**

Date: 10/26/2023 Scale: AS SHOWN

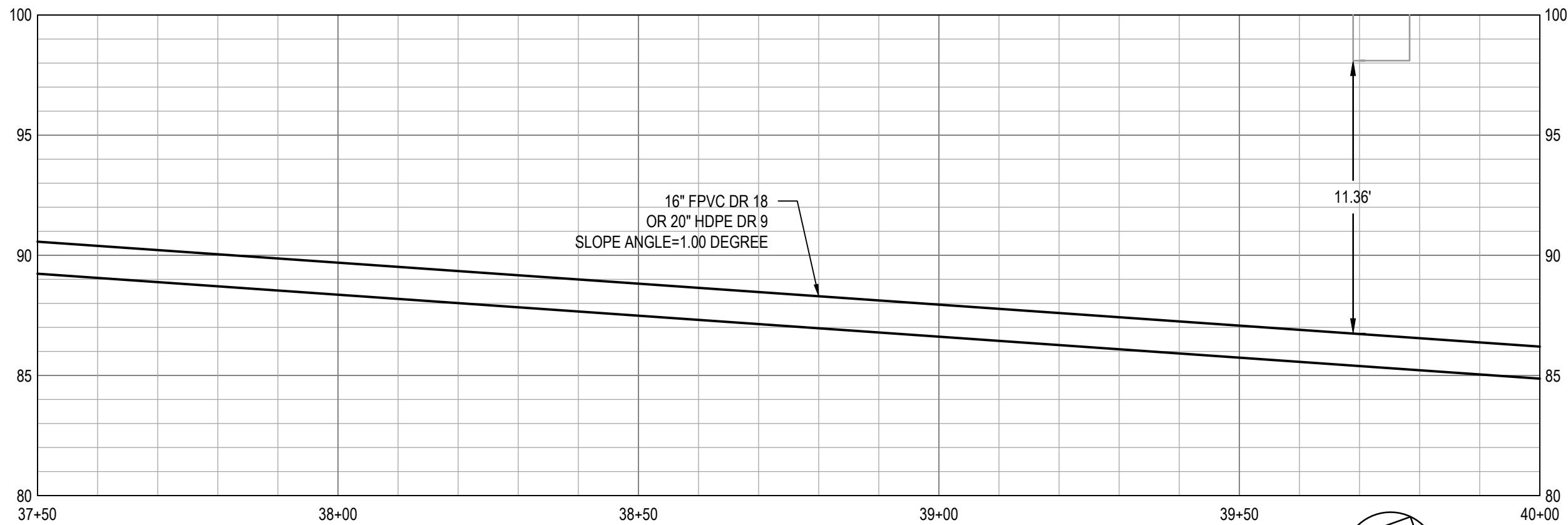
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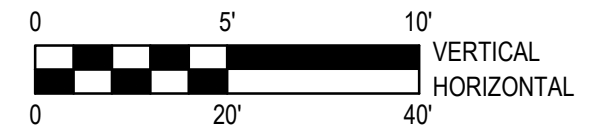
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PLAN - ADOBE ROAD (STA 37+50 TO STA 40+00)

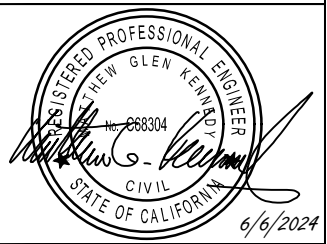


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GHD Inc.  
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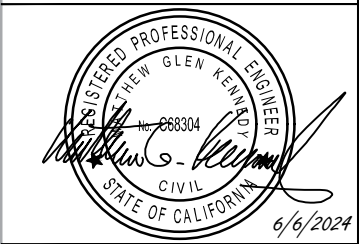
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**ADOBE ROAD RECYCLED WATER PIPELINE**

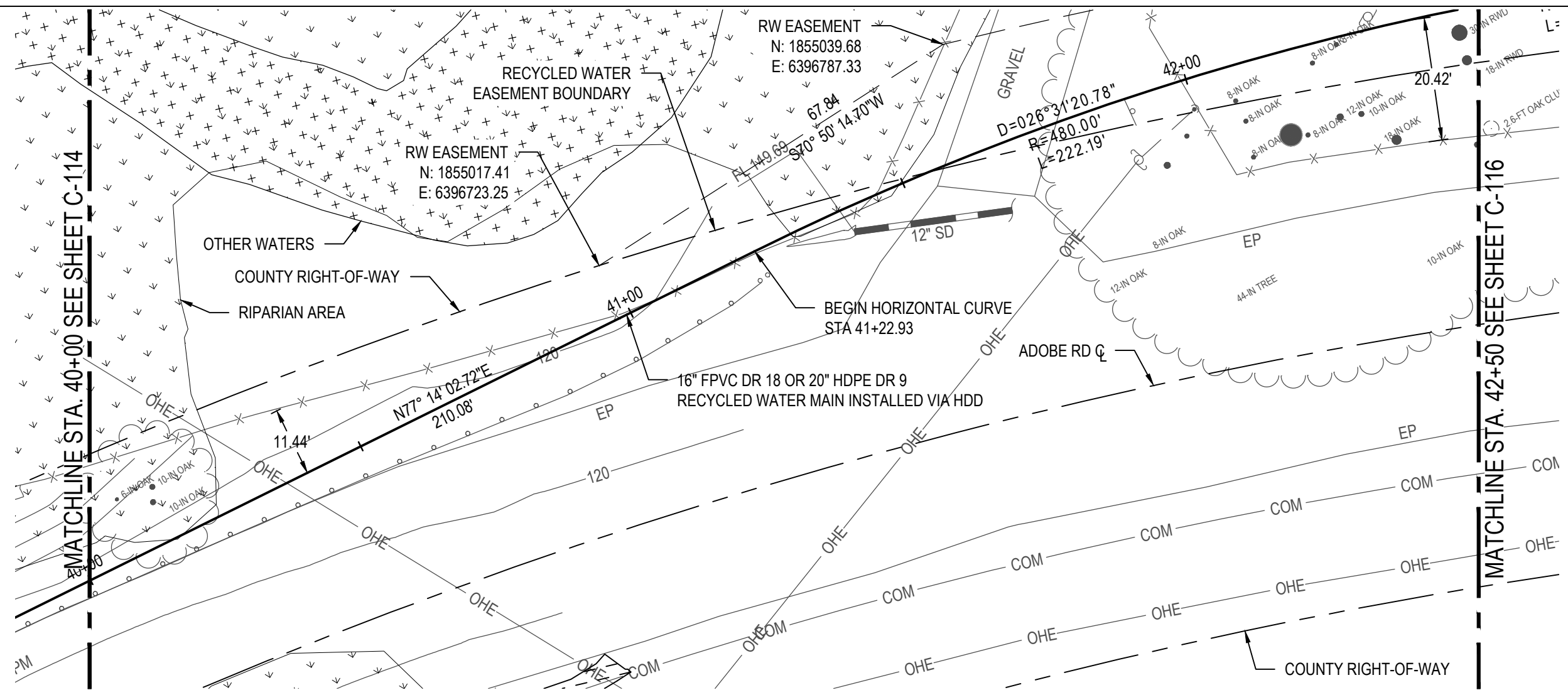
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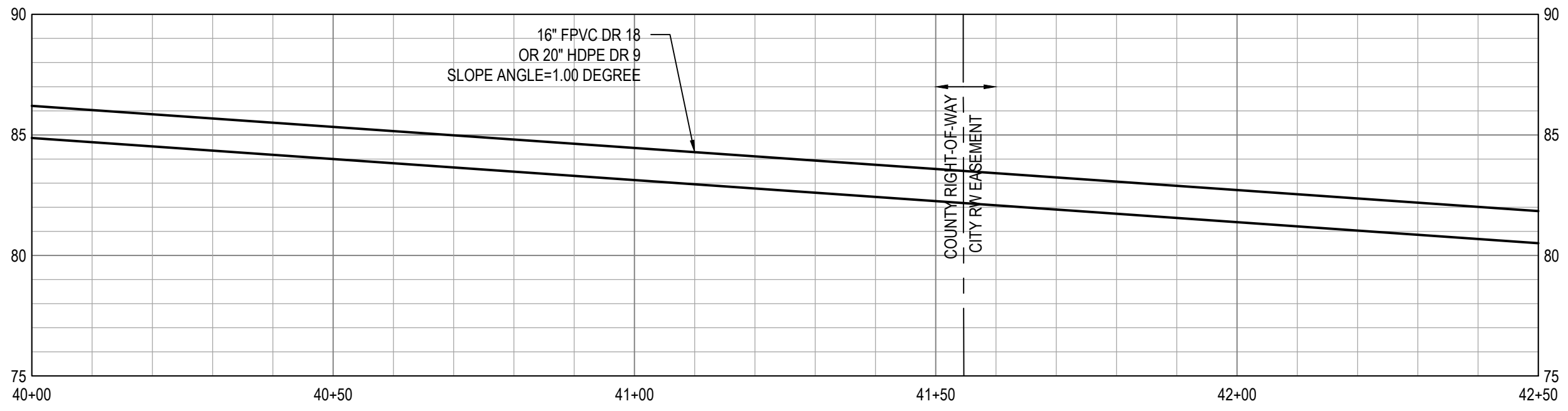
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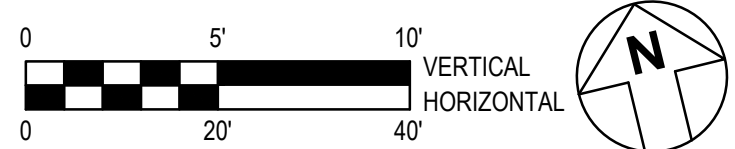
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PLAN - ADOBE ROAD (STA 40+00 TO STA 42+50)



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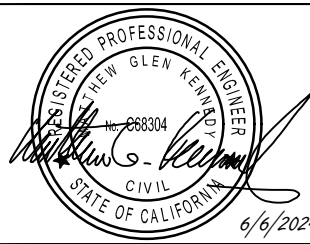
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Date: 10/26/2023 Scale: AS SHOWN

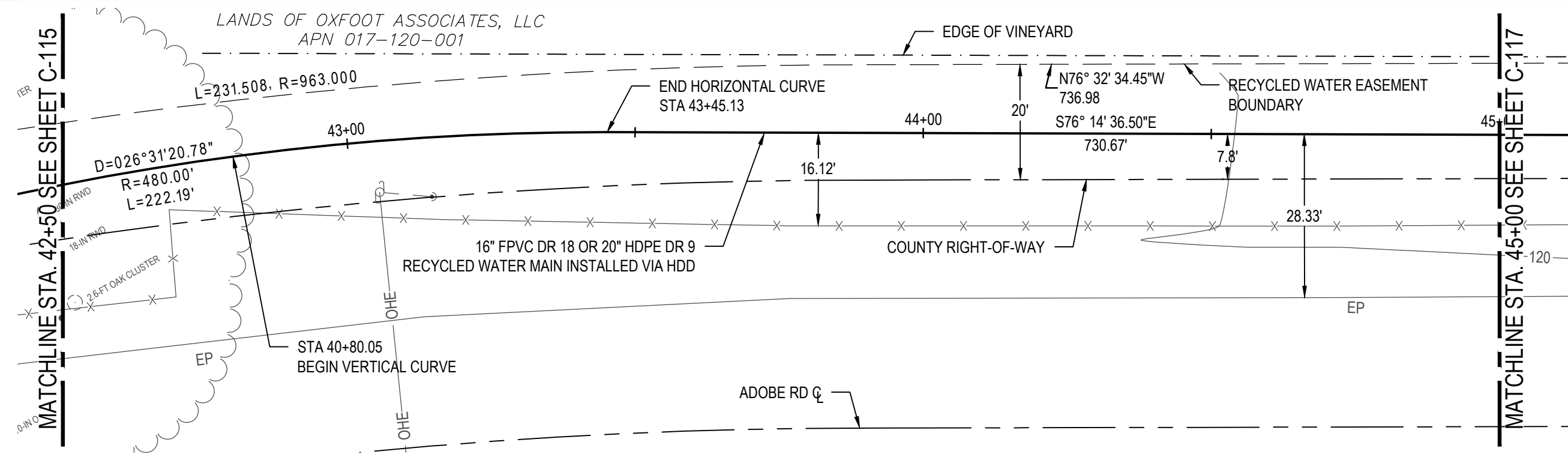
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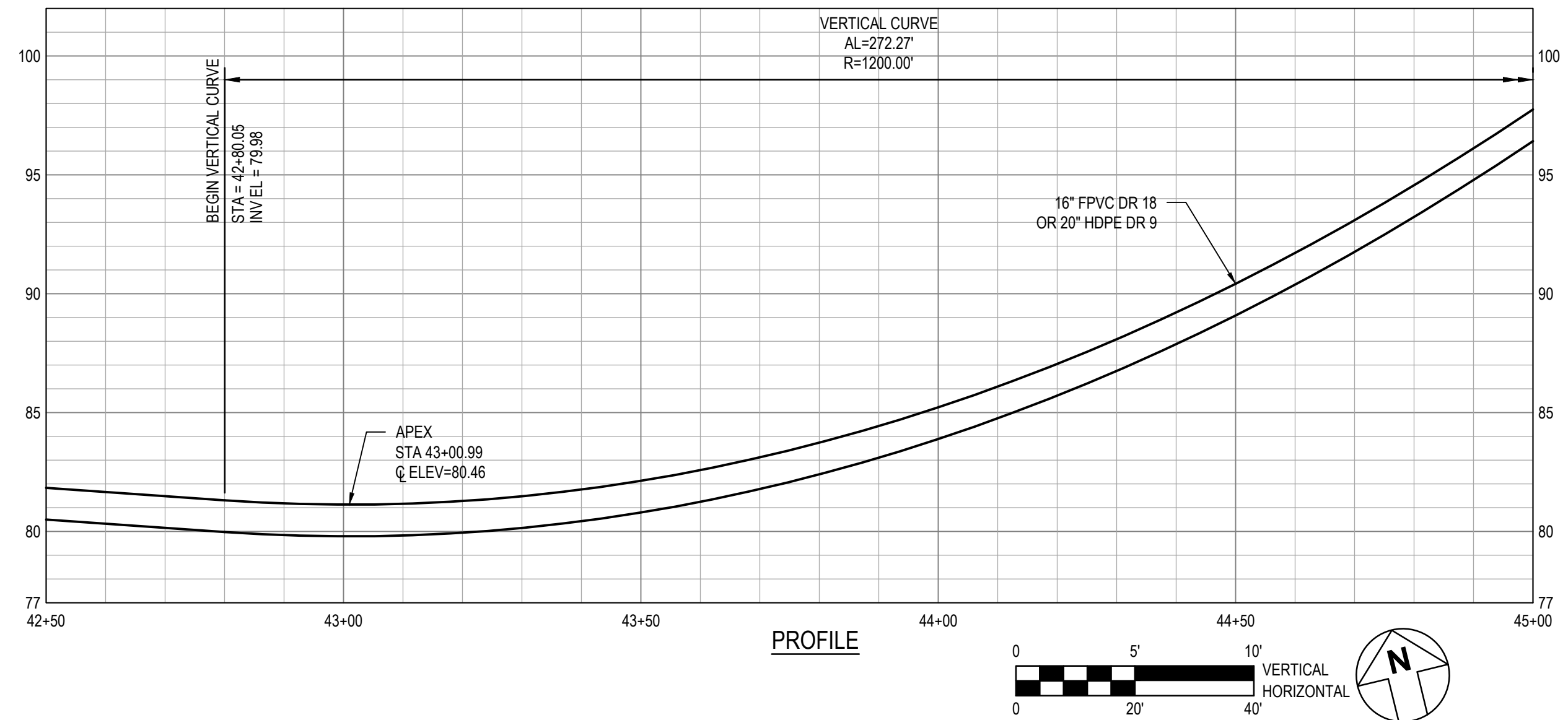
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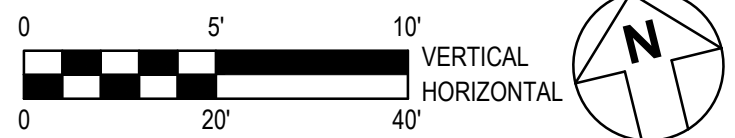
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PLAN - ADOBE ROAD (STA 42+50 TO STA 45+00)



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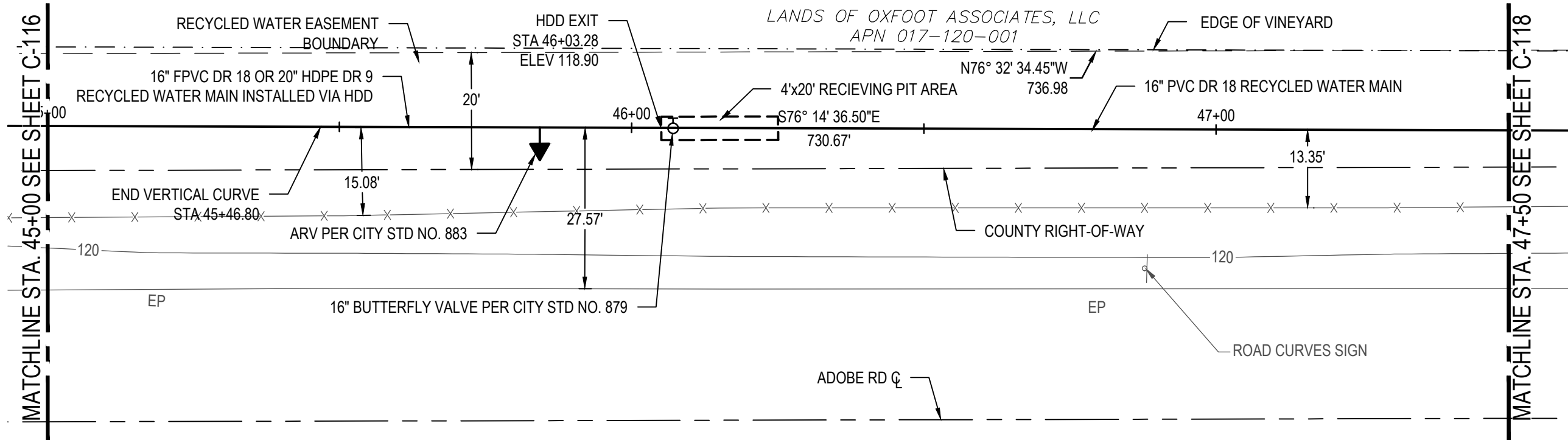
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**ADOBE ROAD RECYCLED WATER PIPELINE**

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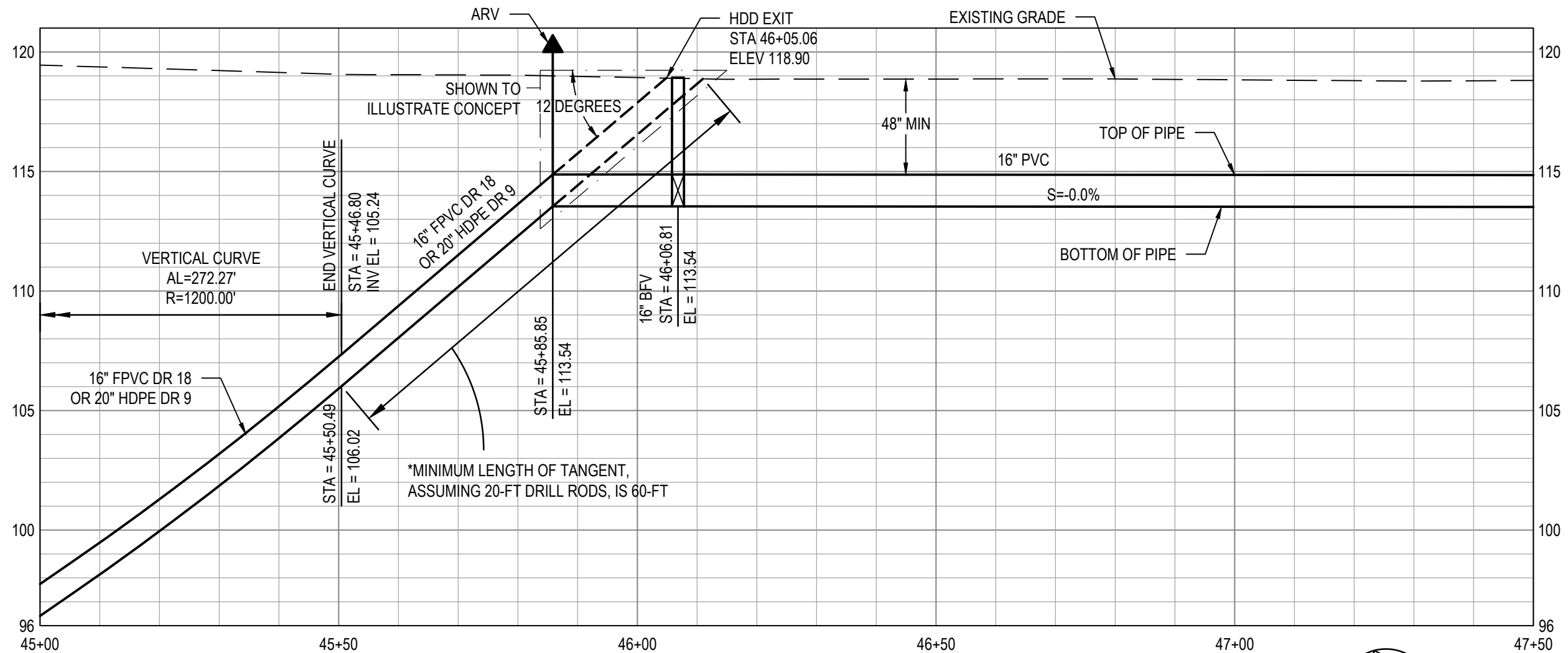
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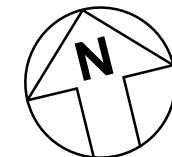
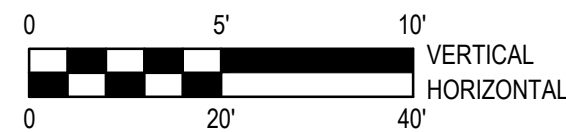
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PLAN - ADOBE ROAD (STA 45+00 TO STA 47+50)

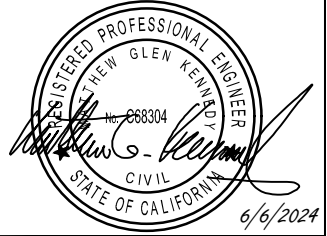


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**ADOBE ROAD RECYCLED WATER PIPELINE**

Date  
 10/26/2023

Scale  
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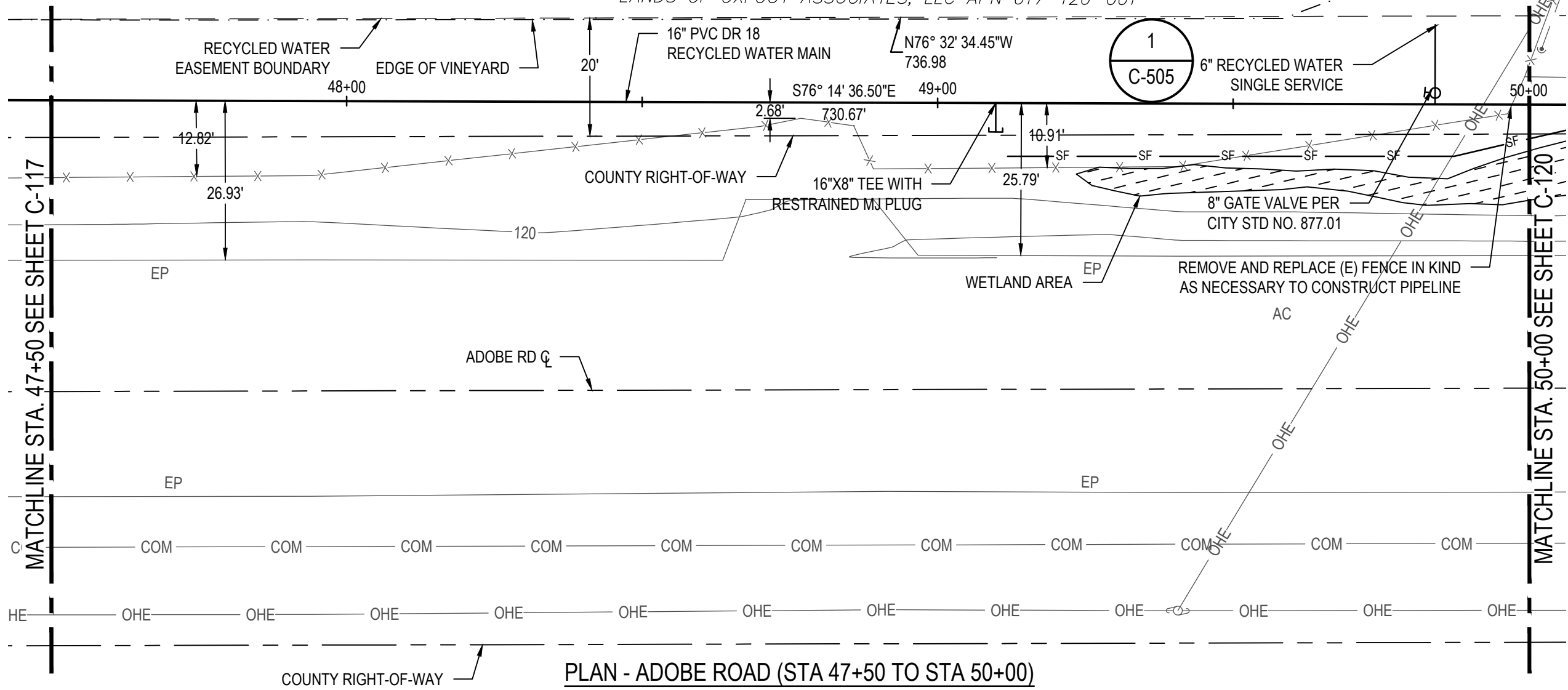
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Title  
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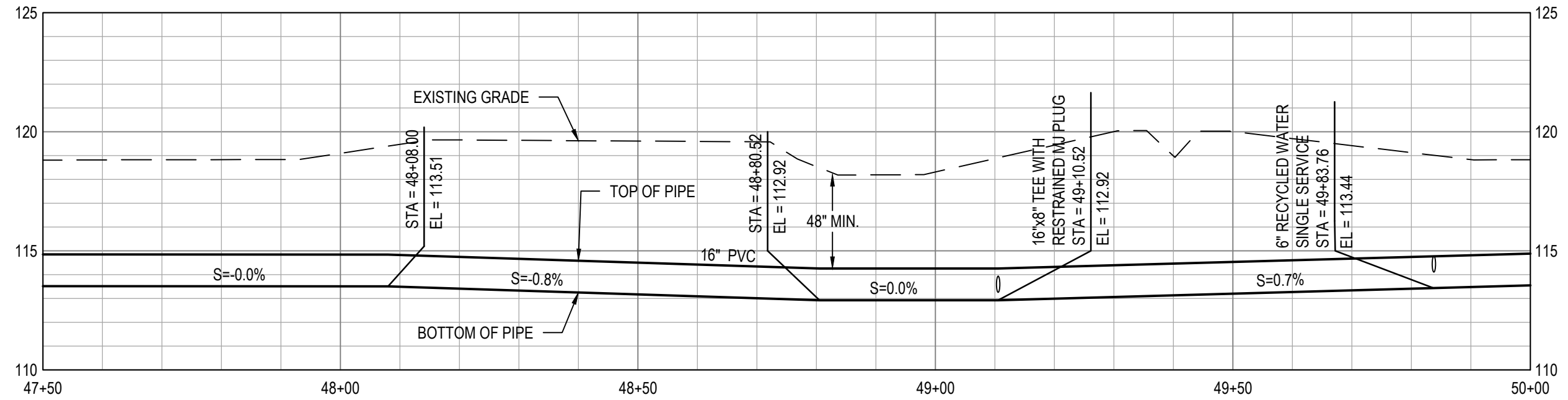
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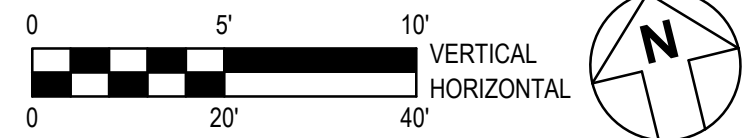
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PLAN - ADOBE ROAD (STA 47+50 TO STA 50+00)



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Project  
**ADOBE ROAD RECYCLED WATER PIPELINE**

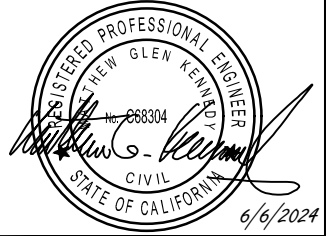
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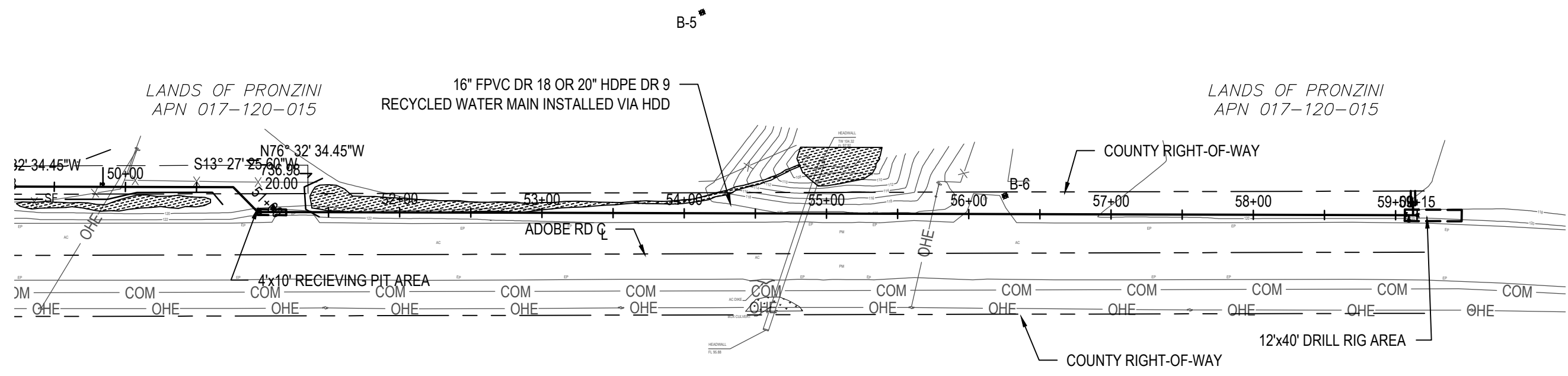
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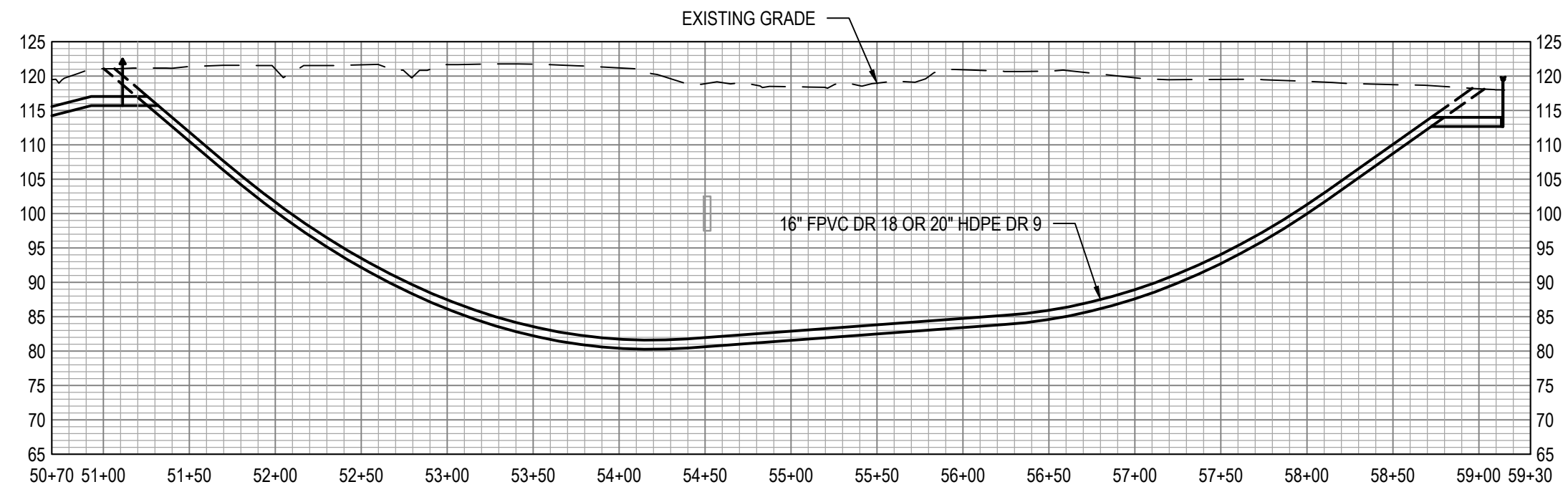
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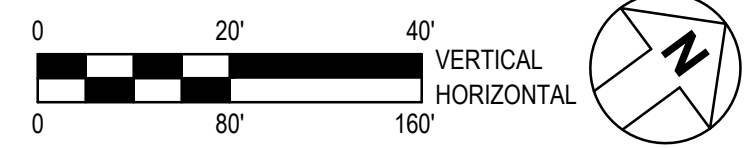
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**OVERALL PLAN - HDD SECTION 3 - FRATES ROAD (STA 51+00 TO STA 59+15)**



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Project Manager	MK	Project Director	AC	

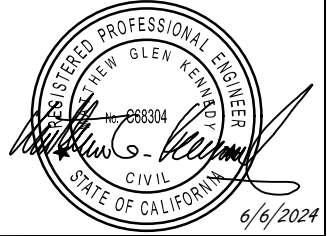
Client  
**CITY OF PETALUMA**

Project  
**ADOBE ROAD RECYCLED WATER PIPELINE**

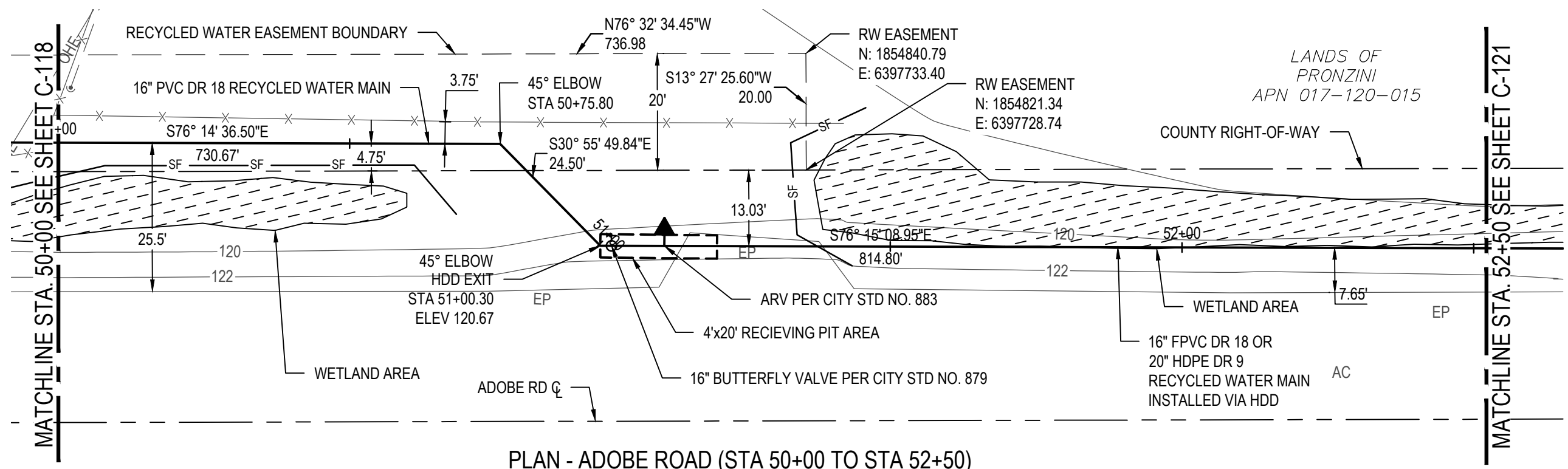
Date: 10/26/2023  
 Scale: AS SHOWN  
 Project No.: 11219037

Title  
**OVERALL PLAN  
 HDD SECTION 1**

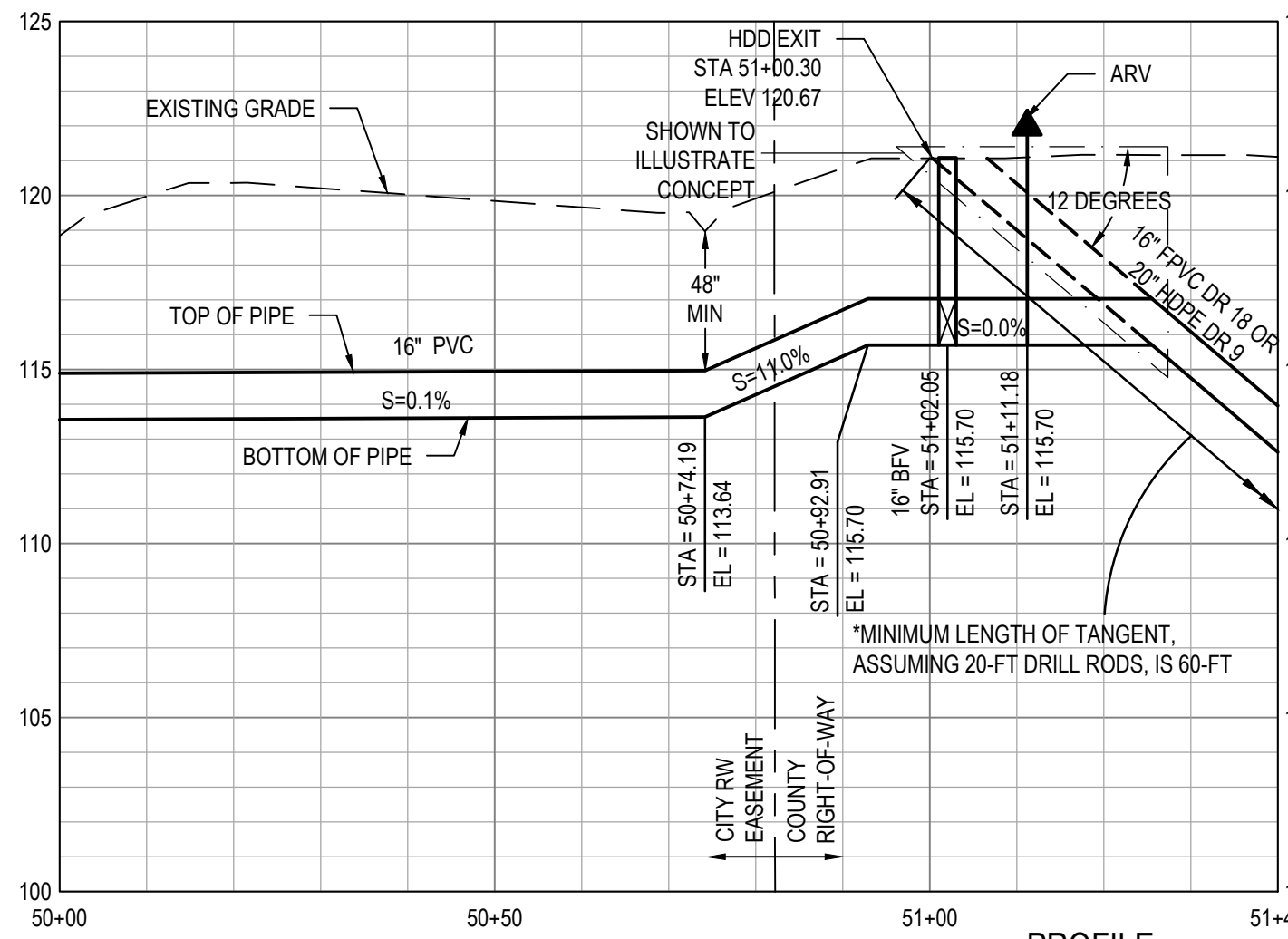
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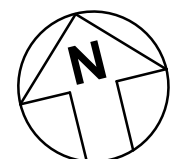
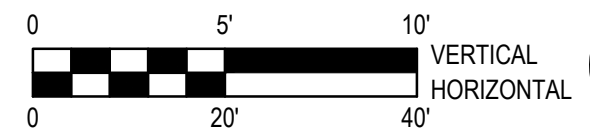
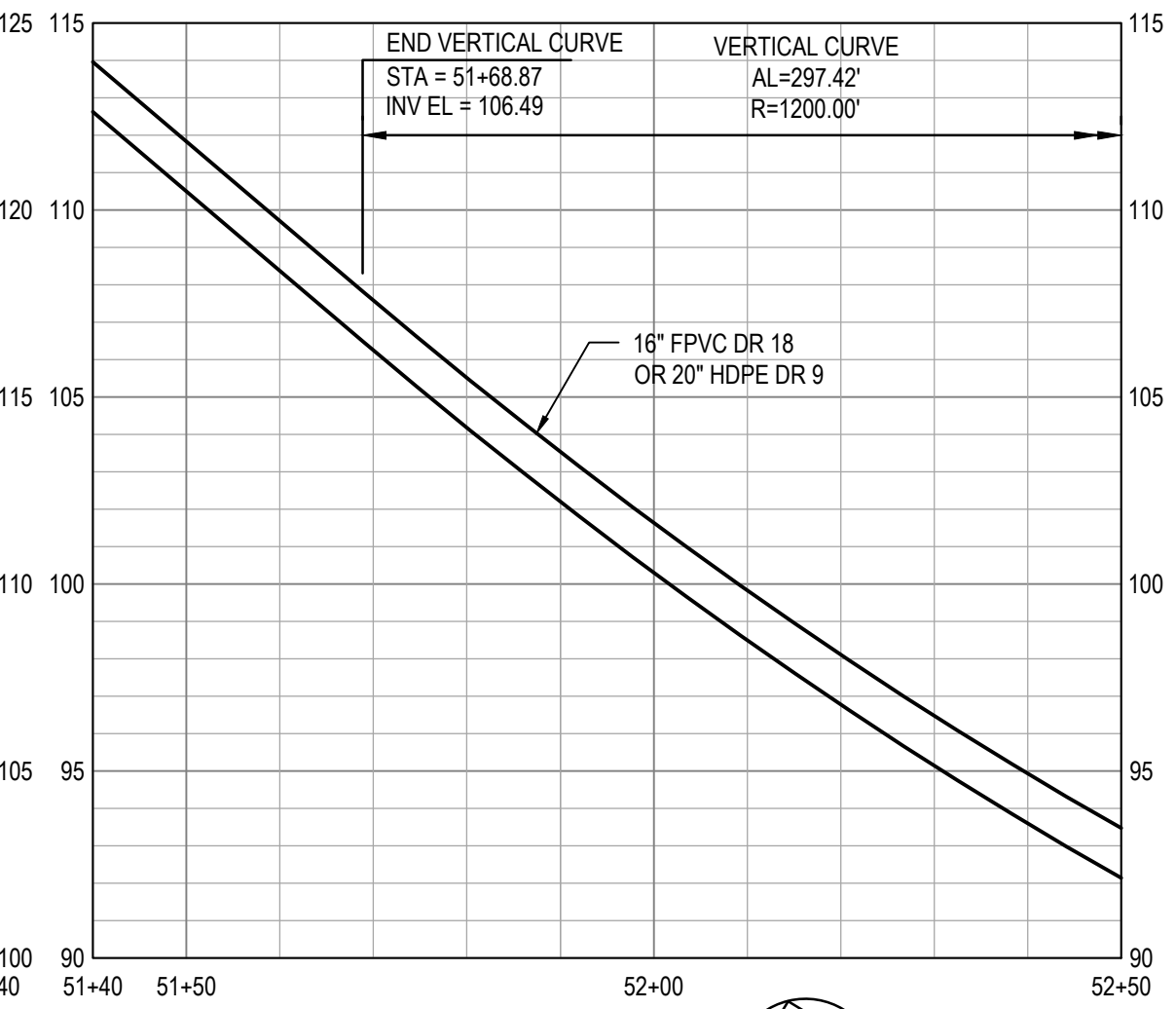
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PLAN - ADOBE ROAD (STA 50+00 TO STA 52+50)



PROFILE



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Project  
**ADOBE ROAD RECYCLED WATER PIPELINE**

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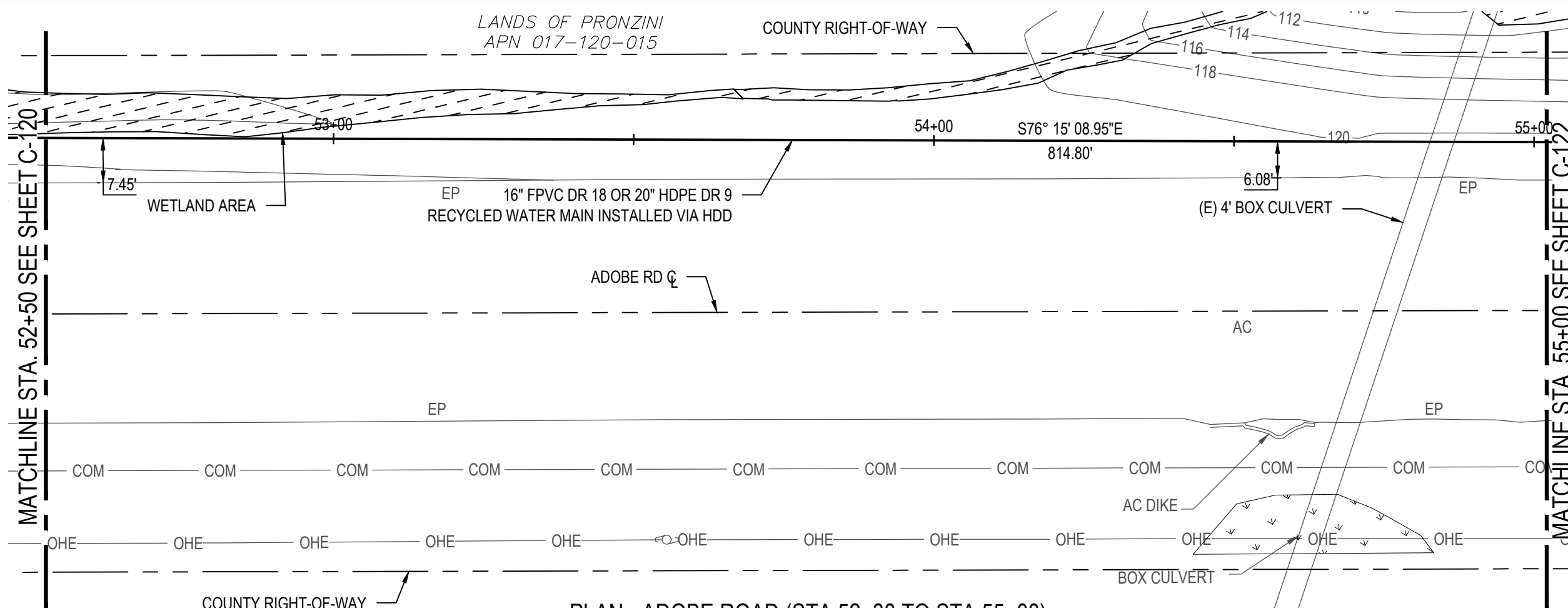
Scale  
AS SHOWN

Project No.  
11219037

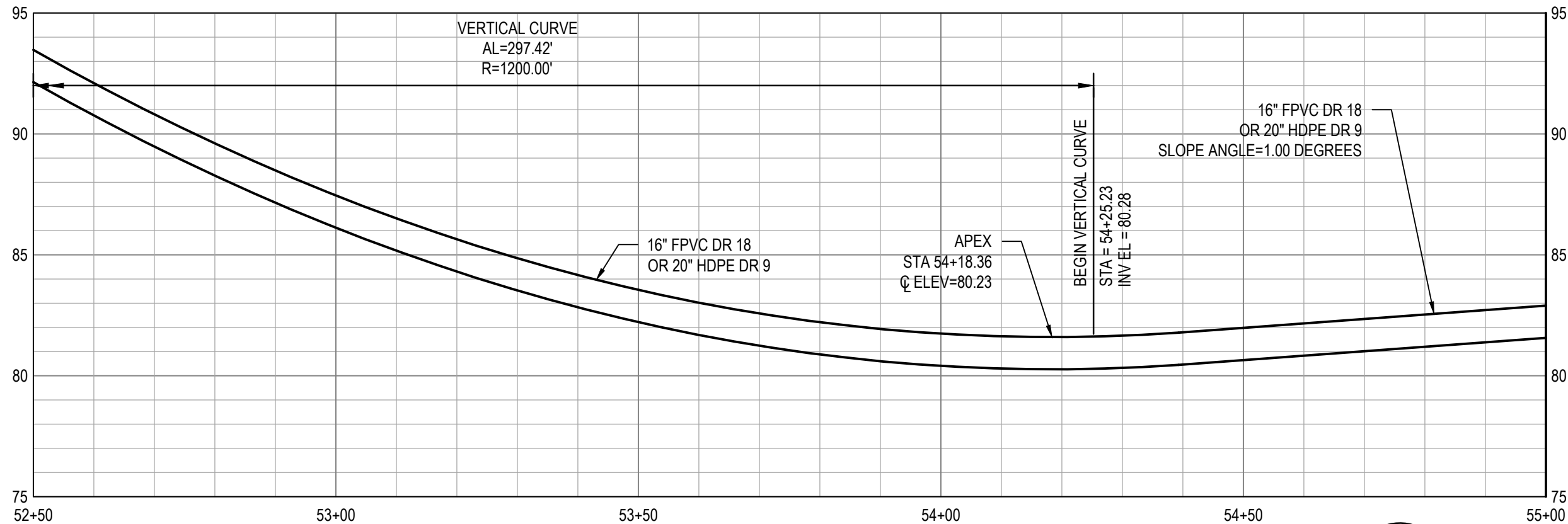
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**PLAN AND PROFILE - ADOBE ROAD (STA 50+00 TO STA 52+30)**

LANDS OF PRONZINI  
APN 017-120-015

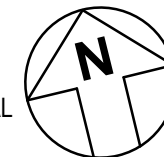
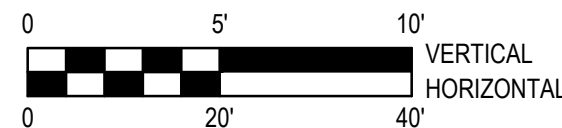
COUNTY RIGHT-OF-WAY



PLAN - ADOBE ROAD (STA 52+30 TO STA 55+00)



PROFILE



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Project  
**ADOBE ROAD RECYCLED WATER PIPELINE**

Date  
10/26/2023

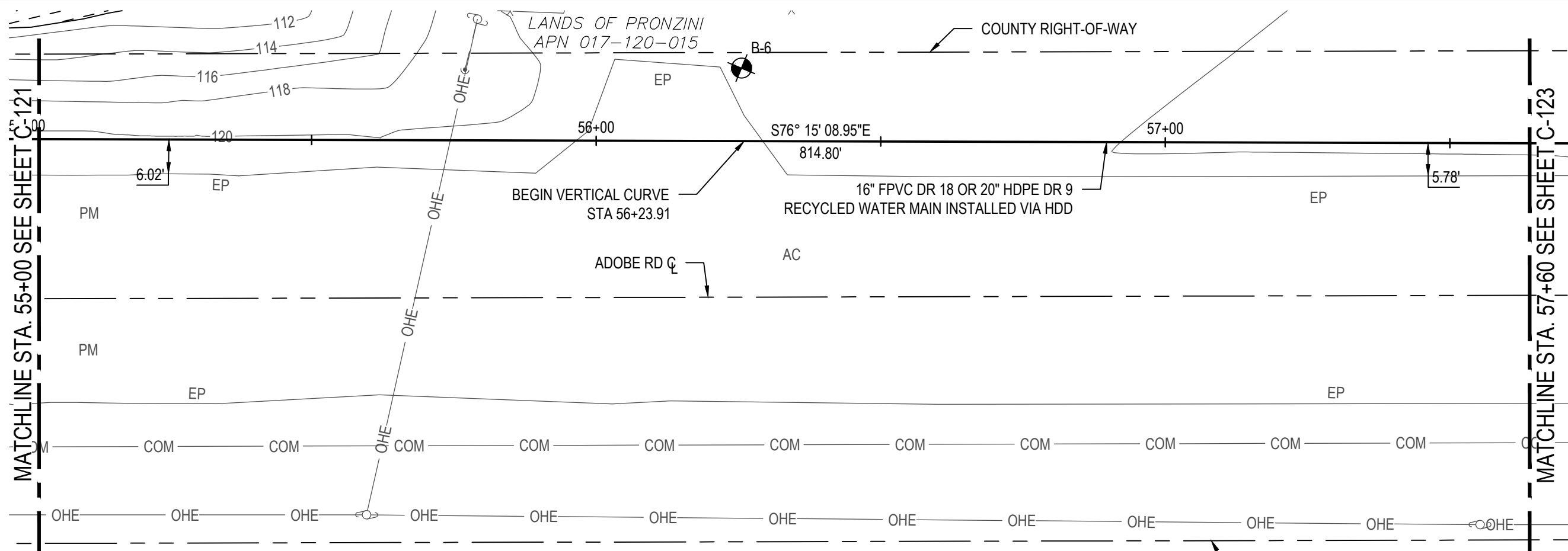
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Project No.  
11219037

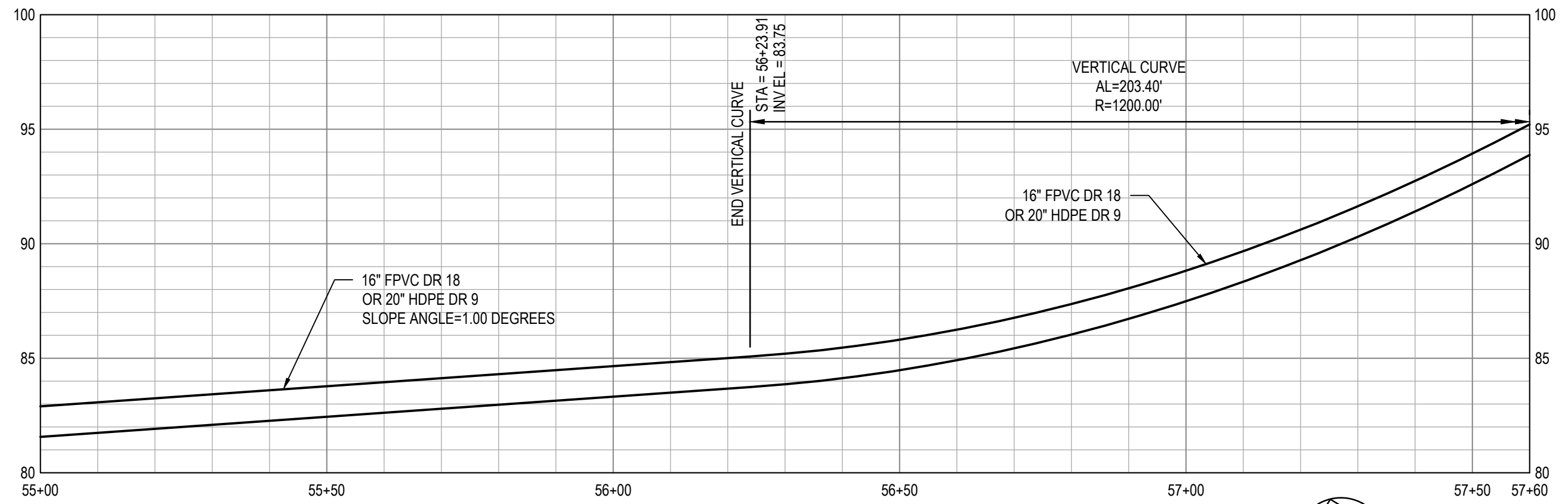
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**PLAN AND PROFILE - ADOBE ROAD (STA 52+30 TO STA 55+00)**

Drawing No.  
C-121

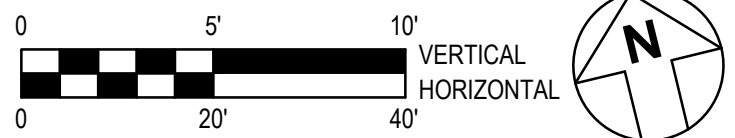
Sheet  
26 of 33



PLAN - ADOBE ROAD (STA 55+00 TO STA 57+60)

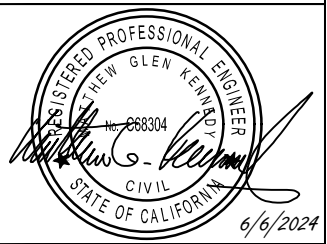


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**ADOBE ROAD RECYCLED WATER PIPELINE**

Date  
 10/26/2023

Scale  
 AS SHOWN

Project No.  
 11219037

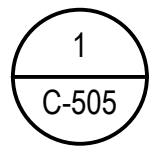
Title  
**PLAN AND PROFILE - ADOBE ROAD (STA 55+00 TO STA 57+60)**

Drawing No.  
 C-122

Sheet  
 27 of 33

MATCHLINE STA. 57+50 SEE SHEET C-122

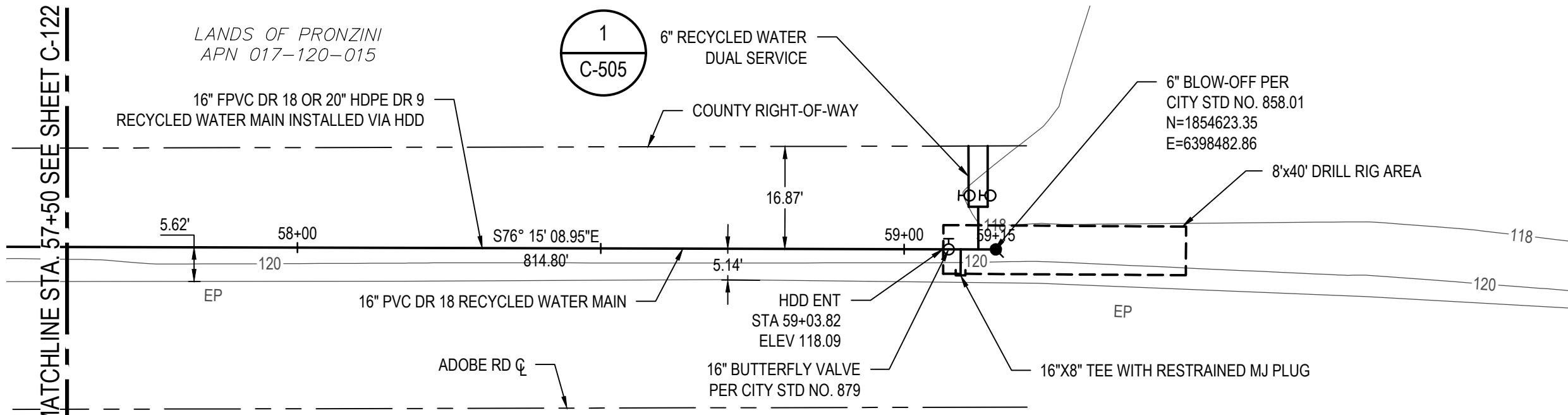
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APN 017-120-015



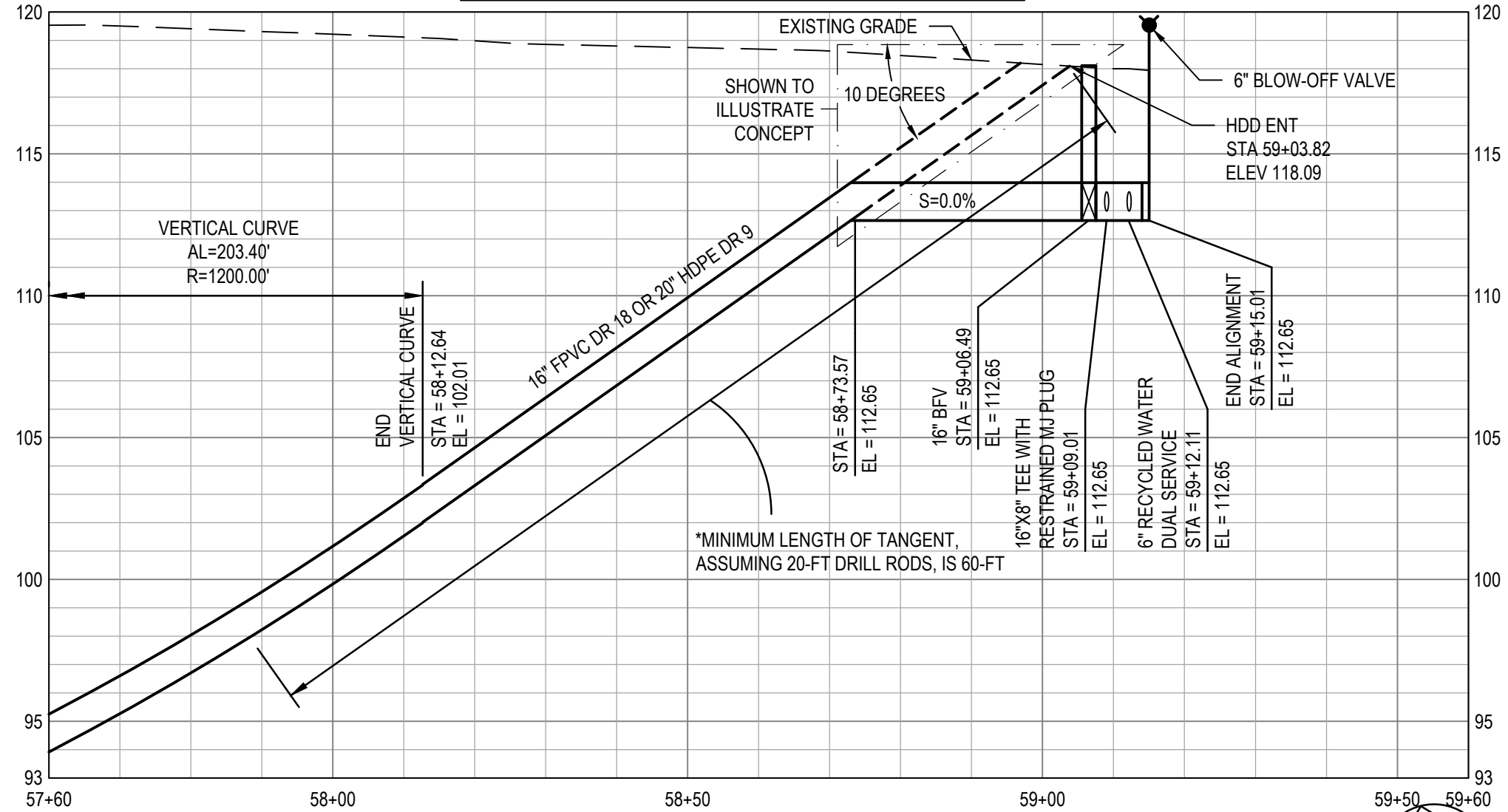
6" RECYCLED WATER  
DUAL SERVICE

6" BLOW-OFF PER  
CITY STD NO. 858.01  
N=1854623.35  
E=6398482.86

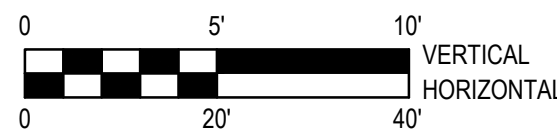
8'x40' DRILL RIG AREA



PLAN - ADOBE ROAD (STA 57+60 TO STA 59+13)



PROFILE



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6/6/2024

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**CITY OF PETALUMA**

Project  
**ADOBE ROAD RECYCLED WATER PIPELINE**

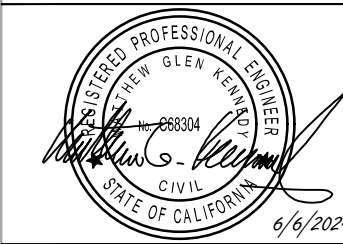
Date: 10/26/2023 Scale: AS SHOWN

Project No.: 11219037

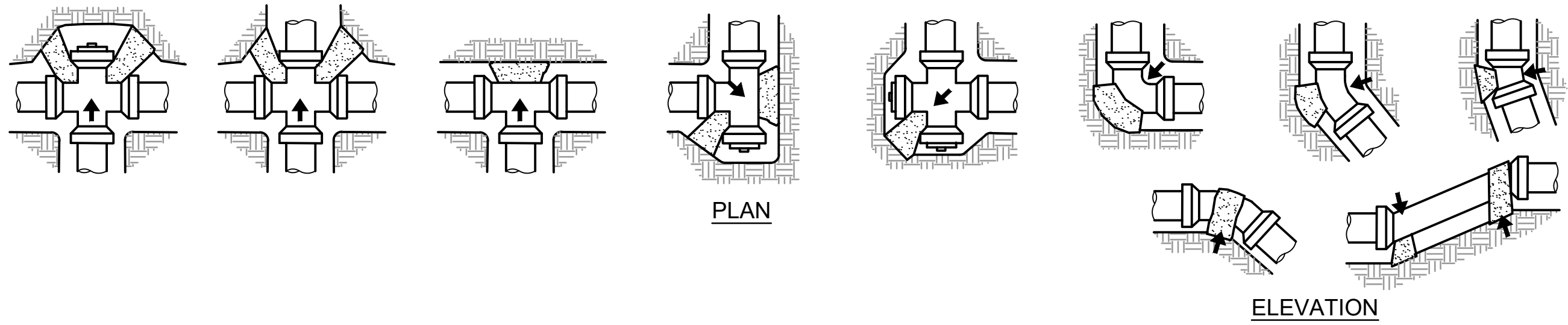
Title  
**PLAN AND PROFILE - ADOBE ROAD (STA 57+60 TO STA 59+13)**

Drawing No.: C-123 Sheet: 28 of 33

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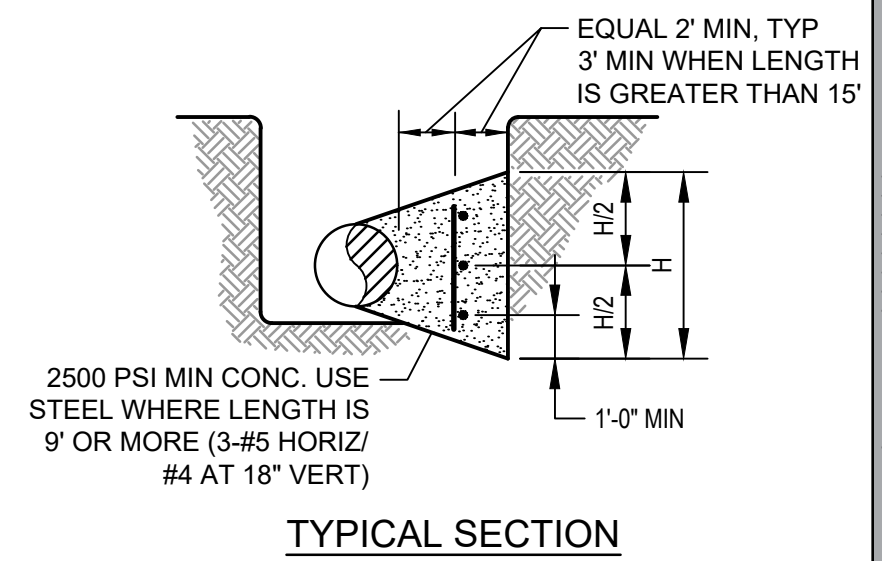


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0 1"



BEARING AREA OF THRUST BLOCK IN SQ. FT.

PIPE SIZE	TEE, WYE, PLUG OR CAP	90° BEND PLUGGED CROSS	TEE PLUGGED		45° BEND	22 1/2° BEND	11 1/4° BEND
			A1	A2			
4	1.5	2	2	1.5	1.5	1	1
6	3	4.5	4.5	3	2.5	1.5	1
8	5	7	7	5	4	2	1
10	8	12	12	8	7	3	2
12	12	17	17	12	10	5	3
16	15	21.5	21.5	15	12	6	4
18	19	27	27	19	15	8	6
20	24	34	34	24	18	10	8
22	29	41	41	29	22	12	10
24	34	48	48	34	26.5	14	12
32	39	55	55	39	31.5	16	14



NOT TO SCALE

1 STANDARD THRUST BLOCK DETAIL

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**CITY OF PETALUMA**

Project  
**ADOBE ROAD RECYCLED WATER PIPELINE**

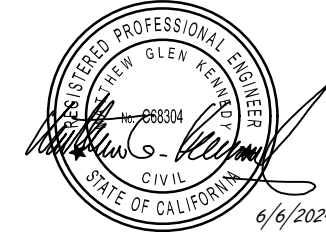
Date  
10/26/2023

Scale  
AS SHOWN

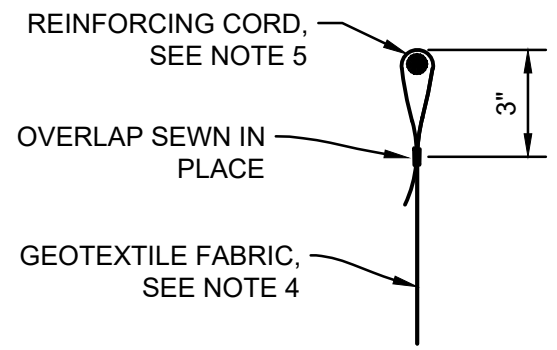
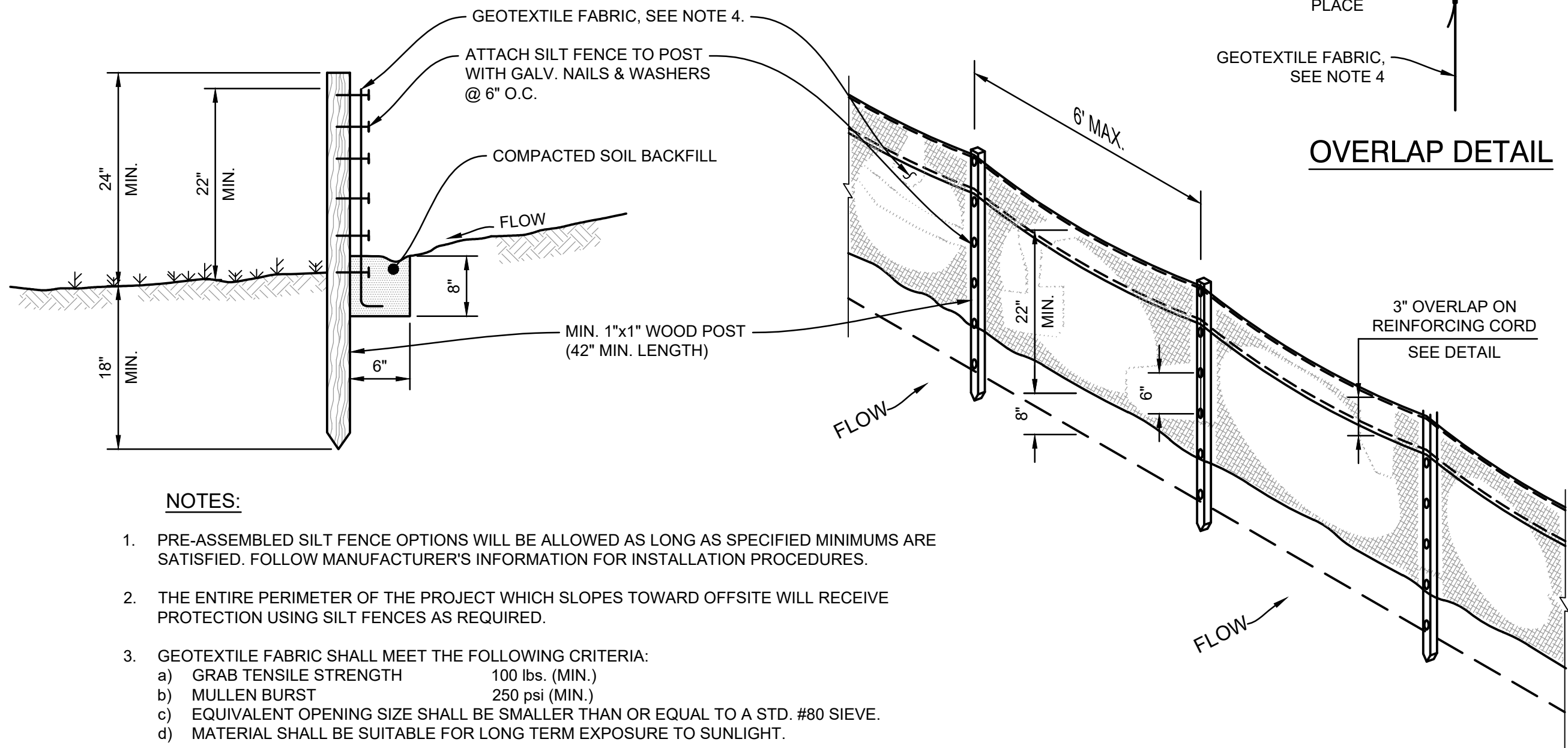
Project No.  
11219037

Title  
**DETAILS 1 - STANDARD THRUST BLOCK DETAIL**

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**OVERLAP DETAIL**

**NOTES:**

1. PRE-ASSEMBLED SILT FENCE OPTIONS WILL BE ALLOWED AS LONG AS SPECIFIED MINIMUMS ARE SATISFIED. FOLLOW MANUFACTURER'S INFORMATION FOR INSTALLATION PROCEDURES.
2. THE ENTIRE PERIMETER OF THE PROJECT WHICH SLOPES TOWARD OFFSITE WILL RECEIVE PROTECTION USING SILT FENCES AS REQUIRED.
3. GEOTEXTILE FABRIC SHALL MEET THE FOLLOWING CRITERIA:
  - a) GRAB TENSILE STRENGTH 100 lbs. (MIN.)
  - b) MULLEN BURST 250 psi (MIN.)
  - c) EQUIVALENT OPENING SIZE SHALL BE SMALLER THAN OR EQUAL TO A STD. #80 SIEVE.
  - d) MATERIAL SHALL BE SUITABLE FOR LONG TERM EXPOSURE TO SUNLIGHT.
4. REINFORCING CORD SHALL HAVE A MIN. TENSILE STRENGTH OF 500 lbs.

NOT TO SCALE

**1 TEMPORARY SILT FENCE**

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Client  
**CITY OF PETALUMA**

Project  
**ADOBE ROAD RECYCLED WATER PIPELINE**

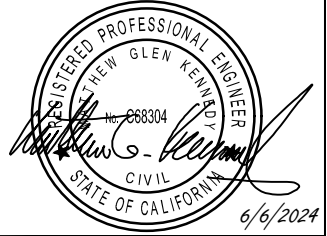
Date  
**10/26/2023**

Scale  
**AS SHOWN**

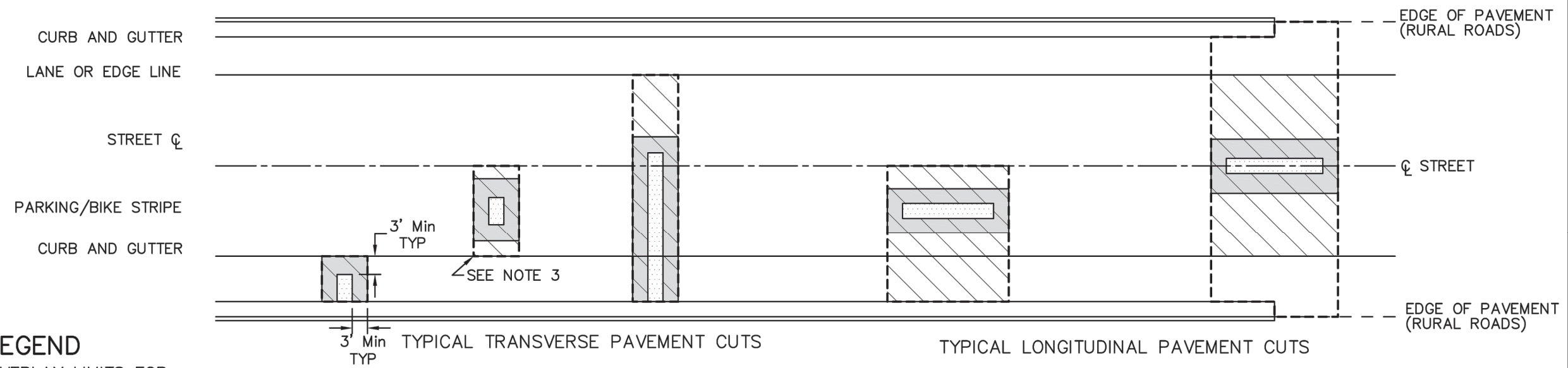
Project No.  
**11219037**

Title  
**DETAILS 2 - TEMPORARY SILT FENCE DETAIL**


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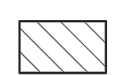


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**LEGEND**

 **OVERLAY LIMITS FOR PAVEMENT 5 YEARS OLD AND NEWER**  
WHEN PAVEMENT IS 5 YEARS OLD, OR LESS, A PAVEMENT PATCH IS REQUIRED TO THESE LIMITS. NO JOINTS OR REDUCTION IN AREA ARE ALLOWED. PAVEMENT REPLACEMENT IS REQUIRED TO THE NEXT ADJACENT CURB/EDGE OF PAVEMENT, PARKING OR LANE LINE WHENEVER A TRENCH OR DISTURBANCE OF ASPHALT OR SUPPORT MATERIAL EXTENDS BEYOND SUCH LINE. SEE NOTE 3 ON THIS PAGE.

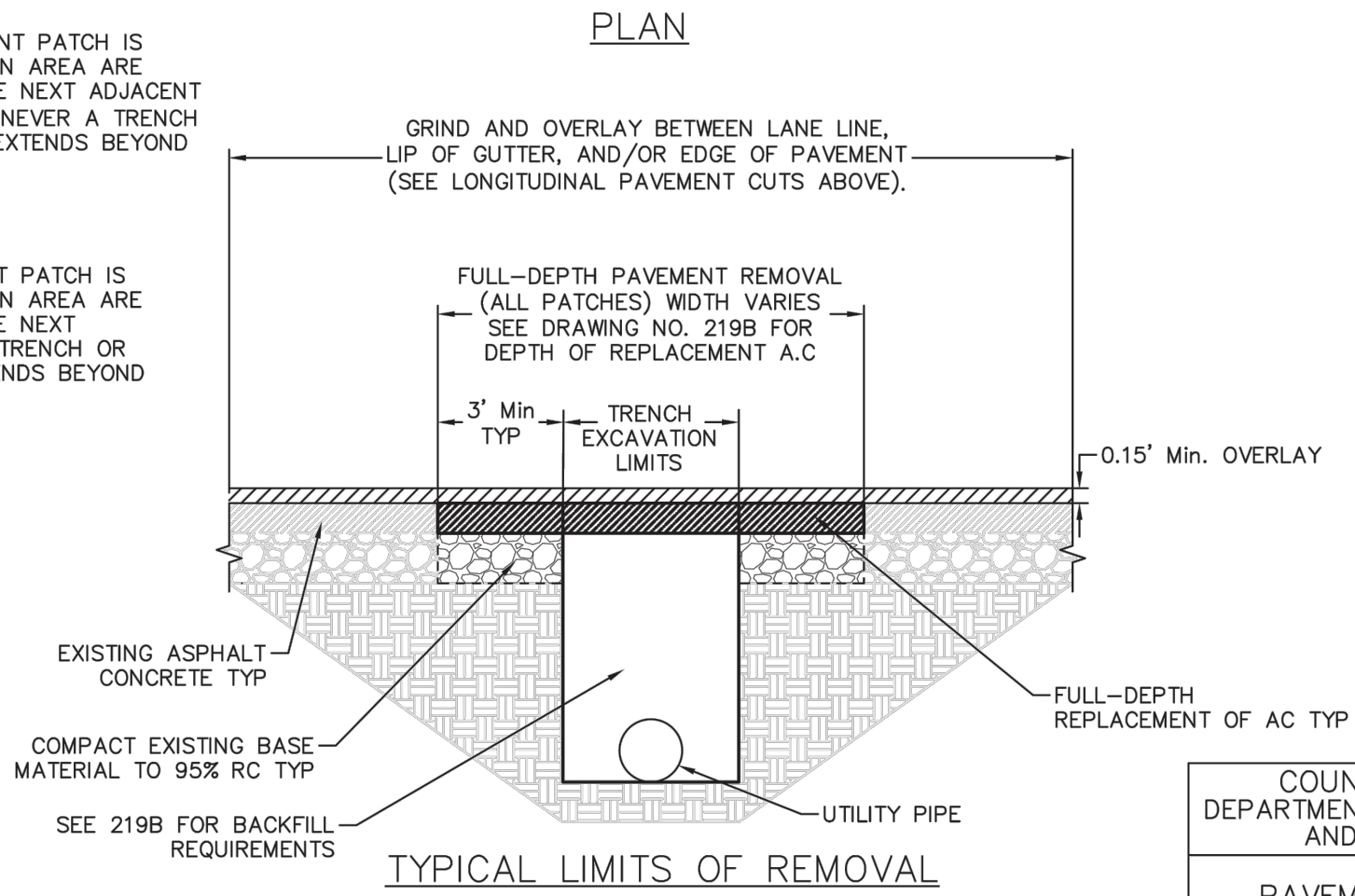
 **OVERLAY LIMITS FOR PAVEMENT OLDER THAN 5 YEARS**  
WHEN PAVEMENT IS OLDER THAN 5 YEARS, A PAVEMENT PATCH IS REQUIRED TO THESE LIMITS. NO JOINTS OR REDUCTION IN AREA ARE ALLOWED. PAVEMENT REPLACEMENT IS REQUIRED TO THE NEXT ADJACENT CURB, PARKING OR LANE LINE WHENEVER A TRENCH OR DISTURBANCE OF ASPHALT OR SUPPORT MATERIAL EXTENDS BEYOND SUCH LINE. SEE NOTE 3 ON THIS PAGE.

 **TRENCH LIMITS AT TOP OF PAVEMENT**

 **T SECTION LIMITS (FULL DEPTH AC REPLACEMENT)**

**NOTES**

- FULL-DEPTH PAVEMENT PATCH JOINTS SHALL BE SEALED WITH CRAFTCO POLYFLEX TYPE-1, OR EQUAL.
- ALL CUTS SHALL BE PERPENDICULAR OR PARALLEL TO DIRECTION OF TRAVEL.
- REMOVE ADDITIONAL PAVEMENT TO ADJACENT EXISTING PAVEMENT PATCH, MANHOLE, BOX, OR EDGE OF PAVEMENT IF THESE FEATURES ARE WITHIN 3 FEET OF FINAL SAW CUT.
- SEE SONOMA COUNTY CONSTRUCTION STANDARD DRAWING 219E FOR REQUESTING AN EXCEPTION TO THIS STANDARD PLAN. APPROVED EXCEPTIONS SHALL BE INCLUDED AS SPECIAL ENCROACHMENT PERMIT CONDITIONS.



COUNTY OF SONOMA  
DEPARTMENT OF TRANSPORTATION  
AND PUBLIC WORKS

**PAVEMENT CUT POLICY**

DATE: MAY 2013  
REV. JAN. 2020

SCALE: NONE

DRAWING NO. 219A

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**CITY OF PETALUMA**

Project  
**ADOBE ROAD RECYCLED WATER PIPELINE**

Date  
10/26/2023

Scale  
AS SHOWN

Project No.  
11219037

Title  
**DETAILS 3 - 219A  
SONOMA COUNTY  
PAVEMENT CUT POLICY**



NOTES

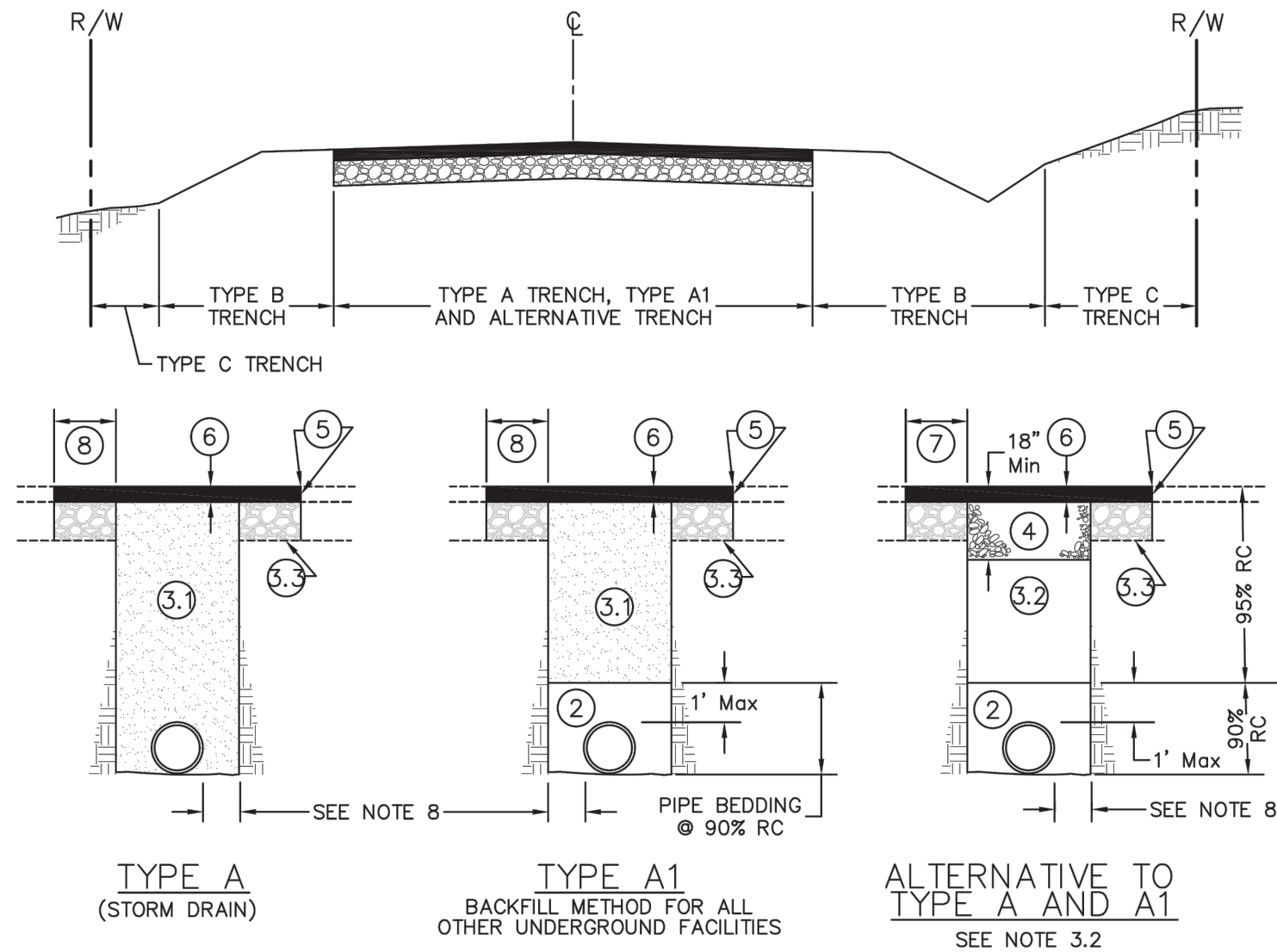
- REFERENCES MADE TO STATE STANDARD PLANS AND STANDARD SPECIFICATIONS ARE TO THE CURRENT EDITIONS; EXCEPT FOR ASPHALT MATERIALS REFERENCE MAY 2006 PLANS AND SPECIFICATIONS.
- PIPE BEDDING REQUIREMENTS AS REQUIRED BY AGENCY INSPECTING PIPE. STORM DRAIN BEDDING PER STATE STANDARD PLANS AND SPECIFICATIONS.
- 3.1 TYPE A AND A1: SLURRY CEMENT BACKFILL PER SECTION 19 OF THE STATE STANDARD SPECIFICATIONS (MAY 2006).
- 3.2 STRUCTURE BACKFILL MATERIAL MEETING THE SPECIFICATIONS IN SECTION 19 OF THE STATE STANDARD SPECIFICATIONS (MAY 2006) MAY BE USED AT CONTRACTOR'S OPTION. IF ALTERNATIVE IS USED, CONTRACTOR WILL PROVIDE A REPORT FROM A CIVIL ENGINEER LICENSED IN THE STATE OF CALIFORNIA, CERTIFYING THAT CONTRACTOR'S WORK MEETS SPECIFICATIONS. PEA GRAVEL SHALL NOT BE USED FOR STRUCTURE BACKFILL.
- 3.3 COMPACT EXISTING BASE MATERIAL TO 95% RC TYP
- CLASS 2 AGGREGATE BASE MATERIAL. THICKNESS SHALL BE EQUAL TO THE THICKNESS OF THE EXISTING ROAD BASE, BUT IN NO CASE SHALL THE THICKNESS BE LESS THAN 18".
- TACK COAT S.S. 1 EMULSIFIED ASPHALT. SEAL ALL JOINTS WITH CRAFCO POLYFLEX TYPE-1, OR EQUAL, AFTER PAVING.
- TRENCH SHALL BE PAVED WITH ASPHALT CONCRETE WHOSE THICKNESS IS EQUAL TO THE THICKNESS OF THE EXISTING PAVEMENT, BUT IN NO CASE SHALL THICKNESS BE LESS THAN THAT SHOWN IN THE TRENCH A.C. PAVING TABLE. ASPHALT CONCRETE SHALL BE 1/2" TYPE A CONFORMING TO THE PROVISIONS IN SECTION 39, ASPHALT CONCRETE, OF THE CALTRANS STANDARD SPECIFICATIONS (MAY 2006).
- REPLACE WITH NATIVE MATERIAL RELATIVE COMPACTED TO 90%.
- REFER TO DRAWING NO. 219A FOR DIMENSION.
- STORM DRAIN: TWO (2) FEET; SIDE CLEARANCE MAY BE REDUCED TO A MINIMUM OF 6" WHEN SLURRY CEMENT BACKFILL IS USED. UTILITIES: TWO (2) FOOT MINIMUM TRENCH WIDTH UNLESS SLURRY BACKFILL IS USED.
- ANY PORTLAND CEMENT CONCRETE ROADWAY REMOVED DURING EXCAVATION SHALL BE REPLACED IN KIND AND THICKNESS PER STATE STANDARD PLANS P3A+P3B, LONGITUDINAL JOINT DETAILS.

MINIMUM UTILITY COVER TABLE

UTILITY TYPE	Min. DEPTH OF COVER
STORM DRAIN CONDUITS	36"
SEWER SERVICE LATERALS	36"
WATER SERVICE LATERALS	36"
WATER LINE >2" DIAMETER	36"
SEWER MAIN LINES	36"
ELECTRICAL TRANSMISSION CABLES	36"
TELECOMMUNICATION CABLES	36"
GAS DISTRIBUTION LINES & SERVICE LATERALS	36"
GAS TRANSMISSION LINES	60"

TRENCH AC PAVING TABLE

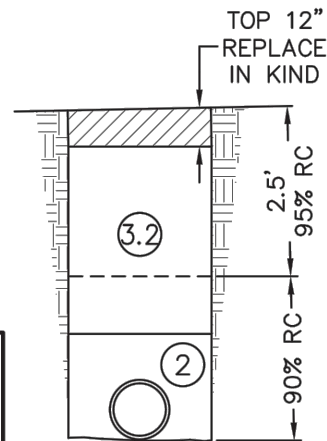
STREET TYPE	MIN. A.C. THICKNESS
RESIDENTIAL/LOCAL	0.25'
COLLECTOR	0.35'
ARTERIAL	0.45'



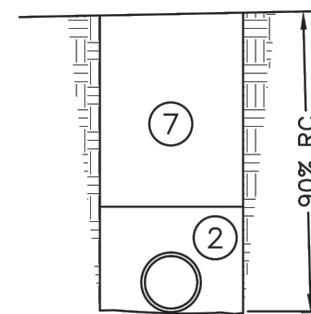
TYPE A  
(STORM DRAIN)

TYPE A1  
BACKFILL METHOD FOR ALL  
OTHER UNDERGROUND FACILITIES

ALTERNATIVE TO  
TYPE A AND A1  
SEE NOTE 3.2



TYPE B



TYPE C

COUNTY OF SONOMA  
DEPARTMENT OF TRANSPORTATION  
AND PUBLIC WORKS

TRENCH BACKFILL AND  
PAVING DETAILS

DATE: MAY 2013  
REV. MAR. 2020

SCALE: NONE  
DRAWING NO. 219B

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Client  
**CITY OF PETALUMA**

Project  
**ADOBE ROAD RECYCLED WATER PIPELINE**

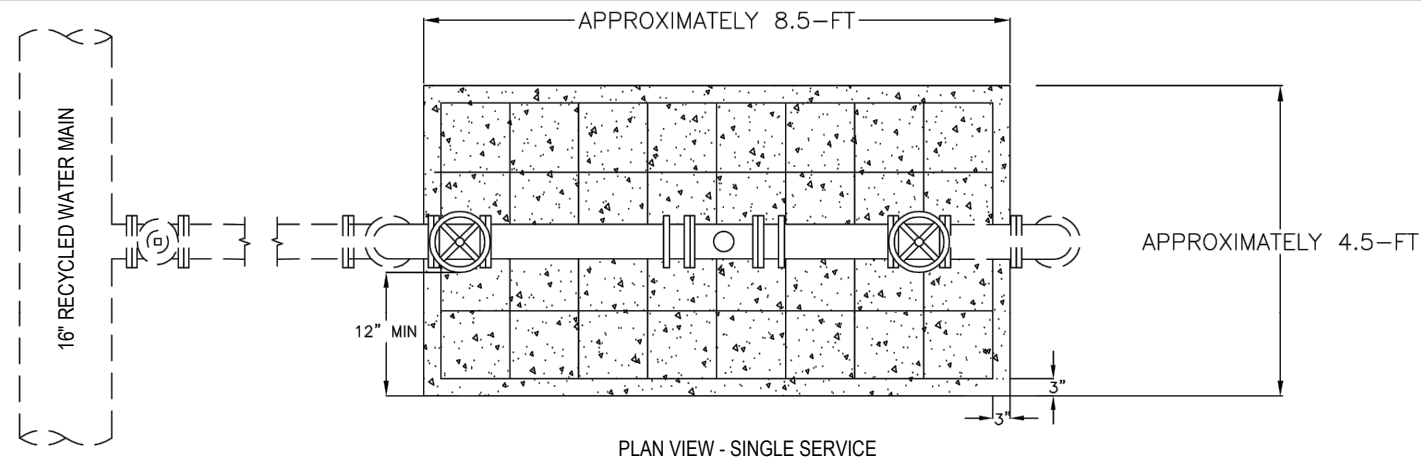
Date  
10/26/2023

Scale  
AS SHOWN

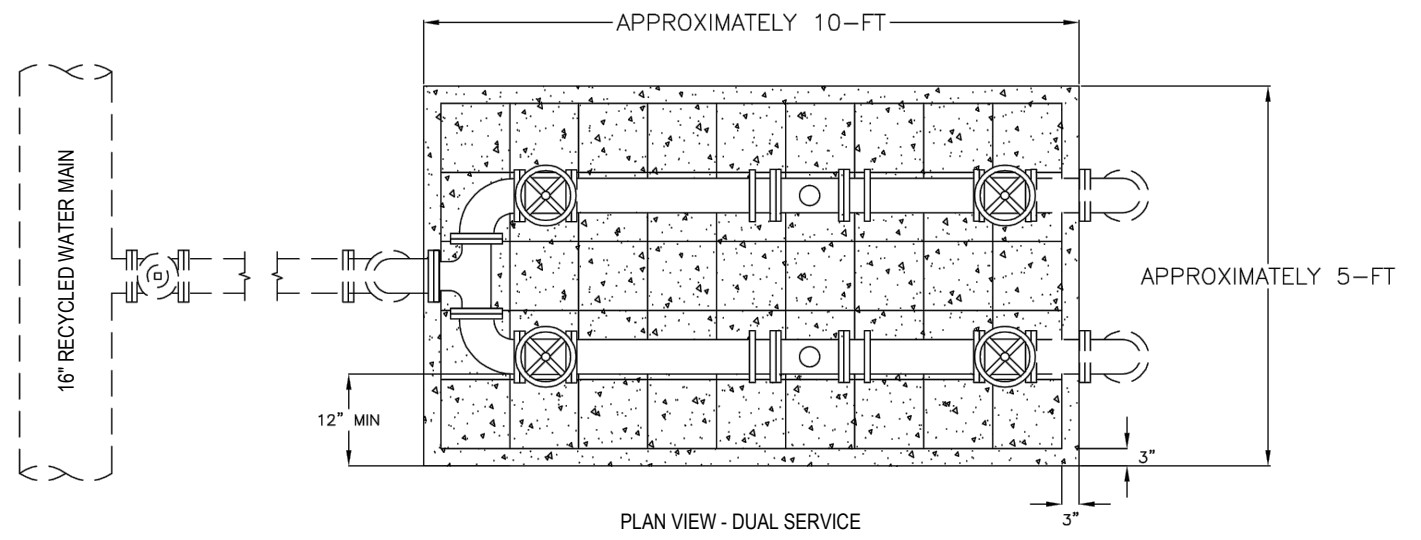
Project No.  
11219037

Title  
**DETAILS 4 - 219B  
SONOMA COUNTY  
PAVEMENT CUT POLICY**

Sheet  
C-504 32 of 33



PLAN VIEW - SINGLE SERVICE



PLAN VIEW - DUAL SERVICE

- NOTES:**
1. ALL PIPELINE, FITTINGS, AND APPURTENANCES SHALL CONFORM TO CITY STANDARDS AND SPECIFICATIONS.
  2. PIPING AND FITTINGS ABOVE GROUND TO BE COATED WITH PURPLE POLYURETHANE COATING.

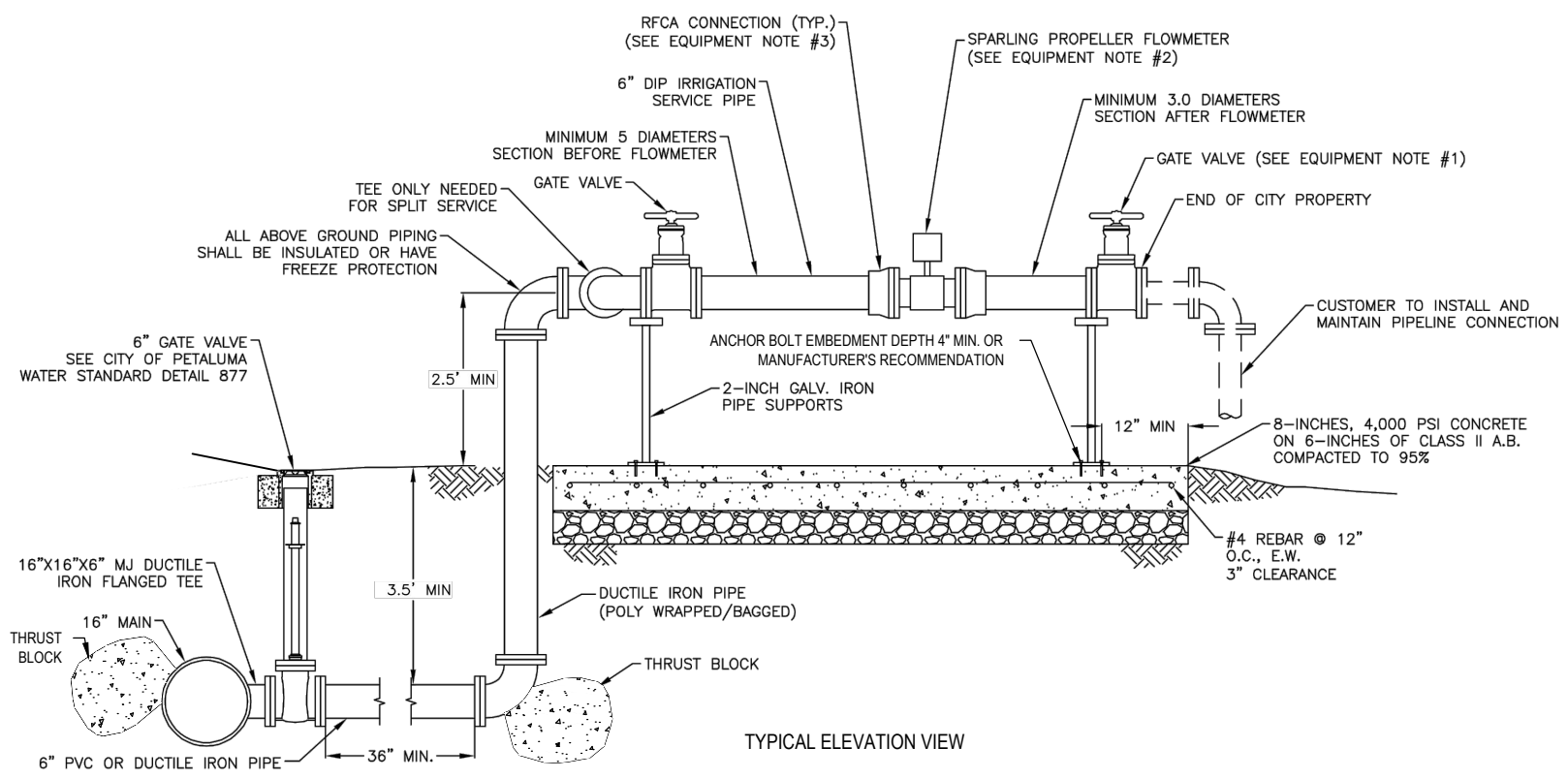
- EQUIPMENT**
1. GATE VALVE SHALL BE KENNEDY VALVE RESILIENT WEDGE GATE VALVE W/ HANDWHEEL OR APPROVED EQUAL.
  2. FLOWMETER SHALL BE SPARLING PROPELLER TYPE WITH INSTANTANEOUS FLOW AND TOTALIZER. SEE MODEL BELOW:
    - 6" SPARLING ELECTRONIC PROPELLER METER
    - FM104-062-1200 250# METERHEAD
    - MT106-211 250# FLANGED TUBE
    - FT194-0-1 DIGITAL INDICATOR AND TOTALIZER
  3. RESTRAINED FLANGE COUPLING ADAPTER SHALL BE ROMAC RFCA (OR APPROVED EQUAL)
  4. ALL PIPING, FITTINGS, AND APPURTENANCES SHALL BE RATED FOR 150 PSI MINIMUM.
  5. ALL PIPING/INSULATION SHALL BE PURPLE IN COLOR.

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0 1"



TYPICAL ELEVATION VIEW

NOT TO SCALE

**1 IRRIGATION SERVICE DETAIL**

No.	Issue	Checked	Approved	Date
Author	CB	Designer	SC/CC	
Drafting	MK	Design	MK	
Check		Check		
Project	MK	Project	AC	
Manager		Director		

Client  
**CITY OF PETALUMA**

Project  
**ADOBE ROAD RECYCLED WATER PIPELINE**

Date  
**10/26/2023**

Scale  
**AS SHOWN**

Project No.  
**11219037**

Title  
**DETAILS 5 - IRRIGATION SERVICE DETAILS**

Size  
**ANSI B**