

**CITY OF PETALUMA
PETALUMA, CALIFORNIA**

**CONTRACT DOCUMENTS FOR
NORTH MCDOWELL BOULEVARD
COMPLETE STREETS PROJECT
VOLUME 1 OF 2**

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

CITY PROJECT NO. C16102147

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: Ken Eichstaedt, P.E., T.E.

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

Bid Opening: August 4, 2022 at 2:00 p.m.

CITY OF PETALUMA
PETALUMA, CALIFORNIA

**NORTH MCDOWELL BOULEVARD
COMPLETE STREETS PROJECT**

CITY PROJECT NUMBER C16102147

CITY OF PETALUMA - SONOMA COUNTY - CALIFORNIA

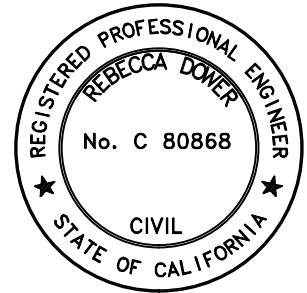
Prepared by:



Becky Dower, P.E

7/13/2022

Date



Reviewed by:

Ken Eichstaedt, P.E., T.E.

7/13/2022

Date



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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, California, 94952-2610, until 2:00 (enter time) on Thursday, August 4th, 2022, for the North McDowell Boulevard Complete Streets Project (C16102147). 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, August 4th, 2022 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 within 120 working days after the commencement date stated in the Notice to Proceed.
4. **DESCRIPTION OF WORK:** The WORK includes includes the full rehabilitation of North McDowell Boulevard from Sunrise Parkway to Old Redwood Highway. The breakdown of the full rehabilitation includes roadway surface reconstruction, pedestrian facility improvements (ADA access, curb ramps, crossings, sidewalks, and other safety improvements), Bicycle facility improvements (Class I, II, and IV bike facilities, wayfinding, and other improvements), traffic calming measures (sidewalk bulbouts, and other measures), transit stop improvements, as well as traffic signal connectivity, coordination, and detection upgrades.
5. **SITE OF WORK:** The site of the WORK is located: North McDowell Blvd from Sunrise Parkway to Old Redwood Highway, Petaluma, CA.
6. **OBTAINING CONTRACT DOCUMENTS:** The Contract Documents are entitled “North McDowell Boulevard Complete Streets Project (C16102147).”

The Contract Documents may be obtained by 4:00 P.M., Monday through Thursday at the office of Public Work & Utilities, 202 North McDowell Boulevard, Petaluma, California 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

Submitting 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 bid 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.
9. **PREFERENCE FOR MATERIAL:** 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.
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 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. 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.
13. **LABOR COMPLIANCE PURSUANT TO CALIFORNIA LABOR CODE §1771.1:** A contractor or 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 this chapter, unless currently registered and qualified to perform public work pursuant to Section 1725.5. It is not a violation of this section for 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 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 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 of 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 3247, a payment (labor and materials) bond must be filed if the expenditure for the WORK is in excess of Twenty-Five Thousand Dollars (\$25,000).
16. **PRE-BID CONFERENCE VISITS:** [At least on 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 _____ (*enter time*) on _____, at the _____. 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.

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

NAME: Ken Eichstaedt, P.E., T.E.

ADDRESS: 202 N McDowell Blvd

Petaluma, CA

94954

PHONE: (707) 776-3672

18. **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 Kendall Rose

DATE: July 14, 2022

END OF NOTICE 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 received less than 14 days prior to the date of Bids may not be answered. 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 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 (5th) 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

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 A 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

BASE BID
ROAD WORK, CURB RAMPS AND LIMITED GAP CLOSURE BETWEEN OLD REDWOOD
AND SMART TRACKS

Item No.	Description	Estimated Quantity	Unit	Unit Price	Total Price
1	MOBILIZATION/DEMOBILIZATION	1	LS		
2	TRAFFIC CONTROL	1	LS		
3	STORM WATER MANAGEMENT AND EROSION CONTROL	1	LS		
4	TREE REMOVAL	5	EA		
5	LANDSCAPE WALL REMOVAL	10	LF		
6	MINOR CONCRETE - VERTICAL CURB	745	LF		
7	MINOR CONCRETE - CURB AND GUTTER	1375	LF		
8	MINOR CONCRETE - SIDEWALK	13465	SF		
9	MINOR CONCRETE - REINFORCED CONCRETE SIDEWALK	1880	SF		
10	MINOR CONCRETE - 8" MEDIAN CURB	210	LF		
11	MINOR CONCRETE - RETAINING WALL	370	LF		
12	MINOR CONCRETE - VALLEY GUTTER	1085	SF		
13	SIDEWALK CONFORM GRINDING	500	SF		
14	VEHICULAR CONCRETE	3885	SF		
15	TRUNCATED DOME PANELS (3'X5')	66	EA		
16	TRUNCATED DOME PANEL INSTALL	2	EA		
17	12" AC FULL DEPTH CONFORM	165	TON		
18	END OF PAVEMENT REHABILITATION CONFORM	2450	SY		
19	6" COLD PLANING/GRINDING	43940	SY		
20	CCPR AC OVERLAY	11120	TON		
21	GLASGRID	43940	SY		
22	AC OVERLAY	3710	TON		
23	6" GRIND DIGOUT	6460	TON		
24	PEDESTRIAN BARRICADE	40	LF		
25	RELOCATE MONUMENT SIGN	1	EA		
26	RELOCATE SIGN	2	EA		
27	FLASHING BEACON SYSTEM (RRFB)	1	LS		
28	PAVEMENT MARKINGS	7260	SF		
29	FIRE HYDRANT RETROREFLECTIVE MARKER	30	EA		
30	BIKE LANE STRIPING, GREEN	12180	SF		
31	DETAIL 9	11250	LF		
32	DETAIL 21	1680	LF		
33	DETAIL 32	5160	LF		
34	DETAIL 38	2400	LF		
35	DETAIL 39	12220	LF		
36	DETAIL 39A	3240	LF		
37	OBJECT MARKER (TYPE K-1)	9	EA		
38	ADJUST EXISTING UTILITY BOX TO GRADE	42	EA		
39	ADJUST EXISTING VALVE COVER TO GRADE	93	EA		
40	ADJUST EXISTING MANHOLE TO GRADE	29	EA		
41	ADJUST OR REPLACE EXISTING MONUMENT COVER TO GRADE	8	EA		

North McDowell Boulevard Complete Streets Project
City Project No. C16102147

42	ADJUST EXISTING UTILITY TO GRADE - COORDINATE W/ UTIL OWNER	8	EA		
43	RELOCATE LIGHT POLE	16	EA		
44	RELOCATE FIRE HYDRANT	6	EA		
45	RELOCATE UTILITY POLE	3	EA		
46	RELOCATE BACKFLOW PREVENTER	1	EA		
47	TRAFFIC SIGNAL AND LIGHTING SYSTEM	1	LS		
48	CLEARANCE PRUNING	1	LS		

Total Base Bid \$

ADDITIVE ALTERNATIVE 1
SIGNAL INTERCONNECT

Item No.	Description	Estimated Quantity	Unit	Unit Price	Total Price
1	MOBILIZATION/DEMobilIZATION	1	LS		
2	TRAFFIC CONTROL	1	LS		
3	SIGNAL INTERCONNECT	1	LS		

Total Alt 1 Bid \$

ADDITIVE ALTERNATIVE 2
ADDITIONAL GAP CLOSURE BETWEEN OLD REDWOOD AND SMART TRACKS

Item No.	Description	Estimated Quantity	Unit	Unit Price	Total Price
1	MOBILIZATION/DEMobilIZATION	1	LS		
2	TRAFFIC CONTROL	1	LS		
3	STORM WATER MANAGEMENT AND EROSION CONTROL	1	LS		
4	TREE REMOVAL	6	EA		
5	LANDSCAPE WALL REMOVAL	35	LF		
6	MINOR CONCRETE - VERTICAL CURB	55	LF		
7	MINOR CONCRETE - CURB AND GUTTER	890	LF		
8	MINOR CONCRETE - SIDEWALK	15985	SF		
9	MINOR CONCRETE - RETAINING WALL	1200	LF		
10	VEHICULAR CONCRETE	2995	SF		
11	TRUNCATED DOME PANELS (3'X5')	12	EA		
12	12" AC FULL DEPTH CONFORM	90	TON		
13	RELOCATE SIGN	8	EA		
14	ADJUST EXISTING UTILITY BOX TO GRADE	47	EA		
15	ADJUST EXISTING UTILITY TO GRADE - COORDINATE W/ UTIL OWNER	10	EA		
16	RELOCATE LIGHT POLE	10	EA		
17	RELOCATE FIRE HYDRANT	5	EA		
18	RELOCATE UTILITY POLE	3	EA		
19	RELOCATE BACKFLOW PREVENTER	3	EA		
20	INSTALL CATCH BASIN	1	EA		

Total Alt 2 Bid \$

ADDITIVE ALTERNATIVE 3
IMPROVEMENTS BETWEEN SMART TRACKS AND SUNRISE

Item No.	Description	Estimated Quantity	Unit	Unit Price	Total Price
1	MOBILIZATION/DEMobilIZATION	1	LS		
2	TRAFFIC CONTROL	1	LS		
3	STORM WATER MANAGEMENT AND EROSION CONTROL	1	LS		
4	FENCE REMOVAL	15	LF		
5	TREE REMOVAL	17	EA		
6	MINOR CONCRETE - VERTICAL CURB	100	LF		
7	MINOR CONCRETE - CURB AND GUTTER	1310	LF		
8	MINOR CONCRETE - SIDEWALK	4520	SF		
9	MINOR CONCRETE - 8" MEDIAN CURB	730	LF		
10	MINOR CONCRETE - VALLEY GUTTER	70	SF		
11	VEHICULAR CONCRETE	4285	SF		
12	TRUNCATED DOME PANELS (3'X5')	12	EA		
13	12" AC FULL DEPTH CONFORM	720	TON		
14	END OF PAVEMENT REHABILITATION CONFORM	965	SY		
15	5" COLD PLANING/GRINDING	12820	SY		
16	CCPR AC OVERLAY	2520	TON		
17	GLASGRID	12820	SY		
18	AC OVERLAY	1080	TON		
19	5" GRIND DIGOUT	1930	TON		
20	RELOCATE SIGN	8	EA		
21	PAVEMENT MARKINGS	3460	SF		
22	FIRE HYDRANT RETROREFLECTIVE MARKER	15	EA		
23	BIKE LANE STRIPING, GREEN	3360	SF		
24	DETAIL 9	4560	LF		
25	DETAIL 21	1220	LF		
26	DETAIL 32	680	LF		
27	DETAIL 38	500	LF		
28	DETAIL 39	7060	LF		
29	DETAIL 39A	1190	LF		
30	OBJECT MARKER (TYPE K-1)	4	EA		
31	ADJUST EXISTING UTILITY BOX TO GRADE	6	EA		
32	ADJUST EXISTING VALVE COVER TO GRADE	39	EA		
33	ADJUST EXISTING MANHOLE TO GRADE	18	EA		
34	ADJUST OR REPLACE EXISTING MONUMENT COVER TO GRADE	3	EA		
35	ADJUST EXISTING UTILITY TO GRADE - COORDINATE W/ UTIL OWNER	1	EA		
36	RELOCATE LIGHT POLE	2	EA		
37	RELOCATE FIRE HYDRANT	1	EA		
38	RELOCATE UTILITY POLE	3	EA		
39	INSTALL CATCH BASIN	7	EA		
40	CONVERT CATCH BASIN TO SDMH	5	EA		
41	LANDSCAPE FABRIC AND MULCH	425	SY		

Total Alt 3
Bid \$

ADDITIVE ALTERNATIVE 4
IMPROVEMENTS OUTSIDE OF CITY ROW

Item No.	Description	Estimated Quantity	Unit	Unit Price	Total Price
1	MOBILIZATION/DEMobilIZATION	1	LS		
2	TRAFFIC CONTROL	1	LS		
3	STORM WATER MANAGEMENT AND EROSION CONTROL	1	LS		
4	FENCE REMOVAL	50	LF		
5	MINOR CONCRETE - VERTICAL CURB	135	LF		
6	MINOR CONCRETE - CURB AND GUTTER	45	LF		
7	MINOR CONCRETE - SIDEWALK	1240	SF		
8	MINOR CONCRETE - VALLEY GUTTER	415	SF		
9	VEHICULAR CONCRETE	1040	SF		
10	TRUNCATED DOME PANELS (3'X5')	7	EA		
11	12" AC FULL DEPTH CONFORM	20	TON		
12	ADJUST EXISTING UTILITY BOX TO GRADE	4	EA		
13	RELOCATE LIGHT POLE	2	EA		
14	RELOCATE UTILITY POLE	2	EA		
15	TRAFFIC SIGNAL AND LIGHTING SYSTEM	1	LS		

Total Alt 4 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. 4 Signature Acknowledging Receipt: _____ Date: _____

LIST OF SUBCONTRACTORS

In accordance with the provisions of Section 4102 and 4108, inclusive, of the Government Code of the State of California, each bidder shall list below the name and location of place of business of each subcontractor who will perform a portion of the contract work in an amount in excess of one-half of one percent of the total contract price. In each such instance, the nature and extent of the work to be performed shall be described.

If a prime contractor fails to specify a subcontractor or if a prime contractor specifies more than one subcontractor for the same portion of work to be performed under the contract in excess of one-half of one percent of the prime contractor's total bid, the prime contractor agrees that he or she is fully qualified to perform that portion himself or herself, and that the prime contractor shall perform that portion himself or herself. The subcontracting of work for which no subcontractor was designated in the original bid and which is in excess of one-half of one percent of the total contract price, will be allowed only with the written consent of the City.

Name of Subcontractor	Address of Office, Mill, or Shop	Description of Work to be Performed (also show Bid Schedule Item Number)	Public Works Contractor Registration Number
-----------------------------	-------------------------------------	--	--

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.

Item	Supplier & Manufacturer	Address
GlassGridConcreteACTher -moplastic Material		
-		
-		
-		
-		
-		

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:

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

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.

- 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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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 construction 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 50 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:

SECTION III
SPECIAL PROVISION

SECTION III.

SPECIAL PROVISIONS

- 3-1. DESCRIPTION OF WORK – The work includes the full rehabilitation of North McDowell Boulevard from Sunrise Parkway to Old Redwood Highway. The breakdown of the full rehabilitation includes roadway surface reconstruction, pedestrian facility improvements (ADA access, curb ramps, crossings, sidewalks, and other safety improvements), Bicycle facility improvements (Class I, II, and IV bike facilities, wayfinding, and other improvements), traffic calming measures (sidewalk bulbouts, and other measures), transit stop improvements, as well as traffic signal connectivity, coordination, and detection upgrades.
- 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) Special Provisions
- 4) Technical Specifications
- 5) Standard Specifications (Current Caltrans Standard Specifications)
- 6) Drawings
- 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

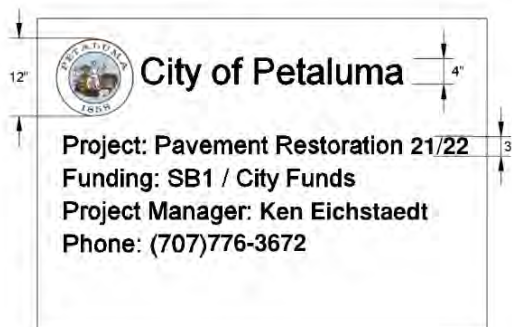
If the CONTRACTOR's certain operation is delayed, in the opinion of the ENGINEER, by the discovery of an underground utility not indicated on the plans or not marked by USA, the CONTRACTOR shall be paid a fair and reasonable compensation for the actual loss. Actual loss shall be understood to include 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.

Two (2) project signs with a minimum dimension of 3’X4’X3/4” plywood bolted to an A-frame barricade shall be furnished, installed and moved from site to site by the Contractor. Letters and numbers shall be black on a white background. The sign information shall be as shown below:

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



Construction area signs will be installed 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.

The Contractor will minimize disruption to all traffic (vehicular, transit, bicycle, and pedestrians) during the allowed work window. During construction, bicyclists will either share the road with vehicular traffic in a signed detour or be provided separate access. In addition, pedestrian access will be maintained at all times during construction. The Contractor shall provide temporary pedestrian curb ramps and clearly mark the temporary crosswalks. The pedestrian path shall be clear of any debris and meet ADA requirements. Driveway access to schools, residents, and businesses will also be maintained at all times.

Lane closures shall conform to the provisions in the section of these special provisions entitled, "Traffic Control System for Lane Closure".

At least five (5) working days prior to beginning of each phase of construction (i.e., piping installation, paving, pavement repair, concrete construction, etc.), the CONTRACTOR shall:

- A. Notify all adjacent residents, businesses, City of Petaluma Police and Fire, Green Waste Recovery (residential refuse service company), Waste Management Company (industrial refuse service company), and Petaluma Transit by written notices detailing the type, limits, date and the hours of work. Details of the notice shall be submitted to the ENGINEER for review and approval at least five (5) days prior to delivering these notices.
- B. Where required, post streets with temporary "No Parking/Tow Away" signs at 100-foot intervals at least 72 hours in advance. These signs shall be furnished by the CONTRACTOR and shall state the date; day of week and hour parking is prohibited.

Illuminated traffic cones when used during the hours of darkness shall be affixed or covered with reflective cone sleeves as specified in Section 12-3.10, "Traffic Cones", of the Standard Specifications.

Full compensation for temporary delineation shall be considered as included in the prices paid for the contract in terms of work which obliterated the existing delineation and no separate payment will be made therefore.

When working in or blocking any intersection, the CONTRACTOR shall provide flag persons to direct traffic at that intersection. This is in addition to other required flag persons.

Personal vehicles of the CONTRACTOR's employees shall not be parked on the traveled way, including any section closed to public traffic. The CONTRACTOR, at all times, shall provide flag person(s) to direct delivery trucks and CONTRACTOR's vehicles entering or leaving the public traffic.

The CONTRACTOR shall notify the City of Petaluma of his/her intent to begin work at least 5 days before work is begun. The CONTRACTOR shall cooperate with local

authorities relative to handling traffic through the area and shall make his/her own arrangements relative to keeping the working area clear of parked vehicles.

Whenever vehicles or equipment are parked on the shoulder within 6 feet of a traffic lane, the shoulder area shall be closed with fluorescent traffic cones or portable delineators placed on a taper in advance of the parked vehicles or equipment and along the edge of the pavement at 25-foot intervals to a point not less than 25 feet past the last vehicle or piece of equipment. A minimum of 9 cones or portable delineators shall be used for the taper. A C23 (Road Work Ahead) or C24 (Shoulder Work Ahead) sign shall be mounted on a telescoping flag tree with flags. The flag tree shall be placed where directed by the ENGINEER.

A minimum of one (paved) reversible traffic lane, not less than 10 feet wide, shall be open for use by public traffic in with minimal delays, flaggers, adequate traffic control, and signing. ***Flashing arrow boards shall be required for any lane closures.***

Day work: No work and/or preparation of work shall be performed between 5:00 p.m. and 7:00 a.m. unless approved by the ENGINEER in writing, except work required under said Sections 7-1.03 and 7-1.04 of the Standard Specifications or specified elsewhere in the special provisions.

Night work: No work and/or preparation of work shall be performed between 5:00 a.m. and 10:00 p.m. unless approved by the ENGINEER in writing, except work required under said Sections 7-1.03 and 7-1.04 of the Standard Specifications or specified elsewhere in the special provisions.

Except as otherwise provided, the full width of the traveled way shall be open for use by public traffic on Saturdays, Sundays, after 5:00 p.m. on Fridays, on designated legal holidays, during the holiday shutdown period (in applicable areas), and when construction operations are not actively in progress.

Designated legal holidays and the holiday shutdown period are outlined in “Hours of Work” of these Special Provisions.

Minor deviations from the requirements of this section concerning hours of work which do not significantly change the cost of the work may be permitted upon the written request of the CONTRACTOR if in the opinion of the ENGINEER public traffic will be better served and the work expedited. Such deviations shall not be adopted until the ENGINEER has indicated his/her written approval. All other modifications will be made by contract change order.

Ten (10) working days prior to commencing construction which will affect existing traffic, the contractor shall submit for review by the Engineer, a Traffic Control Plan on 11”x17” or 22”x34” sheet(s) of paper which contains only information specially related to work zone traffic control. If the Contractor proposes to use the latest edition of California Department of Transportation Manual of Traffic Controls for Construction and Maintenance of Work Zones in lieu of a traffic control plan, in specific work operations, he/she shall submit in writing for consideration which Typical Application Diagram will

be used for each work operation. No work shall commence on Public / County / State right of way until a traffic control plan is approved and implemented.

In addition to the traffic control plan, the Contractor shall submit a haul route for approval by the Engineer. The route must minimize traffic on residential streets that are not part of the project. Temporary staging of construction materials shall not occur on streets or areas that are not within the immediate limits of the project.

The 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 acknowledgement by the City.

The content of the Traffic Control Plan shall include, but not limited to, the following:

- A. Show location and limits of the work zone for each phase or specific operation of construction if requiring different traffic control.
- B. Give dimensions of lanes affected by traffic control that will be open to traffic.
- C. Indicate signing with ca MUTCD designation, cone placement (including spacing), changeable message signs, flashing arrow boards, pavement markings, and other methods of delineation and reference to appropriate standards and sign designations.
- D. Dimension location of signs and cone tapers.
- E. Location of any and all flagmen, if applicable.
- F. Identify side streets and driveways affected by construction and show how they will be handled.
- G. Show how pedestrian and bicycle traffic will be handled through the construction site during all hours including edge grinding operation.
- H. Show locations of night time lighting if applicable.
- I. Modification to Traffic Signal operations in the vicinity of the project. Contractor shall be responsible for making arrangements with the City's Traffic Signal Technician at least 48 hours in advance before starting any work in or nearby a signalized intersection if any signal operations need to be modified.
- J. Separate Traffic Control Plans shall be prepared for each phase of a construction project and shall be submitted for City's review and approval.

No work except for installation of project identification signs will be allowed to commence prior to approval of the Traffic Control Plan.

Residents, businesses, delivery to businesses, and customer parking shall be notified in writing by the Contractor at least five (5) calendar days prior to any activity that will impact access to their property.

The City of Petaluma Traffic Control Design and Construction Standards (Series 700) shown elsewhere in these specifications are guidelines only. The CONTRACTOR is not relieved from his/her responsibility for submitting his/her own traffic control plan.

The CONTRACTOR's failure to comply with the requirements of this section will be sufficient cause for the ENGINEER to suspend work at no cost to the City.

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

- 3-8. TRAFFIC CONTROL SYSTEM FOR LANE CLOSURE - A traffic control system shall consist of closing traffic lanes in accordance with the details shown on the plans, the City of Petaluma Traffic Control Design and Construction Standards Series 700, the provisions of Section 12, "Temporary Traffic Control", of the Standard Specifications, and the provisions under "Maintaining Traffic" elsewhere in these supplementary general conditions.

The provisions in this section will not relieve the CONTRACTOR from his/her responsibility to provide such additional devices or take such measures as may be necessary to comply with the provisions in Section 7-1.04, "Public Safety", of the Standard Specifications.

During the hours of darkness, as defined in Division 1, Section 280, of the Vehicle Code, portable signs shown on the plans to be illuminated shall be, at the option of the CONTRACTOR, either; illuminated signs in conformance with the provisions in Section 12-3.06B(3), "Portable Signs", of the Standard Specifications; or Reflexite vinyl microprism reflective sheeting signs; or 3M high intensity reflectorized sheeting on aluminum substrate signs or Seibulite Brand Ultralite Grade Series, encapsulated lens retroreflective sheeting signs; or equal.

Each vehicle used to place, maintain and remove components of a traffic control system on arterials and collectors shall be equipped with a Type II flashing arrow sign which shall be in operation when the vehicle is being used for placing, maintaining, or removing said components. The sign shall be controllable by the operator of the vehicle while the vehicle is in motion. The flashing arrow sign shown on the plans shall not be used on the vehicles which are doing the placing, maintaining and removing of components of a traffic control system, and shall be in place before a lane closure requiring its use is completed.

If any component in the traffic control system is displaced, or ceases to operate or function as specified, from any cause, during the progress of the work, the CONTRACTOR shall immediately repair said component to its original condition or replace said component and shall restore the component to its original location.

When lane closures are made for work periods only, at the end of each work period, all components of the traffic control system, except portable delineators placed along open trenches or excavation adjacent to the traveled way shall be removed from the traveled way and shoulder. If the CONTRACTOR so elects, said components may be stored at selected central locations, approved by the ENGINEER, within the limits of the City right-of-way.

When traffic is shifted across the centerline, the CONTRACTOR shall provide W57 signs at 300-foot intervals and on both sides of intersections to direct traffic in proper lanes. Flashing arrow boards shall be required for any lane closures on any streets.

The adjustment provisions in Section 4-1.05, "Changes and Extra Work", of the Standard Specifications, shall not apply to the item of traffic control system. Adjustments in compensation for traffic control system will be made only for increased or decreased traffic control system required by changes ordered by the ENGINEER and will be made on the basis of the cost of the increased or decreased traffic control necessary. Such adjustment will be made on a force account basis as provided in Section 9-1.04, "Force Account", of the Standard Specifications for increased work, and estimated on the same basis in the case of decreased work.

Traffic control system required by work which is classed as extra work, as provided in Section 4-1.05 of the Standard Specifications, will be paid for as a part of said extra work.

The contract lump sum price paid for "Traffic Control System" shall include full compensation for furnishing all labor (including flagging costs), materials, signs, tools, equipment and incidentals, and for doing all the work involved in furnishing, placing, operating, maintaining, repairing, replacing, changing messages on a **FOUR** changeable message signs as requested by the Engineer, moving and removing the components of the traffic control system as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer.

- 3-9. SMART ROW – Contract will be responsible for obtaining a right of entry permit for work within SMART right of way. Application for entry permit can be obtained at the link below:

<https://www.sonomamarintrain.org/sites/default/files/Property%20Management/Right%20of%20Entry%20Application%202021.pdf>

Contractor is responsible for reviewing SMART conditions and requirements for work within their right of way.

Entry form shall be completed and submitted to SMART ROW Access Coordinator, ROWAccessPermit@sonomamarintrain.org, via email a minimum of 72 hours prior to planned work within the right of way.

- 3-10. TREE REMOVAL AND TREE PROTECTION – Contractor to supply a city approved arborist and their associated cost as a part of all other improvements. See below for City recommended arborist and their contact information.
- Jeff Bart,

Work within City right of way shall be performed in accordance with City encroachment permit. All trees proposed to be removed shall not be replaced with this project.

3-11. 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 so used with a City furnished meter (a deposit will be required) and a CONTRACTOR furnished valve assembly.

3-12. 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.

3-13. 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.

- 3-14. 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.

- 3-15. 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.

- 3-16. 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.

- 3-17. 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.
- 3-18. 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.

3-19. 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 – Other than emergency work, there will be no night hours allowed on this project.

Liquidated Damages in the sum of Fifteen 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 25th thru January 3rd of the following year.

- 3-20. 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.

- 3-21. 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.

- 3-22. 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.

- 3-23. ACCESS TO DRIVEWAYS – All accesses for local businesses and residents shall be maintained at all times. Temporary ramps will be required each night for access to driveways for residences and commercial access. The Contractor shall coordinate with each driveway user as needed.
- 3-24. 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.
- 3-25. STORM WATER MANAGEMENT, AND SEDIMENT AND EROSION CONTROL – CONTRACTOR shall prepare storm water management, and sediment and erosion control measures for implementation and shall maintain these measures during the construction period.

If the area to be disturbed by construction activities is more than one acre, the CONTRACTOR shall be required to file a Notice of Intention (NOI), pay the fee, prepare the SWPPP, BMP, etc. as required by RWQCB permit.

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. Measures shall be submitted to the ENGINEER for review seven (7) days prior to start of construction. The

CONTRACTOR shall be responsible for providing the measures that would comply with the RWQCB.

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.

If required, the CONTRACTOR shall file a Notice of Intent (NOI) with the RWQCB, and shall comply with the National Pollution Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Association with Construction Activity requirements. The CONTRACTOR shall prepare and implement a Storm Water Pollution Plan (SWPPP). Resources used in developing the SWPPP shall include the "California Storm Water Best Management Practice Handbook for Construction Activity," and the San Francisco Bay Regional Water Quality Control Board's "Information on Erosion and Sediment Controls for Construction Projects." The SWPPP shall be submitted for review and acceptance prior to start of work. The CONTRACTOR shall have an accepted and implemented SWPPP as part of Mobilization. The SWPPP shall, at a minimum, include Best Management Practices (BMPs), acceptable to the City, to address the following:

1. Housekeeping
2. Waste Containment and Control.
3. Minimizing Disturbed Areas.
4. Stabilize Disturbed Areas.
5. Protect Slopes and Channels.
6. Control Site Perimeter.
7. Control of Internal Erosion.
8. Disposal of Storm Water and Ground Water
9. Sediment Control.
10. Liquid Waste Management.
11. Concrete Waste Management.
12. Hazardous Waste Management.
13. Employee and SUBCONTRACTOR Training.

14. Vehicle and Equipment Fueling and Maintenance.

15. Spill Prevention and Control.

16. Contaminated Soil Management.

17. Sawcutting.

18. Paving and Asphalt Work.

19. Street Cleaning.

Employ and utilize environmental protection methods, obtain all necessary permits, and fully observe all local, state, and federal regulations.

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

3-26. 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 50 percent or less for increases and 50 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 50 percent for increases and 50 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 50 Percent

Should the total pay quantity of any item of work required under the contract exceed the ENGINEER's Estimate therefore by more than 50 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 50 Percent

Should the total pay quantity of any item of work required under the contract be less than 50 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 50 percent of the ENGINEER's Estimate of the quantity for the item at the original contract unit price.

- 3-27. 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.

Prior to placement of paving, all manholes, monuments, and valves covered by paving, shall be clearly marked in white paint before the close of that work day. 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.

- 3-28. 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.

- 3-29. INSTRUCTIONS TO BIDDERS -Section 17, “Award of Contract” of the Instruction to Bidders is amended to read:

The award of contract shall be based on the lowest Bid. However, the Contractor shall submit a bid for each add alternate section. The City reserves the right to award, to the lowest responsive bidder, the combination of base bid plus add alternate sections that will allow the most work to be completed within the City’s budget.

- 3-30. STAGING AREA – It is the responsibility of the Contractor to provide a staging area for equipment and materials. The site and hauling route shall be submitted to the City for approval prior to the commencement of work. The Contractor shall obtain written confirmation from property owners for use of the site.

SECTION IV
TECHNICAL SPECIFICATIONS

10-1 RECTANGULAR RAPID FLASH BEACONS

10-1.1 GENERAL

This section includes general specifications for installing Rectangular Rapid Flash Beacons in the City of Petaluma at these locations.

1. North McDowell Boulevard south of Scott Street, Sta 24+00.
2. North McDowell Boulevard south of Clegg Street, Sta 37+00.

Rectangular Rapid Flash Beacons include:

1. Foundations
2. Standards
3. Accessible pedestrian signals
4. Solar-powered Rectangular Rapid Flash Beacons (RRFBs)

The components of signal and lighting (City) are shown on project plans sheets LY-5, LY-7, and CD-5, specifically:

1. North McDowell Boulevard south of Scott Street, Sta 24+00:
 - a. four solar-powered, wireless RRFB on new Type 1-A with APS
 - b. two solar-powered, wireless RRFB on new Type 1-A without APS (advance beacons).
2. North McDowell Boulevard south of Clegg Street, Sta 37+00:
 - a. Three solar-powered, wireless RRFB on new Type 1-A with APS.
 - b. Two solar-powered, wireless RRFB on new Type 1-A without APS (advance beacons).
 - c. One AC-powered, wireless RRFB on an existing Type 15 lighting standard with connection to street light service with APS

10-1.2 SUBMITTALS

Equipment

Within 15 days after Contract approval, submit a list of equipment and materials you propose to install.

Submit the list before shipping equipment and materials to the job site. The list must include:

1. Manufacturer's name
2. Make and model number
3. Month and year of manufacture
4. Lot and serial numbers
5. Contract number
6. Your contact information

Submit the manufacturer's replacement warranty documentation.

Submit a certificate of compliance and the manufacturer's QC test data for the light bar, solar panel system, battery system, radio system and APS as an informational submittal.

Submit detailed solar simulations as evidence that the RRFB is capable of the claimed performance at a specific location. Solar Simulations shall be composed of three calculations: Energy Balance, Array-to-Load Ratio (ALR), and Autonomy. The manufacturer or bidder shall provide a detailed analysis of these three calculations in an "Energy Balance Report".

As-Builts

Submit a set of As-built drawings within 30 days of installation as one PDF file.

10-1.3 MATERIALS

RRFB Solar Engine

The solar engine shall be constructed from aluminum with an integrated solar panel. All batteries and electronics shall be mounted in the solar engine, with no external control cabinet or battery cabinet required.

The solar engine shall not exceed 15" in height from bottom of adapter fitting to top of solar panel. The depth of the solar engine shall not exceed 4".

The overall weight of the solar engine assembly (including two batteries but not including light bars or pushbutton) shall not exceed 20 lbs. (9.1 kg).

The solar engine shall be supplied with a fixed tilt angle of 45 degrees and shall be able to be oriented toward the equator with no additional mounting hardware.

Access to the interior of the solar engine shall be provided by a lid that is hinged on the bottom edge and is fitted with a foam gasket. The lid shall have a lockable latch.

The solar engine shall be vented to provide cooling of the battery and electronic system. The vents shall be screened to prevent ingress by insects and debris.

Fasteners shall be stainless steel.

The solar engine shall have the capacity to provide 300 20-second activations per day year-round using the applicable peak sun hours insolation available at the installation location. Refer to Section 8. Solar Simulations for details on insolation data sources.

The controller shall be able to support up to 1.4 amps combined current through the RRFB fixtures simultaneously.

RRFB AC-Powered Cabinet

The control cabinet shall be constructed from aluminum with a lockable industry standard #2 lock and tamper-proof hinged door. No other external control cabinet shall be required. The control cabinet shall be vented to provide air circulation and cooling of the electronic system. The vents shall be screened to prevent ingress by insects and debris.

The overall weight of the control cabinet shall not exceed 90lbs (41 kg) and shall have the approximate dimensions: 24" H x 16" W x 8" D (61cm H x 41cm W x 21 cm D).

Fasteners shall be stainless steel.

RRFB Light Bars

The light bars shall be current-driven LED strings without active electronics. The LEDs shall be driven by pulse-width modulated fixed current.

The light bar housing shall be constructed from aluminum and shall have the approximate dimensions: 24" L x 1.5" D x 4.5" H (61.0 cm L x 3.8 cm D x 11.4 cm H).

Each light bar shall conform to all provisions of the MUTCD and FHWA requirements.

Each of the two modules in a light bar shall have 8 LEDs and shall be purpose-built by the manufacturer of the RRFB including the optics.

Each end of a light bar shall include a side-emitting pedestrian confirmation light composed of a single LED. Users shall have the option of using both confirmation lights for median applications, or covering one confirmation light with an included sticker for side-of-road applications.

The light bar shall be mounted to the post or pole using a separate bracket assembly to facilitate mounting two light bars back-to-back (bi-directional) and to allow the light bar(s) to rotate horizontally for aiming.

The light bar bracket shall be constructed from galvanized or stainless steel and shall have both banding and bolting mounting options and shall be able to be mounted to all specified pole types.

The light bar assembly shall open for access to the wiring connections for the LED modules. LED modules shall be rated to NEMA 3R.

The RRFB shall meet the minimum photometric specifications of the Society of Automotive Engineers (SAE) standard J595 Class I dated January 2005. A photometric report by a certified third-party testing laboratory shall be provided to demonstrate compliance with J595.

The color of the yellow light bar indications shall meet the specifications of SAE standard J578 (Color Specification) dated December 2006.

The system shall use a dedicated light sensor to detect night and day states and apply any optionally-enabled intensity adjustments.

RRFB Mounting

Mounting adapter hardware for the RRFB and cabinet shall be available for 4" – 4.5" round poles. Side-of-Pole mounting shall offer strapping as standard with an option for Z-bar and U-bolts.

Mounting configurations shall not require specialized tools.

RRFB Solar Panel System

The solar engine shall include one 18V nominal solar panel rated between 10 and 15 watts with bypass diode. The solar panel shall be no larger than the footprint of the solar engine enclosure.

Electrical connections on the back of the solar panel shall be contained with an enclosure that prevents accidental contact with either of the power leads.

The solar charging system shall use maximum power point tracking (MPPT).

RRFB Battery System

The solar engine shall house two 7 amp-hour 12V nominal sealed valve-regulated AGM lead-acid maintenance-free batteries. Each battery shall be equipped with a 1.5 amp fast-blow barrel fuse on the positive lead.

The battery charging system shall be 3-stage and incorporate temperature-compensation to prevent battery overcharging in hot weather.

Batteries, in conjunction with recommended RRFB performance, shall be designed for a demonstrable service life of 5 years.

The battery shall be rated for -40° to 140°F (-40° to 60°C).

Batteries shall have quick connections to facilitate installation and be readily available from multiple suppliers and non-proprietary.

Batteries shall be supported by rubber bumpers and be secured in place with straps.

RRFB Radio System

The radio system shall operate at 2.4GHz

Upon detection of a pushbutton press, an RRFB will broadcast an activation to all other nearby RRFBs sharing the same channel.

The RRFB shall have the capability to activate other RRFBs by wireless communications within 1,000 feet (304 meters).

The RRFB shall have a minimum of 14 unique channels that can be configured on-site to avoid inadvertent activation of nearby systems.

The antenna shall be a low-profile “button” shape that cannot be bent or broken by vandals

RRFB Accessible Pedestrian Signal

The pedestrian push buttons shall have an LED indicator with audible tone with Piezo control and shall be ADA compliant. The RRFB shall be capable of operating with either 1 or 2 pushbuttons.

APS shall be wired to the nearest RRFB system. Pushbutton wiring harnesses shall be included.

Signs and Plaques

All signs shall conform to CA-MUTCD standards. All signs shall be fluorescent yellow-green.

All sign blanks and plaques shall be Federally specified .080 gauge, 5052 aluminum.

Unless specified otherwise, sign sheeting shall be 3M™ DG3 diamond grade cubed or equivalent prismatic sheeting, with anti-graffiti overlay.

All sign assemblies shall use provided anti-vandal fasteners and tools to mount components to sign, and sign to fixture.

Crossing signs shall be W11-2 per CA-MUTCD (two per Double-Sided RRFB Assemblies)

Crossing plaques W16-7P shall also accompany the crossing signs. Crossing plaques W16-9P (“AHEAD”) shall also accompany the advance crossing signs.

R10-25 Pedestrian pushbutton instruction signs shall be installed per PPB as indicated on the plans. PPB instruction sign shall be furnished, at a minimum size of 5" x 7", to be mounted adjacent to or integral with each pedestrian pushbutton.

Standards, Poles, Pedestals, and Posts

New RRFB poles shall conform to Caltrans Revised Standard Plan ES-7B, Type 1-A Standard Detail A-1. New RRFB pole foundations shall conform to Caltrans Standard Plan ES-7N, Detail A.

10-1.4 QUALITY CONTROL

General

The RRFB solar engine and light bars shall be rated to a minimum of NEMA 3R.

The RRFB shall be FCC certified to comply with all 47 CFR FCC Part 15 Subpart B Emission requirements.

The RRFB shall be manufactured in the USA and shall be Buy American compliant.

The Manufacturer shall be ISO 9001 certified.

Warranty

Manufacturer shall provide a 5-Year Limited Warranty for the RRFB systems, with the exception of the batteries which shall be covered by a 1-year warranty.

10-1.5 CONSTRUCTION

General

Notify the City of Petaluma at (707) 778-4303 at least 5 business days before starting work for a field marking of all city electrical facilities.

Contractor shall field verify with the City's Representative the proposed locations of all poles, pull boxes, push buttons, signs and beacons prior to final installation.

Contractor shall test the complete installation in the presence of City's Representative upon completion of the project, including tests for light distribution, controls, unintentional grounds, proper grounding, and bonding, circuit continuity.

Each RRFB indication will be mounted horizontally to a standard 4" diameter aluminum pedestal, either a Type 1A pole (Per Caltrans Standard Plan RSP ES-7B) or an existing electrolier, in accordance with the plans.

RRFB System

The solar engine (solar-powered only) or RRFB cabinet (AC-powered only) shall house an auto-scrolling LED on-board user interface that provides on-site configuration adjustment, system status and fault notification.

The user interface shall provide a display of four (4) alphanumeric characters and three (3) control buttons to navigate and change settings and activate functions.

When editing the configuration, the user interface will flash the display indicating it is ready to accept editing and will flash the display rapidly 3 times to indicate the setting change has been accepted.

The flash duration shall be adjustable in-the-field from 5 to 60 seconds in one second increments, 60 to 1,200 seconds in 60-second steps, and 3,600 seconds.

Flash duration shall be calculated as the crossing width (ft) divided by 3.5 (ft/s) plus 4 seconds warning time. The timing shall be confirmed by the City Engineer for each location.

The system shall provide configurable nighttime intensity settings ranging from 10% to 100% of daytime intensity.

The system shall be capable of enabling or disabling ambient brightness auto-adjustment. This feature allows the system to provide optimal output brightness in relation to ambient light levels while always maintaining adherence to SAE J595 Class I specifications. If enabled, the ambient brightness auto-adjustment shall adjust output to a range between 50% and 100% of daytime intensity.

The User Interface shall provide viewing and/or programming access for the following:

- Activation Duration (5 to 60, 60 to 1200, or 3600 seconds)

- Digital output that is active during the flashing cycle that allows the control of external devices such as crosswalk illumination. Digital output shall be configurable for night operation only or operation day or night
- Radio Channel (Choice of 1 to 14)
- Radio Status
- Night Intensity Setting
- Adjustment for Ambient Daytime Brightness
- Self-Test / BIST (Built-In Self-Test) including the detection of shorts or open circuits in the fixture outputs
- Battery Status – General description and actual battery voltage
- Day or Night Status (as determined by dedicated photosensor not solar panel output)
- Solar Panel Voltage
- Automatic Light Control. If this safety feature is enabled, it allows the RRFB to temporarily reduce the intensity of the light bars to maintain energy equilibrium. The user interface shall report the amount of dimming being applied in the range of 10% to 100%
- Daily activations averaged over 90 days
- Pushbutton detection
- Firmware Version number

Activation duration, Night intensity setting and adjustment for ambient daytime brightness shall be automatically broadcast to all RRFBs in the system when changed in one RRFB.

RRFB Accessible Pedestrian Signals

A manufacturer's representative must program the accessible pedestrian signals at the RRFB locations:

Audible message should say: “Yellow lights are flashing to cross North McDowell Boulevard.” Message should be spoken twice.

All RRFBs in the system shall initiate activation simultaneously within 150ms of activation.

If an additional activation occurs while the system is activated, the flash duration shall reset. For example, with the flash duration set to 20 seconds, if an additional activation occurs after the RRFB has been activated for 15 seconds the RRFB will continue for an additional 20 seconds, or 35 seconds in total.

If the RRFB has ceased its flashing cycle, any subsequent activation shall activate the RRFB immediately regardless of how recently the RRFB ceased operation.

Standards, Poles, Pedestals, and Posts

Construct foundations for posts according to Caltrans Standard Specifications section 56-3 and 87-1.3E(3).

Testing

Contractor shall test the complete installation in the presence of Engineer upon completion of the project, including tests for light distribution, controls, unintentional grounds, proper grounding, bonding, circuit continuity, wireless connectivity, and synchronization of the components of the RRFB system.

The functional test for the beacon system shall consist of not less than 14 days. If unsatisfactory performance of the system develops, the conditions shall be corrected and the test shall be repeated until the 14 days of continuous, satisfactory operation is obtained.

10-1.6 PAYMENT

The contract **lump sum (LS)** price paid for

1. Flashing Beacon System (RRFB), North McDowell Boulevard south of Scott Street, Sta 24+00
2. Flashing Beacon System (RRFB), North McDowell Boulevard south of Clegg Street, Sta 37+00

shall include full compensation for installing the poles, assemblies, push buttons, and any other component necessary for a complete and functioning system as specified herein, as shown on the plans, and as directed by the Engineer.

Full compensation for fulfilling all requirements specified in this section shall be considered as included in the various Contract items of work and no additional compensation will be allowed therefor.

10-2 TRAFFIC SIGNAL AND LIGHTING SYSTEM

10-2.1 GENERAL

This section includes specifications for constructing the following work on North McDowell Boulevard:

1. STA 01+25 (Old Redwood Highway), removing and relocating an existing APS onto an existing lighting standard, and reconnecting APS to the signal controller.
2. STA 83+00 (Southpoint Boulevard), removing and relocating one existing signal mast arm pole and one existing Type 1 pole, including traffic signals and luminaires, onto new pole foundations, and reconnecting signals to the signal controller.
3. STA 85+25 (75 feet west of Palo Verde Way), removing an existing electrical pull box, replacing with a new electrical pull box in a new location, and reconnecting to street light service.
4. STA 89+00 (Palo Verde Way), removing and relocating one existing lighting standard onto a new foundation, modifying existing pull box, and reconnecting to street light service.
5. STA 93+30 (120 feet west of Sunrise Parkway), removing and relocating one existing lighting standard onto a new foundation; removing an existing electrical pull box, replacing with a new electrical pull box in a new location, and reconnecting to street light service.
6. STA 94+50 (Sunrise Parkway), removing and relocating one existing pedestrian push button (PPB) post onto a new foundation; removing an existing electrical pull box, replacing with a new electrical pull box in a new location, and reconnecting the PPB to the beacon (RRFB) system.

10-2.2 SUBMITTALS

Within 15 days after Contract approval, submit a list of equipment and materials you propose to install.

Submit the list before shipping equipment and materials to the job site. The list must include:

1. Manufacturer's name
2. Make and model number
3. Month and year of manufacture
4. Lot and serial numbers
5. Contract number
6. Your contact information

Submit the manufacturer's replacement warranty documentation and QC test data for the following items as an informational submittal consistent with the State Specifications Section 86-1.1C(2-10):

1. Non-traffic rated pull boxes
2. Traffic rated pull boxes

10-2.3 MATERIALS

Pull Boxes

Pull boxes shall conform to the provisions in Section 86-1.02C “Pull Boxes”, Section 87- 1.03C “Installation of Pull Boxes”, Revised Standard Plans ES-8A and these Special Provisions for TRAFFIC pull boxes.

Pull boxes and covers in the sidewalk or behind the curb shall be composite, Christy “Fiberlite”, Armorcast polymer concrete or Engineer Approved equivalent, unless, otherwise noted on the Plans.

The cover markings for each pull box shall read “TRAFFIC SIGNAL” on one line or “STREET LIGHTING” as indicated in the plans.

Pull boxes listed in the plans include No. 5 and No. 6 as noted in the plans. Pull box sizes shall match nominal sizes listed on State Revised Standard Plans ES-8A.

Conduit

Conduit installed between a pull box and a pole foundation shall be Type 1 hot dip galvanized rigid steel with a zinc coating.

Conductors and Wiring

Conductors and wiring shall conform with Section 86-1.02F of the State Specifications.

Signal conductors shall be copper. Conductor identification for the various signal phases shall match Section 86-1.0f(2)(a) of the latest State Specifications.

Splicing Materials

Splicing materials shall conform with Section 86-1.02H of the State Specifications.

Connectors and Terminals

Connectors and terminals shall conform with Section 86-1.02I of the State Specifications.

10-2.4 SCHEDULE OF VALUES

The Contractor shall furnish to the Engineer a Schedule of Values for the Traffic Signal and Lighting System contract lump sum item of work described in this Section. Quantities required to complete the work shown on the plans are provided to the Contractor. The Contractor shall verify and is responsible for the accuracy of the quantities and values used in the schedule of values submitted for approval. The Schedule of Values shall be submitted within 15 working days following issuance of the Notice to Proceed (NTP), and at least 15 working days prior to the proposed start of on-site work, for review and approval by the Engineer.

No adjustment in compensation will be made in the contract lump sum prices paid for the various Traffic Signal and Lighting System work due to any differences between the quantities shown in the schedule of values furnished by the Contractor and the quantities required to complete the work as shown on the plans and as specified in these special provisions.

The sum of the amounts for the units of work listed in the schedule of values for the electrical, shall be equal to the contract lump sum price bid for the work. Overhead, profit, bond premium, temporary construction facilities, plant and other items shall be included in each individual unit listed in the schedule of values; however, costs for traffic control system shall not be included.

The schedule of values shall be approved, in writing, by the Engineer before any partial payment for the items of electrical work will be made. At the Engineer's discretion, the approved schedule of values may be used to determine partial payments during the progress of the work and as the basis of calculating the adjustment in compensation for the item or items of electrical work due to changes ordered by the Engineer. When an ordered change increases or decreases the quantities of an approved schedule of values, the adjustment in compensation may be determined at the Engineer's discretion in the same manner specified for increases and decreases in the quantity of a contract item of work in accordance with Section 4 1.03B, "Increased or Decreased Quantities," of the State Specifications.

The schedule of values shall, as a minimum, include the items listed in the table below:

#	Description	Qty	Unit	Unit Price
1	Remove and relocate existing APS onto an existing pole. Connect APS to signal controller.	1	EA	
2	Remove traffic signals and luminaire. Remove and relocate signal mast arm pole onto a new pole foundation. Reinstall traffic signals and luminaire and connect to signal controller.	1	EA	
3	Remove traffic signals and luminaire. Remove and relocate Type 1-B pole onto a new pole foundation. Reinstall traffic signals and luminaire and connect to signal controller.	1	EA	
4	Remove street lighting standard and reinstall onto a new pole foundation. Reconnect service to relocated street light.	2	EA	
5	Remove ped push button post and reinstall onto a new PPB pole foundation. Reconnect PPB to RRFB system.	1	EA	
6	Remove existing pull box and install a new No. 5 pull box at new location and/or final grade. Reconnect conductors to existing signal or lighting systems.	5	EA	
7	Remove existing pull box and replace with new No. 5 non-traffic-rated Street Lighting pull box at new final grade.	1	EA	

10-2.5 CONSTRUCTION

General

Contractor shall provide five (5) working days advance notice to the Engineer prior to beginning work on the existing traffic signal controller. Engineer will coordinate signal work with the City of Petaluma traffic engineering department to maintain the existing signals.

Construction methods shall conform with Section 87-1.03A of the State Specifications, as amended below:

The City Traffic Engineer determines the final locations of electrical systems. Verify the locations of electrical systems and the depths of existing detectors, conduits, and pull boxes. Verify the location of proposed signal pole foundations by potholing.

Notify the City Traffic Engineer before performing work on the existing system.

Contractor may shut down the system for alteration or removal with prior notice to the City Traffic Engineer for a previously agreed-upon day, time and duration.

Where an existing underground facility is shown within 10 feet of any excavation, locate and field mark the facility before performing work that could damage or interfere with the existing facility.

If an existing facility is within 2 feet of an excavation, determine the exact location of the facility by excavating with hand tools before using any power-operated or power-driven excavating or boring equipment. A vacuum excavator may be used if authorized.

Notify the City Traffic Engineer immediately if an existing facility is damaged by your activities.

Limit the shutdown of traffic signal systems to normal working hours. Notify the Engineer and the City of Petaluma Police Department before shutting down the signal.

If you work on an existing lighting system and the roadway is to remain open to traffic, ensure the system is in operation by nightfall.

Do not use electrical power from existing highway facilities unless authorized.

Maintain a minimum 48-inch clearance for a pedestrian pathway when placing equipment.

Except for service installation or work on service equipment enclosures, do not work above ground until all materials are on hand to complete the electrical work at each location.

Bond all metal components to form a continuous grounded system as specified in National Electrical Code (NEC).

Ground metallic equipment mounted less than 8 feet above the ground surface on a wood pole.

If you damage any portion of a concrete curb, sidewalk, curb ramp, driveway, or gutter depression, replace the entire section between contraction or expansion joints under section 73.

Perform an operational test of the systems.

Before starting the operational test for systems that impact traffic, the system must be ready for operation, and all signs, pavement delineation, and pavement markings must be in place at that location.

Conduit

Conduit installation shall conform with Section 87-1.03B of the State Specifications. Excavating and backfilling for electrical systems shall conform with Section 87-1.3E of the State Specifications.

If existing underground conduit is to be incorporated into a new system, clean it with a mandrel or cylindrical wire brush and blow it clean with compressed air.

Conduit shall extend 1.5 inches above the bottom of pull boxes.

After conductors have been installed, the ends of conduits terminating in pull boxes and service and controller cabinets shall be sealed with an approved type of sealing compound.

Pull Boxes

Pull box installation shall conform with Section 87-1.03C(1) of the State Specifications. Replace paragraph 3 of Section 87-1.03C(1) with:

Install a pull box on a bed of crushed rock.

Pull boxes shall not be located within sidewalk access ramp areas.

Where new conduit is to be installed into an existing pull box, the Contractor shall remove and dispose of the existing pull box and shall furnish a new pull box of equal or greater size.

Whenever a part of a square or slab of existing sidewalk, curb and gutter, or driveway is broken or damaged, the entire square, section or slab shall be removed and the concrete reconstructed. Payment for backfilling, compaction and sidewalk repair shall be included in the unit cost breakdown for removal of each item.

Conductors and Wiring

Installation for conductors and wiring shall conform to Section 87-1.03F of the State Specifications.

Splices shall be insulated by "Method B" or by heat shrink tubing conforming to the requirements of Section 87-1.03H(2) "Splice Insulation," of the State Specifications.

Foundations

Reinforced cast-in-drilled-hole concrete pile foundations for traffic signal and lighting standards shall conform to the provisions in Section 49 "Piling," Section 56-3 "Standards, Poles, Pedestals, and Posts", and Section 87-1.03E(3) of the State Specifications.

Verify the location of proposed signal pole foundations by potholing.

Material resulting from drilling holes shall be disposed of in conformance with the provisions in Section 87-1.03E, "Excavating and Backfilling," of the State Specifications.

For foundations shown to be abandoned, remove the top of the foundation, anchor bolts and conduits to a one foot below the sidewalk or roadway finished grade. Backfill the resulting hole with material equivalent to the surrounding material.

10-2.6 PAYMENT

Traffic Signal and Lighting System shall be paid on a **lump sum (LS)** basis. The contract unit price paid for this item shall include full compensation for all labor, materials, tools, equipment, and incidentals required to remove and replace accessible pedestrian signals, traffic signal poles, lighting standards, and pull boxes; construct new traffic signal pole foundations and conduits; and connect conductors to the existing traffic signal controllers; as shown on the Plans, as specified in these Technical Specifications, and as directed by the Engineer. Full compensation for all additional materials and labor, not shown on the plans or specified, which are necessary to complete the installation of the various items, shall be considered as included in the prices paid for the items, or units thereof, and no additional compensation will be allowed therefor.

10-3 TRAFFIC SIGNAL INTERCONNECT (SIC) SYSTEM

10-3.1 GENERAL

This section includes specifications for constructing interconnection conduit and cable on North McDowell Boulevard from Old Redwood Highway to Rainier Avenue as shown in the plans.

Interconnection conduit and cable includes:

1. Pull boxes
2. Multicell Conduit
3. Single mode fiber optic cables (SMFOC)
4. Splice enclosures at the SIC termination points (Old Redwood Highway and Rainier Avenue)
5. Fiber optic termination components for vaults and signal cabinets (six locations)
6. Communication data network equipment (six locations)

10-3.2 SUBMITTALS

Within 15 days after Contract approval, submit a list of equipment and materials you propose to install.

Submit the list before shipping equipment and materials to the job site. The list must include:

1. Manufacturer's name
2. Make and model number
3. Month and year of manufacture
4. Lot and serial numbers
5. Contract number
6. Your contact information

Submit the manufacturer's replacement warranty documentation.

10-3.3 MATERIALS

Signal Interconnect Pull Boxes & Splice Vaults

Pull boxes shall conform to the provisions in Section 86-1.02C "Pull Boxes", Section 87- 1.03C "Installation of Pull Boxes", Revised Standard Plans ES-8A and these Special Provisions for TRAFFIC pull boxes.

Pull boxes and covers in the sidewalk or behind the curb shall be composite, Christy "Fiberlite", Armorcast polymer concrete or Engineer Approved equivalent, unless, otherwise noted on the Plans.

Splice vaults shall be Oldcastle Precast MH 4x4x6 or Engineer Approved equivalent. The cover markings for each pull box shall read "TRAFFIC – FIBER" on one line.

Signal Interconnect Conduit

All conduits shall be high-density polyethylene (HDPE) Schedule 80 UL continuous conduit. HDPE conduit shall be designed and engineered for direct burial, directionally drilled installation, or encased underground applications. Conduit shall be Carlon or Endot made or approved equivalent. The HDPE Schedule 80 continuous conduit shall conform to NEMA TC-2 and UL651B.

All conduits shall be new, UL listed and meet NEMA and NEC requirements pertaining to electrical conduits and components. The conduit shall also be marked with data traceable to plant location, date, shift and machine of manufacture. All conduits shall be free from defects including non-circularity, foreign inclusions, etc. It shall be nominally uniform (as commercially practical) in color, density and physical properties.

All interconnect conduits shall have mule tape and a No. 12 AWG bare solid copper tracing wire.

Signal Interconnect Cable

All fiber optic cable shall be Single Mode Fiber Optics (SMFO). Approved cable is Altos Loose Tube All Dielectric GelFree Cables with Binderless FastAccess Technology or approved equal. Trunk fiber optic cable shall be minimum 72 fiber count unless approved by City Engineer. Product code is 024-ZU4- T4F-22-D-20 or approved equal.

Cable installed in runs between splice enclosures and cabinet termination equipment shall be minimum 12 fiber count unless approved by City Engineer. Product code is 012-ZU4-T4F-22-D-20 or approved equal.

Fiber Optic Interconnect Equipment

Termination components for vaults and signal cabinets are listed in Table 1 below.

Table 1: Cabinet and Vault Fiber Termination Components

Description	Manufacturer	Model
Splice Closures	Corning	SCF-4C18-01
Splice Closures Splice Tray	Corning	SCF-ST-099
Splice Housing	Corning	
Splice Trays	Corning	M67-48
Cabinet Termination	Corning	CCH-01U
24 Port Patch Panel with MTP Adapter	Corning	CCHE-CP72-89
6 Port Panel	Corning	CCH-CP12-A9
Fiber Distribution Unit	Corning	CCS-01U
Splice Cassette	Corning	CCH-CS12-A9-P00RE
Jumpers	Generic	2M Duplex LC to SC
Connectors	Generic	LC

10-3.4 SCHEDULE OF VALUES

The Contractor shall furnish to the Engineer a Schedule of Values for the Traffic Signal Interconnect (SIC) contract lump sum item of work described in this Section. Quantities required to complete the work shown on the plans are provided to the Contractor. The Contractor shall verify and is responsible for the accuracy of the quantities and values used in the schedule of values submitted for approval. The Schedule of Values shall be submitted within 15 working days following issuance of the Notice to Proceed (NTP), and at least 15 working days prior to the proposed start of on-site work, for review and approval by the Engineer.

No adjustment in compensation will be made in the contract lump sum prices paid for the various SIC work due to any differences between the quantities shown in the schedule of values furnished by the Contractor and the quantities required to complete the work as shown on the plans and as specified in these special provisions.

The sum of the amounts for the units of work listed in the schedule of values for the SIC, shall be equal to the contract lump sum price bid for the work. Overhead, profit, bond premium, temporary construction facilities, plant and other items shall be included in each individual unit listed in the schedule of values; however, costs for traffic control system shall not be included.

The schedule of values shall be approved, in writing, by the Engineer before any partial payment for the items of electrical work will be made. At the Engineer's discretion, the approved schedule of values may be used to determine partial payments during the progress of the work and as the basis of calculating the adjustment in compensation for the item or items of electrical work due to changes ordered by the Engineer. When an ordered change increases or decreases the quantities of an approved schedule of values, the adjustment in compensation may be determined at the Engineer's discretion in the same manner specified for increases and decreases in the quantity of a contract item of work in accordance with Section 4 1.03B, "Increased or Decreased Quantities," of the State Specifications.

The schedule of values shall, as a minimum, include the items listed in the table below:

#	Description	Qty	Unit	Unit Price
1	Install No. 6 pull box	27	EA	
2	Install No. 6E pull box with splice enclosure.	4	EA	
2	Install splice vault with splice enclosure.	4	EA	
3	Install fiber optic interconnect equipment and connect SIC to signal controller.	6	EA	
4	Install 3" PVC Schedule 80 conduit using directional bore.	12,000	LF	
5	Install Single Mode Fiber Optics Cable 72 fiber count.	13,000	LF	

10-3.5 CONSTRUCTION

Pull Boxes & Splice Vaults

All pull boxes shall be installed at the locations shown on the Plans or as directed by the Engineer. However, these locations maybe changed to suit field conditions as directed or approved by the Engineer. Boxes shall be installed between 300 feet (minimum) and 600 feet (maximum) apart unless geographical or site conditions necessitate a shorter run.

SIC conduit shall be installed in pull boxes using 45-degree, UL approved elbows. These elbows shall be placed as far apart in the pull box as possible, oriented in the direction of the cable, and offset to one side to facilitate cable pulling and coiling.

Approximately 50 feet of SIC slack shall be coiled inside of each splice box (12 and 72 SMFOC).

Approximately 50 feet of SIC slack shall be coiled on either side of the splice enclosure where present.

Approximately 20 feet of SIC slack shall be coiled inside of each pull box.

Approximately 20 feet of SIC slack shall be coiled inside each controller cabinet

No pull box shall be located on the driveway apron or above catch basin or within one (1) foot of any existing, proposed or future (as shown on plans) wheelchair ramp or within one (1) foot from the curb in case of street without gutter or within thirty (30) inches from any pole foundation or other locations which may interfere with the movement of people or vehicles, unless approved by the Engineer.

The conduit shall also be placed in a manner to allow the cable/wire to be pulled in a straight line and clear the side of the pull box by at least two (2) inches.

If new pull boxes are replacing existing pull boxes or intercepting existing conduits, the Contractor shall make modifications to conduit entering pull box including the modification of conduit ends to support the cable and/or the replacement of elbows with sweeps, without causing any damage to the existing conduit and cables. Should the existing conduit or cable become damaged, the conduit or cable shall be replaced at no cost to the City.

Whenever installation of new pull boxes damages a part of a square or slab of existing sidewalk, curb and gutter, or driveway, the entire square, section or slab shall be removed and the concrete reconstructed. Payment for backfilling, compaction and sidewalk repair shall be included in the unit cost breakdown for each new pull box. Any existing features or improvements damaged during installation shall be replaced in kind without cost to the City. Prior to replacement, the City or the Engineer shall be notified of exact location and shall be provided with a detailed description of the damage. No additional compensation will be allowed for replacement.

Signal Interconnect Conduit

All conduits shall be installed by directional drilling method except for exposed installation or as directed by the Engineer. The method of installation shall be determined by the Engineer to suit

the existing field conditions. Drilling pits shall be kept at least two (2) feet clear of the edge of any type of pavement wherever possible.

Install conduit to a depth of not less than 30 inches below finished grade, except in sidewalk and curbed paved median areas, where it must be at least 18 inches below grade.

Make right angle bends in conduit runs with long-radius elbows or conduits bent to radii not less than three (3) feet unless otherwise set forth elsewhere in this Special Provision or as directed by the Engineer. The sum of the angles for conduit bends between two consecutive pull boxes shall not exceed 270 degrees. All conduit bends shall be factory bends done by the manufacturer. Hot box or other field bends will not be accepted. The bell and spigot ends of each PVC conduit shall be chamfered by the manufacturer. Transition of the conduit without bends shall not exceed more than one foot for every ten feet.

Make bends and offsets so that the inside diameter of conduit is not effectively reduced. Unless otherwise indicated, keep the legs of a bend in the same plane and the straight legs of offsets parallel.

Do not use diagonal runs except when specifically noted in the drawings.

Provide waterproof label on each end of the pull wire to indicate the destination of the other end. Except for pull boxes with extensions, conduit shall enter the pull box at not more than a 45-degree angle. In addition, conduit may not be terminated less than 45 degrees to the ground level, except for pull boxes with extension. Conduit ends shall be terminated three inches above the gravel surface (bottom of pull box) and nine (9) inches clearance between the top of the bushing and the top of the pull box shall be provided.

For pull boxes with extensions or vaults, conduit shall enter the side of the pull box or vault at not more than a 15-degree angle. Conduit ends shall be terminated no more than three (3) inches inside the pull box or vault at height of 12 inches above the gravel surface (bottom of pull box) and twelve (12) inches clearance between the top of the conduit and the top of the pull box shall be provided. Within the splice vault, the conduit shall be laid no closer than two (2) inches from any wall of the splice vault. After conductors/cables have been installed, the exposed end of conduits remaining in pull boxes and controller cabinets shall be sealed with a sealing compound as approved by the Engineer.

The conduit leading to splice vaults or pull boxes shall be terminated with a manufacture-produced terminator connector to seal the wall of the splice vault/pull box.

Conduits entering vaults shall terminate flush with the inside walls of each pull box.

Conduits entering vaults and pull boxes shall be capped or sealed to prevent ingress of water, debris and other foreign matters into the conduit. Immediately prior to installing cables, conduits shall be blown out with compressed air until all foreign material is removed. After cables have been installed, the ends of conduits shall be sealed with a reusable mechanical plug.

Conduit and fittings shall be supplied with an ultraviolet inhibitor.

If trenching in City right of way is allowed by the Engineer or as shown on the plan, it shall conform to the Caltrans Standards.

All pavement markings that are disturbed shall be replaced within thirty (30) calendar days. All work shall be approved by the Engineer.

Signal Interconnect Cable

Approximately 50 feet of SIC slack shall be coiled inside of each splice box (12 and 72 SMFOC).

Approximately 50 feet of SIC slack shall be coiled on either side of the splice enclosure where present.

Approximately 20 feet of SIC slack shall be coiled inside of each pull box.

Approximately 20 feet of SIC slack shall be coiled inside each controller cabinet

Splices are to be made in splice enclosures in fiber optic splice box only. SIC shall be continuous and unspliced between cabinets. Exceptions must be approved by City Engineer.

The design engineer shall perform a site survey to determine slack availability on existing SIC runs or require cable replacement when sufficient slack is not available.

A patch panel shall be installed to terminate the 12 SMFOC. In instances where there is insufficient rack capacity, a spider fan out kit shall be installed upon approval of City Engineer.

Connect the signal interconnect cable to the terminal block in the controller cabinets. The Engineer provides you a list of terminations for each controller cabinet.

Fiber Optic Interconnect Connection to Signal Cabinets

Termination components for vaults and signal cabinets are listed in Section 10-3.3.

The fiber optic cables shall be terminated and/or spliced with these components per the fiber assignment provided by Traffic Engineering during project design or before signal turn-on. A minimum of 5 working days' notice will be required for Traffic Engineering to produce this documentation.

10-3.6 TESTING

The contractor will be responsible for ensuring the operability and quality of SIC delivered from the manufacturer before installation. SIC shall not be removed from the reel or installed until it has been successfully tested by the contractor. The pre-installation test results shall be documented and provided to the City Traffic Engineer for approval. SIC found to be defective or damaged shall be returned to the source for replacement by the contractor.

Fiber optic SIC shall be installed, spliced, terminated, and tested in accordance with NECA/FOA 301-2009 standards. This includes pre-installation and post installation testing of the cable.

Pre-installation testing shall be performed on all fibers using an Optical Time-Domain Reflectometer (OTDR) to preclude manufacturing and shipping damage. The contractor shall perform such testing either on-site or at a holding facility prior to installing the cable into conduit.

Post-installation testing of all terminated fibers shall be performed using launch cables at both ends as specified in NECA/FOA 301-2009 Annex B.3. The contractor shall perform such testing on-site after all termination and splicing work is completed.

Test results, in the form of pre-installation test data and post installation OTDR traces, shall be provided to the City Traffic Engineer in a bound hard copy format along with the electronic file and appropriate viewing software, for review and approval after installation and splicing/termination work are completed.

The pre-installation test results shall be in the form of a spreadsheet detailing the length and loss/km for each fiber as well as the parameters used for testing. The post-installation OTDR traces shall clearly show each continuous fiber, the connectors on each end, and the loss for each event.

The City Traffic Engineer shall approve the test results before final acceptance.

10-3.7 PAYMENT

Traffic Signal Interconnect System shall be paid on a **lump sum (LS)** basis. The contract unit price paid for this item shall include full compensation for all labor, materials, tools, equipment, and incidentals required to install new pull boxes, conduit, fiber optic cable, and fiber optic interconnect equipment; and connect the SIC system to the existing traffic signal controllers; as shown on the Plans, as specified in these Technical Specifications, and as directed by the Engineer. Full compensation for all additional materials and labor, not shown on the plans or specified, which are necessary to complete the installation of the various items, shall be considered as included in the prices paid for the items, or units thereof, and no additional compensation will be allowed therefor.

SECTION 15 EXISTING FACILITIES

15A. GENERAL

Performing work on existing facilities shall conform to the applicable provisions of Section 15 of the Standard Specifications with the following modifications and additional requirements:

15B. SUBMITTALS -Not used-

15C. MATERIALS -Not used-

15D. TRAFFIC STRIPES AND PAVEMENT MARKINGS

All traffic stripes, pavement markings or any other traffic marking disturbed by construction shall be removed in accordance with Sections 15-2.02B of the Standard Specifications. Replacement shall be in kind by the Contractor to the satisfaction of the Engineer and in accordance with Sections 84 of the Standard Specifications, City Standards, the Plans and these Special Provisions.

15E. PAVEMENT MARKERS

All raised pavement markers disturbed by construction shall be removed in accordance with Sections 15-2.02C of the Standard Specifications. Replacement shall be in kind by the Contractor to the satisfaction of the Engineer and in accordance with Sections 85 of the Standard Specifications, City Standards, the Plans and these Special Provisions.

15F. REMOVAL METHODS

All removed concrete shall become the property of the Contractor and shall be immediately off-hauled. None of the removed concrete shall be dumped or stockpiled on the work site. The Contractor shall dispose of all removed concrete at a recycler for this material. Burying of broken concrete within the limits of the project will not be allowed.

All concrete which is to be removed from sidewalk, curb, gutter and driveway areas shall be removed to the nearest score mark or construction joint as directed by the Engineer unless otherwise noted on Project Plans. The edge of existing concrete to remain shall be neat and free of defects. Saw cutting may be required to achieve this effect.

Reinforcing steel may be encountered in portions of concrete to be removed and no additional allowance will be made for the removal of such steel.

Irrigation facilities may be encountered during concrete removal and replacement. The Contractor shall exercise care in this area and repair any damage done by their operations

at no additional cost to the City.

Landscaping and other surfaces or structures shall be restored to original condition at no additional cost to the City.

15G. TREE ROOT PRUNING

All tree roots two inches and greater which are encountered during excavation must be pruned by hand. The root shall be cut cleanly with a saw to avoid splits. When digging within the drip line of trees, Contractor shall exercise extreme caution to avoid pulling on roots with excavation equipment. Hand dig around all roots greater than one inch in diameter. The Contractor shall notify the Engineer when encountering roots within the drip line of trees which are greater than one inch. If the Engineer elects to get direction from an arborist the Contractor shall redirect crews to other contract work after safeguarding the area.

All new hardscape improvements adjacent to existing trees shall be installed with root barriers to protect new improvements from upheaval from root expansion.

15H. MEASUREMENT AND PAYMENT

Payment for **Relocate Bus Shelter** shall be paid for at the contract price per **each (EA)** for bus shelter relocation which shall include full compensation for furnishing all labor, materials, tools, equipment, for removal of existing bus shelters that conflict with the proposed improvements per contract documents, salvaging the structure and reinstalling the existing shelter in the proposed location per the contract documents.

Payment for **Relocate Minor Monument Sign** shall be paid for at the contract price per **each (EA)** for monument sign relocation which shall include full compensation for furnishing all labor, materials, tools, equipment, for removal of existing monument signs that conflict with the proposed improvements per contract documents, salvaging the signs and reinstalling the existing signs in the proposed location per the contract documents.

Payment for **Tree Removal** shall be paid for at the contract price per **each (EA)** for tree removal which shall include full compensation for furnishing all labor, materials, tools, equipment, for removal of trees and capping of existing irrigation facilities serving the tree to be removed that conflict with the proposed improvements per contract documents and no additional compensation will be made therefor.

Payment for **Landscape Wall Removal** shall be included in the various items of work and will not be paid as a separate item of work and no other compensations shall be paid therefore.

Payment for **Fence Removal** shall be paid for at the contract price per **linear foot (LF)** for fence removal which shall include full compensation for furnishing all labor, materials, tools, equipment, for removal of fences per contract documents and no additional compensation will be made therefor.

Payment for **Remove Speed Limit Sign; Post to Remain** shall be paid for at the contract price per **each (EA)** for sign removal which shall include full compensation for furnishing all labor, materials, tools, equipment, for removal of speed limit signs per contract documents and no additional compensation will be made therefor.

Payment for **Root Barrier** shall be included in the various items of work and will not be paid as a separate item of work and no other compensations shall be paid therefore.

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 therefor.

SECTION 20 DUST CONTROL

20A. GENERAL

Dust control shall conform to the provisions in Section 14, "Dust Control," of the Standard Specifications and these technical specifications.

20B. SUBMITTALS -Not used-

20C. MATERIALS -Not used-

20D. CONSTRUCTION

The following on-site mitigation measures shall be implemented for the duration of this project:

- All dust-producing work and unpaved construction sites shall require at a minimum watering in the late morning and at the end of the workday; the frequency of watering shall be increased if dust is mobilized by wind or traffic.
- Contractor shall maintain dust control to the satisfaction of the City Engineer, seven (7) days a week, 24 hours per day.
- The Engineer at his discretion may require sprinkling at any time or place.
- At the end of each work week, the Contractor shall sweep all streets in the work zone with a commercial grade street sweeping machine.

Water is available from the CITY at the current rate provided that the CONTRACTOR meters the water so used with a CITY furnished meter (a deposit will be required) and a CONTRACTOR furnished valve assembly. Cost may be adjusted at the time of construction.

20E. QUALITY CONTROL -Not used-

20F. MEASUREMENT AND PAYMENT

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 therefor.

SECTION 30
MOBILIZATION/DEMobilIZATION

30A. GENERAL

Mobilization shall consist of obtaining all required insurance, bonds, and permits; preparatory work and operations necessary for the movement of personnel, equipment, supplies, and incidentals to the project site; preparation of a construction schedule; badging and training of flaggers, and other employees; and all other work which must be performed or cost incurred prior to beginning work on the various contract items at the project site.

It is the Contractors Responsibility to provide the necessary construction fencing, security, and erosion control /swppp measures. The Contractor shall return the site to its original condition after the completion of the work.

30B. SUBMITTALS

Not required

30C. MATERIALS

N/A

30D. CONSTRUCTION

N/A

30E. SCHEDULE

All work related to Full Depth Reclamation and Asphalt Paving shall be started and completed during the summer break for the Petaluma Junior College. The summer break is considered June 6, 2022 thru August 15, 2022. The schedule can be found here: <https://admissions.santarosa.edu/academic-calendar> . Other items of work such as potholing and concrete work can commence at any time prior to Full depth Reclamation.

30F. MEASUREMENT AND PAYMENT

Mobilization/Demobilization will be paid for at the contract LUMP SUM (LS) price, which shall include full compensation for furnishing all labor, materials, tools and equipment, permits, and doing all work involved in mobilization, as specified herein, and no additional allowance will be made therefor.

Payment will be made in two installments: 80% in Progress Payment after substantial mobilization has been completed and 20% in the final Progress Payment after Demobilization.

SECTION 40 CONSTRUCTION STAKING

40A GENERAL

This work shall consist of furnishing and setting construction stakes and marks by the Contractor to establish the lines and grades required for the completion of the work as shown on the plans and as specified in the Standard Specifications and these Special Provisions. Reference points are to be set by a License Surveyor or Registered Civil Engineer. Slope staking is to be performed by a qualified grade setter.

Stakes or marks will be set by the Engineer as the Engineer determines to be necessary to establish the lines and grades required for the completion of the work specified in these specifications, on the plans and in the special provisions.

When the Contractor requires the stakes or marks, the Contractor shall notify the Engineer of the requirements in writing a reasonable length of time in advance of starting operations that require the stakes or marks. In no event, shall a notice of less than 2 working days be considered a reasonable length of time.

Stakes and marks set by the Engineer shall be carefully preserved by the Contractor. In case the stakes and marks are destroyed or damaged, the stakes and marks will be replaced at the Engineer's earliest convenience. The Contractor will be charged for the cost of necessary replacement or restoration of stakes and marks which in the judgment of the Engineer were carelessly or willfully destroyed or damaged by the Contractor's operations. This charge will be deducted from any moneys due or to become due the Contractor.

In the event the Contractor's operations destroy any of the Engineer's survey control points, the Contractor shall either replace such control points at his expense, subject to verification by the Engineer, or request the Engineer will do so within 10 working days. The cost of any such verification or replacement of the Engineer's control surveys will be deducted from any monies due or to become due the Contractor. The Contractor will not be allowed any adjustment in contract time for such verification or replacement of survey control points by the Engineer.

All computations necessary to establish the exact position of the work shall be made by the Contractor. All computations, survey notes, cut sheets and other records necessary to accomplish the work shall be neat, legible, and accurate. Copies of such computations, notes, and other records shall be furnished to the Engineer at least 48 hours prior to the beginning of work that requires their use.

Construction stakes and markings shall be removed from the site of the work when no longer needed.

40B SURVEY CONTROL AND PLAN

The plans were prepared using computer assisted aerial photogrammetric mapping. There is no

survey control provided.

40C MEASUREMENT AND PAYMENT

Construction staking for all work in the project including the roadway work and paving and installation of curb ramps shall be included in the various items of work and will not be paid as a separate item of work and no other compensations shall be paid therefore.

END OF SECTION

SECTION 50 TRAFFIC CONTROL

50A. GENERAL

Construction area traffic control devices shall be installed and maintained in accordance with the applicable sections of these Technical Specifications, the Standard Specifications, the current edition of the California Manual On Uniform Traffic Control Devices (MUTCD), and as directed by the Engineer.

50B. SUBMITTALS

50B.1 TRAFFIC CONTROL PLAN

The CONTRACTOR shall submit to the ENGINEER for approval at least twenty-one (21) working days prior to start of work three (3) copies of the traffic control plan minimum 11-inch x 17-inch drawing, which shall represent actual conditions. Traffic Control Plans submittals will be reviewed by City of Petaluma. No lane closures will be allowed without a written approval from the agencies and/or the ENGINEER. A complete road closure is prohibited

Plans deemed incomplete may be returned without review. The Traffic Control Plan shall contain a title block which contains the CONTRACTOR's name, address, phone number, project superintendent's name, dates and hours the traffic control will be in effect, along with a signature block for the CONTRACTOR, and for the Engineer.

The Traffic control plan shall include, but is not limited to the following:

- A. Show location and limits of the work zone for each phase or specific operation of construction if requiring different traffic control.
- B. Give dimensions of lanes affected by traffic control that will be open to traffic.
- C. Indicate signing with MUTCD designation, cone placement (with spacing), Portable changeable message signs (PCMS), flashing arrow boards, pavement markings, and other methods of delineation and reference to appropriate standards and sign designations.
- D. Dimension location of signs and cone tapers.
- E. Location of any and all flagmen, if applicable.
- F. Identify side streets and driveways affected by construction and show how they will be handled.
- G. Show how pedestrian/bicycle traffic will be handled through the construction site.
- H. Show locations of night time lighting if applicable.
- I. Modification to Traffic Signal operations in the vicinity of the project.
CONTRACTOR shall be responsible for making arrangements with the City's Traffic Signal Technician at least 48 hours in advance before starting any

work in or nearby a signalized intersection if any signal operations need to be modified.

- J. Separate Traffic Control Plans shall be prepared for each phase of a construction project and shall be submitted for City's review and approval.

Unless specifically approved in writing, all accesses for local businesses and residents shall be maintained at all times. Approval of the ENGINEER shall be required for any changes from the previously approved traffic control plans.

If at any time there is a deviation from the traffic control plan proposed, an additional submittal from the CONTRACTOR is required. Each additional submittal has a five (5) working day review time.

The CITY Standard Work Traffic Control Plans shown elsewhere in these specifications are guidelines only. The CONTRACTOR is not relieved from his/her responsibility for submitting his/her own traffic control plan.

At least five (5) working days prior to beginning of each phase of construction (i.e., utility installation, paving), the CONTRACTOR shall:

- A. Notify all adjacent residents, City of Petaluma Police and Fire Departments, Waste Management Company (refuse Service Company), Petaluma Transit (Golden Gate & Sonoma County Transit), County of Sonoma, California Highway Police, Sonoma County Sheriff, by written notices detailing the type, limits, date and the hours of work.
 - 1) Details of the notice shall be submitted to the ENGINEER for review and approval at least five (5) days prior to delivering these notices.
- B. Where required, post streets with temporary "No Parking/Tow Away" signs at 50-foot intervals at least seventy-two (72) hours in advance. These signs shall be furnished by the CONTRACTOR and shall state the date; day of week and hour parking is prohibited.

Illuminated traffic cones when used during the hours of darkness shall be affixed or covered with reflective cone sleeves as specified in Section 12-3.10, "Traffic Cones", of the Standard Specifications, except the sleeves shall be seven (7) inches long.

When working in or blocking any intersection, the CONTRACTOR shall provide a flag person to direct traffic at that intersection. This flag person is in addition to other required flag persons. The CONTRACTOR, at all times, shall provide flag person(s) to direct delivery trucks and CONTRACTOR'S vehicles entering or leaving the public traffic.

A minimum of one (paved) traffic lane, not less than ten (10) feet wide, shall be open at all times for use by public traffic with adequate flag persons, traffic control, and signing.

Whenever vehicles or equipment are parked on the shoulder within six (6) feet of a traffic lane, the shoulder area shall be closed with fluorescent traffic cones or portable delineators placed on a taper in advance of the parked vehicles or equipment and along the edge of the pavement at 25-foot intervals to a point not less than twenty-five (25) feet past the last vehicle or piece of equipment. All cones, delineators and signs placement shall be shown on the traffic control and approved by the ENGINEER.

The CONTRACTOR shall notify the City of Petaluma, Public Works and Utilities Department of his/her intent to begin work at least five (5) days before work is begun. The CONTRACTOR shall cooperate with local authorities relative to handling traffic through the area and shall make his/her own arrangements relative to keeping the working area clear of parked vehicles.

Except as otherwise provided, the full width of the traveled way shall be open for use by public traffic on Saturdays, Sundays, after 5:00 p.m. on Fridays, and designated legal holidays; and when construction operations are not actively in progress. At the end of each working day, any open trench shall be duly steel plated.

CONTRACTOR shall not store any construction materials on public streets / sidewalks.

The CONTRACTOR shall schedule and coordinate any work that affects the pickup or drop off riders at a transit stop. If necessary a transit stop can be temporarily relocated with the assistants of the Contractor and the Transit agency to provide notices and a location of the temporary stop.

Minor deviations from the requirements of this section concerning hours of work which do not significantly change the cost of the work may be permitted upon the written request of the CONTRACTOR if in the opinion of the ENGINEER public traffic will be better served and the work expedited. Such deviations shall not be adopted until the ENGINEER has indicated his/her written approval. All other modifications will be made by contract change order.

The CONTRACTOR'S failure to comply with the requirements of this section will be sufficient cause for the ENGINEER to suspend work at no costs to the CITY.

If any component in the traffic control system is displaced, or ceases to operate or function as specified, from any cause, during the progress of the work, the CONTRACTOR shall immediately repair said component to its original condition or replace said component and shall restore the component to its original location.

When lane closures are made for work periods only, at the end of each work period, all components of the traffic control system, except portable delineators placed along open trenches or excavation adjacent to the traveled way shall be removed from the traveled way and shoulder. If the CONTRACTOR so elects, said components may be stored at selected central locations, approved by the ENGINEER, within the limits of the highway right-of-way.

Where pavement markers, traffic stripes and/or pavement markings are obliterated by any construction work activity, they shall be replaced by the CONTRACTOR. The entire pavement markings shall be replaced regardless how much area is obliterated by the construction and shall be determined by the ENGINEER. Traffic stripes and pavement markings shall be minimum 0.15 inch thick thermoplastic conforming to Caltrans Standard Specifications Section 84.

50C. MATERIALS

50C.1 CONSTRUCTION AREA SIGNS

Construction area signs and Three (3) portable changeable message signs (PCMS) 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.

Portable Changeable message signs (PCMS) will be installed at the work locations at least 7 days prior to start of construction and maintained in place for the duration of the work by the Contractor. PCMS shall be repaired, replaced and relocated (with in the Project area, as directed by the ENGINEER) at no cost to the City of Petaluma, if damaged or stolen. The Contractor shall remove the signs upon completion of work with prior approval of the Engineer.

Construction area signs will be installed prior to start of construction and maintained in place for the duration of the project by the CONTRACTOR. If damaged or stolen, signs shall be repaired or replaced at no cost to the City of Petaluma. With prior approval of the ENGINEER, the CONTRACTOR shall remove the signs and posts at the completion of the project.

50D. CONSTRUCTION

50D.1 HOURS

All work shall be performed between the hours of 7:00 a.m. and 5:00 p.m unless approved in writing by the Engineer. Lane closures, if required, will be requested by the CONTRACTOR to the respective local and state agency. The CONTRACTOR shall maintain vehicle access to businesses, homes, and other properties at all times while work is in progress.

No work and/or preparation of work shall be performed between 7:00 p.m. and 7:00 a.m. except work required under said Sections 7-1.03 and 7-1.04 of the Standard Specifications or as approved in writing by the Engineer.

50D.2 PEDESTRIAN / BICYCLE TRAFFIC CONTROL

The CONTRACTOR is directed to Chapter 6D and Part 9, Pedestrian and Worker Safety and Traffic Control of Bicycle Facilities, in the MUTCD and applicable California supplements, the improvement plans and these Technical Specifications.

Pedestrians shall be provided with a safe, convenient, and accessible path that at a minimum replicates the most desirable characteristics of the existing sidewalk, path, or footpath.

Bicycle traffic shall be detoured around the construction zones.

The CONTRACTOR shall construct and maintain temporary pedestrian pathways through the work zone that shall be in compliance with the requirements of the Americans with Disabilities Act (ADA), the MUTCD, and applicable California supplements.

Pedestrian routes shall not be impacted for the purposes of any non-construction activities such as parking of vehicles or equipment, or stock piling of materials. Pedestrians shall not be led into conflicts with work site vehicles, equipment or operations.

50E. QUALITY CONTROL

50F. MEASUREMENT AND PAYMENT

Traffic Control will be paid for at the contract LUMP SUM (LS) price, which shall include full compensation for conforming to the provisions in this section, furnishing all labor, materials, tools and equipment, and doing all work involved in traffic control, including temporary relocation of regulatory signs, provide/ maintain / relocate portable changeable message boards (PCMS), providing/placing/removal of trench plates, providing, as specified herein and / or shown in the approved traffic control plans, and no additional compensation will be made therefor.

Full compensation for pedestrian traffic control shall be considered as included in the contract lump sum price paid for traffic control and no additional allowance will be made therefor.

The cost of furnishing all flaggers, including transporting flaggers, to provide for passage of public traffic through the work under the provisions in Section 7-1.03, "Public Convenience", and Section 7-1.04, "Public Safety" of Standard Specifications 2010, shall be considered as included in the contract lump sum price paid for traffic control and no additional allowance will be made therefor.

END OF SECTION

SECTION 51 CONCRETE STRUCTURES

51A GENERAL

Reinforced concrete pipe shall be installed on the alignment and grade as shown on the plans and in accordance with the applicable provisions of these Special Provisions and as directed by the Engineer.

Catch basins shall be constructed to the details and at the locations shown on the plans and in accordance with these Special Provisions.

Manholes shall be constructed in conformance to the details and at the locations shown on the plans and in accordance with these Special Provisions.

51B EARTHWORK:

If, during excavation for any culvert, material is encountered which is unsuitable as a foundation for such culvert, such unsuitable material shall be removed to a depth as required by the Engineer and the resulting space shall be refilled with approved material.

51C STRUCTURES:

Storm drain manholes shall be standard 48-inch diameter precast concrete manholes at the locations shown on the plans and in accordance with these Special Provisions and City Standard 400.

Storm drain catch basins shall be type-A precast concrete catch basins at the locations shown on the plans and in accordance with these Special Provisions and City Standard 401-A.

Concrete for manhole bases shall be Class A portland cement concrete conforming to the applicable requirements of Section 90 of the Standard Specifications, July 1992 edition, and shall be poured full thickness against the sides of the manhole excavation or shall be formed.

Manhole barrels and taper sections shall be precast concrete sections using Type II portland cement complying with ASTM Designation: C150. The barrel and taper sections shall be constructed in accordance with the applicable provisions of ASTM Designation: C478.

Top of manhole frames and covers shall be set accurately to the existing finished grade in paved streets and to the elevation shown in unimproved areas.

Concrete for catch basins shall be Class "A" portland cement concrete conforming to the requirements of Section 90 of the Standard Specifications, July 1992 edition.

Bar reinforcing steel shall conform to and be placed in accordance with the applicable provisions of Section 52 of the Standard Specifications with the following modifications:

In lieu of the inspection of reinforcing steel as provided under Section 52-1.04 of the Standard Specifications, the Contractor shall furnish the Engineer with a certificate from the supplier of the reinforcing steel stating that the steel delivered complies with the requirements of Section 52-1.02 of the Standard Specifications.

51D MEASUREMENT AND PAYMENT:

Full compensation for **Convert Catch Basin to SDMH** shall be paid for at the contract unit price **each (EA)**, which shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all the work involved in constructing manholes complete in place as shown on the plans including excavation, backfill, furnishing and installing cast iron frame and cover, and no additional allowance will be made therefor.

Full compensation for **Install Catch Basin** shall be paid for at the contract unit price **each (EA)**, which shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all the work involved in constructing catch basins complete in place as shown on the plans including excavation, backfill, furnishing and installing cast iron frame and cover, and no additional allowance will be made therefor.

SECTION 60
STORMWATER MANAGEMENT AND EROSION CONTROL

60A. GENERAL

The CONTRACTOR shall prepare storm water management, sediment and erosion control measures for implementation and shall maintain these measures during the construction period.

The minimum storm water management, and sediment and erosion control for the project shall include, but not be limited use of Best Management Practices (BMPs) including fiber rolls (sediment logs or wattles), straw bales, drain rock, check dams, silt fencing, siltation basins and as required for construction conditions. Measures shall be submitted to the Engineer for review seven (7) days prior to start of construction. The CONTRACTOR shall be responsible for providing the measures that would comply with the Regional Water Quality Control Board (RWQCB) requirements.

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 clean out all storm drains, slot drains, and inlets in the projects limits with vector trucks or equivalent prior to construction at the end of construction.

The CONTRACTOR shall install and maintain all necessary BMP's at the staging area.

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

If the area to be disturbed by construction activities is more than one acre, the CONTRACTOR shall be required to file a Notice of Intention (NOI), pay the fee, prepare the SWPPP, BMP, etc. as required by RWQCB permit. The amount of disturbed area is anticipated to be more than one acre.

If required, the CONTRACTOR shall file the Notice of Intent (NOI) with the RWQCB (electronically on SMARTS), prepare the SWPPP, pay the fee(s) and shall comply with the National Pollution Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Association with Construction Activity requirements, including but not limited to, preparation of the project sediment and receiving water risk level, prepare and implement a Storm Water Pollution Plan (SWPPP) and Rain Event Action Plans (REAP), on-site monitoring, etc. Resources used in developing the SWPPP shall include the "California Storm Water Best Management Practice Handbook for Construction Activity," and the San Francisco Bay Regional Water Quality Control Board's "Information on Erosion and Sediment Controls for Construction Projects." The SWPPP shall be submitted for review and acceptance prior to start of work. The CONTRACTOR

shall have an accepted and implemented SWPPP as part of Mobilization. The SWPPP shall, at a minimum, include Best Management Practices (BMPs), acceptable to the CITY, to address the following:

1. Housekeeping
2. Waste Containment and Control
3. Minimizing Disturbed Areas
4. Stabilize Disturbed Areas
5. Protect Slopes and Channels
6. Control Site Perimeter
7. Control of Internal Erosion
8. Disposal of Storm Water and Ground Water (refer to specification 02140 for additional and more specific dewatering requirements).
9. Sediment Control
10. Liquid Waste Management
11. Concrete Waste Management
12. Hazardous Waste Management
13. Employee and Subcontractor Training
14. Vehicle and Equipment Fueling and Maintenance
15. Spill Prevention and Control
16. Contaminated Soil Management
17. Sawcutting
18. Paving and Asphalt Work
19. Street Cleaning

Employ and utilize environmental protection methods, obtain all necessary permits, and fully observe all local, state, and federal regulations.

60B. SUBMITTALS

60C. MATERIAL

60D. CONSTRUCTION

60E. QUALITY CONTROL

60F. MEASUREMENT AND PAYMENT

Stormwater Management and Erosion Control shall be paid for at the contract LUMP SUM (LS) price, which shall include full compensation for conforming to the provisions in this section, furnishing all labor, materials, tools, equipment, and any other work involved in Stormwater Management and Erosion Control including but not limited to evaluation of risk level, preparation of SWPPP, filing the Notice of Intent (NOI), Notice of Termination (NOT), and Annual Report, implementation and maintenance of all stormwater, sediment, and erosion control measures, following Best Management

Practices, and all incidentals necessary to control stormwater pollution, sedimentation, and erosion, and no additional compensation will be made therefor.

END OF SECTION

LANDSCAPE PLANTING

100A. GENERAL CONDITIONS

If questions arise during construction relating to protected trees, the project arborist shall be consulted to recommend appropriate procedures, or asked to monitor construction activities expected to impact trees. Generally the project or monitoring arborist shall be notified to be present or to provide direction when construction activities will be occurring within Tree Protection Zones (TPZ).

Minimum 24 hours advance notice shall be given when scheduling site visits by project arborist. No operation of equipment or vehicles, or storage of materials, or disposal of waste materials shall occur within the driplines/TPZ of protected trees without approval from the arborist.

All project contractors and subcontractors must be familiar with Tree Protection Measures for the project, and failure to observe them may be cause for a stop work order or other penalties to be issued by the Town of Windsor.

100B. SCOPE OF WORK

This Section includes all materials, labor, transportation, services, and equipment necessary to install landscape planting and landscape construction items as shown on the Contract Drawings, and as specified herein this Section.

This Section includes the following Scope of Work:

1. Sheet Mulching
2. Mulches (wood products, aggregates)
3. Tree Protection Fencing

100C. DEFINITIONS

The “Engineer” in this Section shall refer to the Agent designated by the City of Petaluma.

Acceptance: Wherever the terms “acceptance”, “approved”, “acceptable” or “directed” are used herein, they mean acceptance by the Engineer in writing.

Plant Material(s) refers to all living plants, inclusive of trees, palms, shrubs, groundcovers, vines, turf, and grasses.

Planting Area (P.A.) as indicated on the Contract Drawings, shall mean all areas to be installed with plant material(s), or as areas where existing trees and/or vegetation shall be protected.

ASTM – American Society for Testing Materials.

USDA – United States Department of Agriculture.

ANSI – American National Standards Institute.

Plant Height: Measurement of main body height, not measurement to branch tip.

Plant Spread: Measurement of main body diameter, not measurement from branch tip to branch tip.

Finish Grade: Elevation of finished surface of planting soil.

Topsoil: Naturally occurring soil from the A horizon (top layer).

Planting Soil: Topsoil, which has been amended to meet the specification for planting soil in this section; Import soil that meets the specification for planting soil in this section.

Subsoil: Native soil below topsoil, native soil remaining after construction excavation or fill or backfill material in place after completion of excavation and rough grading, before placement of planting soil.

Planter: Isolated area of planting soil for trees, shrubs, and groundcover. May be raised and or partially surrounded by concrete sidewalk.

100 F. QUALITY ASSURANCE

Installer Qualifications for all items indicated herein this Section: Licensed Landscape Contractor, C-27, in the State of California.

1. Engage an experienced, licensed Contractor who has completed landscaping work similar in material, design, and extent to that indicated for this Project and with a record of successful landscape establishment.
2. Installer's Field Supervision: Contractor shall maintain an experienced, full-time landscape supervisor/superintendent at the Project Site during times that landscaping operations identified herein the Contract are in progress.
3. Superintendent shall be fluent in English and satisfactory to the Engineer. Superintendent shall not be changed except with the consent of the Engineer, and shall be authorized to represent the Contractor.

Testing Agency Qualifications: To qualify for acceptance, an independent testing agency must demonstrate to Engineer's satisfaction, based on evaluation of agency-submitted criteria conforming to ASTM E 699, that it has the experience and capability to satisfactorily conduct the testing indicated without delaying the Work.

Provide quality, size, genus, species, and variety of trees and shrubs indicated, complying with applicable requirements of ANSI Z60.1 "American Standard for Nursery Stock."

1. Selection of trees and shrubs purchased under allowances will be made by Engineer, who has the option to tag stock at their place of growth before the plant material is prepared for transplanting.

2. At least one (1) plant of each species delivered to the project site shall have an identification tag from supplying nursery showing botanical and common name of plant.
3. Upon delivery to the site, provide an invoice listing the names, sizes and quantities of all plant material.
4. Measurements: Measure trees and shrubs according to ANSI Z60.1 with branches and trunks or canes in their normal position. Do not prune to obtain required sizes.
5. Take caliper measurements six inches (6") above ground for trees up to four inch (4") size, and twelve inches (12") above ground for larger sizes.
6. Prior to installation of any items presented within this Measure main body of tree or shrub for height and spread; do not measure branches or roots tip-to-tip.

Pre-Installation Conference: Section or as indicated on the Contract Drawings, the Contractor shall conduct a Pre-Installation Conference at the Project Site.

1. Meeting minutes from the conference shall be the responsibility of the Contractor, and shall be distributed to all parties in attendance for review and subsequent approval of the conference discussion items.

Regulatory Requirements: Contractor shall meet the requirements of applicable laws, codes, and regulations as required by the authorities having jurisdiction over the Work.

Manufacturer's Directions: Follow manufacturer's directions and drawings in all cases where the manufacturers of articles used in this Section furnish directions covering points not shown in the Contract Drawings and Contract Specifications.

Permits, Fees, Bonds, and Inspections: The Contractor shall arrange and pay for any and all permits, fees, bonds, and inspections necessary to perform and complete his portion of the Work.

Contract Drawings and Contract Specifications:

1. Comply with the intent and meaning of Contract Drawings and Contract Specifications taken as a whole, not taking advantage of any readily perceived error or omission shall any exist.
2. Figures and dimensions on Contract Drawings shall take precedence over measurements by scale, and detailed drawings shall take precedence over general drawings.
3. Refer any errors and discrepancies in or between plans, specifications, lists, or notes to the Engineer for adjustments or clarification before proceeding with the Work. In the event of errors or discrepancies, the Contractor shall assume responsibility for work performed without referring to the Engineer for clarification.
4. The Engineer shall interpret the meaning of the Contract Drawings and Contract Specifications in the event of conflict, and his/her decision shall be final.

100G. DELIVERY, STORAGE AND HANDLING

Packaged Materials: Deliver packaged materials in containers showing weight, analysis, and name of manufacturer. Protect materials from deterioration during delivery and while stored at site.

Anti-Desiccant: Spray plant materials in full leaf immediately before transporting with anti-desiccant. Meet requirements of anti-desiccant manufacturer's current printed application instructions.

Trees and Shrubs: Do not prune before delivery. Protect bark, branches, and root systems from sun scald, drying, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy natural shape. Provide protective covering during delivery.

Handling Plant Materials:

1. Handle plant materials grown in containers only by their containers.
2. DO NOT handle plant materials by their trunks or stems.
3. DO NOT drop any plant materials.
4. DO NOT bind or handle plants with wire or rope.
5. Pad trunk and branches whenever using hoisting cables, chains, or straps.
6. Should the Contractor engage in handling any of the plant material(s) by any unacceptable method(s), then the Engineer shall reserve the right to reject any of the mishandled plant material(s). The Contractor shall replace all rejected plant material(s) with approved plant material(s) at no additional cost to the Owner.

Deliver trees, shrubs, ground covers and plants after preparations for planting have been completed and install immediately. If planting is delayed more than six (6) hours after delivery, set planting materials in shade, protect from weather and mechanical damage, and keep roots moist. Anchor plants to prevent damage from winds.

1. DO NOT remove container-grown stock from containers before time of planting.
2. Water root systems of trees and shrubs stored on site with a fine-mist spray. Water as often as necessary to maintain root systems in a moist condition.

100H. PROJECT CONDITIONS

Utilities: Determine location of above grade and underground utilities and perform Work in a manner, which will avoid damage. Hand excavate, as required. Maintain grade stakes until removal is mutually agreed upon by parties concerned.

Excavation: When conditions detrimental to plant growth are encountered, such as rubble fill, adverse drainage conditions, or obstructions, cease planting operations and notify Engineer for further direction.

Installation: Perform planting operations only when weather and soil conditions are suitable in accordance with locally accepted practices.

100I. COORDINATION, SCHEDULING, AND OBSERVATION

Coordinate installation of planting materials during normal planting seasons for each type of plant material required. Coordinate with other trades on Project Site.

Permits: Contractor shall be responsible for obtaining all permits necessary to complete and install Work as specified herein.

Observation: Site observation for Scope of Work specified herein this Section shall be made by the Engineer. The Contractor shall request, in writing, at least one (1) week in advance of the time that observation is required. The Contractor and Engineer shall be in attendance at the Project Site at the time of each scheduled observation. Observation shall be required for the following Scope of Work:

1. Pre-Construction Meeting.
2. Where applicable, placing of planting soil after rough grading and incorporation of planting soil into top layer of sub-soil as described in this section.
3. Upon completion of incorporation of amendments into existing site soil including transition to subgrade and completion of fine grading operations. Planting operation shall not commence until after this review.
4. Inspection and approval of plant material.
5. Spotting trees prior to excavation of planting holes.
6. Tree staking/guying.

100K. MATERIALS

General

Immediately upon award of Contract for Work, the Contractor shall locate and purchase or hold for purchase all plant material as required. Trees may be purchased and contract grown to ensure pruning practices are met.

Contractor shall verify with Engineer of any plant material stock that has been nursery contract grown by Owner for use within Work of this Contract.

Contractor shall review the condition of the plant material with the Engineer at the nursery maintaining the plant material, and at the time of delivery at the Project Site.

All plants shall have a growth habit typical for variety and species, symmetrical, with tightly knit branching, so trained or favored in development and appearance as to be superior in form, number of branches, compactness and symmetry, healthy, vigorous in growth. Plant materials shall also be free from insect pests, eggs and larvae, plant diseases, sun scalds, fresh bark abrasions, excessive abrasions, windburn, saltburn, or other objectionable disfigurements or conditions as determined by the Engineer.

Container stock shall be grown in containers in which delivered for at least six (6) months, but not over two (2) years.

Pruning of trees as grown at the nursery shall meet the requirements outlined by the International Society of Arboriculture's "Tree Pruning Standards."

Leaders of trees shall not have been pruned by the nursery. It is the Contractor's responsibility to ensure these specifications are met regardless of practices by nurseries.

All plant material shall be subject per the California State Department of Agriculture Regulations for Nursery Inspections of Rules and Grading. Quantity and size of all plant shall be No. 1 Grade of Pinto Tag stock, or equal. Pinto tags shall be submitted to the Engineer upon delivery of the plant material to the Project Site.

All plant material shall have normal, well-developed branch systems, and vigorous, fibrous root systems, which are neither root- nor pot-bound, and are free of kinked, gnarled, or girdling roots.

Mulches

Organic Mulch: Mulch shall be well composted and free from deleterious materials, debris, and weed seed. Suitable as a top dressing of trees, shrubs and groundcovers, consisting of following:

Type: Shredded recycled wood products consisting of 100% recycled, hand sorted, chipped and screened urban lumber. Color stained to dark brown using UV resistant organic mineral. Mulch shall be graded to average dimensions of one-half inches (1/2") to two inches (2") in length, and flat in cross section.

Coverage depth shall be a minimum of three inches (3"), or as indicated on the Contract Drawings.

Acceptable Products & Manufacturers: Dark Brown Decorative Mulch, American Soils Products, Richmond, CA, or equal.

Landscape Fabric

Type: Weed control landscape fabric, woven, minimum 0.15 mil thickness.

100L. EXECUTION

Installation practices of the landscape plant materials shall be performed during those periods when weather and soil conditions are suitable and in accordance with locally accepted horticultural practice, as approved by the Engineer. Contractor shall notify the Engineer in writing the anticipated commencement date and length of duration of the landscape installation.

Examine areas to receive landscaping for compliance with requirements and for conditions affecting performance of Work of this Section. Do not proceed with installation until unsatisfactory conditions have been corrected. No planting shall be done in any areas until they have been satisfactorily prepared in accordance with this Section.

Soil moisture level prior to planting shall be no less than 75% of field capacity. The determination of adequate soil moisture for planting shall be the sole judgment of the Engineer, and their decision shall be final.

If the soil moisture level is found to be insufficient for planting, all planting pits shall be filled with water and allowed to drain before commencing planting operations.

No more plants shall be distributed in the planting area on any day than can be planted and watered on that day. All plants shall be planted and watered as specified herein immediately after the removal of their containers. Containers shall not be cut prior to placing the plants in the planting area. Lay out individual tree and shrub locations and areas for multiple plantings. Stake locations, outline areas, and secure Engineer's acceptance before the start of planting work. Make minor adjustments as may be required.

Prior to Work in this Section, Contractor shall examine previously installed Work from other trades and verify that such Work is complete and as required, to the point where the installation of the landscape may commence properly.

Planting areas, which become compacted in excess of 85% relative compaction due to construction activities, shall be tilled and thoroughly cross-ripped to a minimum depth of 9" to alleviate the condition, taking care to avoid all existing subsurface utilities, drainage, etc.

Protection of Site

Contractor shall protect existing and new improvements and systems installed prior to planting installation. Maintain protection in place until completion of Work and maintenance period.

Protect concrete paving, headers, and drainage from staining due to contact with wet nitrogen stabilized mulch/sawdust, or contact with chelated iron. Correct any stained concrete.

Finish Grading

Finish grading shall be as indicated on the Civil Engineer Drawings, unless otherwise noted on the Contract Drawings prepared by the Engineer or noted herein this Section. Contractor shall report discrepancies (if any) to the Engineer and Civil Engineer for clarification and resolution.

Finish grades shall be measured at the top surface of surface materials. The finish grade below adjacent paving, curbs, or headers shall be three (3") inches in shrub and/or groundcover areas.

Remove all rocks two (2") inches and larger to a depth of four (4") inches below finish grade of shrub and groundcover areas and all other growth or debris from the site.

Fill gullies or ruts in excess of one (1") inch deep on areas to be planted with shrubs and groundcovers using adjacent soil, and compact soil to adjacent finish grade of soil.

Contractor shall take every precaution to protect and avoid damage to sprinkler heads, irrigation lines, drainage lines, improvements by other trades, and all underground utilities during grading and conditioning operations. The Contractor shall maintain established site grades and drainage during all stages of landscape construction.

The finish grading shall be smooth, uniform, and free from abrupt grade changes and depressions to insure positive drainage of the site. All surface drainage shall drain away from buildings, walls, and walks, and shall drain towards roadways, streets, gutters, drains, and catch basins.

Final grades shall be acceptable to the Engineer before commencement of planting operations. Planting or other landscape site construction improvements installed without prior approval of finish grades by the Engineer shall be re-installed under requirements of this Section and other Sections of the Contract Specifications, with no additional cost to the Owner.

Ground Cover and Plant Bed Preparation – Sheet Mulching

Site Preparation:

Remove 12- inch wide strip of plants adjacent to all curbs, hardscapes, drains, and other elements such as valve boxes and vaults.

Cut existing plants to soil surface, leaving all plant material in place. Distribute and tamp down plant material so that it lays flat on soil surface.

At structures and adjacent paving, grade soil surface to a depth of 4-6 inches below top of hardscape, drain, vault or other element to allow adequate room for sheet mulch profile. Taper the cut back at a shallow angle (less than 45 degrees) to meet existing grade at existing planting to be covered by sheet mulching.

Install 5-gallon and larger plant material so that top of root ball will be even with top of sheet mulch.

Sheet Mulch Installation:

Install a minimum of two layers of 100% recycled B-flute cardboard to the entire planting area, completely covering all existing soil and remaining herbaceous vegetation, if any.

Wet cardboard while applying to prevent it from blowing away. Keep all foot traffic off wet cardboard.

Overlap cardboard a minimum of 12 inches.

Cardboard shall abut directly against edge of pavement, curbs, boulders or other site features. Do not cover tree and shrub root crowns with cardboard.

Fold excess wet cardboard under itself when at hardscape or root crowns.

Retain any small cardboard scraps to patch holes created during sheet mulch process.

Apply 1 1/2 to 2 inches of quality OMRI- or CDFSA- listed recycled organic compost on top of the cardboard layer. Taper compost application to 1/2" when 6" or less from hardscape.

Apply 3 inches of mulch on top of the compost.

Keep stems and trunks of all plants clear of compost, mulch and debris.

Excavation for Trees and Shrubs

Pits and Trenches: Excavate with vertical sides and with bottom of excavation slightly raised at center to assist drainage. Loosen hard subsoil in bottom of excavation.

Container-Grown Trees and Shrubs: Excavate to two times (3x) the container width and two inches (2") less than the depth of the rootball.

Set top of rootball two inches (2") above the finish grade.

Dispose of unsuitable subsoil removed from landscape excavations. Do not mix with planting soil or use as backfill.

Obstructions: Notify Engineer if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.

Hardpan Layer if applicable: Drill six-inch (6") diameter holes into free-draining strata or to a depth of ten (10') feet, whichever is less, and backfill with free-draining material. Should this work be required by the Engineer based on site conditions, compensation will be paid as an additional pay item. No compensation will be made unless directed in writing by the Engineer.

Drainage: Notify Engineer if subsoil conditions evidence unexpected water seepage or retention in tree or shrub pits.

Fill excavations with water and allow to percolate out, before placing setting layer and positioning trees and shrubs.

Planting Trees and Shrubs

Set container-grown stock plumb and in center of pit or trench with top of ball raised above adjacent finish grades as indicated.

Carefully remove containers so as not to damage root balls.

Place backfill around ball in layers, tamping to settle backfill and eliminate voids and air pockets. When pit is approximately 1/2 backfilled, water thoroughly before placing remainder of backfill. Repeat watering until no more is absorbed. Water again after placing and tamping final layer of backfill.

In non-sidewalk planter locations, dish and tamp top of backfill to form a three inch (3") high mound around the rim of the pit. Do not cover top of root ball with backfill.

Plant Settling: Any tree or shrub that has settled deeper than the surrounding grade shall be raised to the correct level, to the satisfaction of the Engineer.

Pruning

Any pruning shall be the minimum necessary to achieve hazard reduction and public safety, construction clearance, and to improve tree health.

All pruning shall be done according to ISA and ANSI standards, by qualified personnel. Pruning shall be done by ISA certified tree workers or certified arborists, or under the supervision of a certified arborist.

Pruning for hazard reduction shall include: the removal of dead branches or stems 3"+ diameter, cracked/broken, or weakly-attached branches.

Pruning for construction clearance shall be the minimum necessary for the safe operation of equipment and construction activities. Branches shall be cut back to appropriate sized laterals or the parent stem. No stubs, broken ends, flush cuts, or wounds on trunks or branches are acceptable.

Pruning shall occur prior to start of construction activities near trees to be preserved, as project phasing progresses.

Project arborist shall meet with tree service contractor prior to tree pruning to determine limits and goals of clearance and hazard reduction pruning.

Mulching

Within the dripline or TPZ of protected trees where the rootzone has been disturbed, a 4" deep layer of arbor mulch may be spread and maintained as a permanent top dressing. Arbor mulch is the product generated by chipping tree bark, foliage and small branches. It may be applied directly on top of existing vegetation.

Tree Protection Fencing

Temporary protective fencing shall be installed to restrict construction activity within the driplines of protected trees. Fencing shall be placed at the outer edge of the driplines, plus required dimension, of trees or groups of trees, as shown on the Grading Plan. This is the Tree Protection Zone – TPZ. Fencing locations to be approved on site by the arborist.

Fencing shall remain in place throughout construction, and any encroachment within the TPZ shall be approved and supervised by the project arborist.

In areas where construction activities must occur within the driplines of protected trees, the arborist may require that protective wrap be placed around trunks or branches that may be damaged.

Root Protection

Where grading (cut or fill), forming, or other construction activity must occur within the TPZ's of trees to be preserved, project arborist shall be present to monitor work. Roots 2"+ shall be preserved wherever possible. If roots larger than 1" diameter are encountered during grading or trenching which cannot be preserved, they shall be cut cleanly across the face of the root with a sharp saw, past any damaged portion.

In areas where roots are encountered and backfill will be placed, roots should be left exposed as short a time as possible to avoid drying out.

Installation of Miscellaneous Materials

Apply anti-desiccant using power spray to provide an adequate film over trunks, branches, stems, twigs, and foliage.

When deciduous trees or shrubs are moved in full-leaf, spray with anti-desiccant at nursery before moving and again two (2) weeks after planting.

Mitigation

During or at the completion of construction activities there may be areas around protected trees that require treatment to insure future tree health.

Supplementary deep irrigation may be required within the root zones of individual specimens during or after construction, as directed by the arborist.

Areas within tree rootzones where soil has become compacted shall be loosened if required by arborist.

Future tree inspections may be needed if root loss is significant, and will be described and summarized in the final report.

Cleanup and Protection

During landscaping operations, keep pavements clean and Work area in an orderly and safe condition. Contractor shall remove all trash caused from his Work on a weekly basis throughout the duration of the Work.

Protect landscaping from damage due to landscape operations, operations by other Contractors and trades, and trespassers. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged landscape work as directed.

Upon completion of his Work under this Section, the Contractor shall remove all rubbish, waste, debris, excess construction materials, and other items resulting from construction operations offsite as described herein this Section and directed by the Engineer.

All scars, ruts, or other marks in the ground caused by the Contractor's Work shall be repaired. Remove all equipment and implements of service, and leave the entire Project Site area in a neat, clean, and Owner-approved condition. All sidewalks, driveways, pavements, and site areas shall receive a broom-clean treatment or other cleaning treatment as directed by the Engineer.

Disposal of Surplus and Waste Materials

Disposal: Contractor shall remove surplus soil and waste material, including excess subsoil, unsuitable soil, trash, and debris, and legally dispose of it off the Owner's property.

Final Review

A Final Review shall be performed upon completion of the Maintenance Period.

Contractor shall request attendance at the review by the Owner, Engineer, and other parties designated by the Owner of not less than one (1) week prior to the end of the Maintenance Period.

At the time of Final Review, planting areas shall be free of weeds and neatly cultivated. Contractor shall perform all necessary corrective work and replacement of materials as identified.

Work requiring corrective measures by the sole judgment of the Engineer shall be completed within ten (10) days of the Final Review.

Corrective Work and materials replacement shall be in accordance with the Contract Drawings and Contract Specifications, and shall be made at no expense to the Owner.

Maintenance Period shall be continued at no expense to the Owner as determined by the Engineer until final acceptance of the completed Work is accomplished.

Contractor shall request a review upon completion of corrective Work and materials replacement.

If, after review, the Engineer finds the Work has been performed in accordance with the Contract Drawings and Contract Specifications, and plant materials are in satisfactory growing condition, a written notice of acceptance at the end of the Maintenance Period shall be issued by the Engineer.

100M. MEASUREMENT AND PAYMENT

Landscape Fabric and Mulch shall be paid for at the contract unit price per **square foot (SF)** of actual fabric and mulch installed, which shall include full compensation for removing and placing landscaping fabric and mulch, in place, and shall include, but not limited to, demolition, saw cutting, excavation for placement of fabric and mulch, and all other work required to complete work in place.

Clearance Pruning shall be paid for at the contract unit price per **lump sum (LS)** which shall include full compensation for pruning trees for pedestrian walking clearance, in place, and shall include and all other work required to complete work in place.

Irrigation Relocation and Capping shall be paid for on a **force account (FA)** basis which shall be billed at a time and material basis. Work shall include full compensation for cutting, capping and relocating existing irrigation systems in conflict with proposed improvements. Relocated irrigation facilities shall provide the same function as their existing condition and irrigated zones shall not be disconnected from irrigation supply lines due to conflicts with proposed improvements.

The contract per unit paid for the above items shall include compensation for landscape planting all the labor, materials, tools, equipment and incidentals for doing all the work involved in the transport, preparation and execution of planting soil, finish grading, testing, staking, plant material,

landscape materials, etc. complete and in place, all as indicated on the plans, specified in the CSS, these special provisions, and as directed by the Engineer, and no additional compensation will be allowed.

SECTION 110
ADJUST EXISTING UTILITIES TO GRADE

110A. GENERAL

All structures shall be adjusted to new finished grade including such structures as manholes, vaults, hand holes, drainage structures, and utility valve structures, including raising or lowering and resetting existing frames, covers, grates, and lids. Including adding or replacing riser collars. No facility shall be adjusted to grade until the adjacent pavement or surfacing has been completed. While the project does not intend to change the grade of the existing asphalt there may be a need to adjust some utilities based off final condition.

The plans may not show the location of all utilities that may require adjustment. The Contractor shall review filed condition and record the location requiring adjustment.

Adjustments include modifying the utility structure below the grinding plan and raising or lowering to the finish grade, including all excavation (including removing and reconstruction concrete anchor block), backfill and temporary and permanent repair to the surrounding asphalt concrete surface.

Utility vaults impacted by the proposed improvements that are deemed in poor condition by the utility owner should be removed and replaced in accordance with the applicable standards and specifications.

110B. MATERIALS

110B.1 Manhole Adjustment

This work includes all City owned sanitary sewer or storm drain manholes. All work shall be in accordance with City Standards.

Materials used to accomplish the adjustments shall be at least equal in quality to those in the original structure. Cast iron adjusting rings shall not be used to accomplish the adjustment.

Manhole cover shall be adjusted without disturbing the precast concrete cone.

110B.2 Valve Adjustment

This work includes all City owned water valves. All work shall be in accordance with City Standards.

This work includes all PG&E owned gas valves. All work shall be in accordance with PG&E Greenbook standards.

110B.3 Fire Hydrant Adjustment

This work includes all City owned fire hydrants. All work shall be in accordance with City Standards.

Materials used to accomplish the adjustments shall be at least equal in quality to those in the original structure.

110B.4 Catch Basin Adjustment

This work includes all City owned storm drain catch basins. All work shall be in accordance with City Standards.

Materials used to accomplish the adjustments shall be at least equal in quality to those in the original structure.

110B.5 Light Pole Adjustment

This work includes all City owned light poles. All work shall be in accordance with City Standards.

Materials used to accomplish the adjustments shall be at least equal in quality to those in the original structure.

110B.6 Utility Pole Adjustment

This work includes all utility poles that conflict with the proposed improvements. All work shall be in accordance with applicable PG&E Greenbook standards.

Materials used to accomplish the adjustments shall be at least equal in quality to those in the original structure.

110B.7 Survey Monument Adjustment

This work includes all City Survey Monuments that conflict with the proposed improvements. All work shall be in accordance with applicable City of Petaluma Standards.

The contractor is responsible for preservation and/or perpetuation of all existing survey monuments. If the contractor suspects that work will be conducted in an area which may result in the disturbance of survey monuments, the contractor shall retain the services of a licensed professional authorized to practice land surveying to locate said monuments prior to disturbance, re-establish monuments which have been disturbed as a result of construction and file the appropriate documentation with the county once the monuments are reset at the contractor's expense.

110B.8 Telecom Facility Adjustment

This work includes all telecom facilities that conflict with the proposed improvements. All work shall be in accordance with applicable telecom purveyor standards.

Materials used to accomplish the adjustments shall be at least equal in quality to those in the original structure.

110B.9 Telecom Facility Replacement

This work includes all telecom facilities that conflict with the proposed improvements. All work shall be in accordance with applicable telecom purveyor standards.

Materials used to accomplish the replacement shall be comprised of a concrete box and lid.

110C. CONSTRUCTION

- 110C.1 Adjust Existing facilities as shown on the Contract Drawings by raising or lowering to match the new grade line.
- 110C.2 Construct or alter the structure to the required line and grade
- 110C.3 Use approved cast iron or pre-cast concrete riser collar.
- 110C.4 Adjust frames and covers to new grade
- 110C.5 Perform asphalt pavement work after structures have been adjusted to new pavement grade.
- 110C.6 Maximum adjustments of manhole covers, drainage grates, and valve covers shall be 12 inches plus or minus, unless noted otherwise.
- 110C.7 Replacement of structures in poor condition shall be included in the construction cost for adjusting structures.

110D. QUALITY CONTROL

110E. MEASUREMENT AND PAYMENT

Measurement of payment for “Adjust Existing Utility to Grade” will be based upon, but not limited to, all labor, materials, tools, equipment, excavation, backfill, concrete, grade rings, debris platforms, asphalt or concrete pavement and mortar for the completion of adjusting all utility valve boxes, utility vaults, survey monument boxes, manholes and other utility structures to grade throughout the project limits, and all other related work per the Contract Documents.

Full compensation for adjusting existing utilities to grade, either by raising or lowering to finished grade, described in this section shall be considered for payment in the bid item **“Adjust Existing Utility Box to Grade”** which will be made at the unit price per **each (EA)** in the Bid Schedule, which price shall constitute full compensation for the completion of all such work as required per the Contract Documents.

Full compensation for adjusting existing utilities to grade, either by raising or lowering to finished grade, described in this section shall be considered for payment in the bid item **“Adjust Existing Valve Cover to Grade”** which will be made at the unit price per **each (EA)** in the Bid Schedule, which price shall constitute full compensation for the completion of all such work as required per the Contract Documents.

Full compensation for adjusting existing utilities to grade, either by raising or lowering to finished grade, described in this section shall be considered for payment in the bid item **“Adjust Existing Manhole to Grade”** which will be made at the unit price per **each (EA)** in the Bid Schedule, which price shall constitute full compensation for the completion of all such work as required per the Contract Documents.

Full compensation for adjusting or replacing existing monuments to grade, either by raising or lowering to finished grade, described in this section shall be considered for payment in the bid item **“Adjust or Replace Existing Monument Cover to Grade”** which will be made at the unit price per **each (EA)** in the Bid Schedule, which price shall constitute full compensation for the completion of all such work as required per the Contract Documents.

Full compensation for involving the utility owner and adjusting existing utilities to grade, either by raising or lowering to finished grade, described in this section shall be considered for payment in the bid item **“Adjust Existing Utility to Grade – Coordinate with Utility Owner”** which will be made at the unit price per **each (EA)** in the Bid Schedule, which price shall constitute full compensation for the completion of all such work as required per the Contract Documents.

Full compensation for replacing utility vaults in poor condition, described in this section shall be considered for payment in the bid item **“Remove and Replace Utility Vault”** which will be made at the unit price per **each (EA)** in the Bid Schedule, which price shall constitute full compensation for replacement of utility vaults with concrete vault and lid and for the completion of all such work as required per the Contract Documents.

Full compensation for adjusting existing utilities, either by raising or lowering to finished grade or relocating as described in this section shall be considered for payment in the bid item **“Relocate Light Pole”** which will be made at the unit price per **each (EA)** in the Bid Schedule, which price shall constitute full

compensation for the completion of all such work as required per the Contract Documents.

Full compensation for adjusting existing utilities, either by raising or lowering to finished grade or relocating as described in this section shall be considered for payment in the bid item “**Relocate Fire Hydrant**” which will be made at the unit price per **each (EA)** in the Bid Schedule, which price shall constitute full compensation for the completion of all such work as required per the Contract Documents.

Full compensation for adjusting existing utilities, either by raising or lowering to finished grade or relocating as described in this section shall be considered for payment in the bid item “**Relocate Backflow Preventer**” which will be made at the unit price per **each (EA)** in the Bid Schedule, which price shall constitute full compensation for the completion of all such work as required per the Contract Documents.

The estimated quantity of adjusting facilities are for bidding purposes only. This item may be increased, decreased, or eliminated in its entirety based on field conditions evaluated by the Engineer, and no adjustment in the contract bid price or other contract items will be made therefor. The provisions of Section 9-1.06, “Changed Quantity Payment Adjustments,” of the Standard Specifications shall not apply.

END OF SECTION

SECTION 120 SIGNS

120A. GENERAL

All signage shall conform to section 56, "Signs," of the Standard Specifications and in accordance with the details shown on the plans and the City of Petaluma Design and Construction Standards and Specifications. Existing signage affected and /or damaged by the work shall be replaced.

120B. SUBMITTALS

120B.1 STANDARD CALIFORNIA SIGNS

Contractor shall submit to the City, for approval, all sign specifications for standard California signs, as shown in the plans and these technical specifications, prior to installation. All sign references shall be based upon the 2014 California Manual on Uniform Traffic Control Devices (MUTCD).

120B.2 CUSTOM SIGNS

Contractor shall submit to the City, for approval, all sign specifications for custom signs, as shown in the plans and these technical specifications, prior to installation.

120C. MATERIALS

120D. CONSTRUCTION

120E. QUALITY CONTROL

120F. MEASUREMENT AND PAYMENT

Payment for **Signs** will be made at the contract price **Each (EA)**, which shall include full compensation for conforming to the provisions in this section, as shown in the contract plans for furnishing all labor, materials, tools, equipment, for removing existing signage, installing new signs and posts per city standards, performing all other work incidental to it, and no additional compensation will be allowed therefor.

END OF SECTION

SECTION 130 TRAFFIC STRIPING AND PAVEMENT MARKERS

130A GENERAL

Traffic stripes and pavement markings shall conform to the applicable provisions of Section 84 of the 2018 Standard Specifications, plan no. A20a thru A20G of the 2018 Standard Plans and the City of Petaluma Design and Construction Standards and Specifications.

Striping shall be the new 6" width Standard with reflective markers.

Existing signage, stripes and pavement markings which are damaged by the work shall be replaced.

The Contractor shall furnish and apply traffic stripes, characters, arrows, pavement markers, and other delineations and markings. These shall be applied in the original pattern on all streets as shown on the plans, as specified herein, or as directed by the Engineer. Contractor shall install traffic striping and markers in accordance with Sections 84 and 85, "Traffic Stripes and Pavement Markings" and "Pavement Markers".

Temporary pavement delineation shall be furnished, placed, maintained, and removed in conformance with Section 12-3.01, "General," of the Standard Specifications and these special provisions. Nothing in these special provisions shall be construed as reducing the minimum standards specified in the California MUTCD or as relieving the Contractor from the responsibilities specified in Section 7-1.09, "Public Safety," of the Standard Specifications.

All pavement markings and traffic stripes shall be applied in thermoplastic unless otherwise noted. Bike Lane Symbols and Arrows shall always be applied in paint conforming to Section 84-3, "Painted Traffic Stripes and Pavement Markings", of the Standard Specifications.

130B SUBMITTALS

The Contractor shall furnish the Engineer a Certificate of Compliance in accordance with Section 6-3.05E of the Standard Specifications for each material used. In addition, the Contractor shall furnish METS certificates that materials are authorized for use by Caltrans and MSDS sheets.

130C MATERIALS

130C.1 THERMOPLASTIC TRAFFIC STRIPES AND PAVEMENT MARKINGS

Thermoplastic traffic stripes (traffic lines) and pavement markings of the various types and sizes shall conform to the provisions in Sections 84-1, "General," and 84-2, "Thermoplastic Traffic Stripes and Pavement Markings," of the Standard Specifications and these Technical Specifications. Section 84-2.02, "Materials," of the Standard Specifications is deleted.

Thermoplastic material shall be free of lead and chromium, and shall conform to the requirements in State Specification PTH-02ALKYD.

Thermoplastic material shall conform to State Specifications 8010-41G-21. Glass beads to be applied to the surface of the molten thermoplastic material shall conform to the requirements of State Specification 8010-22L-22 (Type II), or AASJTP Designation: M 247 (Type 1).

State Specifications for thermoplastic material and glass beads may be obtained from the Transportation Laboratory, P.O. Box 19128, Sacramento, CA, 95819 (916) 739-2400.

Retroreflectivity of the thermoplastic traffic stripes and pavement markings shall conform to the requirements in ASTM Designation: D 6359-99. White thermoplastic traffic stripes and pavement markings shall have a minimum initial retroreflectivity of 250 mcd m⁻² lx⁻¹. Yellow thermoplastic traffic stripes and pavement markings shall have a minimum initial retroreflectivity of 150 mcd m⁻² lx⁻¹.

Where striping joins existing striping, the contractor shall begin and end the transition from the existing striping pattern into or from the new striping pattern a sufficient distance to ensure continuity of the striping pattern. The entire striping pattern shall be replaced.

Thermoplastic traffic stripes and pavement markings shall be applied at a minimum thickness of 0.125 to 0.150 inches. Thermoplastic traffic stripes and pavement markings shall be free of runs, bubbles, craters, drag marks, stretch marks, and debris.

When applying thermoplastic to concrete surface, the surface preparation shall be per section 84-2.03B of Standard Specification and a primer shall be used per the manufactures instructions.

Red curb paint (no parking) must be Ennis-Flint High Build Fast Dry Waterborne Traffic Paint or approved equal.

Yellow curb paints (median nose) must be Ennis-Flint Standard Dry Waterborne Traffic Paint or approved equal.

Median reflectors shall be type K-1 object markers in accordance with Caltrans standard specifications.

130C.2 Green Bike Lane Marking

The green bike lane pavement marking material must have Green pigment and anti-skid abilities.

The approved color pigmented resin shall comply with FHWA green color guidelines for bike lanes. A sample of the material that shows the color when dry (not a color chip) must be provided to the City for review and written approval at least seven (7) calendar days prior to ordering materials or installing any green markings.

Anti-skid aggregates shall be provided by the pavement marking supplier. Aggregate shall have a minimum Hardness of 7.0 Mohs Scale.

Green bike lane product shall be an epoxy modified, acrylic, waterborne coating specifically designed for application on asphalt pavements, or approved equal. Contractor shall follow the manufacturer's recommendation regarding the number of layers to be used given the heavy volume of vehicular traffic. Application must follow manufacturer's recommended cure times between layers and before opening to traffic. Lanes must be opened to traffic within one hour after the minimum cure time as recommended by the manufacturer expires.

130D CONSTRUCTION

All construction shall conform to the respective provisions of the Standard Specifications, manufacturer's installation requirements, and these Special Provisions.

130D.1 EXISTING STRIPING AND MARKINGS

In areas adjacent to the reconstructed surfacing and at all intersection involving work where existing striping must be changed to conform to a revised striping pattern, conflicting striping shall be removed by sand blasting, grinding, or other methods as specified in the Standard Specifications or by the Engineer.

The Contractor shall replace all striping which has been damaged or obliterated by or during the work. This shall include striping replacement completely across the street even in the event that the Contractor's work may not extend that far. Both lines of each crosswalk shall be completely repainted even if only a portion of a line has been obliterated.

When the Contractor's work removes or reduces the visual appearance of a lane or center line, the Contractor shall replace all striping between the adjacent intersections in both directions. Where a median exists, this work will be required

only in the roadway where the work has occurred, unless a detour which altered the pavement markings occurred in the other roadway. In such cases, the striping will be replaced in both directions.

130D.2 TEMPORARY PAVEMENT DELINEATION

A GENERAL

Whenever the work causes obliteration of pavement delineation, temporary or permanent pavement delineation shall be in place prior to opening the traveled way to public traffic. Lane line or centerline pavement delineation and pavement markings for limit lines shall be provided at all times for traveled ways open to public traffic.

Work necessary to establish the alignment of temporary pavement delineation, including required lines or marks, shall be performed by the Contractor. Surfaces to receive temporary pavement delineation shall be dry and free of dirt and loose material. Temporary pavement delineation shall not be applied over existing pavement delineation or other temporary pavement delineation. Temporary pavement delineation shall be maintained until superseded or replaced with a new pattern of temporary pavement delineation or permanent pavement delineation.

Temporary pavement markers and removable traffic tape which conflicts with a new traffic pattern or which is applied to the final layer of surfacing or existing pavement to remain in place shall be removed when no longer required for the direction of public traffic, as determined by the Engineer.

B TEMPORARY LANELINE AND CENTERLINE DELINEATION

Whenever lane lines and centerlines are obliterated, the minimum lane line and centerline delineation to be provided shall be temporary raised pavement markers placed at longitudinal intervals of not more than 24 ft. The temporary raised pavement markers shall be, at the option of the Contractor, one of the temporary pavement markers listed for short term day/night use (14 days or less) or long term day/night use (6 months or less) in "Prequalified and Tested Signing and Delineation Materials" of these special provisions.

Temporary raised pavement markers shall be placed in conformance with the manufacturer's instructions and shall be cemented to the surfacing with the adhesive recommended by the manufacturer, except epoxy adhesive shall not be used to place pavement markers in areas where removal of the markers shall be required.

Temporary lane line or centerline delineation consisting entirely of temporary raised pavement markers placed on longitudinal intervals of not more than 24 ft shall be used on lanes open to public traffic for a maximum of 14 days. Prior to the end of the 14 days, the permanent pavement delineation shall be placed. If the permanent pavement delineation is not placed within the 14 days, additional temporary pavement delineation shall be provided at the Contractor's expense. The additional temporary pavement delineation to be provided shall be equivalent to the pattern specified for the permanent pavement delineation for the area, as determined by the Engineer.

C TEMPORARY PAVEMENT MARKINGS

Whenever a pavement marking for a limit line is obliterated, the minimum temporary pavement marking shall consist of temporary removable construction grade striping and pavement marking tape. Temporary removable construction grade striping and pavement marking tape, when used, shall be applied in accordance with the manufacturer's recommendations. The color and dimensions of temporary pavement markings shall conform to the details shown on the plans for permanent pavement markings. Temporary pavement markings shall be used on lanes opened to public traffic for a maximum of 14 days. Prior to the end of the 14 days the permanent pavement markings shall be placed. Temporary pavement markings shall be removed when no longer required for the direction of public traffic, as determined by the Engineer.

130D.3 LAYOUT FOR TEMPORARY AND PERMANENT STRIPING

The alignment and layout of traffic stripes shall conform to Subsection 84-1.02, "Control of Alignment and Layout", of the Standard Specifications.

The Contractor shall physically tie down the location of the beginning and ending of each paint or thermoplastic marking type in the adjacent curb top. The marking location shall not exceed fifty square inches each. Any locations exceeding this limit shall be removed by the Contractor prior to acceptance of the work. The Contractor shall contact the City Traffic Division for review of tie downs.

The Contractor shall be responsible for accurately referencing out and replacing the lines and positions of all traffic lines, directional lines, arrows, and other markings in accordance with the plans and City standard markings by cat tracking with painted marks. This shall occur no later than two hours behind the final surface course paving operation.

Cat tracking shall consist of stretching a rope on a straight line between control points on tangent alignment and on a true arc through control points on curved alignment and placing spots of paint along the rope. Temporary tab markers shall

be placed not more than twelve (12') feet apart on curves nor more than twenty-four (24') feet apart on straight segments.

Temporary tab markers shall be the same color as the traffic stripe that they are replacing, shall measure two (2") inches tall by three and one-half (3-1/2") inches wide, and have a reflective lens across the width of the marker.

Prior to application of permanent striping and markers, the Contractor shall call for review and approval of the proposed striping by the City's Traffic Engineer or agent. The City shall have the right to make changes in the location and alignment of line stripes. Striping and traffic markings shall not be applied until after approval is granted by the Traffic Engineer. The Contractor shall allow a minimum of three (3) working days for review of the layout by the City.

130D.4 GREEN BIKE LANE MARKING

The asphalt pavement surface shall be dry and free from all foreign matter, including but not limited to dirt, dust, de-icing materials and chemical residue.

Contractor shall follow manufacturer's guidelines regarding atmospheric conditions. Coating application shall not proceed if precipitation is forecast for the immediate 24 hours after the intended date of application.

Application of coating product shall be performed using all equipment and processes specified by the manufacturer.

Green coloring shall be applied to the asphalt after installing white stripes and pavement markings. White stripes (Detail 39 or 39A) adjacent to green coloring shall be masked prior to installation of green coloring. Green coloring shall not be applied over or under bike lane markings (bike symbol and arrow or bike detector marking). Locations shown on the plans where white marking appear on green coloring shall be adjusted so that there are no white markings on green coloring.

The Contractor shall protect the pavement markings from damage and allow them to fully cure prior to allowing traffic to drive over markings. Any damage shall be corrected by the Contractor at the Contractor's expense.

130D.5 SCHEDULE

Permanent traffic striping and markings including legends and arrows shall be placed within twenty-one (21) days after paving or surfacing, unless otherwise directed by the Engineer.

Temporary yellow marking tape denoting school crosswalks shall be placed the same day that the pavement surfacing is placed.

Failure to comply with these requirements shall result in a liquidated damage of \$1,000 per day for each street that has not received permanent installation of the required raised pavement markers, traffic striping, and markings.

130D.6 PAVEMENT STENCILS

The Contractor shall use stencils which conform to Caltrans Standard Plans and Details.

130D.7 RETROREFLECTIVE PAVEMENT MARKERS

Blue retroreflective pavement markers shall be installed 6 inches from centerline at all fire hydrants.

130D.8 PAINTED TRAFFIC STRIPES AND PAVEMENT MARKINGS

Paint application shall comply with the requirements of Section 84-1, "General", and Section 84-3, "Painted Traffic Stripes and Pavement Markings", of the Standard Specifications, and the manufacturer's instructions.

130D.9 THERMOPLASTIC TRAFFIC STRIPES AND PAVEMENT MARKINGS

Pavement temperature shall be measured at the beginning of the shift on each working day and this information shall be provided to the Traffic Engineer.

No primer or thermoplastic shall be installed within forty-eight (48) hours from the last measurable rain report as provided by the City.

Thermoplastic traffic striping, legends, and arrows shall conform to the provisions of Section 84-1, "General"; Section 84-2, "Thermoplastic Traffic Stripes and Pavement Markings"; and refer to Section 85, "Pavement Markers", and these Special Provisions.

130E QUALITY CONTROL

Contractor shall provide manufacturer's certificates for all the products used, stating that the products used in this project are compliant with the requirements of this contract specifications.

Full compensation of work pertaining to Caltrans Standard Plan Details as listed below shall be considered for payment, which will be made at the contract bid item unit **price per linear feet (LF)** in the Bid Schedule, which price shall constitute full compensation for the completion of all such work including; surface preparation, layout, thermoplastic striping, pavement marker installation, regardless of the number of individual stripes and/or pavement markers comprising the detail or the number of striping passes required and all other related work per the Contract Documents. No additional compensation will be allowed therefor.

Measurement and payment for all the following items will be based upon, but not limited to, furnishing all labor, materials, tools, equipment and other incidentals necessary for preparation, layout and installation and coordination with the City Traffic Engineer shall be included in the various items of work, all shall be complete in place and no additional/separate compensation/payment shall be allowed therefor.

<u>Bid Item #</u>	<u>Description</u>
	Detail 9
	Detail 22
	Detail 32
	Detail 38
	Detail 39
	Detail 39a

Measurement and payment for Thermoplastic Pavement Markings will be based upon, but not limited to, furnishing, labor, materials, tools, equipment and other incidentals necessary for the complete layout and installation of thermoplastic pavement markings, throughout the project limits, including surface preparation, layout, markings and all other related work per the Contract Documents.

Full compensation of work pertaining to white or yellow thermoplastic pavement markings of the various types in this section shall be considered for payment in the Bid Item for **“Pavement Markings, (crosswalk, words, arrows, symbol markings, limit lines etc.)”** which will be made at the unit price **per square feet (SF)** in the Bid Schedule, which price shall constitute full compensation for the completion of all such work as required per the Contract Documents.

Full compensation of work pertaining to fire hydrant pavement marker installation shall be considered for payment in the Bid Item for **“Fire Hydrant Retroreflective Marker”** which will be made at the unit price **per each (EA)** in the Bid Schedule, which price shall constitute full compensation for the completion of all such work as required per the Contract Documents.

Unless there are separate bid items, payments for temporary pavement delineation, traffic striping layout, preparation of surface including existing traffic striping/marking/marker

removal, and coordination with the City Traffic Engineer shall be included in the various items of work and no additional/separate compensation/payment shall be allowed therefore. Replacement of traffic stripes shall be considered as included in the various items of work and no additional compensation will be allowed therefor.

Measurement of payment for **Bike Lane Striping, Green** will be based upon, but not limited to, furnishing all plant, labor, materials, tools, equipment and other incidentals necessary for the complete layout and installation of green bike lane pavement marking, throughout the project limits, including surface preparation, layout striping and all other related work per the Contract Documents.

Full compensation of work pertaining to **Bike Lane Striping, Green** of in this section shall be considered for payment in the Bid Item for **Bike Lane Striping, Green** which will be made at the unit price per **square foot (SF)** in the Bid Schedule, which price shall constitute full compensation for the completion of all such work as required per the Contract Documents.

Full compensation of work pertaining to **Red Curb Paint** shall be considered as included in the price for the various contract items of work involved and no additional compensation will be made therefor. Which shall constitute full compensation for the completion of all such work including; surface preparation, layout, and painting, regardless of the number of striping passes required and all other related work per the Contract Documents. No additional compensation will be allowed therefor.

Full compensation of work pertaining to **Yellow Curb Paint** shall be considered as included in the price for the various contract items of work involved and no additional compensation will be made therefor. Which shall constitute full compensation for the completion of all such work including; surface preparation, layout, and painting, regardless of the number of striping passes required and all other related work per the Contract Documents. No additional compensation will be allowed therefor.

Full compensation of work pertaining to median reflector installation shall be considered for payment in the Bid Item for “**Median Reflector**” which will be made at the unit price **per each (EA)** in the Bid Schedule, which price shall constitute full compensation for the completion of all such work as required per the Contract Documents.

SECTION 190
PRESERVATION OF PROPERTY

190A. GENERAL

Attention is directed to the provisions in Section 5-1.36, "Property and Facility Preservation," of the Standard Specifications and these Special Provisions.

190B. SUBMITTALS

-Not Used-

190C. MATERIALS

-Not Used-

190D. CONSTRUCTION

Existing trees, shrubs, and other plants, that are not to be removed and are injured or damaged by reason of the Contractor's operations, shall be replaced by the Contractor in accordance with the requirements in Section 20-2.03B, "Replacement," of the Standard Specifications and in accordance with the requirements contained herein.

190E. Construction fencing

The Contractor will be expected to conduct his operations in a manner, which creates a minimum amount of damage to the natural vegetation, landscape and existing site improvements. Care shall be exercised to avoid hazards that may cause injury to persons, animals or property either during working hours or after working hours, which would include dust control, backfilling trenches immediately following pipe laying, and temporary fencing as required.

The immediate construction area shall be completely fenced with temporary construction fencing prior to the start of any demolition work and during all phases of construction. This fencing shall secure the construction site from entry and shall be securely locked during non-working hours. Temporary construction fencing shall be removed upon the completion of work.

190F. QUALITY CONTROL

-Not Used-

190G. MEASUREMENT AND PAYMENT

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 therefor.

**SECTION 220
AGGREGATE BASE**

220A. GENERAL

Aggregate base shall conform to Section 26, "Aggregate Bases," of the Caltrans Standard Specifications, the City of Petaluma's Design and Construction Standards and Specifications, the plans, and these Technical Specifications.

220B. SUBMITTALS

Contractor shall submit to the City the typical gradation document of the specified aggregate base in the plans and/or these technical specifications.

220C. MATERIALS

Backfill material shall be Class 2 aggregate base three-quarter (3/4) inch maximum conforming to Section 26 of the Standard Specifications.

220D. CONSTRUCTION

220D.1 AGGREGATE BASE

The constructed thickness of the aggregate base layer shall not be less than the design thickness minus 0.04' (1/2 inch). Aggregate base shall be Class 2, 3/4 inch maximum, and shall be firm and unyielding. The minimum sand equivalent shall be 31 for any individual test. The requirements to use recycled Class II Aggregate base shall only be approved by the ENGINEER.

220E. QUALITY CONTROL

Aggregate must comply with the grading requirements as shown in Section 26 of the Standard Specifications

220F. MEASUREMENT AND PAYMENT

Full compensation for Aggregate Base shall be considered as included in prices paid for the various contract items of work involved and no additional compensation will be allowed therefor.

END OF SECTION

SECTION 301

COLD PLANING/GRINDING

301A. GENERAL

Cold planing/grinding shall include all work necessary to remove existing asphalt pavement to depth as indicated on the drawings or these specifications. The work includes, but is not limited to, removal of the existing pavement including but not limited to edge grinding and ends of overlays. Existing pavement surface on roadways to be milled prior to pavement overlay shall be cold planed as specified herein.

301B. SUBMITTALS

301C. MATERIALS

301C.1 EQUIPMENT

The machine used for planing shall have performed satisfactorily on similar work and shall meet the following requirements herein.

The planing machine shall be specifically designed and built for the planing of bituminous pavements without the addition of heat to soften the pavement during or prior to the planing operation.

The machine shall be capable of being operated at speeds of zero to forty feet per minute. It shall be self-propelled, and have the capability of spraying water at the cutting drum to minimize dust. The machine shall be operated in such a way so that no fumes or smoke will be produced. The machine shall be capable of removing the paving material next to curbs or gutters and be designed such that the operator thereof can at all times observe the planing operation without leaving the controls. The machine shall be adjustable for slope and depth and shall be equipped with sonic sensing devices for controlling depth.

Prior to cold planing, all utility facilities shall be lowered to 1" below the grinding planes.

301D. CONSTRUCTION

301D.1 PAVEMENT REMOVAL

Prior to cold planing, all utility covers shall be lowered such that the cutting teeth of the planing machine passes over the adjusted lid without causing damage to the lid or frame. Contractor will be responsible for maintaining any temporary asphalt fill material over these facilities until the final paving surface is installed. The Contractor shall clearly

mark or reference all lowered utility covers in case emergency access is required by the responsible agency

301D.2 CONCRETE GRINDING

Prior to grinding, all utility covers shall be lowered such that the cutting teeth of the planing machine passes over the adjusted lid without causing damage to the lid or frame. Contractor will be responsible for maintaining any temporary fill material over these facilities until the leveling is complete. The Contractor shall clearly mark or reference all lowered utility covers in case emergency access is required by the responsible agency

301D.3 REMOVAL AND DISPOSAL OF MATERIAL

During the cold planing operation, the Contractor shall sweep the roadway with mechanical equipment and remove all loosened material from the project site until completion of the removal work.

All material removed shall be considered the property of the Contractor and shall be removed and disposed of in accordance all applicable laws at the Contractor's expense.

301D.4 AIR POLLUTION CONTROL

The Contractor shall take all necessary measures to avoid the dispersion of dust. Attention is directed to Subsection 7-1.01F of the Standard Specifications and "Dust Control" of these Technical Specifications.

301D.5 TEMPORARY TRANSITIONS

The Contractor shall construct temporary pavement transitions prior to allowing traffic onto cold-planed pavement areas. Such transitions shall have a maximum slope of 20:1 and be constructed on Kraft paper or other suitable bond breaker such that upon removal of the transition a clean notch remains. Temporary transitions are not necessary in traffic areas if the drop off is less than 0.10 feet. Temporary transitions shall be required at all conforms, pedestrian ramps, cross gutters and driveways with drop offs greater than 0.10 feet.

301D.6 CORRECTION OF TEAR-OUT AREAS

If tear-out to the underlying layers occurs during the cold planing operation, the Contractor shall adjust his operation to minimize tear-out. Corrections shall include changing operation speed and replacing cutting teeth. Changes in cold planing depth shall only be made with approval of the Engineer.

Areas torn out by lack of diligence on the Contractor's part shall be corrected by placement of asphalt concrete conforming to the requirements of these special conditions. Areas torn out due to pre-existing adhesion problems in the existing asphalt concrete shall be immediately reported to the Engineer.

301E. QUALITY CONTROL

301E.1 TOLERANCES

The pavement surface after cold planing shall be uniformly rough. The grade shall not deviate from a suitable straight edge more than 1/4 inch at any point. When multiple passes are required to create the cold planed surface, the maximum variation from a string-line or straight edge shall be 1/4 inch high to 1/2 inch low. High points out of tolerance shall be re-planed to fall within tolerance. Low areas shall be filled with asphalt concrete as specified herein to meet tolerances. The cost of such correction of low areas shall be entirely the Contractor's.

301F. MEASUREMENT AND PAYMENT

Payment for **5" Cold Planing/Grinding** shall be paid for at the contract price per **square yard (SY)** for asphalt overlay and paving, which shall include full compensation for furnishing all labor, materials, tools, equipment, for grinding existing asphalt concrete per contract documents and no additional compensation will be made therefor.

Payment for **6" Cold Planing/Grinding** shall be paid for at the contract price per **square yard (SY)** for asphalt overlay and paving, which shall include full compensation for furnishing all labor, materials, tools, equipment, for grinding existing asphalt concrete per contract documents and no additional compensation will be made therefor.

Payment for **Sidewalk Conform Grinding** shall be paid for at the contract price per **square foot (SF)** for grinding concrete sidewalk that has heaved, which shall include full compensation for furnishing all labor, materials, tools, equipment, for grinding existing concrete per contract documents and no additional compensation will be made therefor.

SECTION 303 PAVEMENT FABRIC

303A. GENERAL

This work consists of furnishing and installing Tensar Glasgrid GG8511TF Pavement Reinforcing Fabric (GLASGRID), or approved equal, pavement fabric as shown on the plans in accordance with Section 39 for “Geosynthetic Pavement Interlayer,” of the CSS, as shown on the plans, described in these Specifications, in accordance with the manufacturer’s instructions, and as directed by the Engineer.

303B. SUBMITTALS -Not used-

303C. MATERIALS -Not used-

303D. CONSTRUCTION -Not used-

303E. QUALITY CONTROL -Not used-

303F. MEASUREMENT AND PAYMENT

The contract price paid for **GLASGRID** are paid in a unit of area in **square yard (SY)** as determined from field measurement. The contract unit price paid for this item shall include full compensation for all labor, materials, tools, equipment, and incidentals as shown in the Plans, specified in these Specifications, and as designated by the Engineer.

SECTION 310
ASPHALT CONCRETE

310A. GENERAL

All Asphalt concrete (AC) work shall be as specified in Section 39, "Asphalt Concrete", of the Standard Specifications; these Technical Specifications; and the plans and typical sections.

310B. SUBMITTALS

The CONTRACTOR will be required to furnish the Engineer with a mix design for each type of asphalt concrete to be used on the project. The mix design shall include a list of material sources and a Certificate of Compliance signed by the material supplier or his representative indicating that the materials to be incorporated in the work fulfill the requirements of these specifications. This submission will be provided fifteen (15) calendar days or ten (10) working days prior to the start of work. If requested, the CONTRACTOR will also provide aggregate and binder samples or a plant produced mix sample for mix design verification.

310C. MATERIALS

310C.1 MIX TYPES

The asphalt concrete mix to be used will be as follows unless modified by the Engineer:

- A. Full Depth AC Plug: 3/4 inch Maximum, Type A, Medium – PG 64-16.
- B. AC Overlay or AC Surface Courses: 1/2 inch Maximum, Type A, Medium – PG 64-16

310C.2 BINDER TYPES

The asphalt grade shall be PG 64-16 conforming to Section 92, "Asphalts", of the Standard Specifications. The bitumen ratio shall not vary by more than 0.3% above or 0.3% below the value specified in the approved mix design.

310C.3 TACK COAT

Tack coat shall be utilized and shall be emulsified asphalt Grade RS-1h or SS-1h and shall conform to Section 94, "Asphaltic Emulsions", of the Standard Specifications and section 4-302 "Tack Coat" of these Technical Specifications.

310C.4 CONTRACTOR SUPPLIED MIX DESIGNS

The mix designs shall be prepared by laboratories and personnel with current Caltrans certification. The asphalt concrete mixtures shall conform to all of the provisions of Section 39 of the Standard Specifications and to the following requirements:

- A. The asphalt concrete air void content shall be between 3% minimum and 3.5% maximum and the S-value shall be 37 or greater.
- B. Up to 10% recycled asphalt pavement may be incorporated into the mix.
- C. In no event shall there be less than two percent passing the No. 200 sieve.

As a minimum, the mix design shall indicate the percentage passing for each specified sieve, the percent of asphalt, the laboratory compacted unit weight, the theoretical unit weight (Rice Gravity), and the stability of the mix to be used for each asphalt concrete mixture to be incorporated on the project. The mix design, with allowable tolerance for a single test, shall be used for job control.

310C.5 DELIVERY TICKETS

Each delivery ticket shall include information on the material type, binder type, oil content, and the mix design number. Material delivered to the project without such annotations shall be subject to rejection. No payments shall be made without load tickets and the acceptance of those tickets by the Engineer at the end of the day of delivery.

310D. CONSTRUCTION

310D.1 PAVING

A. SURFACE PREPARATION

The work shall consist of preparing the existing street surfaces prior to the commencement of paving. Such work shall include, but not limited to, removing raised pavement markers, removing thermoplastic traffic markings and legends, controlling nuisance water, sweeping, watering, and removing loose and broken asphalt concrete pavement and foreign material as specified in the Standard Specifications and these Technical Specifications, and as directed by the Engineer.

Existing concrete or asphalt concrete shall be cut in a neat line along the lip of gutter and in locations as designated on the plans or as indicated by the Engineer to a minimum depth of 0.50 foot with a power driven saw before the concrete or asphalt concrete is removed.

The CONTRACTOR shall locate all surface facilities by triangulation measurement in advanced of paving operations.

B. PRIME COAT

No prime coat is required.

C. TACK COAT

Tack coat shall be applied to all existing asphalt concrete or Portland cement concrete surface (vertical and horizontal) to be paved over. The tack coat shall conform to the requirements in Section 39 of the Standard Specifications and Section 11-1.09 herein.

All vertical edges to be paved against shall be tack coated. These include, but are not limited to, curb faces, gutter lips, gutter pans, curb faces, swale edges, cross gutter edges, and asphalt concrete edges.

The rate of tack coat shall be 0.15 gal/sy (80% emulsified asphalt and 20% water) approximately. The application of tack coat shall be approved by the Engineer prior to placing the mix. Tack coat shall be applied prior to placing the subsequent layer unless placed in the same day.

D. COLD JOINTS

All cold joints, both longitudinal and transverse, shall be heated with a torch immediately prior to paving. Cold joints include previous passes placed more than three hours prior. All cold joints shall be tack coated.

E. ASPHALT CONCRETE FILLS

Digout areas to receive full-depth AC stabilization shall be completed prior to performing paving work.

F. LAYOUT

The CONTRACTOR shall layout and mark the location of the edges of the surface course paving passes. The layout shall be made at least 2 hours prior to paving. The layout shall be approved by the Engineer prior to paving.

In all cases where practical, each lane shall be paved in a single pass. In tapered transition areas, the shoulder areas shall be paved first, and then the through lane shall be hotlapped immediately after the shoulder paving.

For paving which incorporates new quarter-points or grade breaks due to keycuts or other conditions, the CONTRACTOR shall provide equipment capable of adjusting to the new surface profile at the appropriate locations. The profile adjustments shall be within twelve inches of the actual quarter-point or grade break.

The CONTRACTOR shall take sufficient measurements during laydown to assure that the full design asphalt concrete layer depth is provided at each quarter-point,

grade break, or transition. Failure to provide the design depth at these areas shall result in rejection of the work. Correction of this rejected work will include milling out the new asphalt concrete from the road edge to the centerline or nearest inside lane line and repaving. The minimum length of the milled and corrected area shall be fifty feet.

The minimum ambient temperature to begin paving shall be 55 degrees F and rising.

G. ROLLING, COMPACTION AND PAYMENT REDUCTION

In addition to the requirements of Subsection 39-3.03, "Spreading and Compacting Equipment," of the Standard Specifications, the number of rollers required for each paving operation shall be such that all rolling for density can be completed before the temperature of the asphalt concrete mixture drops below 240 degrees Fahrenheit. Breakdown rolling shall commence when the asphalt concrete is placed. Rolling shall be accomplished with the drive wheel forward and with the advance and return passes in the same line.

The CONTRACTOR shall compact the asphalt concrete to meet the compaction requirements between 91-97% of maximum theoretical density as shown in subsection 39-2.03 "Acceptance Criteria" of the Standard Specifications 2010. The compaction shall be computed for each lot, with a maximum lot size of 500 tons. Each street segment of less than 500 tons shall be its own unique lot.

Core density/nuclear gauge shall be done per CTM 375, "Determining the In-Place Density and Relative Compaction of Asphalt concrete Pavement Using Nuclear Gages".

310E. QUALITY CONTROL

310E.1 TOLERANCES

The finished asphalt concrete surface shall be flush with, to 1/4 inch (0.020 feet or 6 mm) above, the gutter lips.

The average pavement thickness shall be equal to the specified thickness for the project.

For total pavement thicknesses of less than four inches, the minimum allowable thickness will be 1/4 inch less than that specified.

Core densities shall be taken at a rate of no less than one core per 500 tons of mix.

If compaction fails by nuclear methods, then core density/nuclear gauge correlation and/or core densities shall be used to establish compaction.

When core density is used to determine compaction, all cores shall be paid for by the CONTRACTOR.

Compaction failing to meet the above criteria shall be subject to the payment reductions as shown in (Standard Specifications 2010) subsection 39-2.03, "Acceptance Criteria."

The CONTRACTOR shall have hand-compaction equipment immediately available for compacting all areas inaccessible to rollers. Hand-compaction shall be performed concurrently with breakdown rolling. If for any reason hand-compaction falls behind breakdown rolling, further placement of asphalt concrete shall be suspended until hand-compaction is caught up. Hand-compaction includes vibratory plates and hand tampers. Hand torches shall be available for rework of areas which have cooled.

After compaction, the surface texture of all hand work areas shall match the surface texture of the machine placed mat. Any course or segregated areas shall be corrected immediately upon discovery. Failure to immediately address these areas shall cause suspension of asphalt concrete placement until the areas are satisfactorily addressed, unless otherwise allowed by the Engineer.

310E.2 SAMPLING

The Engineer may sample the asphalt concrete from truck beds at the plant, from the hopper of the spreading machine, or from the completed mat at the discretion of the Engineer. The CONTRACTOR shall facilitate the sampling process.

310F. MEASUREMENT AND PAYMENT

AC Overlay shall be paid for at the contract price per **ton (Ton)** for asphalt overlay and paving, which shall include full compensation for furnishing all labor, materials, tack coats, tools, equipment, for installing asphalt concrete per contract documents and no additional compensation will be made therefor.

AC Full Depth Conform shall be paid for at the contract price per **ton (Ton)** for asphalt overlay and paving, which shall include full compensation for furnishing all labor, materials, tack coats, tools, equipment, for installing asphalt concrete per contract documents and no additional compensation will be made therefor.

End of Pavement Rehabilitation Conform shall be paid for at the contract price per **ton (Ton)** for asphalt overlay and paving, which shall include full compensation for furnishing all labor, materials, tack coats, tools, equipment, for installing asphalt concrete per contract documents and no additional compensation will be made therefor.

Payment for **Saw Cutting** shall be considered as included in the price for the various contract items of work involved and no additional compensation will be made therefor.

Payment for **Conforming to Existing** shall be considered as included in the price for the various contract items of work involved and no additional compensation will be made therefor.

END OF SECTION

SECTION 311
COLD CENTRAL PLANT RECYCLING

311A. GENERAL

This work shall consist of Cold Central Plant Recycling (CCPR) of Reclaimed Asphalt Pavement (RAP) milled from roadways within the project limits and stockpiled at the Petaluma Airport and as shown on the plans. RAP cannot be taken off-site to any other production facility or alternate plant location. All RAP milled from project locations must be used for recycled CCPR paving operations and must be utilized in mix design. Excess RAP that is not used on the project is the property of the Contractor.

The RAP shall be clean, free of contamination of dirt, base, concrete or other deleterious materials. The stockpiled RAP shall be crushed and screened to 100% of the crushed RAP passing a 1-inch sieve. The properly sized RAP to be recycled shall then be blended with an emulsified asphalt recycling agent and cement additive, as required by the CCPR Contractor's Mix Design, to produce a recycled asphalt concrete. This material shall then be placed and compacted in accordance with the Plans and specifications, and as directed by the Engineer.

311B. SUBMITTALS

At the time of bid, the Contractor shall furnish the following information regarding the Cold Central Plant Recycling (CCPR) to the Engineer. Approval of the Contractor or Subcontractor performing the CCPR is at the discretion of the Engineer.

1. Emulsion and emulsion supplier. Identification that the proposed recycling emulsion has been successfully used on at least five (5) other CCPR asphalt projects in California over the past three (3) years, including project name, agency/owner, project engineer, and construction dates.
2. Description and specification of the proposed CCPR recycling unit and support equipment, construction methods.
3. The Contractor (or Subcontractor) shall have completed a minimum of five (5) CCPR asphalt projects in the last three (3) years. Submit project name, agency/owner, project engineer, and construction dates.
4. The CCPR recycling unit shall demonstrate the ability to crush and screen the RAP used in the CCPR process and remove pavement reinforcing fabric during the recycling process.
5. Verification the CCPR recycling unit meets the proportioning requirements and the applicable Air Quality Control district permits.
6. Quality Control Plan.

311C. JUST IN TIME TRAINING

Attending a 2-hour minimum Just-In-Time Training (JITT) shall be mandatory, and consist of a formal joint training class on cold recycled asphalt materials, required special equipment, placement and compaction methods, and quality control. Construction operations for cold recycling shall not begin until the Contractor's and the Engineer's personnel have completed the JITT. The JITT class shall be conducted for not less than 2 hours on cold recycling operations and recycled paving techniques. The training class shall be conducted at a project field location convenient for both the Contractor and the Engineer. The JITT class shall be completed not more than 3 days prior to the start of cold recycling operations. The class shall be held during normal working hours. The Contractor shall provide the JITT instructor. The instructor shall be experienced in the construction methods, materials, and test methods associated with construction of cold recycle asphalt projects. A copy of the course syllabus, handouts, and presentation material shall be submitted to the Engineer at least 7 days before the day of the training. The Contractor and the Engineer shall mutually agree to the course instructor, course content, and training site. Just-In-Time Training shall not relieve the Contractor of responsibility under the contract for the successful completion of the work in conformance with the requirements of the plans and specifications.

311D. MIX DESIGN

A mix design shall be submitted by the CCPR Contractor using representative samples of the asphalt concrete to be recycled obtained directly from the Project site. The mix design shall be certified by a licensed Civil Engineer experienced in cold recycled pavements. The job mix formula shall meet the criteria of Table 1 and be approved by the Engineer.

TABLE 1

CIR Mixture Design Requirements	Requirement
Gradation of Reclaimed Asphalt Pavement (RAP): CT 202	1-inch maximum
Asphalt Content of RAP: CT 362 or CT 379 or ASTM D 2172 Method B	Report
Bulk Specific Gravity of Compacted Samples ^{a, b} : CT 308, Method C	Report
Maximum Theoretical Specific Gravity ^b : CT 309, including provisions of Section J	Report
Air Voids of Compacted and Cured Specimens ^b : CT 367 Part B	Report
Marshall Stability, Cured Specimen ^b : AASHTO T 245 104 °F (min)	1250 lb
Marshall Retained Stability, AASHTO T 245, 104 °F based on Moisture Conditioning on Cured Specimen (min) ^{b, c}	70% ^d
Ratio of Emulsion Residue to Cement (min)	3.0
Raveling Test of Cold Mixed Bituminous Emulsion, ASTM D 7196, 50 °F (max)	7.0
RAP Coating Test, ASSHTO T59 ^e , (min)	Good

Notes:

- a 4-inch diameter mold compaction based on either 75 blow Marshall on each side or gyratory compactor at 30 gyrations.
- b Test specimens after 140°F curing to constant weight between 16 hours and 48 hours.
- c Vacuum saturation from 55 percent to 75 percent. Water bath at 77 °F for 23 hours, with the last 30 minutes to 40 minutes in 104 °F water bath.
- d The Marshal Retained Stability ratio may be reduced to 60%, providing the saturated Marshall Stability is at least 1500 lbs.

e Modify ASSHTO T59 using jobsite RAP, emulsified recycling agent and water application rates that have been determined in the CCPR mix design and submitted in job mix formula.

During the mix design, the Contractor shall determine the target values for penetration at 25°C and viscosity at 60°C of the emulsified recycling agent to be used in production of the recycled pavement mixture.

The mix design report shall include gradation of dry RAP, RAP asphalt content, recommended mixing water content range as a percentage of dry RAP; optimum emulsion content as a percentage of dry RAP; amount of cement additive as a percentage of dry RAP; and corresponding density, air void level, Marshall stability, retained stability, compaction method used to determine reported stability, and raveling at recommended moisture and emulsion contents. For the emulsified recycling agent and cement additive, include the designation, company name, location, residue content, and Certificates of Compliance.

310D.1 MIX TYPES

- I. **Emulsified Recycling Agent** – The type of emulsified recycling agent to be used shall be determined by the mix design. An experienced and qualified technician (“Qualified Technician”) shall be at the job site during mixing operations to monitor the characteristics and performance of the emulsified recycling agent. Throughout the job the Qualified Technician shall be available to monitor the mixing, placement and compaction of the recycled asphalt concrete and make adjustments to the emulsified recycling agent formulation as required to improve coating, increase or decrease moisture content to aid in compaction or adjust breaking properties of the emulsion.

The asphalt binder used to make the emulsified recycling agent shall be in compliance to the Bending Beam requirements of the Performance Graded (PG) Asphalt Binder Specification AASHTO M320. This will verify its suitability in meeting the low temperature climatic requirements of the given region where the recycled asphalt concrete will be placed.

The Certificate of Compliance (COC) shall indicate the target value for penetration and the Bending Beam results. The Emulsified recycling agent shall be a polymer modified rejuvenating emulsion with a latex polymer, rejuvenating agent, and asphalt and shall conform to the requirements of Table 2:

Table 2 Emulsified Recycling Agent Requirements

	Test Method	Requirement	
		Minimum	Maximum
Tests on emulsion:			
Sieve test, % of weight sample	AASHTO T59 ^a	---	0.1
Residue by distillation, %	AASHTO T59 ^a	60	--
Total Distillate from distillation	AASHTO T59 ^a	--	1.0
Tests on residue by distillation:			

Penetration at 25°C, 100 g / 5 sec (TV) (min)	AASHTO T49 ^{b,d}	TV +/- 25 percent ^c
Absolute Viscosity at 60°C, pascal second (x10 ⁻¹) (TV) ^c	AASHTO T2171	Report Only

Notes:

^a Modify AASHTO T 59 - distillation temperature of 350 °F with a 20 minute hold.

^b Target value (TV) is determined for emulsified recycling agent chosen for use and submitted in job mix formula.

^c Sieve residue from distillation on No. 20 sieve before determining viscosity.

^d Modified procedure may be used: The sample shall be removed from the bath, shaken gently to remove free water from the surface of the specimen, tested in a dry surface state, and then immediately replaced in the water bath in less than 60 seconds. Repeat for determination.

The Contractor shall provide current test results and a COC for the emulsified recycling agent and cement additive at the time of mix design. A COC shall also be provided for each load delivered to the jobsite. The Contractor shall obtain two 1-quart minimum samples of emulsified recycling agent from each load delivered to the project. One sample shall be used for the Contractor's quality control testing. The remaining samples shall be delivered to the Engineer at the end of each working day. Emulsified recycling agent shall be sampled in plastic containers that are clean, dry, and sealed. Each sample shall be labeled with the date and time sampled and the bill of lading number from the delivery vehicle. Emulsion samples shall be retained and protected from damage or contamination by the Contractor until the project is accepted.

- II. **Crushed RAP** - The stockpiled RAP shall be crushed and screened as necessary to conform to the following sizing requirement prior to the addition of the emulsified recycling agent:

Sieve Size	Percentage Passing
1-Inch	100

Rubberized crack filler, pavement markers, loop wires, thermoplastic markers, fabric and other like materials that may be incorporated into the RAP as it is removed from the roadway shall be removed by the screening process. A minor amount of these residual materials that cannot be completely removed from the processed RAP may be incorporated into the recycled mix if the Contractor can demonstrate that those added materials will not adversely affect the performance of the recycled asphalt pavement. Any such materials retained in the mix shall be appropriately sized and blended so as not to adversely affect the appearance or strength of the recycled pavement.

Crushed and screened RAP shall not be stockpiled for longer than 10 days or in stockpiles greater than 20 feet in height that may, through the weight of the stockpile, reconsolidate the crushed and screened RAP. Water shall be added to the RAP as it is screened and crushed to abate dust and mitigate reconsolidation.

- III. **Water** - Water may be added to facilitate the uniform mixing of the emulsified recycling agent and the processed RAP. Water added to the recycled asphalt concrete shall be potable, clean and free from deleterious concentrations of acids, alkalis, salts, sugar and other organic or chemical substances. The water shall not contain an amount of impurities that will cause a reduction in the strength of the recycled asphalt concrete pavement. If the water is of questionable quality, it shall be tested in accordance with AASHTO T26.
- IV. **Cement Additive** – Type II Portland cement shall be added to the recycled pavement mixture to meet the requirements of Table 1 and to aid in curing and early strength gain. Source and percentage used shall be described in the job mix formula submittal.

311E. CONSTRUCTION METHODS

310E.1 WEATHER LIMITATION

Recycling and placement operations shall not be performed during wet conditions or if rain or cold conditions (less than 50°F) are imminent or predicted to exist at any time. “Imminent or predicted” is defined as being forecasted within a 48-hour period on the National Weather Service Web Site <http://www.wrh.noaa.gov> for the most representative and nearest location listed where recycling is to begin and end.

Recycling and placement operations shall not be performed unless the ambient temperature is a minimum of 50°F and unless the National Weather Service Web Site forecasts that the ambient temperature will be a minimum of 60°F within 3 hours after the start of placement operations and will remain above 60°F throughout the recycling operation until all initial compaction and protection efforts have been completed for that day’s run.

Recycling mixing operations shall be ceased if actual ambient temperatures drop below 60°F anytime after the initial 3-hour window following start-up. In the event CCPR pavement is placed and weather conditions deteriorate soon after, it is then a requirement that all traffic stay off the recycled mat until weather conditions improve (temperature rises and humidity drops) and the recycled section has “cured” sufficiently for secondary compaction to take place in accordance with the Cure and Maintenance requirements of this specification. The Contractor will be responsible for maintaining and protecting the recycled surface. Any recycled asphalt surfacing damaged by inclement weather shall be replaced by the Contractor at the Contractor’s expense as directed by the Engineer.

All CCPR mixing and paving operations shall be completed a minimum of 2 hours before sunset to allow for compaction and protection operations.

310E.2 SUBGRADE AND SURFACE PREPERATION

Prior to placing recycled pavement the subgrade soils/base shall be properly prepared, moisture treated and compacted to a minimum of 95 percent relative compaction based upon ASTM D 1557 so as to create an evenly graded, unyielding surface. If the recycled pavement is to be placed on an existing milled pavement surface it shall be verified that the milled surface is firm and unyielding and there are no subgrade failure areas beneath the milled surface that might compromise the integrity of the recycled pavement. When CCPR pavement is placed on a milled surface or adjacent to structures such as curbs, concrete gutters, swales, planters, etc... these contact surfaces shall be swept of all loose material to create a dry clean surface. A tack coat of diluted (50:50) SS-1h emulsion, emulsified recycling agent or equivalent (0.05 gallon per square yard minimum) shall be applied to all surface areas prior to placing the recycled pavement.

CCPR pavement is not recommended as a direct overlay on existing asphalt pavement without first milling the underlying pavement to aid in bonding and to prevent slippage. Successive layers of recycled pavement may be paved without milling but requires that each layer be fully cured and compacted before placing the overlay section. See "Placement" in this specification.

310E.3 MIXING AND PROPRTIONING

The recycled material shall be processed through a material sizing unit having screening and crushing capabilities to reduce the RAP to the maximum size of 1-inch prior to mixing with the emulsified recycling agent.

After crushing and sizing, the recycled material shall be processed in a mixing unit capable of processing the sized RAP, emulsified recycling agent, water and cement additive to a homogeneous mixture to produce recycled asphalt concrete. The mixing unit shall be equipped with a belt scale for the continuous weighing of the RAP and a coupled/interlocked computer-controlled liquid metering device. The mixing unit shall be an on-board completely self-contained counter rotating twin shaft pugmill appropriately rated by the manufacturer for the production levels used by the Contractor. The liquid metering device shall be capable of automatically adjusting the flow of emulsified recycling agent to compensate for any variation in the weight of the RAP introduced into the pugmill. Emulsified recycling agent shall be metered by weight of RAP using a mass flow, coriolis effect, type meter that will accurately measure the amount of emulsified recycling agent to within 0.5 percent of the amount required by the mix design or as adjusted in the field and approved by the Engineer. Cement additive and water as required, shall be controlled and metered using the weight of the RAP introduced into the pugmill. Additives may be introduced volumetrically or by weight per the mix design. The CCPR Contractor shall calibrate and verify the accuracy of the recycle plant not less than five days before recycle operations are to begin.

Automatic digital readings shall be displayed for both the flow rate and total amount of RAP, emulsified recycling agent, and additives in appropriate units of weight and time.

The emulsified recycling agent, cement additive and water shall be incorporated into the graded RAP at the initial rate determined by the mix design and approved by the Engineer. The total water content shall include that amount present in the stockpile and additional mixing water at the pugmill if required. Adjustments in the rate of emulsified recycling agent, cement additive and water shall be determined by the Qualified Technician and made as necessary based on the coating, compaction and breaking properties of the recycling emulsion. Sampling variations and mix design may determine the necessity of different levels of emulsified recycling agent and/or additives in various sections of the project.

When a paving fabric is encountered during the cold milling operation, the CCPR Contractor shall make the necessary changes in equipment or operations so that incorporation of the shredded fabric in the recycled material does not affect the performance parameters of the recycled asphalt concrete or inhibit placing or compaction of the CCPR pavement. No fabric piece incorporated into the recycled section shall have any dimension exceeding a length of 2-inches. The Contractor shall be required to remove and properly dispose of oversized pieces of paving fabric as directed by the Engineer.

Similarly, loop wires, pavement markers, rubberized crack fill materials, thermoplastic marking materials, milled concrete, and other materials that may be incorporated into the RAP through the milling process shall be removed from the recycled material unless the Contractor can demonstrate that minor amounts of residual materials that remain will not compromise the integrity of the recycled asphalt.

If fabric or other deleterious material is determined to exist within the section to be recycled and is not identified in the project documents, removal and disposal of the fabric during CCPR activities will be considered and paid for as extra work.

310E.4 TRANSPORTATION

Trucks with smooth clean beds shall be used to haul the recycled asphalt concrete mixture to the placement area. The loaded trucks shall deliver the blended material into the paver within 1 hour of mixing or before the emulsion begins to break and set, whichever time is earlier.

310E.5 PLACEMENT

Recycled pavement shall be spread using a self-propelled paver having electronic grade and cross slope control for the screed. The equipment shall be of sufficient size and power (minimum 170 hp), equipped with paving skis to spread the recycled material in one continuous pass, without segregation, to the lines and grades established by the Engineer and according to Plans. Heating of the paver screed is not permitted.

CCPR pavement shall be placed to the finished thickness as specified by the Engineer. A single lift thickness shall be at a minimum compacted depth of 2 inches and no more than

4 inches. Before placing any additional lifts, the recycled surface shall be allowed to cure until the moisture of the material is reduced to 2.0 percent or less or has remained in place for a minimum of 10 days without rainfall upon the Engineer's approval. Compaction of the first layer, and any subsequent layers to be overlaid shall be performed and verified per the Compaction and Cure and Maintenance requirements of this specification. Prior to installing any additional lifts, contact surfaces shall be carefully swept of all loose material to create a dry clean surface. A tack coat of SS-1h emulsion, emulsified recycling agent or equivalent (0.05 gallon per square yard minimum) shall be applied to all surface areas prior to placing any additional lifts.

When a pick-up machine is used for transferring the recycled material from a windrow to the receiving hopper of the paver, the pick-up machine shall be capable of removing and transferring the entire windrow of recycled mix in a single pass.

Handwork of CCPR pavement shall be minimized and care shall be taken to prevent segregation. The wings of the paver shall be emptied regularly to prevent buildup and to minimize segregation.

310E.6 COMPACTION

Compacting the recycled mix shall be completed using self-propelled rollers, complete with properly operating scrapers and water spray systems. Rollers of the vibratory- steel drum and pneumatic tired type shall be used. They shall be in good condition, capable of operating at slow speeds to avoid displacement of the mixture.

Compaction operations shall start no more than 15 minutes behind the paver, unless the ambient temperature is below 60 deg F. For each 5 deg below 60 deg F another 10 minutes can elapse before rolling begins, or at the direction of the Qualified Technician and/or Engineer. The number, weight and types of rollers shall be as necessary to obtain the required compaction. At a minimum the following rollers shall be used:

At least one pneumatic roller with a minimum gross operating weight of not less than 25 tons. Tires on the pneumatic rollers shall be evenly inflated and matched in size and profile so as to maximize compactive effort.

At least one double drum steel vibratory roller with a gross operating weight of not less than 10 tons with a minimum drum diameter of at least 60-inches.

Rolling patterns shall be established in the field by the Contractor and verified by the Engineer to achieve a maximum density determined by nuclear density testing. A rolling pattern for compaction shall be determined such that no increase in density is shown on successive nuclear density tests (per ASTM D 2950) for any additional passes of the compaction equipment once the maximum density pattern has been identified ("break over point"). Nuclear density testing shall be repeated throughout the time compaction is being completed to continuously verify the compaction is achieving maximum density results by establishing a rolling vs. density chart that shows the progress of densification

from initial breakdown compaction through maximum obtainable density at the break over point.

Care shall be taken not to over compact the mat. A Qualified Technician shall be on site and observing all compaction efforts, monitoring density gauge readings, and approving areas as they reach maximum density. The minimum rolling pattern shall be as follows:

Two complete coverages with the double drum steel vibratory roller immediately after the recycled mix is placed. The first coverage shall be made without the vibratory unit turned on and the second with the vibratory unit operating.

Two complete coverages with the pneumatic-tired roller shall be made after the initial passes of the steel roller.

Final rolling, before cure, to eliminate pneumatic tire marks and to achieve maximum density shall be done by the double drum steel roller, either operating in a static or vibratory mode.

Nuclear density testing shall be repeated throughout the time secondary compaction is being completed to continuously verify that the secondary compaction is within 5% of the maximum density results. A Qualified Technician shall be on site and observing all compaction efforts, monitoring density gauge readings, and approving areas as they reach maximum density. The recycled mat shall be continuously observed during compaction efforts. If moisture cracking occurs under the vibratory compaction mode, the vibrators shall be turned off and static rolling only applied. If moisture cracking of the mat continues under static steel rolling, steel drum compaction shall cease, the mat shall be allowed to cure for a time in order for some moisture to escape, and pneumatic rolling commenced, followed by steel rolling to iron out irregularities from the rubber-tired roller(s). This procedure shall be followed until there is no longer any displacement of the mat observed by roller action on the recycled surface.

The selected rolling pattern shall be followed unless changes in the recycled mix or placement conditions occur and a new rolling pattern is established at that time. Any type of rolling that causes cracking, major displacement and/or any other type of pavement distress shall be discontinued until such time as the problem can be resolved. Discontinuation and commencement of rolling operations shall be at the discretion of the Engineer.

Extra care shall be taken to ensure that aggregate from the recycled mixture does not stick to the drums or wheels of the rollers. Water shall be uniformly applied to the wheels and drums, along with mechanical means to keep aggregate from sticking. Sufficient water shall be applied to keep rollers and tires clean, but not so much that water pools or ponds on the recycled surface.

Rollers shall not be started or stopped on uncompacted recycled material. Rolling patterns shall be established so that starting and stopping shall be on previously compacted material or the adjacent, existing surfacing.

310E.7 CURE AND MAINTENANCE

After the completion of compaction of the recycled material, no traffic, including that of the Contractor, shall be permitted on the recycled material for at least two hours. This may be reduced if sufficient care is established for traffic that will not initiate raveling. A fog seal of dilute (50 to 60 %) SS-1h emulsion, emulsified recycling agent or equivalent (0.08 to 0.12 gallon per square yard) shall be applied after initial compaction or after the secondary compaction, as outlined below, to all areas opened to significant traffic depending on curing of the CCPR pavement. To prevent pickup of the fog seal, the recycled pavement surface shall be covered with sand at a rate of 1.0 to 2.0 pounds per square yard. Excess sand shall be removed from the pavement surface by careful sweeping. Sand shall be free from clay or organic material. Fog sealing and/or sanding shall be initiated at the Engineer's direction.

After opening to traffic, the surface of the recycled pavement shall be maintained in a condition suitable for the safe movement of traffic. Before placing the final surfacing, the recycled surface shall remain in-place:

- For a minimum of 2 days and until there is less than 2.0 percent moisture remaining in the recycled pavement mixture; or
- A minimum of 10 days without rainfall.

310E.8 SECONDARY COMPACTION

Two complete coverages (minimum), after cure and before placing any AC overlay or other surface seal shall be conducted with the pneumatic and steel drum roller. A rolling pattern shall be reestablished to determine the maximum density of final rolling. Density of the recycled pavement shall be verified behind the secondary compaction by nuclear density gauge. A rolling pattern for the secondary compaction shall be determined such that no increase in density is shown on successive nuclear density tests (per ASTM D 2950) for any additional passes of the compaction equipment once the maximum density pattern has been identified. Nuclear density testing shall be repeated throughout the time secondary compaction is being completed to continuously verify that the secondary compaction is within 5% of the maximum density results. Care shall be taken not to over compact the mat. A Qualified Technician shall be on site and observing all secondary compaction efforts, monitoring density gauge readings, and approving areas as they reach maximum density.

The Contractor shall protect and maintain the recycled surface from nuisance water, other deleterious substances, and/or any other damage. Any damage to the completed recycled material shall be repaired by the Contractor prior to the placement of new asphalt concrete or final surface sealing. Areas damaged shall be excavated to the depth directed by the Engineer and/or filled and compacted with new asphalt concrete. All loose

particles that may develop on the pavement surface shall be removed prior to the final surface course. No direct payment will be made and costs shall be included elsewhere for protection and maintenance of the recycled asphalt concrete pavement.

Prior to any overlay with asphalt concrete, the recycled pavement should be carefully swept of all loose material to create a dry clean surface. A tack coat of SS-1h emulsion, emulsified recycling agent or equivalent (0.05 gallon per square yard minimum) shall be applied to all surface areas.

311F. SMOOTHNESS

The finished surface and grade of the recycled material shall be checked regularly during placement using a level. The smoothness shall not vary more than ¼ inch from a 10-foot straight edge placed on the surface. The Contractor shall correct humps or depressions exceeding this tolerance. High points may be trimmed if approved by the Engineer in the field.

311G. MEASUREMENT AND PAYMENT

CCPAC Overlay shall be paid for at the contract price per **ton (Ton)** for the asphalt overlay placed which shall include full compensation for all labor, materials, tools, equipment, and incidentals; for doing all the work involved in cold central plant recycling, complete in-place; which includes asphalt milling, transport to recycling location, stockpiling, crushing, sizing, processing, blending, emulsified asphalt emulsion, cement, water, loading into trucks, transport to paving operating, paving CCPR, and compacting the recycled pavement mixture; for protection and maintenance of the recycled layer; for performing all QC testing including mix design; for fog sealing, sanding and sweeping; for obtaining measurements and recording results of all tests as shown on the plans and as directed by the Engineer.

SECTION 400 MINOR CONCRETE

400A. GENERAL

New Portland cement concrete facilities including curbs, curbs and gutters, sidewalks, ADA curb ramps, and roadways, pads, thrust blocks, and shallow utility backfill shall be constructed per the plans, Construction Standard 200 Series, and these specifications at the locations indicated on the plans or as directed by the Engineer.

The CONTRACTOR shall furnish all materials for concrete and grout work in accordance with the provisions of this Section and shall form, mix, place, cure, repair, finish, and do all other work as required to produce finished concrete and grout in accordance with the requirements of the Contract Documents.

400B. SUBMITTALS

Submittals shall be provided to confirm that material to be used comply with information specified herein. The CONTRACTOR shall furnish a concrete mix design to the Engineer at least ten working days prior to the start of the work.

Mix Designs: Prior to beginning the Work, the CONTRACTOR shall submit to the ENGINEER, for review, preliminary concrete mix designs which shall show the proportions and graduations of all materials proposed for each class and type of concrete specified. The mix designs shall be designed by an independent testing laboratory acceptable to the ENGINEER. All costs related to such mix design shall be borne by the CONTRACTOR. This Specification sets the minimum requirements for mix design that meets all requirements specified herein.

If deviations from the specifications are indicated, and therefore requested by the CONTRACTOR, each deviation shall be underlined and denoted by a number in the margin to the right of the identified paragraph. The remaining portions of the paragraph not underlined will signify compliance on the part of the CONTRACTOR with the specifications. The submittal shall be accompanied by a detailed, written justification for each deviation. Failure to include a copy of the marked-up specification sections, along with justification(s) for any requested deviations to the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no further consideration.

400C. MATERIALS

400C.1 GENERAL

Concrete shall conform to the provisions of Section 90 of the Standard Specifications and these special provisions.

Where new concrete is placed adjoining existing concrete, steel dowels (No. 4 x 20 inch) shall be installed at 24 inches o.c. into existing concrete with six-inch embedment. The dowels shall be epoxy grouted.

Concrete shall contain one (1) pound of lampblack per cubic yard of concrete to match existing concrete

General Concrete Facilities including curbs, gutters, and sidewalk and ADA curb ramps shall meet the following requirements:

- Compressive Strength: 3,000 psi @ 28 days
Polypropylene Fiber
Reinforcement: 1.5 lbs/cy (0.01% by volume), ¾ inch or 1-1/2 inch length
- Maximum Slump: 4 inches

Heavy Vehicular Facilities including valley gutters, driveways, and alley entrances and shallow utility backfill shall meet the following requirements:

- Compressive Strength: 2000 psi @ 3 days,
4000 psi @ 28 days
Polypropylene Fiber
Reinforcement: 3.0 lbs/cy (0.02% by volume), 1-1/2 inch minimum length
- Maximum Slump: 4 inches
- Steel Reinforcement: 60 ksi

Lean concrete shall have a minimum 28-day compressive strength of 2,000 psi, a maximum aggregate of ¾ inches, a minimum of 4 sacks of cement per cubic yard, and a maximum water to cement ratio of 0.60 by weight.

400C.2 FORMS

Concrete forms shall be metal, wood, plywood, or other approved material that will not adversely affect the concrete and will facilitate placement of concrete to

the shape, form, line, and grade indicated. Metal forms shall be an approved type that will accomplish such results.

Plywood for concrete formwork shall be new, waterproof, synthetic resin bonded, exterior type Douglas Fir or Southern Pine plywood manufactured especially for concrete formwork.

Lumber shall be Douglas Fir or Southern Pine, construction grade or better.

400C.3 REINFORCEMENT STEEL

Reinforcement steel shall be deformed bars conforming to ASTM A615 Grade 60 or ASTM A706. Welded wire fabric shall conform to latest edition of CRSI Manual of Standard Practice.

400C.4 CONCRETE

Cement: Portland Cement Type II conforming to ASTM C150.

Water: Clean and free from oil, acid, alkali, organic matter, or other deleterious substances and shall contain not more than 50 ppm chlorides as Cl no more than 50 ppm sulfates as SO_4^{-2} .

Aggregates:

Natural aggregates shall be free from deleterious coatings, conforming to ASTM C33, together with all referenced ASTM Standard Specifications, except as modified herein. Aggregates shall not be potentially reactive as defined in Appendix XI of ASTM C33. Aggregates shall be thoroughly and uniformly washed before use.

Fine aggregates shall conform to ASTM C33. Materials finer than the 200 sieve shall not exceed 4 percent. Use only clean, sharp, natural sand.

Coarse aggregate shall be: 1) natural gravels, 2) a combination of gravels and crushed gravels, 3) crushed stone, or 4) a combination of these materials containing no more than 15 percent flat or elongated particles (long dimension more than five times the short dimension). Materials finer than the 200 sieve shall not exceed 0.5 percent.

Ready-Mixed Concrete: Ready-mixed concrete shall conform to the requirements of ASTM C94.

400C.5 CURING COMPOUND

Liquid membrane-forming curing compound shall be clear or translucent, suitable for spray application and shall conform to ASTM C309, Type 1.

400C.6 EXPANSION JOINT FILLER

Expansion joint filler shall be ½-inch thick, preferred asphalt-impregnated, expansion joint material, conforming to ASTM D994.

400C.7 GROUTS

Epoxy Grout. Epoxy grout for bonding reinforcing bars to existing concrete structures shall be manufactured by, or approved equal:

- A. Adhesive Engineering, Concrevice No. 1001
- B. Sika Chemical Corp., Sikastix 350, 370, or 390, as applicable

Ordinary Type Grout (Dry Pack). One part portland cement to 2 parts fine sand. Add sufficient water to form a damp formable consistency.

Non-Shrink Grout. Non-shrink grout shall be nonmetallic, nongas-liberating type, as manufactured by, or approved equal:

- A. Master Builders, Master Flow 713
- B. UPCO Company, UPCON, High Flow

Cement Grout. Cement grout shall be composed of one part cement, two parts sand, and the minimum amount of water necessary to obtain the desired consistency. Where needed to match the color of adjacent concrete, white portland cement shall be blended with regular cement as needed. The minimum compressive strength at 28 days shall be 4000 psi.

400C.8 BONDING AGENT

Bonding agent shall be manufactured by, or approved equal:

- A. W. R. Grace and Company, Cambridge, MA
- B. Sika Chemical Corp., Lyndhurst, NJ
- C. Adhesive Engineering Company, San Carlos, CA

Product shall be recommended by manufacturer as suitable to meet job requirements with regard to surface, pot life, set time, vertical or horizontal application, forming restrictions, etc. Furnish manufacturer's specific instructions for this job application, and obtain ENGINEER's approval prior to application.

400C.8 TRUNCATED DOMES

Prefabricated truncated dome panels shall be used. The panels shall be “**BRICK RED**” (unless specified otherwise on the plans) and shall be cast-in-place (“wet set”) style at all locations. The CONTRACTOR shall submit for review the

manufacturer's information at least 14 days prior to placement of the panels for approval by the City.

400D. CONSTRUCTION

400D.1 EARTHWORK

Excavation, backfill and compaction shall be in accordance with Section 80, Earthwork.

400D.2 EXISTING CURB & GUTTER, SIDEWALK, AND ASPHALT REMOVAL

The CONTRACTOR shall only be permitted to remove concrete and/or asphalt on one side of the street at a time. The other side of the street may be removed only after the concrete and asphalt have been installed and opened to the public.

All concrete which is to be removed from curb and gutter areas shall be removed to the nearest construction joint or as directed by the Engineer.

All concrete which is to be removed from sidewalk areas shall be removed to the nearest transverse score mark across the full width of sidewalk or construction joint as directed by the Engineer.

Burying of broken concrete within the limits of the project will not be allowed.

Reinforcing steel may be encountered in portions of the concrete to be removed and no additional allowance will be made for the removal of such steel.

400D.3 SUBGRADE

After the subgrade is prepared, moisture conditioned, and compacted to 90% relative compaction at zero to three percent over optimum, the CONTRACTOR shall continuously maintain the subgrade in a uniform condition at the moisture content obtained during subgrade compaction until the concrete is placed.

400D.4 FORMING

Construct all form work in accordance with ACI 347. Before placing the concrete, the contact surfaces of forms shall be coated with a suitable non-staining form coating compound or shall be given two coats of nitrocellulose lacquer. All excess coating shall be removed by wiping with cloths.

400D.5 TOLERANCES

The maximum variation from design elevation shall not exceed +/- 0.02 feet. In some instances, particularly in critical drainage areas, tolerances may be reduced

to zero. Concrete facilities shall be installed to maintain or provide positive drainage. Questions regarding applicable tolerances shall be directed to the Engineer forty-eight hours in advance of the work.

When shown on the drawings, the concrete shall be set at the design elevations. When existing facilities are to be removed and replaced, they shall conform to the existing elevations and grades. Generally, this will be at a straight line between the start and end points of the removal, unless otherwise noted on the plans.

400D.6 REINFORCEMENT

All reinforcement shall be provided as indicated together with all necessary ties, spacers, supports, and other devices necessary to install and secure the reinforcement properly. All reinforcement, when placed, shall be free from loose rust, scale, oil, grease, and other coatings and foreign substances that would reduce or destroy the bond.

400D.7 MIXING

Concrete mixing shall conform to ACI 304, current edition, and to the other requirements specified herein.

Concrete shall be discharged at the job within 1-1/2 hours after the water has been added to the cement and aggregates mixture. Concrete may be machine mixed at the job site or ready mixed at the CONTRACTOR's option, and shall conform to the following requirements:

1. Site Mixing: Concrete produced at the site shall be mixed in a batch mixer with a capacity of not less than 1/2 cy. The minimum mixing time for each batch (from the time when all solid materials and water are in the drum) shall be 1-1/2 minutes for mixers of 1 cy capacity or less; for mixers of larger capacity, the mixing time shall be increased 30 seconds for each additional 1/2 cy or fraction thereof. The mixer shall revolve at a uniform peripheral speed of about 200 rpm. The entire batch shall be discharged before the mixer is recharged.
2. Ready Mixed Concrete: All concrete constituents for ready mixed concrete shall be batched at the central plant. All central plant and rolling stock equipment and methods shall conform to the requirements of ASTM C94, as applicable.

400D.8 SCHEDULING

The CONTRACTOR shall schedule the work so that the replacement of sidewalks and curbs and gutters at driveways shall be completed within three (3) days of demolition operation start. The CONTRACTOR may use seven (7) sack

mixes (Class D) with no more than one (1) percent calcium chloride to speed up the concrete set.

The CONTRACTOR shall notify the affected business owners or residents in writing at least forty-eight (48) hours prior to starting the work. All local business and residents shall be provided access at all times.

The CONTRACTOR shall schedule his operation so that all other concrete shall be poured within five (5) days after excavation or by the weekend, whichever is earlier. Failure to do so will result in a liquidated damage of \$500 per location per occurrence.

400D.9 PLACING

No concrete shall be placed after there is evidence of initial set. Concrete placement will not be permitted when weather conditions prevent proper placement and consolidation. Consolidation of concrete shall be with internal concrete vibrators supplemented by handspading, rodding, and tamping. Vibrating equipment shall be adequate to thoroughly compact the concrete. Concrete shall be compacted, screeded to grade, and prepared for the specified finish.

In general, adding water to the surface of the concrete to assist in finishing operations shall not be permitted.

Before final finishing is completed and before the concrete has taken its initial set, the edges shall be carefully finished with the radius shown on the plans or a radius to match the existing construction.

Concrete shall be thoroughly consolidated against and along the faces of all forms and adjacent concrete. After the forms are removed, excess concrete below the form surface shall be removed to be flush with the form face.

400D.10 CURING

Curing shall begin as soon as free water has disappeared from concrete surfaces after placing and finishing. Curing materials shall be applied and maintained so as to protect the concrete from moisture loss. Water used in curing shall be potable. Curing shall be accomplished by moist curing method. Unformed surfaces shall be covered with absorptive materials wetted before placing. Absorptive materials or forms used in curing shall be kept continually wet.

400D.11 CLEANUP AND BACKFILL

After the concrete is placed, cured, and the forms have been removed, the CONTRACTOR shall clean the site of all concrete and forming debris.

After curing has been completed and the forms have been removed from the driveway, sidewalk, or ADA curb ramp, the void between the new concrete and the existing parkway shall be filled with clean native material and the entire parkway left in a clean and orderly condition.

For concrete removed but not replaced, the resulting void after excavation shall be backfilled with clean native material or topsoil.

400E. QUALITY CONTROL

Without limiting the generality of other requirements of these Specifications, all work specified herein shall conform to or exceed the requirements of the Building Code and the applicable requirements of the following documents to the extent that the provisions of such documents are not in conflict with the requirements of this Section; provided, that for Building Codes, the latest edition of the code, as adopted as of the date of award by the agency having jurisdiction, shall apply to the Work.

ACI 304R Guide for Measuring, Mixing, Transporting and Placing Concrete

ACI 347R Guide to Formwork for Concrete

ASTM A 185 Steel Welded Wire, Fabric, Plain, for Concrete Reinforcement

ASTM A615 Deformed and Plain Billet-Steel Bars for Concrete Reinforcement

ASTM C33 Concrete Aggregates

400E.1 FIELD SAMPLING AND TESTS

The CONTRACTOR shall be responsible for the quality of the materials and workmanship of the placement of the concrete. Sampling, preparation of test specimens, and testing will be the ENGINEER's responsibility.

400E.2 SLUMP

Concrete consistency shall be determined by slump tests in accordance with ASTM C143. At least one test shall be made at the commencement of the concrete placement and at the time standard test cylinders are molded.

Tests will be performed by the ENGINEER.

400F. MEASUREMENT AND PAYMENT

Minor Concrete - Curb and Gutter shall be paid for at the contract unit price **per linear foot (LF)** of actual concrete installed, which shall be full compensation for mobilization, site preparation and site clean-up, installation of concrete curb and gutter, removal and disposal of existing curb and gutter, excavation and grading, root pruning, backfilling, 6" class II aggregate base, compaction, addition of lamp black paint, two (2) foot wide asphalt concrete conform, pedestrian and traffic control, and restoration of any damages including furnishing all labor, materials, tools, equipment and incidentals necessary to do all the work involved thereof and as directed by the Engineer, complete, in place, and accepted, and no additional compensation will be allowed therefor.

Minor Concrete - Vertical Curb shall be paid for at the contract unit price **per linear foot (LF)** of actual concrete installed, which shall be full compensation for mobilization, site preparation and site clean-up, installation of concrete curb, removal and disposal of existing curb, excavation and grading, root pruning, backfilling, 6" class II aggregate base, compaction, addition of lamp black paint, two (2) foot wide asphalt concrete conform, pedestrian and traffic control, and restoration of any damages including furnishing all labor, materials, tools, equipment and incidentals necessary to do all the work involved thereof and as directed by the Engineer, complete, in place, and accepted, and no additional compensation will be allowed therefor.

Minor Concrete – 8" Median Curb shall be paid for at the contract unit price **per linear foot (LF)** of actual concrete installed, which shall be full compensation for mobilization, site preparation and site clean-up, installation of concrete curb, removal and disposal of existing curb, excavation and grading, root pruning, backfilling, 6" class II aggregate base, compaction, addition of lamp black paint, two (2) foot wide asphalt concrete conform, pedestrian and traffic control, and restoration of any damages including furnishing all labor, materials, tools, equipment and incidentals necessary to do all the work involved thereof and as directed by the Engineer, complete, in place, and accepted, and no additional compensation will be allowed therefor.

Minor Concrete - Retaining Wall shall be paid for at the contract unit price **per linear foot (LF)** of actual concrete installed, which shall be full compensation for mobilization, site preparation and site clean-up, installation of concrete retaining wall, removal and disposal of existing sidewalk, excavation and grading, root pruning, backfilling, 6" class II aggregate base, compaction, addition of lamp black paint pedestrian and traffic control, and restoration of any damages including furnishing all labor, materials, tools, equipment and incidentals necessary to do all the work involved thereof and as directed by the Engineer, complete, in place, and accepted, and no additional compensation will be allowed therefor.

Minor Concrete - Sidewalk shall be paid for at the contract unit price **per square foot (SF)** of actual concrete installed, which shall include full compensation for removing and placing PCC sidewalk complete, in place, and shall include, but not limited to, demolition, saw cutting, excavation for placement of aggregate base, subgrade preparation; furnish and place 4" thick aggregate base; dowels to existing concrete:

reinforcing bars and wire mesh where required; furnish and place concrete; weakened plane, construction joints and scoring, protection from vandalism, removal and disposal of existing sidewalks, capping encountered irrigation lines at work limit, and all other work required to complete work in place.

Minor Concrete - Reinforced Concrete Sidewalk shall be paid for at the contract unit price **per square foot (SF)** of actual concrete installed, which shall include full compensation for removing and placing reinforced concrete complete, in place, and shall include, but not limited to, demolition, saw cutting, excavation for placement of aggregate base, subgrade preparation; dowels to existing concrete: reinforcing bars and wire mesh where required; furnish and place concrete; weakened plane, construction joints and scoring, protection from vandalism, removal and disposal of existing vehicular concrete, and all other work required to complete work in place.

Minor Concrete – Valley Gutter shall be paid for at the contract unit price **per square foot (SF)** of actual concrete installed, which shall include full compensation for removing and replacing concrete valley gutter complete, in place, and shall include, but not limited to, demolition, saw cutting, excavation for placement of aggregate base, subgrade preparation; furnish and place 8” thick aggregate base; dowels to existing concrete: reinforcing bars and wire mesh where required; furnish and place concrete; weakened plane, construction joints and scoring, protection from vandalism, removal and disposal of existing valley gutters, and all other work required to complete work in place.

Truncated Dome Panels (3’x5’) shall be paid for at the contract unit price **per each (EA)**, which price shall include full compensation of installation of the truncated dome panels at new curb ramps, including, but not limited to site preparation and site clean-up, sawcutting, excavation removal, base rock, wet setting of truncated domes (3’x5’)with minimum 4-inch concrete band, and all other labor, materials, tools, equipment and incidentals necessary to do all the work involved thereof as shown in the plans, these specifications, and as directed by the Engineer, complete, in place, and accepted, and no additional compensation will be allowed therefor.

Truncated Dome Panel Install shall be paid for at the contract unit price **per each (EA)**, which price shall include full compensation of installation of the truncated dome panels at existing curb ramps where grading modifications are not proposed, including, but not limited to site preparation and site clean-up, sawcutting, excavation removal, base rock, wet setting of truncated domes (3’x5’)with minimum 4-inch concrete band, and all other labor, materials, tools, equipment and incidentals necessary to do all the work involved thereof as shown in the plans, these specifications, and as directed by the Engineer, complete, in place, and accepted, and no additional compensation will be allowed therefor.

Vehicular Concrete shall be paid for at the contract unit price **per square foot (SF)** of actual concrete installed, which shall include full compensation for removing and placing vehicular concrete complete, in place, and shall include, but not limited to, demolition, saw cutting, excavation for placement of aggregate base, subgrade preparation; furnish and place 8” thick aggregate base; dowels to existing concrete: reinforcing bars and wire

mesh where required; furnish and place concrete; weakened plane, construction joints and scoring, protection from vandalism, removal and disposal of existing vehicular concrete, and all other work required to complete work in place.

END OF SECTION

CITY OF PETALUMA




**LANDSCAPING
& IRRIGATION
DESIGN AND
CONSTRUCTION
STANDARDS**

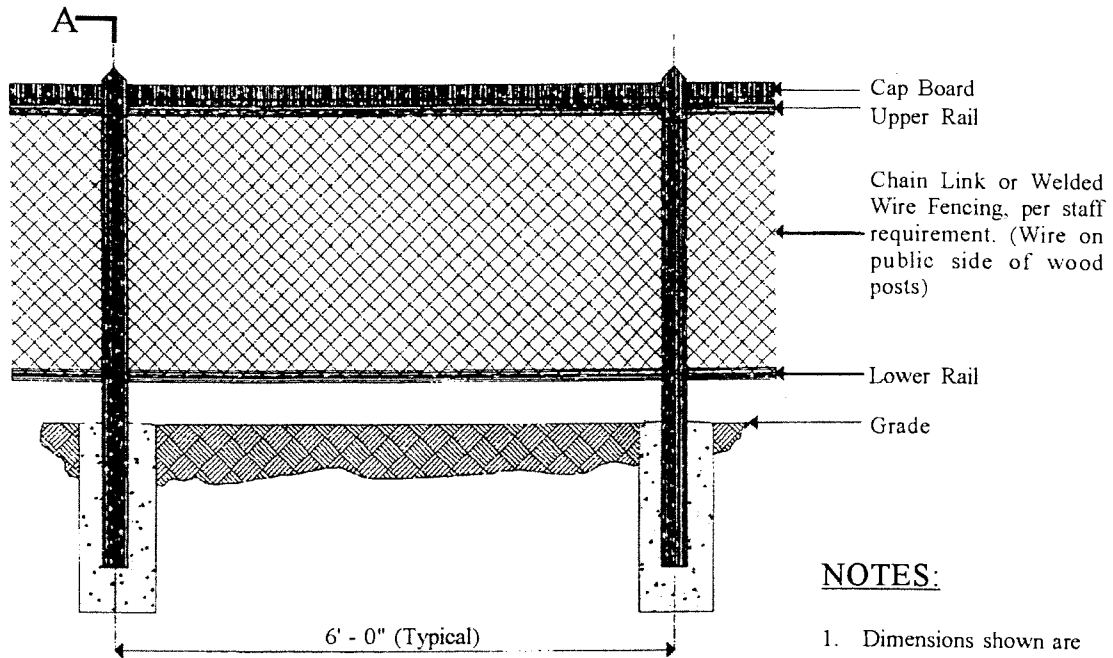
100 SERIES

May 1999

TABLE OF CONTENTS LANDSCAPING & IRRIGATION 100 SERIES

<u>Standard No.</u>	<u>Title</u>	<u>Date of Approval \ Revision</u>
100A	Table of Contents	April 9th 1998
100	Mitigation - Open Space Easement Fencing Standard	May 21st 1999
101	Standard Tree Planting and Staking Detail	August 21st 1995
102	Standard Linear Root Barrier Detail	August 21st 1995
103	Electrical Irrigation System Standard	March 31st 1995
104	Electrical Irrigation System Standard	March 31st 1995

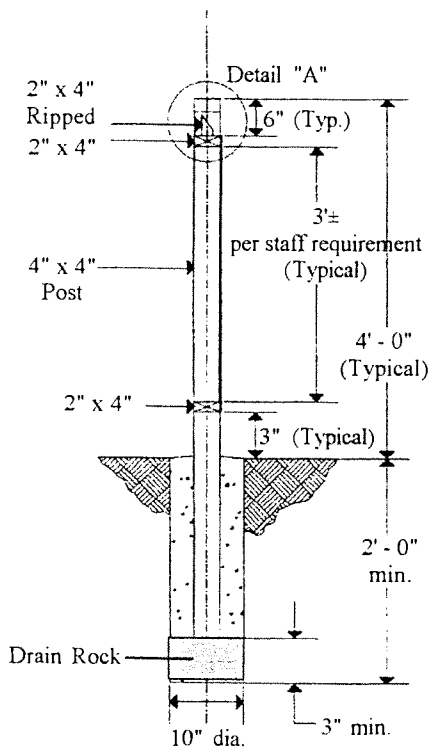
<p>CITY OF PETALUMA Department of Engineering 22 Bassett Street - Petaluma California 94952 707.778.4304 - Fax 707.778.4437</p>	<p>Standard LANDSCAPING & IRRIGATION Table of Contents</p>	<p>Drawn By: Butch Smith</p> <p>Scale: N. T. S.</p> <p>Date: May 21st 1999 (Rev.)</p> <p>File Number: Std.Det. LIS0000.100A</p>	 <p>Page: 100A</p>
<p>Approved By: <i>Thomas S. Hargis</i> Thomas S. Hargis - R.C.E. 22366</p>			



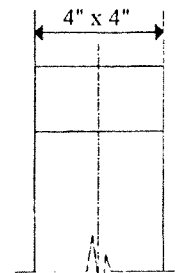
NOTES:

1. Dimensions shown are nominal dimensions.
2. All wood is rough cut clear heart redwood.

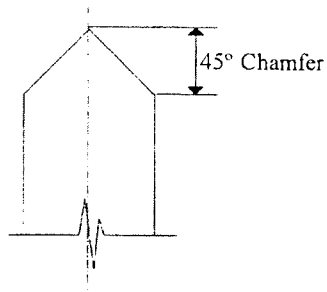
Elevation View



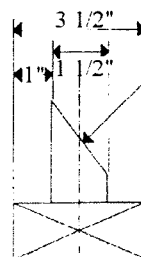
Section A-A



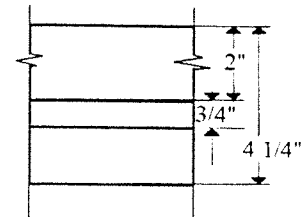
Post Detail "A" Side



Post Detail "A" Front



Upper Rail Detail "A" Side




Upper Rail Detail "A" Front

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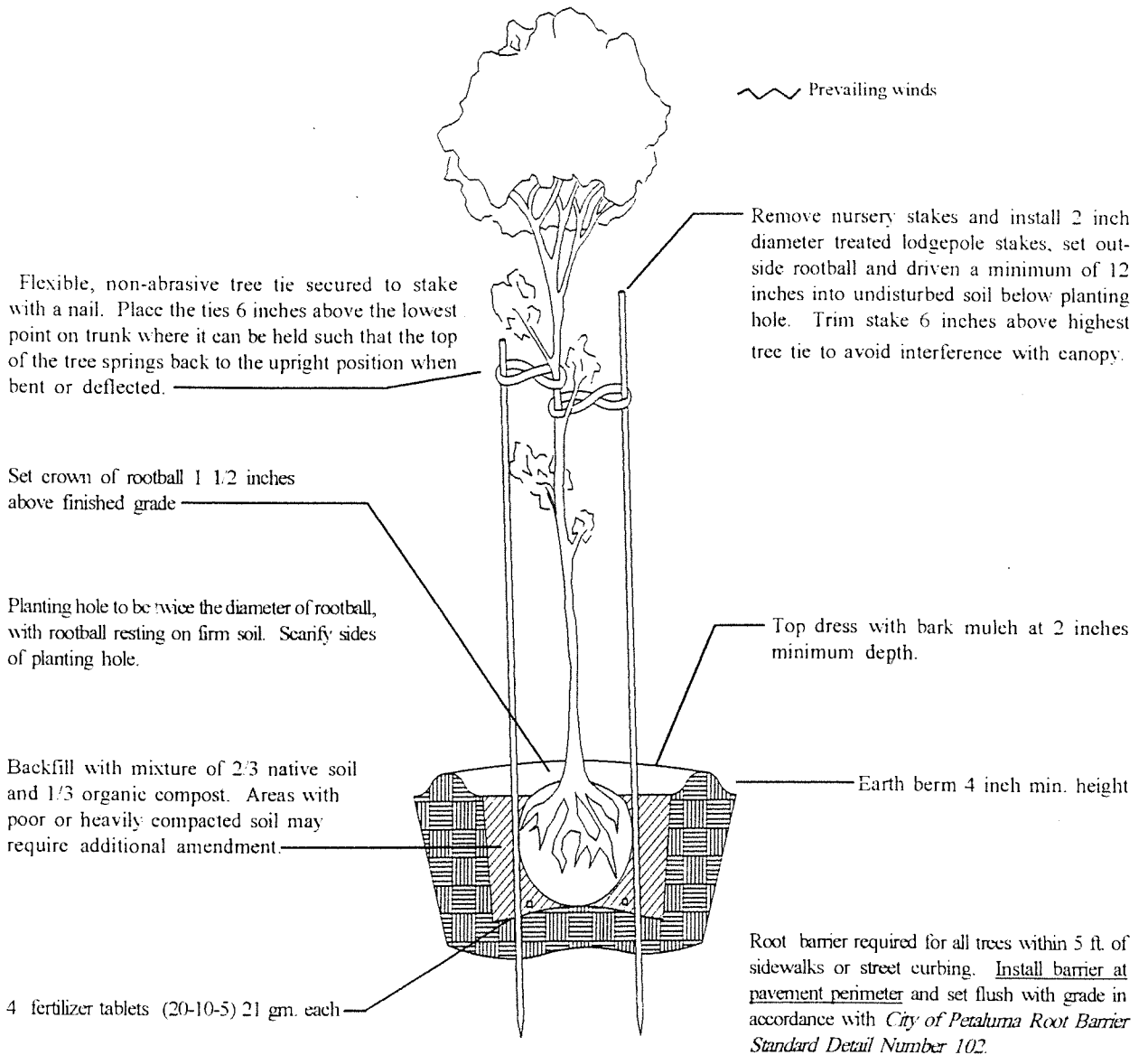
Approved By:
Thomas S. Hargis
 Thomas S. Hargis - R.C.E. 22366

Mitigation / OpenSpace
 Easement
**FENCING
 STANDARD**
 Detail

Drawn By:
 Butch Smith
 Scale:
 N. T. S.
 Date:
 May 21st 1999 (Rev.)
 File Number:
 Std.Det. LIS0000.100




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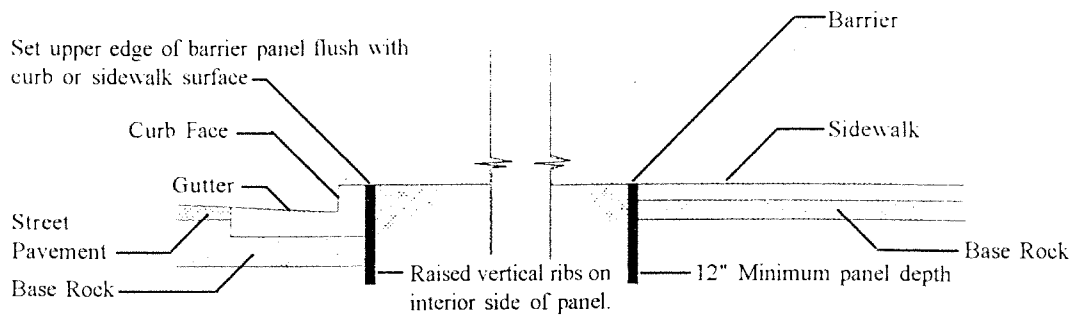


Section View

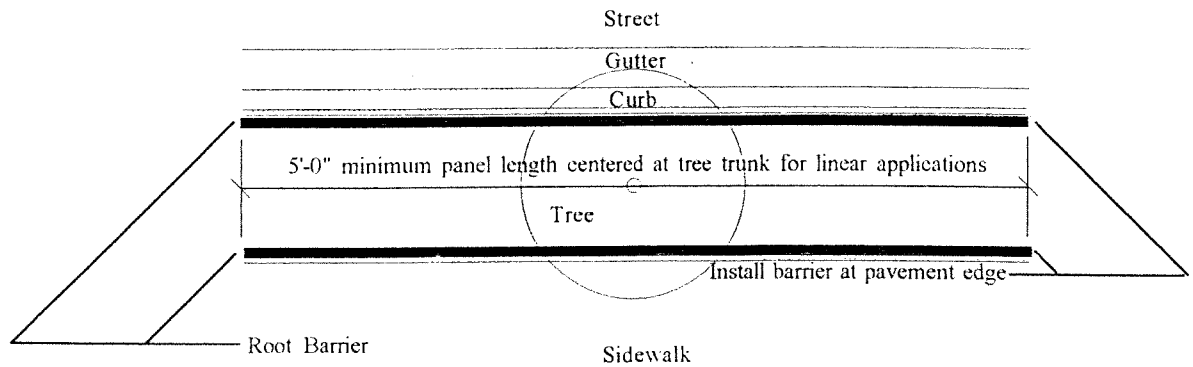
NOTES:

- 1) All trees within public right-of-way areas to be minimum 15 gal. size, and in conformance with City Street Tree List.
- 2) Excavation permit required prior to removal of pavement in right of way areas.
- 3) All trees planted and/or installation of decorative metal grates within downtown area shall, at the discretion of the Director of Engineering, and/or Director of Public Works, and/or Director of Planning.

<p>CITY OF PETALUMA Department of Engineering 22 Bassett Street - Petaluma California 94952 707 778 4304 - Fax 707 778 4437</p> <p>Approved By: <i>Thomas S. Hargis</i> Thomas S. Hargis - R.C.E. 22366</p>	<p>Standard TREE PLANTING AND STAKING Detail</p>	<p>Drawn By Butch Smith Scale N. T. S. Date August 21st 1995 File Number Std. Det. LIS0000.101</p>	 <p>Page 101</p>
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Section View




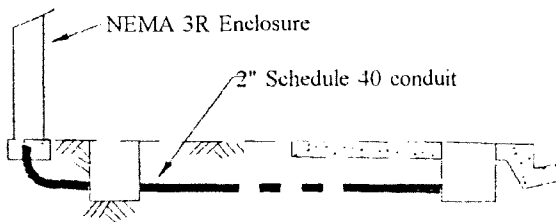
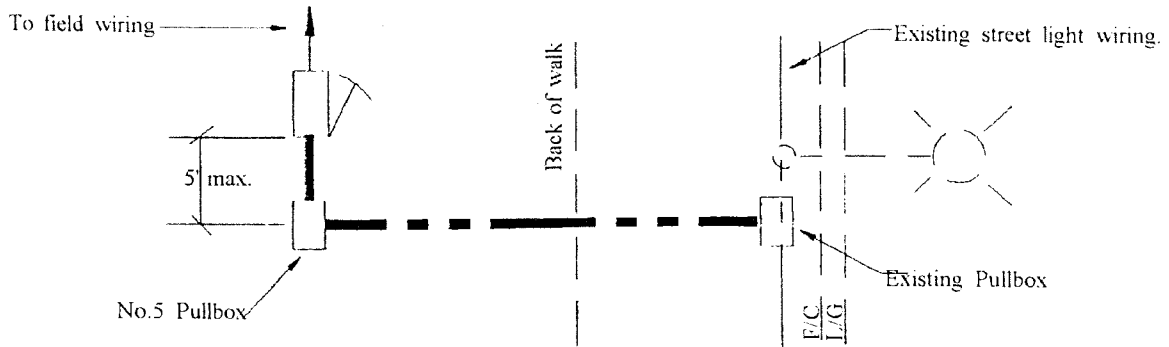
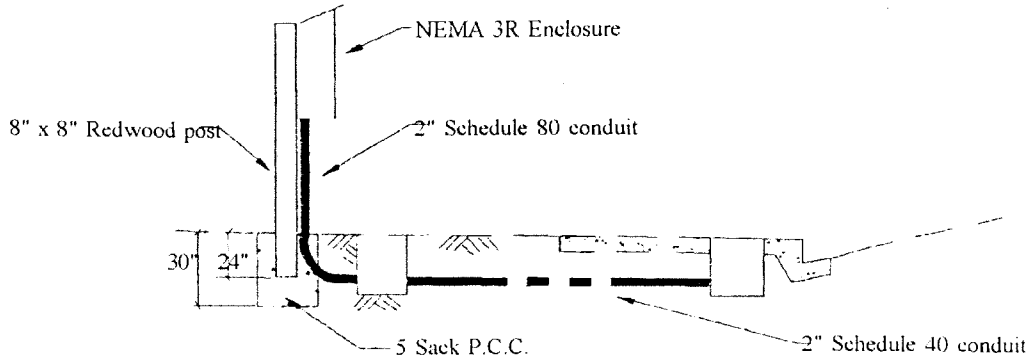
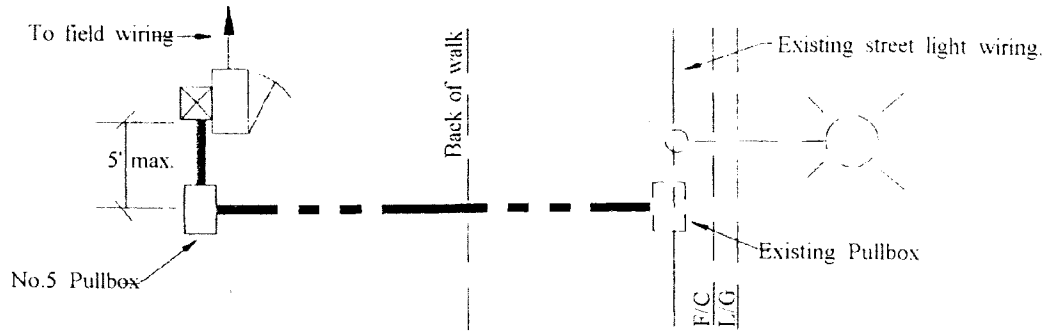
Plan View

NOTE:

1. Install barrier against perimeter of all adjacent street cubing or sidewalk paving situated within 5'-0" of tree trunk.
2. Set upper edge of barrier panel at or slightly below pavement surface grade.
3. Install barrier with ribs facing the tree. Panel may be positioned to angle slightly outward toward the bottom.

Material shall consist of polypropylene or polystyrene sheets, or other City approved sheet or sectional panel material. Sheet or sectional panel material shall be at least a thickness of .060 by 12" minimum depth with root deflective, raised vertical ribbing. Interlocking coupling connectors shall be used to connect panels, or coupling shall be solvent welded to provide sealed units, in accordance with manufacturer's specifications. Materials shall not be impregnated with chemicals intended to deter root growth.

<p>CITY OF PETALUMA Department of Engineering 22 Bassett Street - Petaluma California 94952 707 778 4301 - Fax 707 778 4437</p>	<p>Standard LINEAR ROOT BARRIER Detail</p>	<p>Drawn By: Butch Smith Scale: N. T. S. Date: August 21st 1995 File Number: Std.Det. LIS0000.102</p>	 Page 102
<p>Approved By: <i>Thomas S. Hargis</i> Thomas S. Hargis - R.C. 22366</p>			



LEGEND


F.C. = Face of Curb
L.G. = Lip of Gutter

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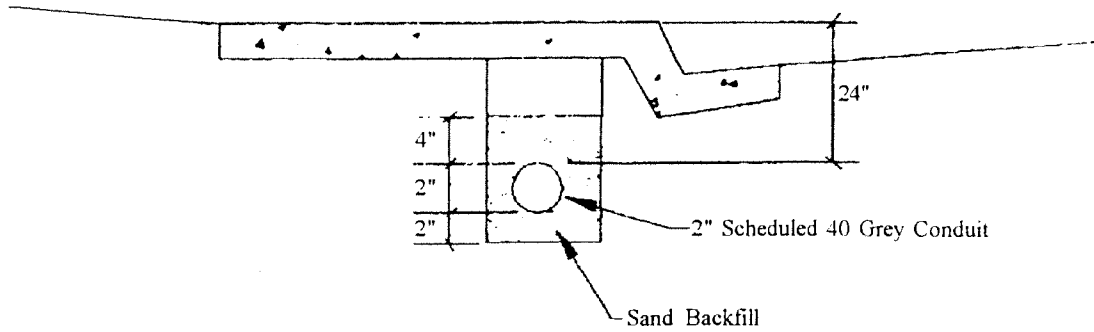
Approved By
Thomas S. Hargis
Thomas S. Hargis - R.C.D. 22366

Electrical
Irrigation
System
Standard

Drawn By
Butch Smith
Scale
N. T. S.
Date
March 31st 1995
File Number
Std. Det. LIS0000.103



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NOTES:

All City maintained irrigation systems shall comply with the City of Petaluma General Notes for Street Light installations. The city of Petaluma General Notes are in addition to CALTRANS Standard Specifications, Section 86.

The Contractor shall provide a NEMA Type 3R cabinet enclosure with a hinged cover. The cabinet shall be sized to hold the following equipment.

- One (1) 8 Station Irrigation Controller
- One (1) 20A Circuit Breaker Disconnect
- One (1) 20A Receptacle GFI

All underground conduit shall be Scheduled 40 Grey 2"

All wire shall be No.8 stranded copper with weather proof covering.



3' of slack wire shall be coiled at each termination point.

All conductors shall be tagged for permanent identification to the irrigation controller.

All splices shall be capable of satisfactory operation under continuous submersion in water.

The fuse tran with 10A fuse shall be installed in the street light handhole.

No.5 pullboxes shall be used with 12" of clean drain rock, roofing paper and 1/2" thick grout sloped to a 1" drain hole.

<p>CITY OF PETALUMA Department of Engineering 22 Bassett Street - Petaluma California 94952 707.778.4304 - Fax 707.778.4437</p>	<p>Electrical Irrigation System Standard</p>	<p>Drawn By: Butch Smith</p>	
<p>Approved By:  Thomas S. Hargis - R.C.E. 22366</p>		<p>Scale: N. T. S.</p>	
		<p>File Number: Std.Det. LIS0000.104</p>	<p>Page: 104</p>

**LANDSCAPE WATER EFFICIENCY
STANDARDS**
of the
CITY OF PETALUMA

in compliance with the
**STATE OF CALIFORNIA
WATER CONSERVATION
IN LANDSCAPING ACT
AB 325**

Developed by the City of Petaluma
Department of Water Resources
and
Conservation

February 16, 2001

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- II. Application
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- IV. Water Efficient Specifications
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APPENDICES

Appendix A: The Water Use Classification of Landscape Species (WUCOLS).....

Appendix B: Landscape Water Use Statement Form

CITY OF PETALUMA

LANDSCAPE STANDARDS

I. PURPOSE

The purpose of these standards is to promote efficient water use and reduce water waste through landscape and irrigation planning and design, installation, and long-term landscape management specific to Petaluma's climate zone.

All plants require water. Landscape irrigation water serves the purpose of maintaining a healthy, attractive and functional landscape. A design water budget will match plant needs to water supply and maintain landscape health and vigor. Applicants will develop a design water budget per each site plan submitted for review.

The purpose of developing a design water budget is to create an estimate of landscape water needs. Estimates of landscape water needs are important for at least three reasons: water efficiency; economics; and landscape quality. Water efficiency can be achieved by supplying only the amount of water sufficient to meet plant needs. Applying only that amount of water needed by plants and landscapes, and avoiding excess use, can save the customer money. Lastly, identifying and meeting plant water needs can minimize the potential for plant injury caused by water deficits or excess.

Turf grass can be included in a design water budget. Turf grass has relatively high water needs, therefore, these standards do not permit turf grass on slopes and in median strips. Tree planting in turf grass areas is not permitted (water supplied to meet turf needs is often not sufficient for newly planted trees in turf).

These Standards supercede the Model Water Efficient Landscape Ordinance, as required by California Assembly Bill 325, 1992 (The Water Conservation and Landscaping Act of 1990).

II. APPLICATION

- A. The standards apply to new industrial, commercial, and institutional landscaping, and all new multi-family common areas and contractor installed single-family front yards in new sub-divisions.
- B. Single-family residences and multi-family private areas are exempt from these standards. However, all residents are encouraged to follow these standards.
- C. Schoolyards, parks, playgrounds, sports fields, and golf courses are exempt from establishing a design water budget. Every other requirement of these standards is applicable, including estimation of irrigation water requirements. In addition, turf grass areas of these sites shall have a landscape irrigation audit performed after the installation or renovation of the irrigation system.

- D. The standards do not apply to cemeteries or registered historical sites. However, landscape managers at these sites are encouraged to follow efficient irrigation system management practices.
- E. The standards apply to any landscaping that is irrigated solely by reclaimed (treated, recycled wastewater) water. Reclaimed water may contain injurious levels of salts or specific elements. When irrigating with reclaimed water, water quality will need to be monitored and assessed. (Some upward adjustments in water estimates may be needed to reduce plant injury potential with low quality water).
- F. The standards do not apply to areas devoted to agricultural cultivation.

III. DEFINITIONS OF TERMS

Adjusted ET Factor - An adjustment of 0.75 is applied to evapotranspiration to decrease the amount of water intensive landscape features such as turfgrass.

Area - Expressed in square feet. Area can be defined as:

- i. site area - the total area of a site, including building footprints, roadways, and parking areas
- ii. hardscapes such as decks and patios, and other non-porous surfaces.
- iii. irrigated area - planted areas requiring supplemental irrigation.

Bubbler - An irrigation head that delivers water to the root zone by "flooding" the planted area, usually measured in gallons per minute. Bubblers exhibit a trickle, umbrella, or short stream pattern.

CCF - Hundred cubic feet. The City of Petaluma water customers are billed for water consumption in units of CCF.

CIMIS Weather Station - The California State Department of Water Resources operates California Irrigation Management Information System (CIMIS) weather stations. CIMIS weather station #144 has been installed at the Rooster Run Golf Course in Petaluma. CIMIS weather stations collect weather data through sensors and calculate Evapotranspiration data. ET data is available on the City of Petaluma's web site www.ci.petaluma.ca.us.

Common areas - Those areas in a residential development maintained by either the developer or a homeowner's association.

Conversion factor (0.00083) - A number that converts the maximum water allowance (design water budget) from inches (in.) per square foot (sq. ft.) per year to units of one hundred cubic feet (CCF) per square foot per year. Water is metered and sold in Petaluma in CCF units. The conversion is calculated as follows:

$$(435.6 \text{ CCF}/43,560 \text{ sq.ft.})/12 \text{ inches} = 0.00083$$

Where 435.6 CCF = 1 acre foot
43,560 sq.ft. = one acre
12 inches = one foot

Design Water Budget (dWB) - For design purposes, the upper limit of annual water use for the established landscaped area supplied through City water meters.

Effective Precipitation - The portion of total precipitation used by plants in the landscape. Precipitation is not a reliable source of water and has not been used in calculating landscape water requirements in Petaluma's landscape standards.

ET (Evapotranspiration) - The quantity of water evaporated from adjacent soil surfaces and transpired by plants during a specific time, expressed in inches per day, month, or year. For purposes of these standards, the annual ET for Petaluma is 39 inches. ET can be converted to gallons or units of 100 cubic feet (ccf).

GPM – Gallons per minute

Hydrozone - A portion of the landscaped area that has plants with similar water needs and are in a similar microclimate. A hydrozone may be non-irrigated or served by one or more irrigation valves. For example, a naturalized area planted with native vegetation that will not need supplemental irrigation once established as a non-irrigated hydrozone.

Irrigation Efficiency - A measurement of the amount of water beneficially used by plants divided by the amount of water applied. Irrigation efficiency is derived from estimates of irrigation system design efficiency and management practices.

Irrigation Zone - Same as irrigation circuit. An irrigation distribution line and associated application devices controlled by one valve.

Landscape Coefficient Method – Describes a method of estimating irrigation needs of landscape plantings in California. It is intended as a guide for landscape professionals. LCM is derived from analysis of plant species, planting density, and microclimate which, when compared to ET, results in an estimate of the amount of water required to maintain a planted area.

Landscape Zone – (see Hydrozone) A portion of the landscaped area having similar microclimate and soil conditions and plants with similar water needs that are served by one or several valves with a similar type of irrigation.

Local Annual Mean Precipitation - The average amount of rain in inches per year is based on an average of annual rainfall over a 30-year period. The 30-year average for Petaluma was obtained from California Department of Water Resources and California Polytechnic San Luis Obispo. The local annual mean precipitation for Petaluma is 24.8 inches per year.

Plant Water Requirement - An estimate of the amount of water required to maintain an acceptable degree of health and vigor in the planting or group of plants irrigated by one valve.

Precipitation Rate – The depth of water applied to a given area, usually measured in inches per hour.

Rain Shut-Off Device – A device wired to the automatic controller that shuts off the irrigation system when it rains.

Sq. Ft. – Square foot.

Turf – A surface layer of earth containing mowed grass with its roots.

WUCOLS – Initiated and supported by the California Department of Water Resources, the Water Use Classification of Landscape Species (WUCOLS) is a guide to the water needs of landscape plants. The City of Petaluma falls into WUCOLS region #1 described as north central and coastal. Plants are listed by botanical name and ranked in hydrozones as high, moderate or low (very low) water requirements to the water needs of landscape plants and divides plants into water use categories (see Appendix 1).

IV. WATER EFFICIENT SPECIFICATIONS

1.0 Requirements for Preparing a Landscape Design Water Budget

1.01 Calculate Design Water Budget

The design Water Budget (dWB) is the amount of water that a project is allotted based on the size of the landscape area. A design Water Budget will be established for each site plan submitted for review:

$$\begin{aligned} \text{dWB} &= \text{ET} \times \text{Adjusted ET Factor} \times (\text{LA}) \times .00083 \\ \text{dWB} &= 39" \times 0.75 \times (\text{LA}) \times 0.00083 \end{aligned}$$

Where: dWB = Design Water Budget in CCF
 ET = Annual Reference Evapotranspiration = 39 inches
 0.75 = ET adjustment factor
 LA = Landscaped area in sq. ft.
 0.00083 = Conversion factor into CCF

Example for a one-acre site:

$$\begin{aligned} \text{dWB} &= 39" \times 0.75 \times 43560 \times 0.00083 \\ \text{dWB} &= 1,057 \text{ CCF annual water allowance} \end{aligned}$$

The dWB will be itemized on a Landscape Water Use Statement Form provided by the City. See Appendix 2 for a sample form (*being developed*).

Note: For the purposes of these standards, the annual ET for Petaluma is 39 inches per year. It is expected that ET data will be used for irrigation management after plant installation, e.g. from CIMIS weather station #144 located at the Rooster Run Golf Course in Petaluma, or other site-specific, electronically monitored ET calculation system.

1.02 Calculate Landscape Water Requirements (LWR)

The landscape water requirements will be estimated based on a review of the landscape plans and the following formula. The LWR will be itemized on a Landscape Water Use statement form provided by the City.

$$\text{LWR} = \frac{\text{ET} \times (\text{landscape area for each hydrozone} \times \text{plant factor}) \times 0.00083}{\text{Irrigation Efficiency}}$$

Water Use Classification of Landscape Species (WUCOLS)

The water requirements of landscape plants are documented in the WUCOLS guide to the water needs of landscape plants. The City of Petaluma falls into WUCOLS region #1 described as north central and coastal. Plants are listed by botanical name and ranked in hydrozones as high, moderate or low (very low) water requirements. The following plant factors are used for each plant water requirement.

<u>Plant factor</u>	<u>Type of plants</u>
0.8 =	Turf (cool season) and high water-using plants
0.5 =	Moderate water-using plants
0.3 =	Low and very low water-using plants
0.8 =	Water features

1.03 Irrigation Efficiency

Irrigation efficiency is the portion of the irrigation water that is beneficially used to satisfy the water needs of the plants compared to the total irrigation applied. Included in the calculation are losses that occur due to controller programming errors, sprinkler overthrow, poor sprinkler distribution uniformity, and broken or leaking sprinkler systems. The irrigation efficiency is set at the industry standard of an acceptable level of 70%.

2.0 Requirements for Preparing a Landscape Plan

The Landscape Architect, or qualified designer responsible for design of the landscape areas, should seek to design a resource efficient landscape that includes, at minimum, observance of design water budget, soil analysis and water waste ordinance.

The Landscape Contractor, or qualified builder responsible for the construction and/or maintenance of the landscape areas, should seek to provide a high standard of construction. This should include an efficient water use to establish and maintain the landscape; observances of the City's water waste ordinance, the California Landscape Contractor's Association landscape standards and the Uniform Plumbing Code.

2.01 Statement of Design Intent

Each landscape plan submitted for review shall include a Statement of Design Intent. This statement shall show how sound water management will be incorporated and consist of:

1. A brief statement of the designer's use of an integrated management program (soil, water, irrigation system, fertilization and pest management) that optimizes plant health, resource efficiency and, therefore, cost-effectiveness for the site; and
2. A summary of the on-going water needs and long range maintenance of the project.

2.02 Site Map

A site map shall reflect the following:

1. Property lines and street names; and
2. Existing and proposed buildings, structures, retaining walls, fences, utilities, paved areas, and other site improvements including elevation, if applicable; and
3. Landscaped areas; and
4. Location of soil test(s) and soil percolation test(s) areas on base plan; and
5. Maximum slope ratios (both cut and fill) should be not more than three feet horizontal to one foot vertical unless erosion control measures are specified.

2.03 Planting Plan

The planting plan shall be drawn on project base sheets at a scale that accurately and clearly identifies:

1. Location of all proposed plant materials (trees, shrubs, ground cover, turf, and other vegetation) and a legend labeled by botanical name, common name, container size, spacing, and quantities of each group of plants indicated; and
2. Location, size and species of existing trees and plant materials to be removed or retained; and
3. All hydrozones measured per sq. ft. and clearly labeled; and
4. Locate pools, ponds, water features, fences and retaining walls; and
5. Locate existing natural features including, but not limited to rock outcroppings, water bodies; and
6. A calculation of the:
 - Total landscaped area in sq. ft.
 - Total turf grass area in sq. ft.; and
7. Prepare specifications for tree staking, soil preparation, and other applicable planting work and installation detail; and
8. Provide for a minimum of 3 inches of mulch to be added in non-turf areas to soil surface after planting except for very low groundcover type plants and around base of trees; and
9. Provide for a minimum of 1 inch of mulch to be added to areas planted with a non-turf ground cover (such as around base of trees and very low groundcover types plants); and
10. Visqueen, sheet plastic, and other non-porous material shall not be placed under the mulch. Porous weed-barrier fabrics are acceptable; and
11. Locate proposed site areas for soil amendments; and
12. Plant selection and grouping:
 - Any plants may be used in the landscape, provided the total metered water use does not exceed the design water budget (DWB) and that the plants meet the specifications set forth in the WUCOLS Guide. The design Water Budget will not allow for 100% use of high water plant materials or water features; and
 - Plants shall be selected based upon their adaptability to the climatic, geologic, and topographic conditions of the site. Protection and preservation of native species and natural areas is encouraged; and
 - Plants having similar water use shall be grouped together in distinct hydrozones; and
 - Trees should not be planted in turf, or, trees planted in turf should be surrounded by a mulched area of a diameter equal to the diameter of the projected median-life crown drip line; and
 - If new turf (and associated irrigation) is installed around established trees, trees should be surrounded by a mulched area of a diameter equal to the diameter of the projected median-life crown drip line;
 - The plant establishment period is considered to be 12 months for the purposes of these standards. Landscapes may require more irrigation than the DWB during the first 12 months after planting; and
13. Water Features:
 - Water needed to fill and maintain levels in water features shall be calculated in cubic feet per second (CCF) and included as part of the maximum landscape water allowance; and
 - Fountains or other types of decorative water bodies where water is sprayed into the air are discouraged. "Misting" will not be allowed; and
 - Any water feature submitted for review shall be designed to minimize evaporation; and

- Re-circulating water shall be used for any water feature; and
- Use of reclaimed water for fountains and water features is encouraged; and
- Refilling of all fountains and/or other type of decorative water bodies with potable water may be prohibited during a City-Council-declared water emergency.

3.0 Requirements for Preparing an Irrigation Plan

The Irrigation Designer, responsible for design of the irrigated landscape areas, should seek to design an efficient irrigation plan based on the design water budget approach for each City water meter service. All irrigation systems shall be designed to avoid: runoff, low head drainage, over-spray, or other similar conditions where water flows onto adjacent property, walks, roadways, or structures.

3.01 Statement of Design Intent

Each irrigation plan submitted shall include a Statement of Irrigation Design Intent. This statement shall describe the irrigation system and how the system conforms to the City's irrigation design requirements.

3.02 Irrigation Drawing, Schedules and Details

Drawings shall be the same scale as the landscape planting plan and shall accurately and clearly identify:

1. Location and size of the landscape water meter; and
2. Minimum static pressure at the point of connection. The nominal system static pressure for the City's water service area is available from the Department of Water Resources and Conservation at (707) 778-4392; and
3. Location, type, and size of all components of the irrigation system; point of connection, including electronic controllers, main lateral lines, valves, application devices, rain shut off sensors, flow sensors, soil moisture sensors, booster pumps, and back-flow prevention devices; and
- 4. Station/zone number, valve size, flow rate in gallons per minute (GPM), sprinkler precipitation rate, and operating pressure for each irrigation zone; and
5. Spot elevations used in making the grading plan; and
6. Two irrigation schedules for each irrigation controller. One schedule shall be based on Petaluma's historic ET for plant establishment period and the second schedule based on mature plant water needs.

3.03 Irrigation Specifications and Details

Specifications shall prescribe quality of materials, standards of workmanship, expected results, and guarantees, and include details as required.

3.04 Uniform Plumbing Code

Specifications for irrigation systems shall ensure that all requirements of the adopted unified plumbing code are met.

3.05 Water Service Requirements

A separate water meter shall be installed to irrigate each approved landscape. This meter shall be designated as an irrigation account.

3.06 Backflow Prevention

The irrigation system shall be separated from the City's water supply by a backflow prevention device or devices approved by the City Department of Water Resources and Conservation office. For a list of approved devices contact the Department of Water Resources and Conservation (707) 778-4436.

3.07 Soil-Water Relations

Soil types and infiltration rates shall be considered when designing irrigation systems. Irrigation equipment shall be used to closely match application rates to infiltration rates (Appendix - Soils Infiltration Rate Chart).

3.08 Irrigation Zones

Irrigation zones shall have the following characteristics:

1. All plants shall have similar water requirements (hydrozones); and
2. Irrigation zones shall encompass only one microclimate; and
3. All application devices shall have matched precipitation and even distribution uniformity.

3.09 Irrigation Equipment

Irrigation system components shall be selected on the basis that they are appropriate for the task. Criteria shall include water efficiency, performance, ease of maintenance, and public safety.

1. Sprinklers - All sprinklers for turf (microsprays, sprayheads, rotors, etc.) shall have spring retracted pop-up operation with flexible connections to piping. Sprinklers shall be selected and spaced for head-to-head coverage and maximum distribution uniformity. No overhead sprinkler irrigation systems shall be installed in areas less than eight (8) feet wide; and
2. Bubblers - All bubblers shall be pressure compensating. Bubblers exceeding 0.33 gallons per minute (gpm) shall be used only in planting basins with permanent basin walls to prevent runoff (i.e., tree wells in hardscape areas, planters, containers, etc.); and
3. Pressure Compensated Drip Systems - All drip systems shall be pressure compensating and designed to provide water uniformly to the area of a mature rootzone; and
4. Irrigation Controllers - Electronic controllers shall be required for all projects. They shall be capable of managing all aspects of the irrigation system design; and
5. Minimum controller requirements - Controllers shall have precise individual station timing; runtime capabilities for extremes in precipitation rates; at least one program for each hydrozone and microclimate; sufficient multiple cycles to avoid runoff; extended day calendar for deep-rooted plants; and, power failure backup for all programs; and
6. Anti-Drain Valves - The irrigation system shall be designed to prevent gravity drainage of water through application devices; and
7. Rain Sensing Devices - Irrigation systems shall be equipped with rain sensing devices to prevent irrigation during rainy weather. Soil moisture sensors shall not be used as rain sensing devices; and
8. Tree Irrigation - Trees in turf areas shall be placed in a separate hydrozone, segregated from all circuits and served by separate valves.

4.0 Requirements for Preparing a Grading Plan

Grading design plans satisfying the following conditions shall be submitted with the documents for landscape review:

1. A grading design plan shall be drawn on project base sheets on the same scale as the landscape planting plan. It should be separate from, but use the same format as, the landscape planting plan; and
2. The grading design plan shall indicate finished configurations and elevations of the landscaped area, including the height of graded slopes, drainage patterns, pad elevations, and finish grade; and
3. Where landscaped areas exceed 10 percent slope, contour lines and spot elevations as necessary for the proposed finished grade; and
4. Where applicable, provide specifications for stockpiling and reapplying site topsoil or imported topsoil; and
5. The grading design plan shall indicate soils test and soil percolation tests location(s).
6. The grading design plan agrees with soils report; and
7. Slopes, both cut and fill, should not be steeper than two to one. Slopes should not be constructed so irrigation water endangers or disturbs adjoining property; and
8. Temporary mulching, seeding, or other suitable erosion control stabilization measures should be used to protect exposed critical areas from surface runoff during construction. An erosion control plan is required for all grading performed between October 1 and the following April 15 (rainy season). Said plan shall be designed in accordance with the City of Petaluma Grading and Erosion Control Ordinance 1576; and
9. Where drainage swales are used to divert surface waters, they should be vegetated or otherwise protected from scour.

5.0 Requirements for Horticultural Soils Analysis Report

Soil chemistry analysis or horticultural suitability analysis:

1. For projects with a landscaped area greater than 44,000 square feet; and
2. Will be required from a laboratory specializing in landscape soils (see Appendix 4 for laboratories - forthcoming); and
3. Shall be made for approved projects after rough grading is completed; and
4. If soil is imported for use in the landscaped area, an analysis shall be submitted from each different source of origin of that fill material. Samples will be selected for analysis from each different soil type area of the project; and
5. Final inspections of the project will not be completed without receipt of the soils test report; and
6. Soil will be amended according to the soil test report recommendations.

V. REVIEW AND APPROVAL REQUIREMENTS

NOTE: The City of Petaluma shall decide the Review and Approval Procedure.

Prior to issuance of a building permit for a project, or as otherwise specified in the planning approval for the project, all the above documents shall be submitted for review and approval by the (see above Note).

VI. ALTERNATIVE EQUIPMENT OR DESIGN

The City will consider alternative methodologies for calculating plant water needs as long as the methodology has been endorsed and accepted by appropriate academic and professional organizations.

Streets

- Design and Construction Standards
- Street Construction Detail
Specification No. 41



City of Petaluma - Sonoma County - California
Public Works & Utilities
202 North McDowell Boulevard
Petaluma, CA 94954

APPROVED BY:  1/8/19
Kent R. Carothers, P.E., Operations Manager Date

Street Construction Standards

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Std. No.	Title	Date Approved
201.1	Department of Engineering Street Standards Design and Application Guidelines	Mar 1997
201.2	Standard Street Configuration (Arterial Street)	Nov 1996
201.3	Standard Street Configuration (Collector Street).....	Nov 1996
201.4	Standard Street Configuration (Residential Street)	Nov 1996
201.5	Standard Street Configuration (Minor Residential Street).....	Nov 1996
201.6	Standard Street Configuration (Reduced Minor Residential Street)	Nov 1996
201.7	Standard Street Configuration Details	Mar 1997
202.1	Curb, Gutter, and Sidewalk (General Notes).....	Sep 1996
202.2	Curb Markings for Service Laterals	Oct 1996
203.1	Curb, Gutter, Sidewalk, and Driveway “X-Section”	Feb 1997
203.2	Misc. “NEW” Construction Sections	Feb 1998
204.1	Standard Curb and Gutter (w/ Non-Expansive Backing – with Curb Anchor).....	Feb 1998
204.2	Curb and Gutter (Vertical Curb – Curb and Fall Away Gutter – A.C. Curb).....	Sep 1996
205.0	Valley Gutter	Sep 1996
206.1	Curb Ramp Type-A Detail.....	Feb 1998
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206.3	Curb Ramp Type-C Detail	Feb 1998
207.0	Driveway Culvert (For High Crown Streets)	Sep 1996
208.1	Street and Stop Signs.....	Sep 1996
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209	Stop Bar and Stop Word Detail	Sep 1996
213.1	Gas, Electric, Telephone, Cable, and Traffic Signal Trench Details	Oct 1996
213.2	Trench Plating in Streets	Oct 1996
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215.0	Standard Barricade Detail.....	Sep 1996
216.1	Major Reconstruction – Retention of Cobblestone (Curb and/or Gutter)	Sep 1996
216.2	Minor Reconstruction – Retention of Cobblestone (Curb and/or Gutter)	Sep 1996
216.3	Major Treatment for Tree Roots	Sep 1996
217.1	Standard Hammerhead Turn Around	Sep 1996
217.2	Standard Cul-De-Sac.....	Oct 1996
217.3	Standard Street Configuration (Minor Residential Cul-De-Sac Street)	Nov 1996
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218.1	Side Street and End of Overlay Conform	Dec 1998

Street Construction Standards

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218.2	Edge Grinding at New Structural Section.....	Dec 1998
218.3	Edge Grinding at Lip of Gutter with Overlay Section.....	Dec 1998
219.1	Standard Trench Detail.....	Jan 2019
219.2	Standard Trench Detail Notes	Jan 2019
219.3	Pavement Resurfacing Limits for Public Right-of-Way.....	Jan 2019

Special Note: For Pavement Marking and General Notes, Markers and Traffic Lines, Construction Signing and Safety Notes, see current copy of State of California, Department of Transportation Manuals & Standards.

City of Petaluma

Department of Engineering

Street Standards

Design and Application Guidelines

DESIGN FEATURE	ARTERIAL	COLLECTOR	RESIDENTIAL	MINOR (5) RESIDENTIAL	REDUCED (5) MINOR RESIDENTIAL
Lanes					
Number	4	2	2	2	2
Lane Width	12'-0"	12'-0"	10'-0"	9'-0"	8'-0"
Median Width	10'-0" - 20'-0"	8'-0" - 16'-0"	8'-0" - 12'-0"	6'-0" - 9'-0"	6'-0" - 9'-0"
Left Turn Lane	YES	NO (1)	NO	NO	NO
Right Turn Lane	YES	NO	NO	NO	NO
Bicycle Lane	YES	NO (2)	NO	NO	NO
Parking	YES	NO	YES	YES	NO
Design Speed (M.P.H.)	45	35	25	20	15
Center Line Radius	1000'-0"	500'-0"	250'-0"	125'-0"	(3)
Intersection Spacing (4)	350'-0"	200'-0"	150'-0"	125'-0"	N/A
Sidewalks	YES	YES	YES	YES	YES
Width	6'-0"	5'-0"	5'-0"	5'-0"	5'-0"
Planter	YES	YES	YES	YES	YES
Width	8'-0"	7'-0"	6'-0"	6'-0"	6'-0"
Access	LIMITED	YES	YES	YES	YES
Dwellings Served	N.A.	400	200	100	20
Traffic Volumes Average Daily Traffic (A.D.T.)	6,000 - 25,000	2,000 - 6,000	Less than 2,000	Less than 1,000	Less than 200
Continuity	1-Mile	1-2-Mile	N.A.	N.A.	N.A.

NOTES

1. Left turn lanes may be considered at intersections to Arterial Streets.
2. Bicycle Lanes may be considered near schools and Connectors to other Bicycle Elements.
3. Centerline Radius to be considered at time of Design
4. Minimum Acceptable
5. Driveway locations to be staggered with driveways on opposite side of the Street

CITY OF PETALUMA Department of Engineering

22 Bassett Street - Petaluma California 94952
707 778 4304 - Fax 707 778 4437

Approved By

Thomas S. Haugs
Thomas S. Haugs - R.C.E. 2252

STREET STANDARDS

Design and Application
Guidelines

Drawn By

Butch Smith

Scale

N T S

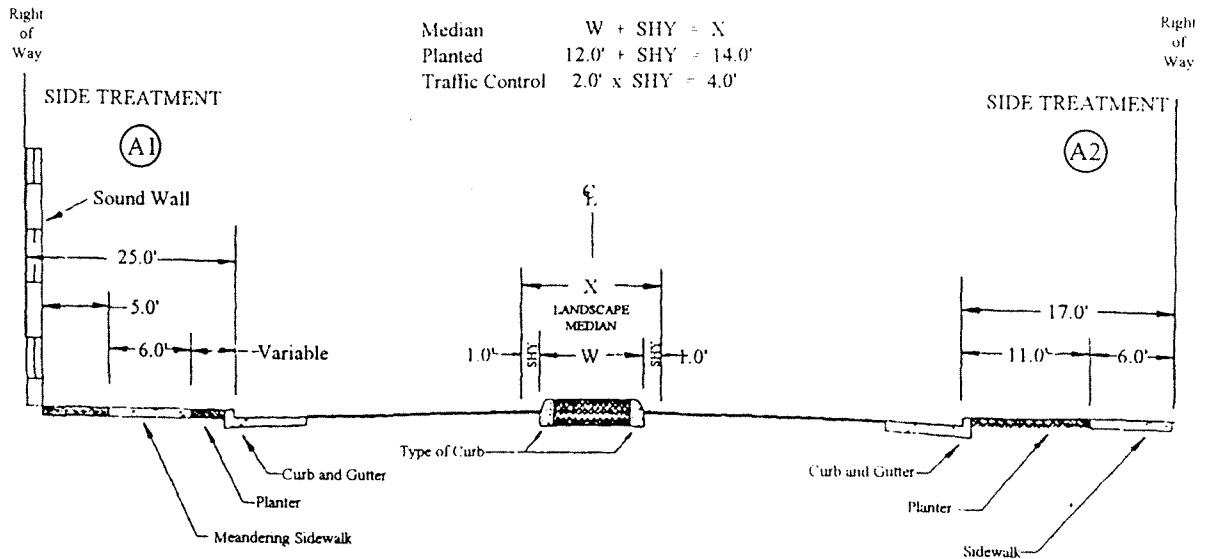
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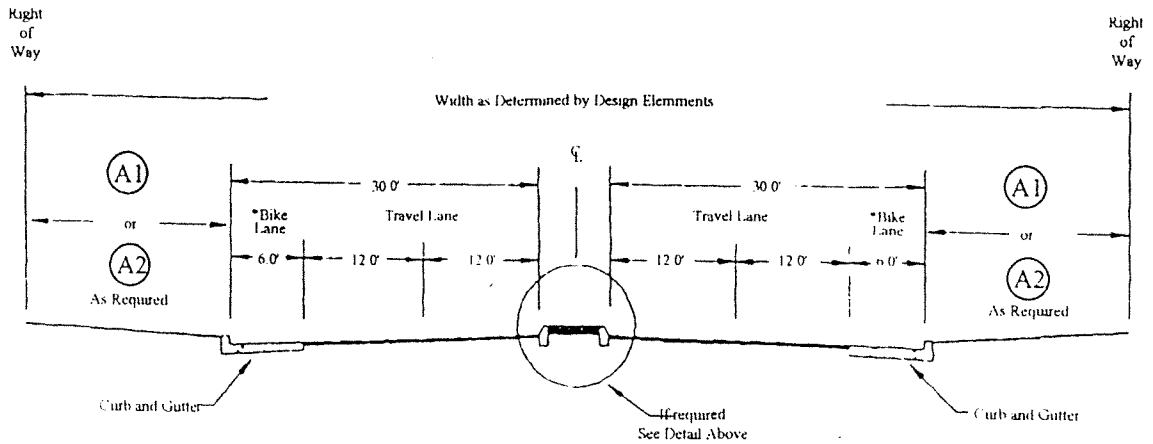
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Arterial Street Detail



Arterial Street

(N) Refer to Detail as shown above

* Add 8' with Parking

Structural Section Design T1 shall be determined by the City Engineer for all Arterial Streets.

Street Design Elements

Operating Speed	Centerline Radius	Intersection Spacing	Traffic Volumes	Driveway Access	Sidewalks
45 MPH	1000'	350'	11 - 20,000	Limited	Yes

CITY OF PETALUMA
 Department of Engineering

22 Bassett Street - Petaluma California 94952
 707 778 1304 - Fax 707 778 4437

Approved By

Ed Hagen

Phone 707 778 1304 - Fax 707 778 4437

STANDARD
 STREET
 CONFIGURATION

Arterial Street

Drawn By
 Butch Smith

Scale
 N T S

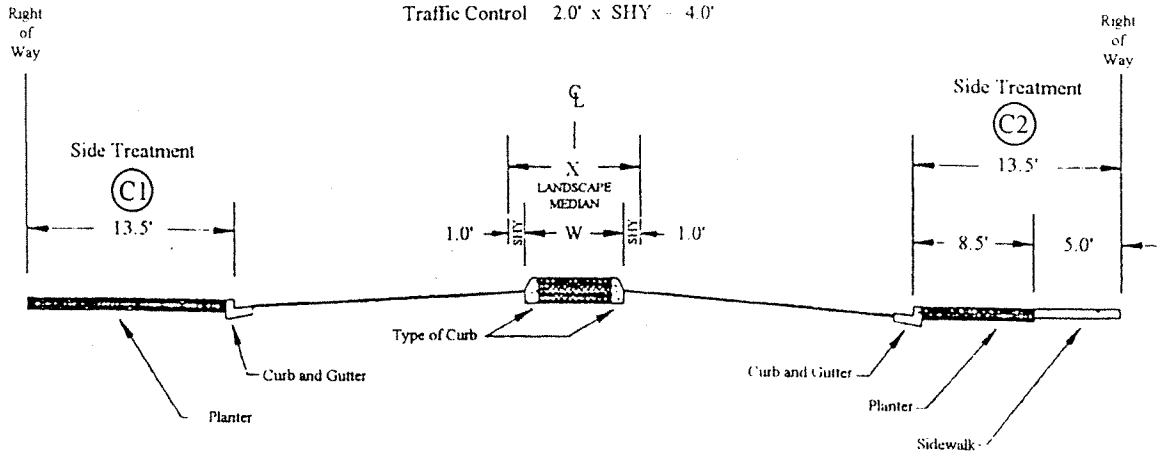
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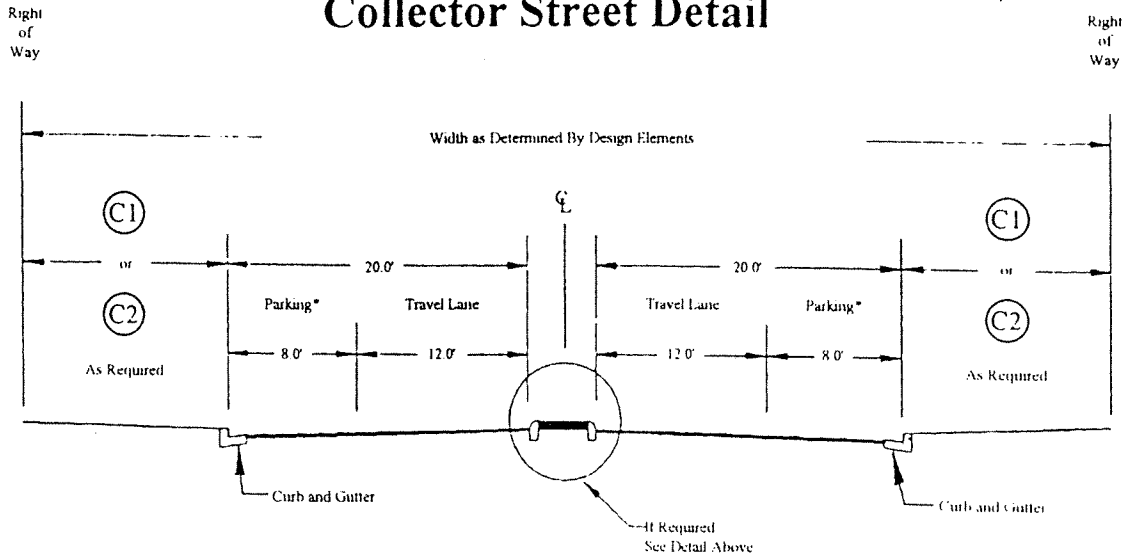


Page
 2 of 2

Median W - SHY X
 Planted 12.0' - SHY - 14.0'
 Traffic Control 2.0' x SHY - 4.0'



Collector Street Detail



Collector Street

(N) Refer to Detail as shown above

* = Add 8.0' with Parking

Street Structural Section shall be Designed to meet T 1 - 60

Street Design Elements

Operating Speed	Centerline Radius	Intersection Spacing	Traffic Volumes	Driveway Access	Sidewalks
35 MPH	500'	200'	2 - 6,000	Yes	Yes

CITY OF PETALUMA
 Department of Engineering

22 Bassett Street - Petaluma California 94952
 707 778 4304 - Fax 707 778 4137

Approved By

Thomas S. Harris
 Thomas S. Harris

STANDARD STREET CONFIGURATION
 Collector Street

Drawn by
 Butch Smith

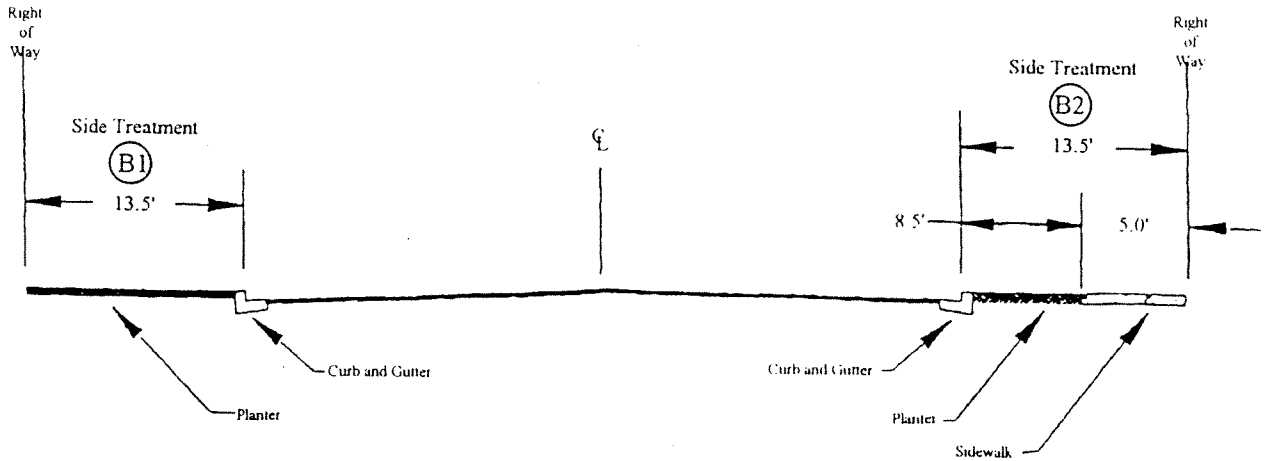
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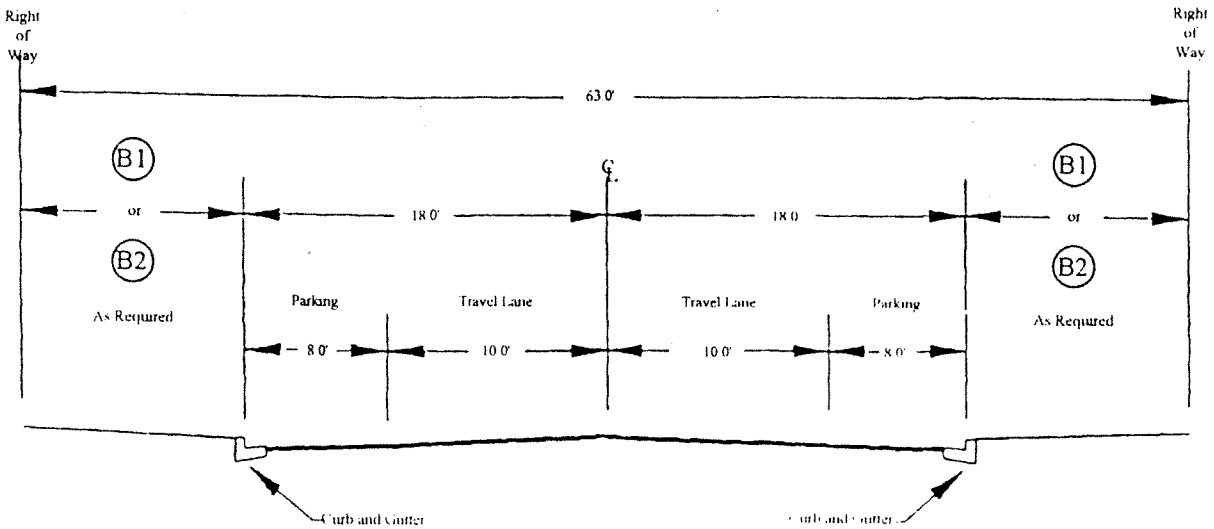
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Residential Street Detail



Residential Street

(N) Refer to Detail as shown above

Street Structural Section shall be Designed to meet T.I. = 5.0

Street Design Elements

Operating Speed	Centerline Radius	Intersection Spacing	Traffic Volumes	Driveway Access	Sidewalks
25 MPH	250'	125'	2 000	Yes	Yes

CITY OF PETALUMA
Department of Engineering

22 Bassett Street - Petaluma California 94952
707-778-1401 - Fax 707-778-4437

Approved By

[Signature]

Thomas S. Larson R.C.E. 22266

STANDARD STREET CONFIGURATION
Residential Street

Drawn By
Butch Smith

Scale
N T S

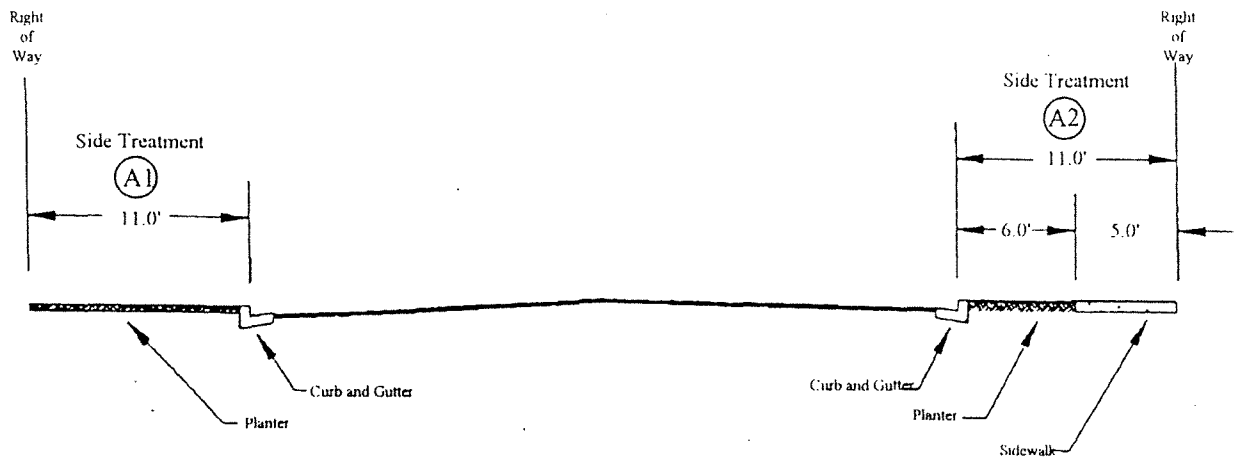
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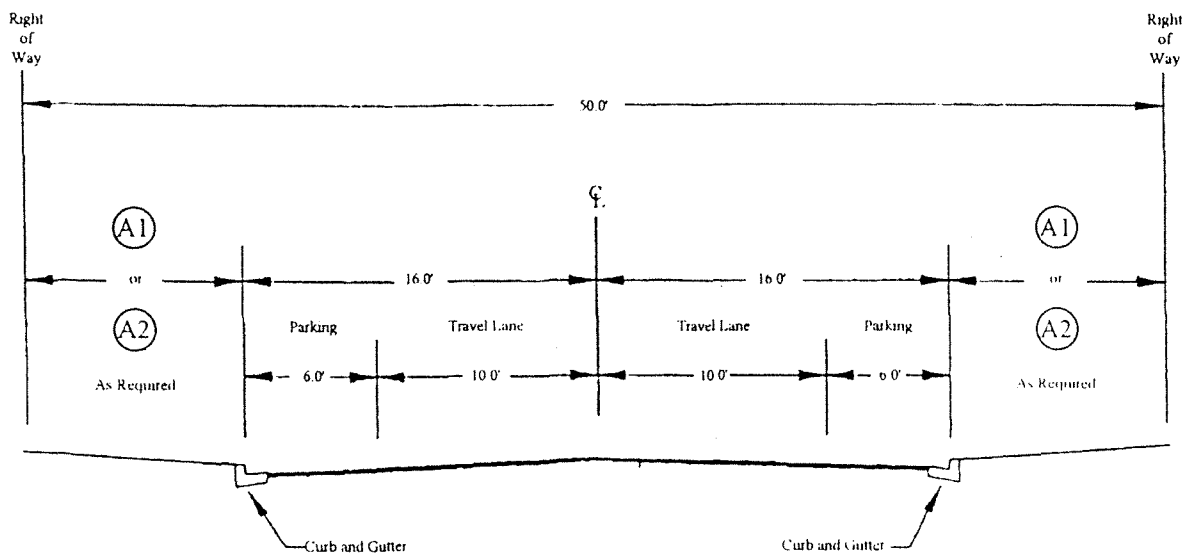
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Page 2 of 2



Minor Residential Street Detail



Minor Residential Street

(N) Refer to Detail as shown above

Street Design Elements

Street Structural Section shall be Designed to meet T.I. 5.0

Operating Speed	Centerline Radius	Intersection Spacing	Traffic Volumes	Driveway Access	Sidewalks
20 MPH	175'	125'	250	Yes	Yes

CITY OF PETALUMA
Department of Engineering

22 Bassett Street - Petaluma California 94952
707 778 4304 - Fax 707 778 4437

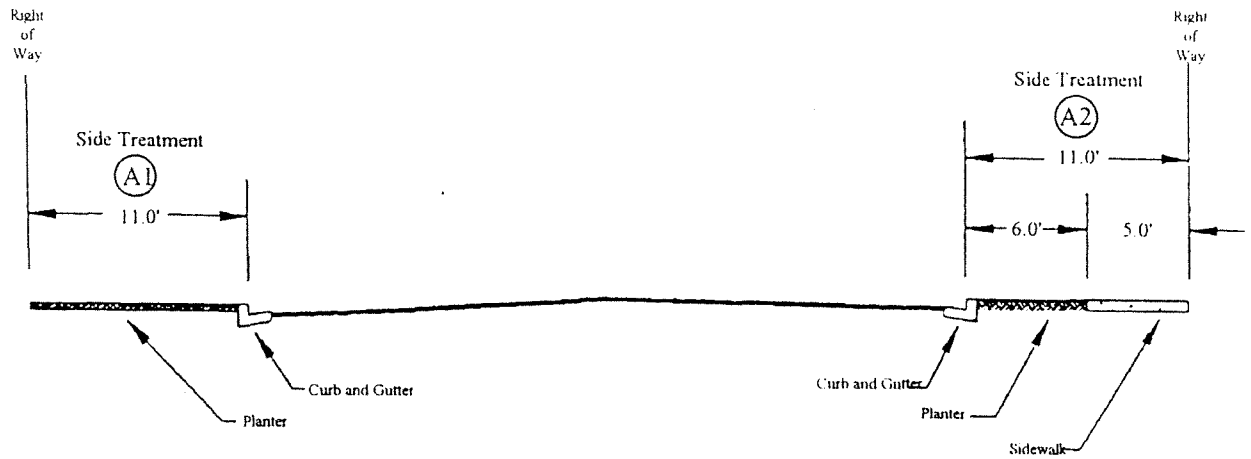
Approved By
Thomas S. Hargis
Thomas S. Hargis, R.C.T., P.E.

STANDARD STREET CONFIGURATION

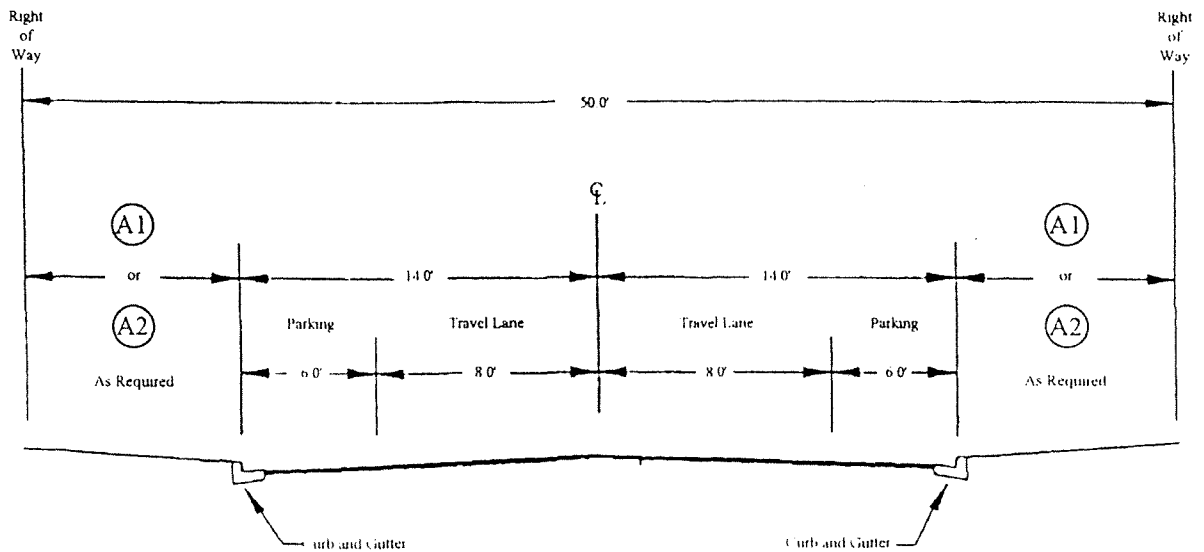
Minor Residential Street

Drawn By
Butch Smith
Scale
N.T.S.
Date
November 12th 1996
File Number
Std Det. SSD0000 201





Reduced Minor Residential Street Detail



Reduced Minor Residential Street

(N) Refer to Detail as shown above

Street Structural Section shall be Designed to meet T.I. 5.0

Street Design Elements

Operating Speed	Centerline Radius	Intersection Spacing	Traffic Volumes	Driveway Access	Sidewalks
20 MPH	175'	125'	250	Yes	Yes

CITY OF PETALUMA
Department of Engineering

22 Bassett Street - Petaluma California 94952
707 778 1304 - Fax 707 778 4437

Approved By:

Thomas S. Hargis

Thomas S. Hargis - R.C.E. 22366

STANDARD STREET CONFIGURATION

Reduced Minor Residential Street

Drawn by
Butch Smith

Scale

N T S

Date

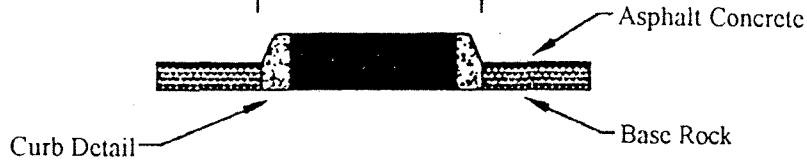
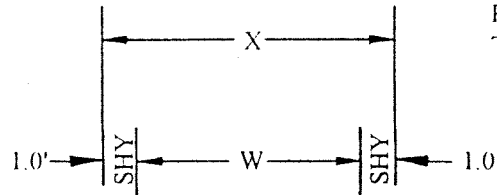
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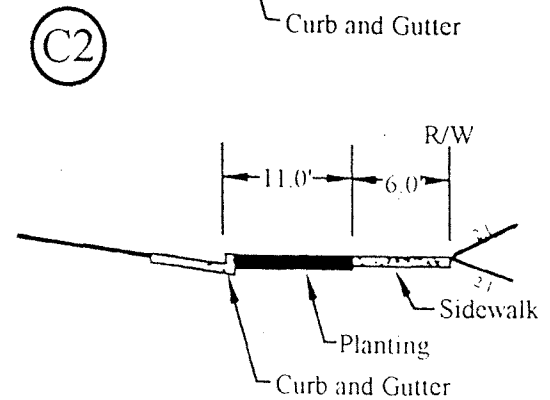
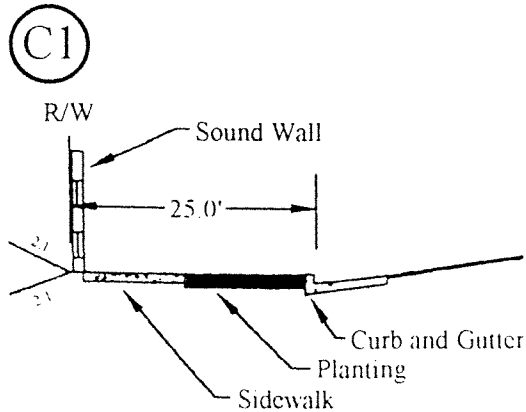
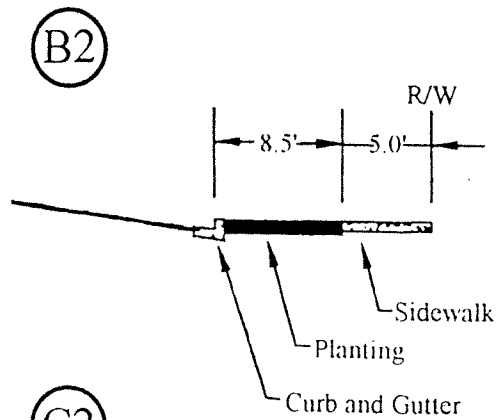
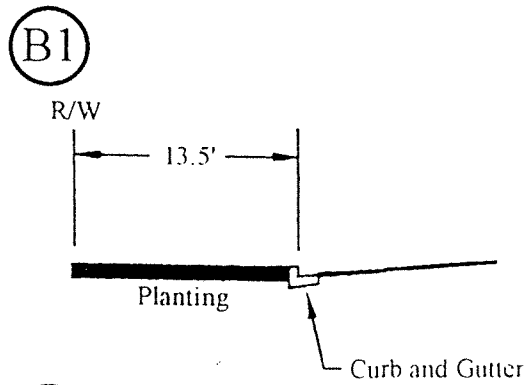
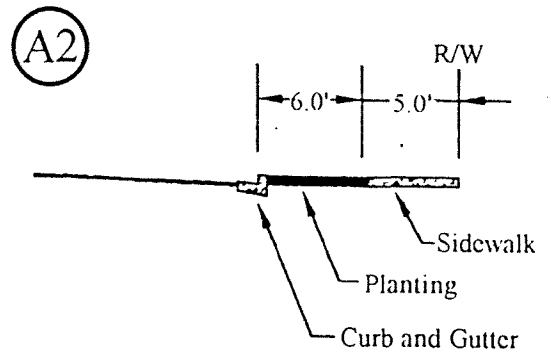
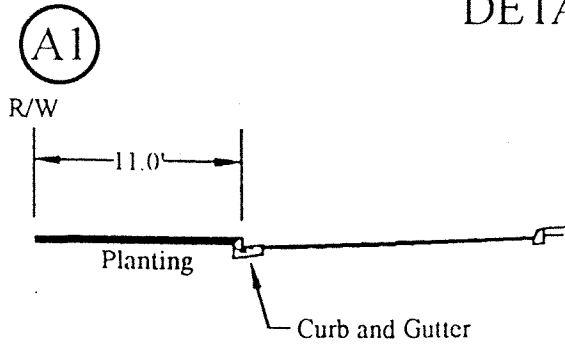
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Median $W + SHY = X$
 Planted $8 + SHY = 10.0'$
 Traffic Control $2 + SHY = 4.0'$



DETAIL "A"



CITY OF PETALUMA
 Department of Engineering
 22 Bassett Street - Petaluma California 94952
 707 778 1504 Fax 707 778 4437

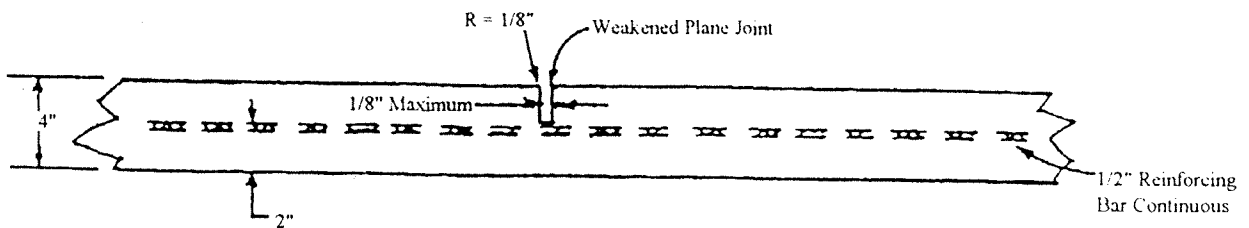
Approved By
Tom Hargis
 Thomas S. Hargis, P.E., C.E.

STANDARD
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 CONFIGURATION
 Details


Drawn by
 Butch Smith
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 File Number
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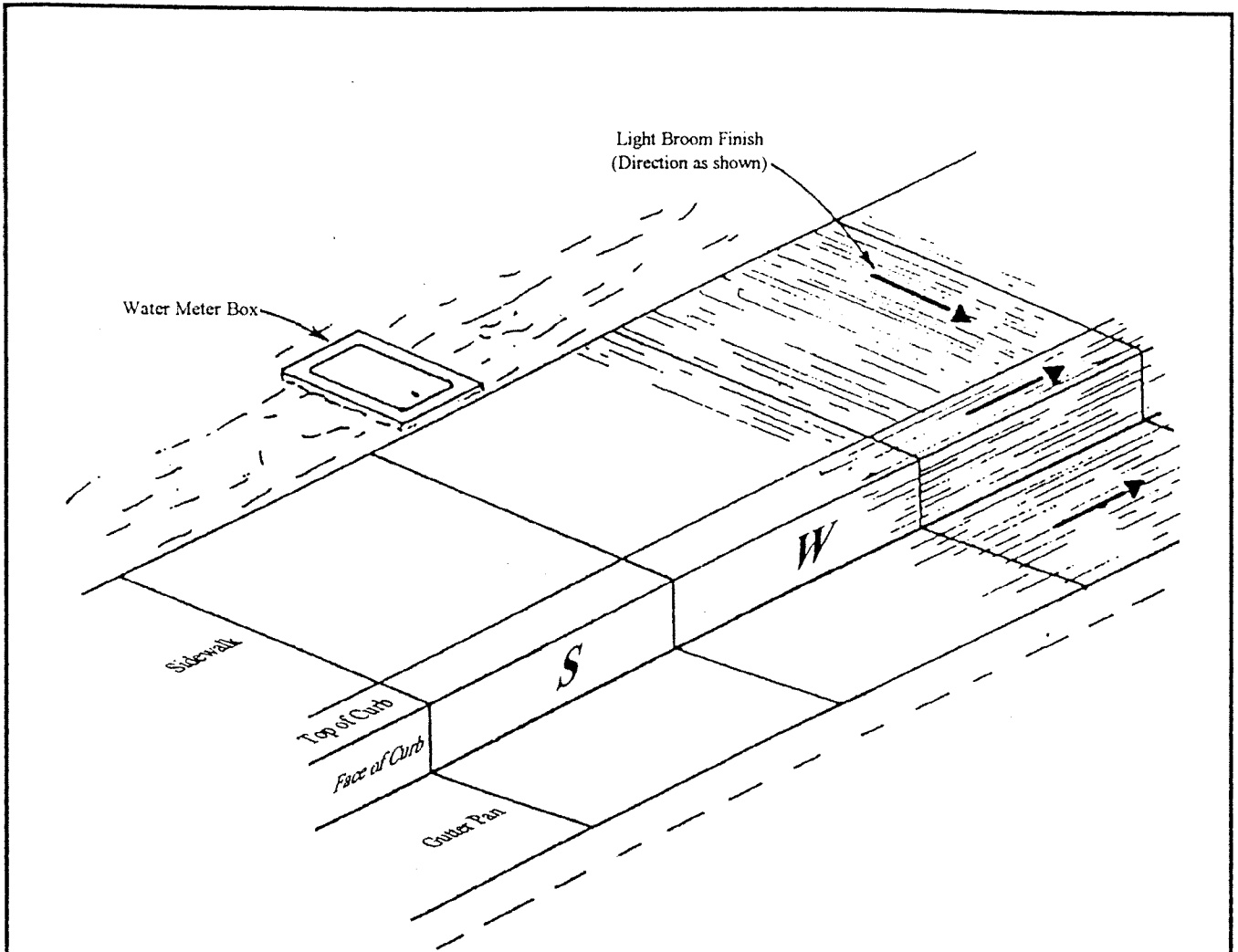


1. Compact all Subgrade to Minimum of 92% at 4 to 6 Percentage Points over opt. Moisture. (See STANDARD DETAIL SPECIFICATION NO. 41, Section 202.2)
2. Flowline of Gutter is 2" below the Lip of Gutter and 2-1/4" below the Edge of Pavement.
3. Top of Curb is 6" above Flowline; i.e. 6" Curb Height.
4. Concrete to be Class "B" (5-Sack per Cubic Yard) with 2" to 4" Slump. If placed by *Extrusion Machine*, concrete to be Class "B" (5-1/2-Sack per Cubic Yard) (See STANDARD DETAIL SPECIFICATION NO.41 Section 202.8)
5. Monolithic Curb, Gutter and Sidewalk require 1/4" *Premold Joint Filler* and 4-1/2" x 20" Smooth Steel Dowels every 60'-0", 4-1/2" rebars between Expansion Joints are required where soil is expansive (Adobe-Clay). If placed by *Extrusion Machine*, *Premold Joint filler* not required. Machine pours require 4-1/2" Smooth Steel Dowels at Cold Joints. NO other Steel required.
6. Use 1/2 Pound of *Lampblack* per Cubic Yard of Mix.
7. Weakened Plane Joints in Curb, Gutter and Sidewalk shall be placed of intervals not to exceed 20-Fect, the Removable Joint forming Plates shall extend through not less than the upper 1/2" (1-3/4") of Sidewalks and completely through the Curb to at least 2-3/4" below the top of the Gutter.
8. Aggregate under Curb, Gutter, Sidewalk and Driveways shall be 3/4" Maximum size Class 2 Aggregate Sub-Base or 3/4" maximum size Class 2 Aggregate Base.
9. If Calcium Chloride is to be added to the Concrete (On Approval Only), 1/2 Sack Cement per Cubic Yard shall be added for each 1% of Calcium Chloride (CC) not to exceed 2%.



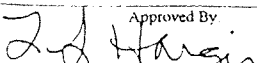

PROFILE - WEAKENED PLANE JOINT

<p>CITY OF PETALUMA Department of Engineering 22 Bassett Street - Petaluma California 94952 707 778-4304 - Fax 707 778-4317</p> <p>Approved By: <i>Thomas S. Hurgis</i> Thomas S. Hurgis - E.C.E. 22366</p>	<p>Standard Details CURB, GUTTER SIDEWALK General Notes</p>	<p>Drawn By Butch Smith Scale N T S Date September 4th 1996 File Number Std Det SSD0000 202 1 of 2</p>	 <p>Page 202</p>
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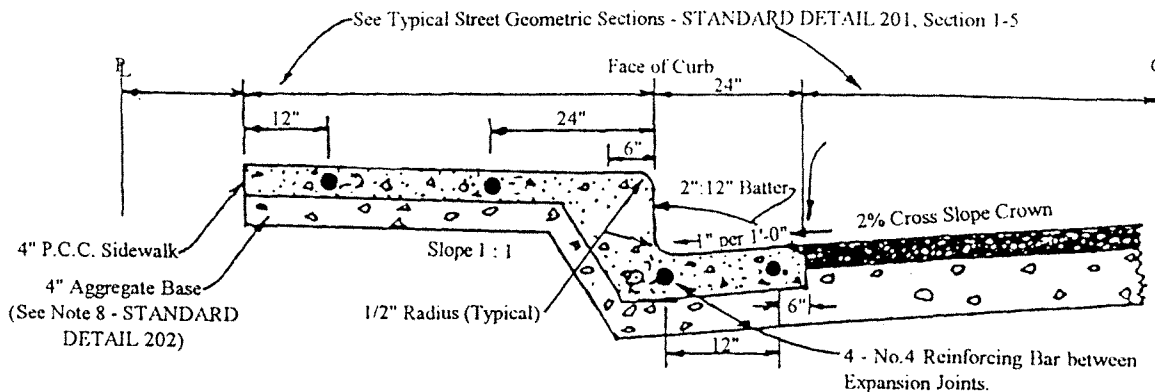


NOTE:

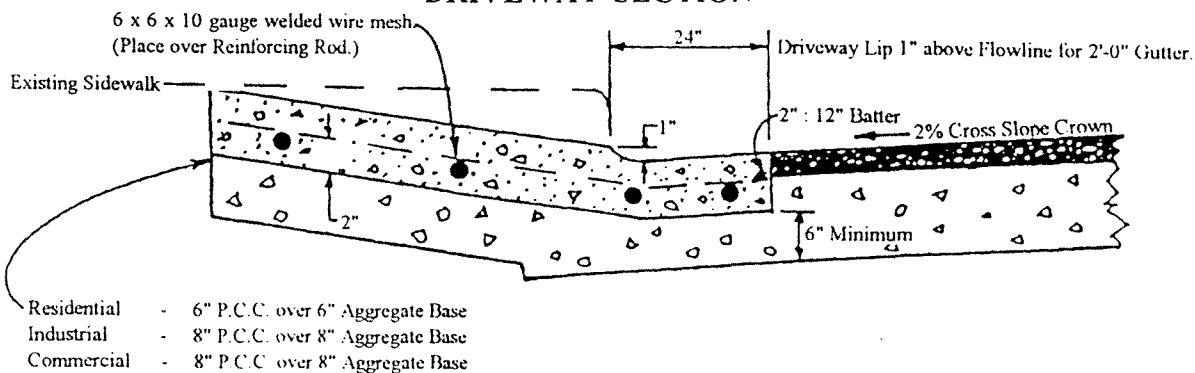
1. The Face of Curb shall be stamped with the appropriate letter, directly over the service lateral.
 - "S" = Sanitary Sewer Lateral
 - "W" = Water Service Lateral
 - "D" = Utility Duct Crossing
 - "B" = Water Blow-off behind Sidewalk.
2. Stamps shall be constructed such that they will leave a clear, clean impression at least 3/16" in depth. Letters shall be a minimum of 3-1/2" high but no more than 4" Scratching in letters with sticks or other object will not be allowed.
3. It will be the responsibility of the Underground Contractor to visibly reference all service laterals prior to pouring curb, gutter, and sidewalk.

<p>CITY OF PETALUMA Department of Engineering 22 Bassett Street - Petaluma California 94952 707 778 4304 - Fax 707 778 4437</p> <p>Approved By  Thomas S. Harts R.C.E. 22366</p>	<p>Standard Details CURB MARKINGS FOR Service Laterals</p>	<p>Drawn By Butch Smith Scale N T S Date October 30th 1996 File Number Std Det SSD0000 202 2 of 2</p>	 <p>Page 202</p>
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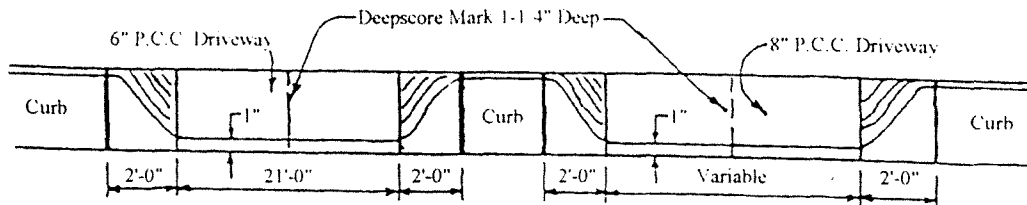
SIDEWALK SECTION



DRIVEWAY SECTION



RESIDENTIAL DRIVEWAY



1/4" Expansion Joint each end of Driveway
(See STANDARD DETAIL 202 Note 5)

COMMERCIAL DRIVEWAY

CITY OF PETALUMA
Department of Engineering

22 Bassett Street - Petaluma California 94952
707 778 4304 - Fax 707 778 4433

Approved By:

Thomas S. Harris

Thomas S. Harris - R.C.E. 2236

Standard Details
**CURB, GUTTER
SIDEWALK
DRIVEWAY**
X-Section

Drawn by:

Butch Smith

Scale:
N T S

Date:

February 9th 1997 (Rev)

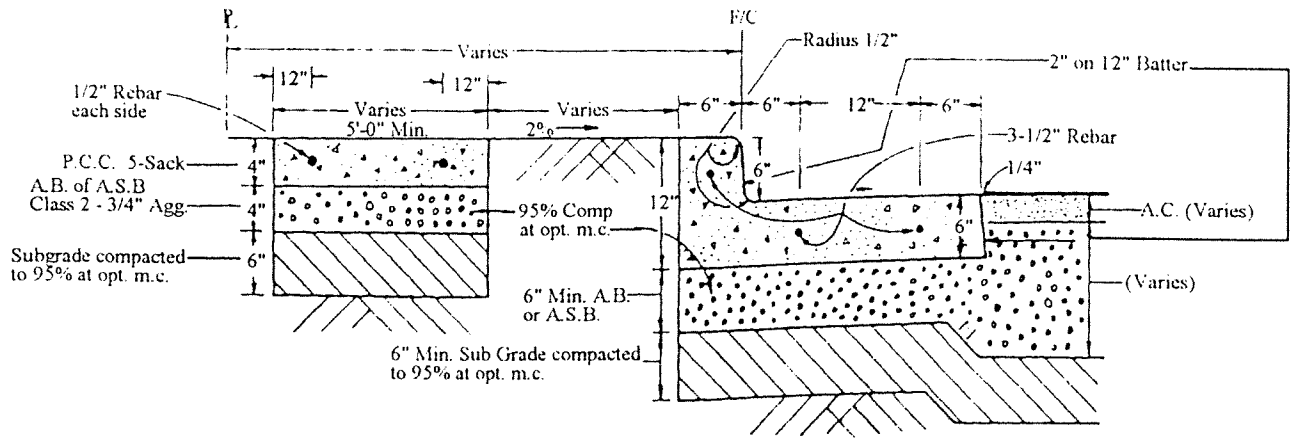
File Number:

SEE STANDARD DETAIL 202



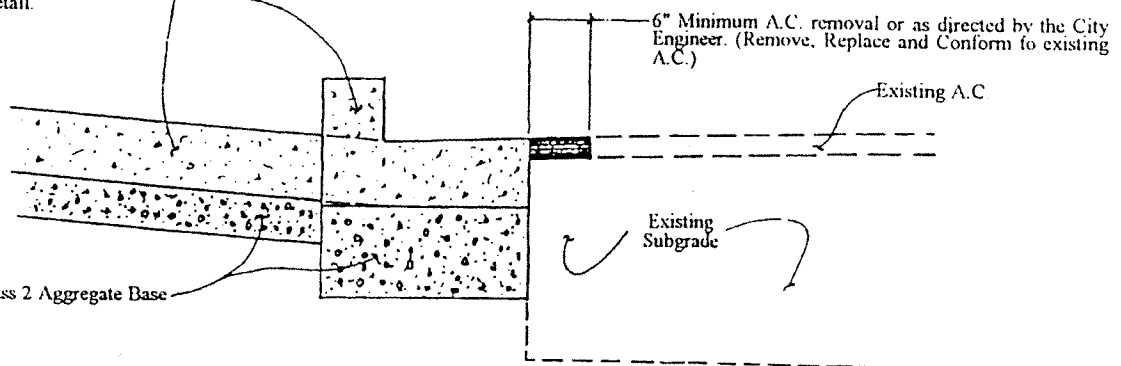
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SIDEWALK, CURB AND GUTTER SECTION WITH PLANTER STRIP "NEW"

"New" curb and gutter and or driveway approach as per City Standard Detail.



STREET CONFORM DETAIL AT NEW CURB AND GUTTER OR DRIVEWAYS

NOTES:

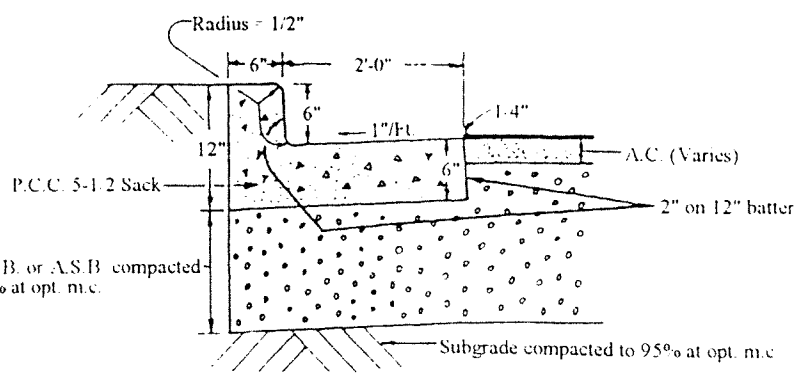
LANDSCAPED AREAS
 Try to save all plants, plants damaged or removed by the contractor shall be replaced "in Kind" at the contractor's expense.

For additional details, See 1984 CALTRANS Standard Plans, Page 85 and 86, drawings N8B and N8C.

1. Expansion joints are required at 60'-0" intervals with 3 each 1/2" diameter Rebar Dowels.
2. Scarify all subgrade and compact to 95% at opt. m.c.
3. Compact A.S.B. or A.B. to 95% at optimum moisture content.
4. Refer to Sidewalk Section.

For expansive soils See City Standard Detail Specification No. 41 paragraph 4102.2 relative compaction

Contractor must remove a minimum of 6" of A.C. or more at the discretion of the Director of Engineering to form for curb and gutter or Driveway approach.



P.C.C. PLACEMENT BY EXTRUSION MACHINE

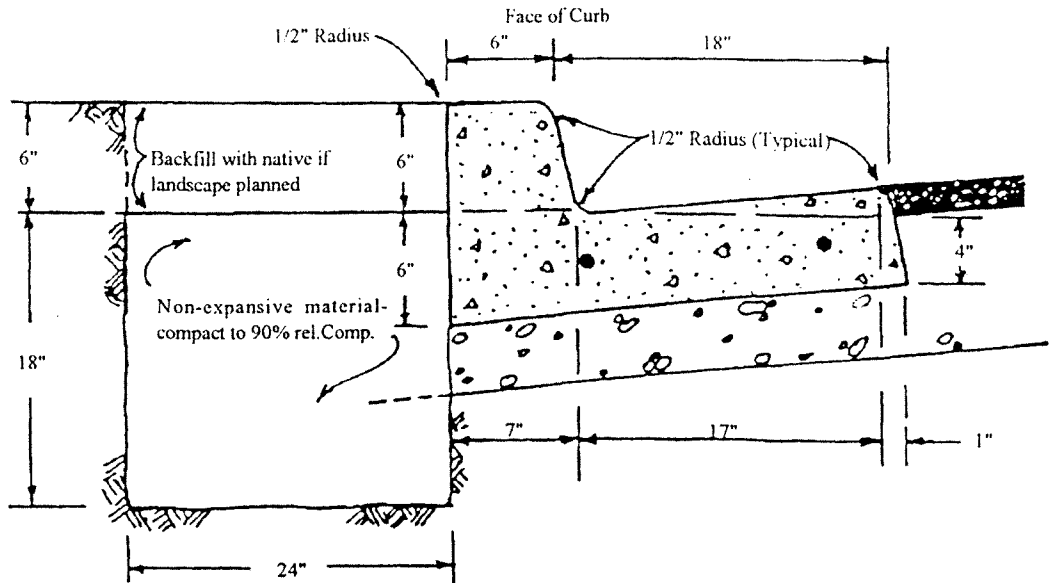
CITY OF PETALUMA
 Department of Engineering
 22 Bassett Street Petaluma California 94952
 Phone 708-4304 Fax 707-778-4437

Approved By
Thomas A. Hagg
 Thomas A. Hagg R.C.E. #2566

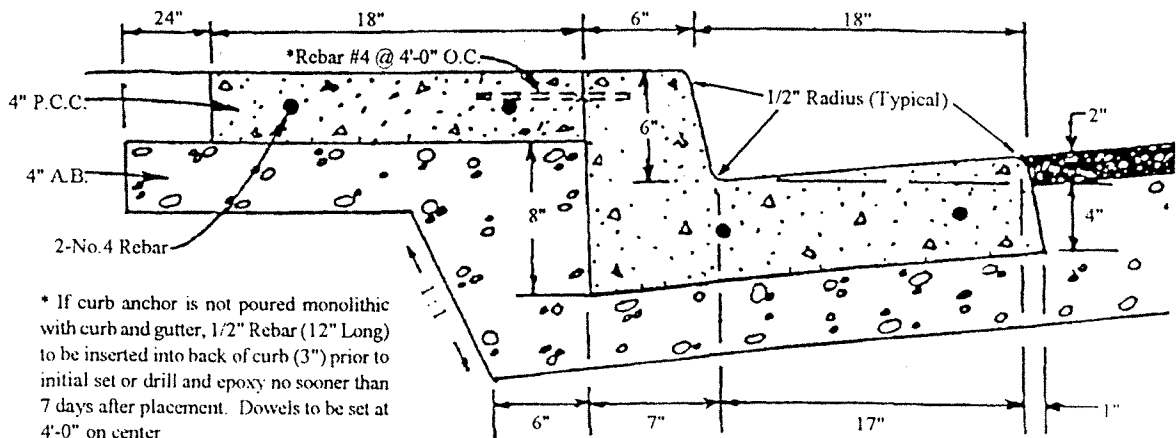
Standard Details
MISC.
"NEW"
CONSTRUCTION
 Sections

Drawn By
Butch Smith
 Scale
N. T. S.
 Date
February 9th 1998 (Rev.)
 File Number
 Std Det SS10000 201 2 81 2

Page 2 of 2



STANDARD CURB AND CUTTER
with Non-expansive Backing




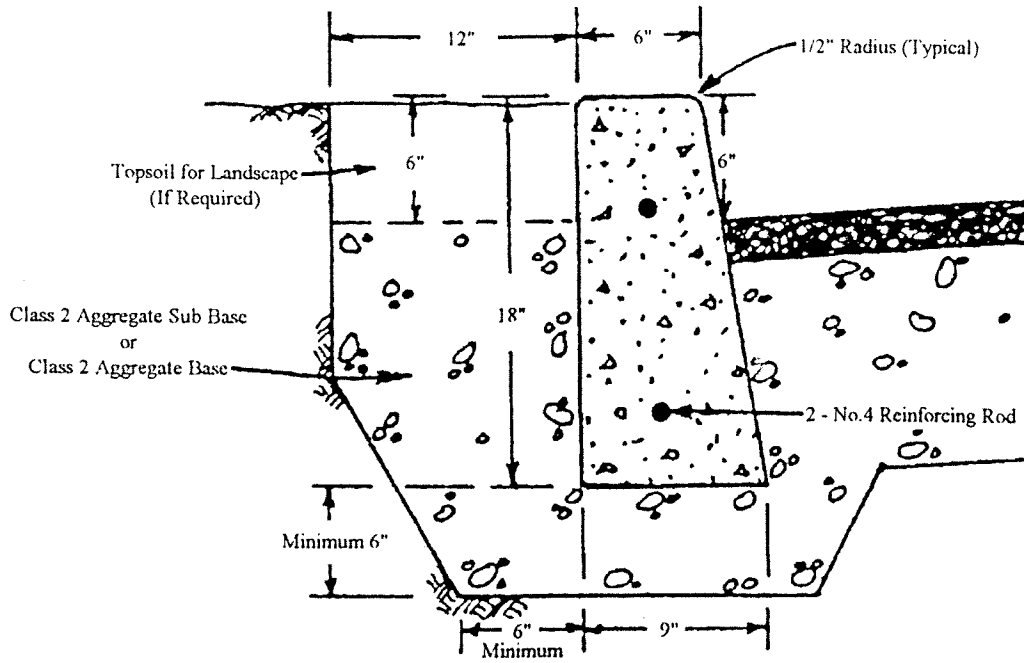
* If curb anchor is not poured monolithic with curb and gutter, 1/2" Rebar (12" Long) to be inserted into back of curb (3") prior to initial set or drill and epoxy no sooner than 7 days after placement. Dowels to be set at 4'-0" on center.

STANDARD CURB AND CUTTER
with Curb Anchor

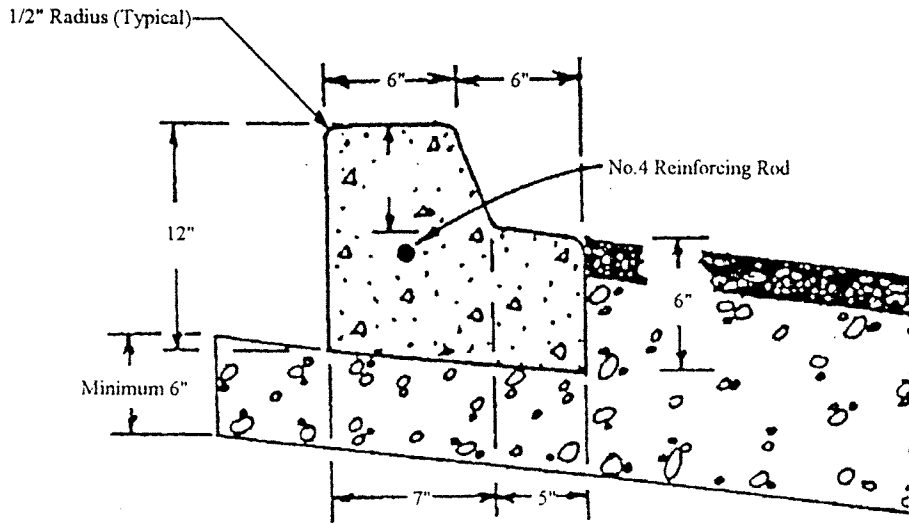
NOTE:

1. Curb and gutter with non-expansive backing or with curb anchor are optional or as directed by the Engineer.
2. Placement of Curb Anchor shall conform to STANDARD DETAIL 203 and DETAIL SPECIFICATION 41, Section 202.8.
3. If non-expansive material is to be used, the Engineer may require testing by an accredited soils lab prior to placement. Sand or pea gravel will not be allowed

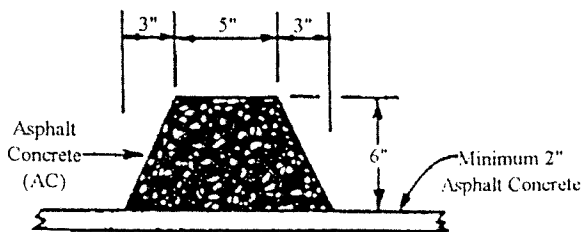
<p>CITY OF PETALUMA Department of Engineering 22 Bassett Street - Petaluma, California 94954 707 778 4304 - Fax 707 778 4437</p> <p>Approved By: <i>Thomas S. Hargis</i> Thomas S. Hargis R.C.E. 2006</p>	<p>Standard Details</p> <p>STANDARD CURB & GUTTER</p>	<p>Drawn by Butch Smith Scale N T S Date February 9th 1998 (Rev.) File Number Std Det SSD0000 204 1 01 02</p>
		 <p>Page 204</p>



VERTICAL CURB



CURB AND FALL AWAY GUTTER



ASPHALT CONCRETE CURB

NOTE:

Asphalt concrete curb to be placed by an acceptable extrusion machine only.

CITY OF PETALUMA
Department of Engineering

22 Bassett Street - Petaluma California 94952
707 778 4304 - Fax 707 778 4437

Approved By

Thomas S. Hargis

Thomas S. Hargis R.C.E. 22366

Standard Details
CURB
&
GUTTER

Drawn By
Butch Smith

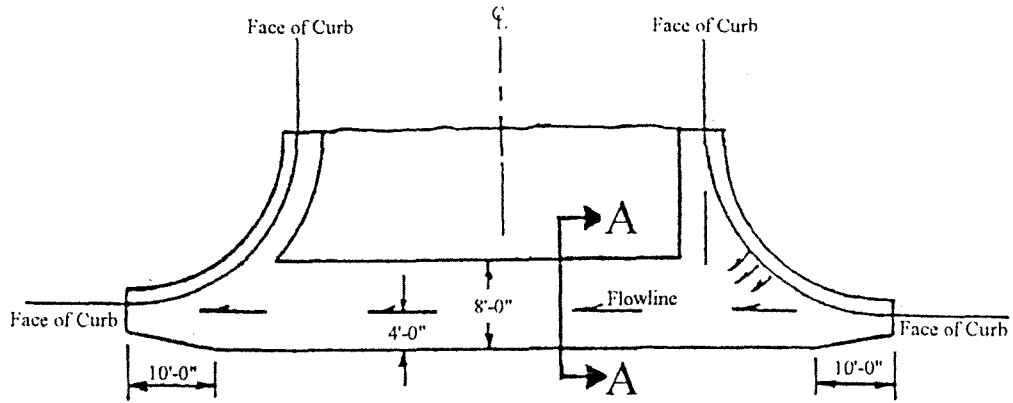
Scale
N T S

Date
September 4th 1996

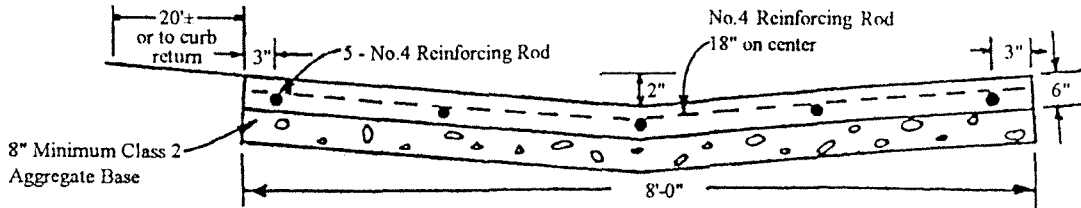
File Number
Std Det SSS0000 204 2 of 2



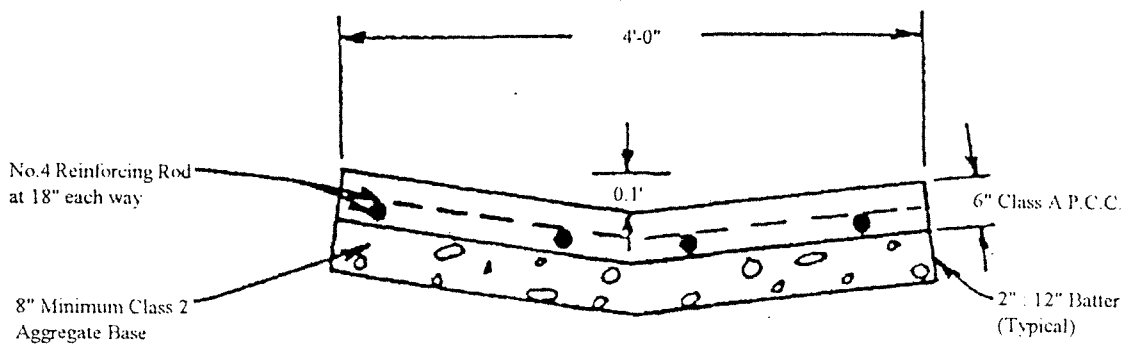
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VALLEY GUTTER DETAIL



SECTION A-A
STANDARD VALLEY GUTTER DETAIL



VALLEY GUTTER MINOR CUL-DE-SAC

CITY OF PETALUMA
Department of Engineering

22 Bassett Street - Petaluma California 94952
707 778 4304 - Fax 707 778 4437

Approved By

Tom Harris

Thomas S. Harris - R.C.E. 22366

Standard Details
VALLEY
GUTTER

Drawn by
Butch Smith

Scale

N. T. S.

Date

September 4th 1996

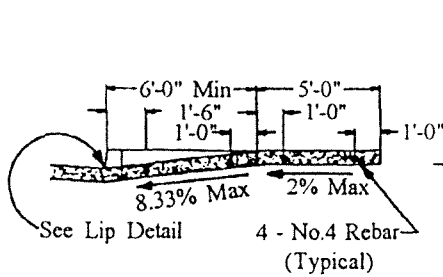
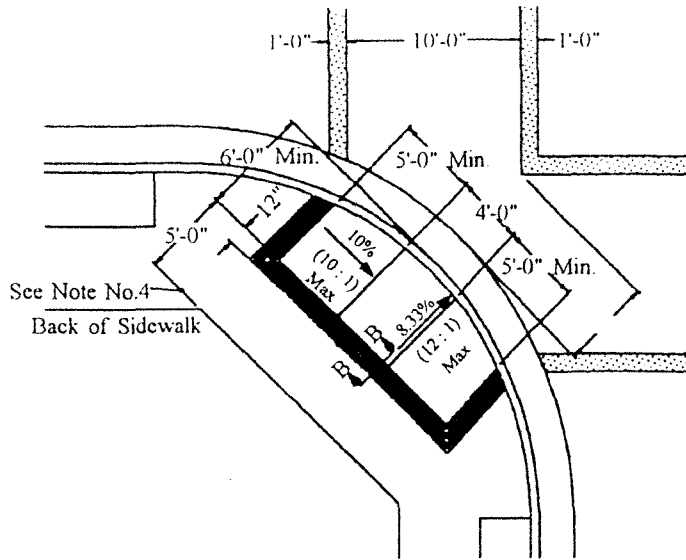
File Number

Std. Det. SSS0000 205

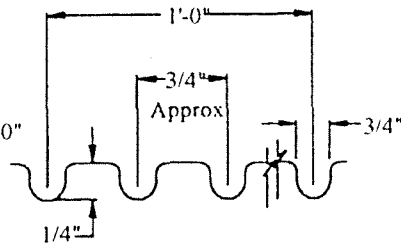


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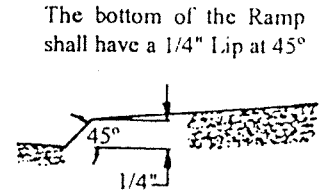
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RAMP DETAIL




SECTION B - B

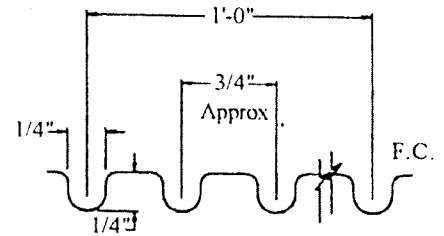
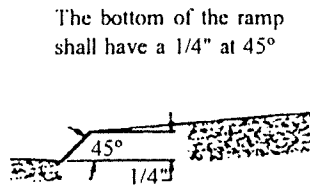
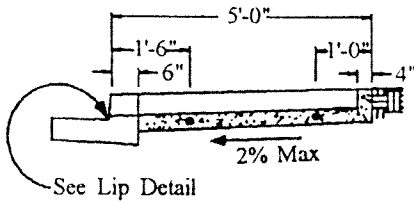
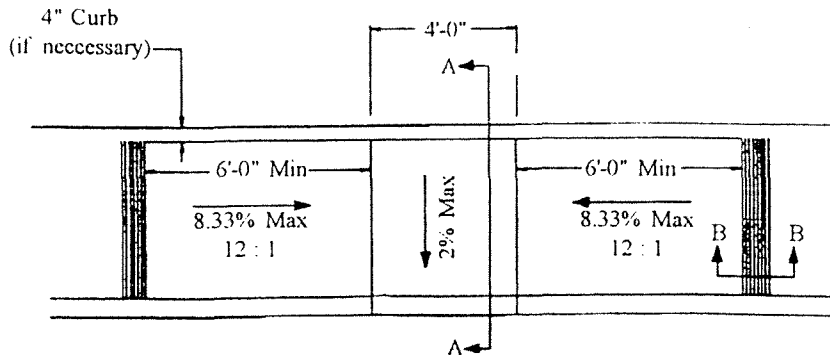


LIP DETAIL

NOTE:

1. Design shall conform to these requirements except as otherwise approved by the Director of Engineering.
2. For subdivisions where sidewalks are not required for street improvement, curb depressions for curb ramps shall be omitted.
3. The surface of each curb ramp shall be slip resistant and shall be of contrasting finish for that of the adjacent sidewalk.
4. Type "B" or "C" ramp to be used in situations when 5'-0" minimum landing can not be obtained.
5. Sidewalk and ramp thickness shall be 4" of P.C.C. with four No 4 rebar continuous over 4" of Class 2 A.B. compacted to 95%.
6. If curb exists, 12" dowels are required at 4'-0" on center between existing curb and new construction.

<p>CITY OF PETALUMA Department of Engineering 22 Bassett Street - Petaluma California 94952 707 778-4304 - Fax 707 778-4437</p> <p>Approved By <i>Thomas S Hargis</i> Thomas S Hargis - R.C.E. 22366</p>	<p>Standard CURB RAMP TYPE - A Detail</p>	<p>Drawn By Butch Smith Scale N T S Date February 9th 1998 (Rev.) File Number Std. Det. SSD0000.206 1 of 3</p>	 <p>Page 206</p>
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SECTION A - A

LIP DETAIL

SECTION B - B

NOTE:

1. Design shall conform to these requirements except as otherwise approved by the Director of Engineering.
2. For subdivisions where sidewalks are not required for street improvements, curb depressions for curb ramps shall be omitted.
3. The surface of each curb ramp shall be slip resistant and shall be of contrasting finish from that of the adjacent sidewalk.
4. Type "B" or "C" ramp to be used in situations when 5'-0" minimum landing can not be obtained.
5. Sidewalk and ramp thickness shall be 4" of P.C.C. with two No.4 rebar continuous over 4" of Class 2 A.B. compacted to 95%.
6. If curb exists, 1/2" dowels are required at 4'-0" on center between existing curb and new construction.

CITY OF PETALUMA
Department of Engineering

22 Bassett Street - Petaluma California 94952
707 778 4304 - Fax 707 778 4437

Approved By

Thomas S. Hargis
Thomas S. Hargis - R.C. 222366

Standard
CURB RAMP
TYPE - B
Detail

Drawn By
Butch Smith

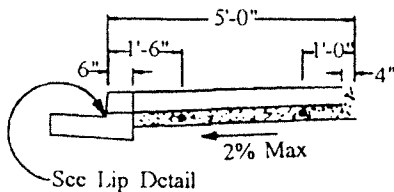
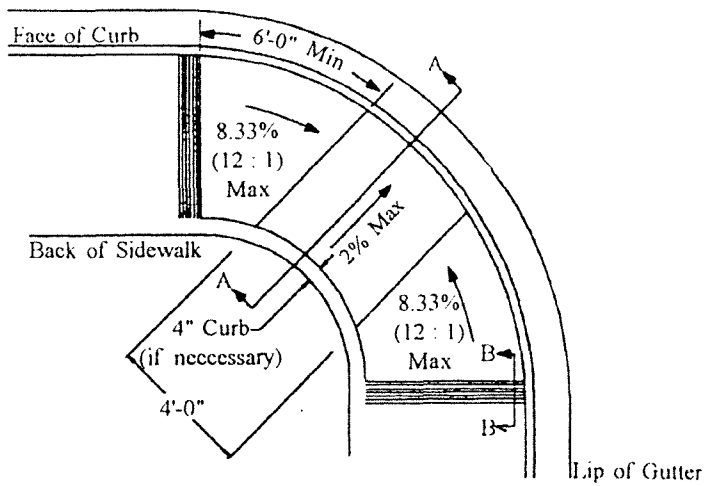
Scale
N. T. S.

Date
February 9th 1998 (Rev.)

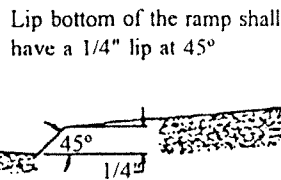
File Number
Std. Det. SSD 0000 206 2 of 3



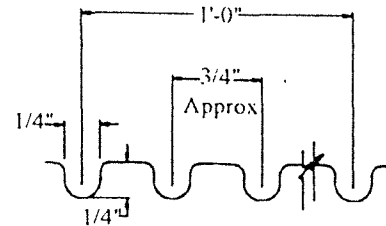
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SECTION A - A



LIP DETAIL



SECTION B - B

NOTE:

1. Design shall conform to these requirements except as otherwise approved by the Director of Engineering.
2. For subdivisions where sidewalks are not required for street improvements, curb depressions for curb ramps shall be omitted.
3. The surface of each curb ramp shall be slip resistant and shall be of contrasting finish from that of the adjacent sidewalk.
4. Type "B" or "C" ramp to be used in situations when 5'-0" minimum landing can not be obtained.
5. Sidewalk and ramp thickness shall be 4" P.C.C. with two No. 4 rebar continuous over 4" of Class 2 A.B. compacted to 95%.
6. If curb exists, 12" dowels are required at 4'-0" on center between existing curb and new construction.

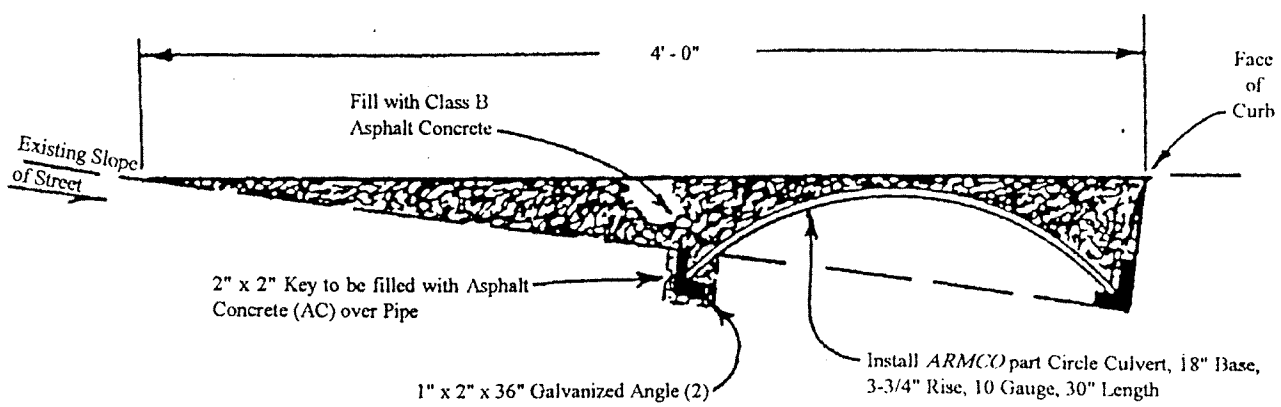
CITY OF PETALUMA
 Department of Engineering
 22 Bassett Street - Petaluma California 94952
 707 778 4304 - Fax 707 778 4437

Approved By
Thomas S. Hargis
 Thomas S. Hargis - R.C.E. 22366

Standard
CURB RAMP
TYPE - C
 Detail

Drawn By
 Butch Smith
 Scale
 N T S.
 Date
 February 9th 1998 (Rev.)
 File Number
 Std Det. SSD0000.206 3 of 3



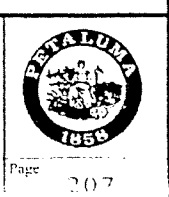


PLAN VIEW

CITY OF PETALUMA
 Department of Engineering
 22 Bassett Street - Petaluma California 94952
 707 778 4304 Fax 707 778 4437
 Approved By
John Nargis
 Thomas S. Nargis R.C.E. 22366

Standard Details
**DRIVEWAY
 CULVERT**
 High Crown Streets

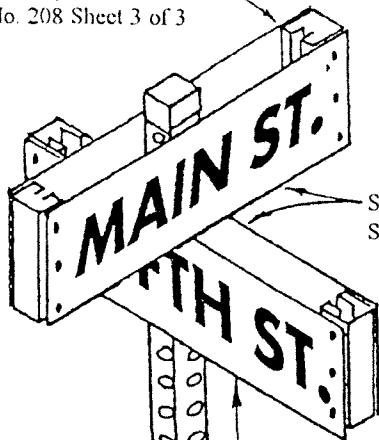
Drawn By
Butch Smith
 Scale
N.T.S.
 Date
September 4th 1996
 File Number
 Std. Det. 558-01-007



NOTE:

Use a Standard 30" STOP Sign with 8" Minimum letters
 Use "SCOTCHLITE" reflective State Hwy. Sign R1

See City Standard Detail
 No. 208 Sheet 3 of 3



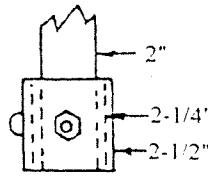
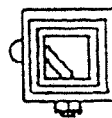
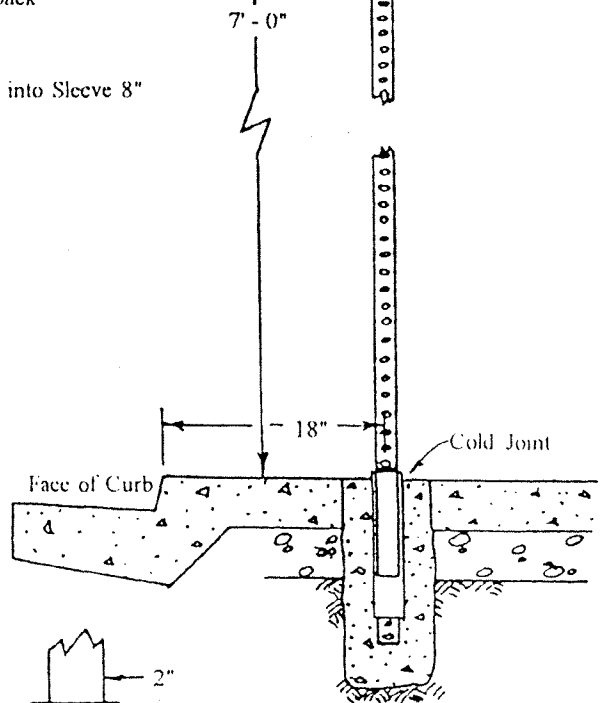
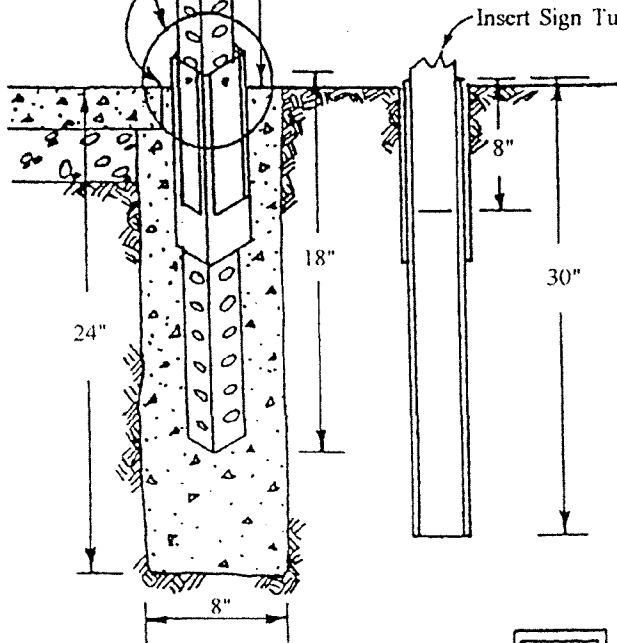
Street Names Sign to have 4" Letters.
 Sign Dimensions to be 6" x 24" Minimum



Standard STOP Sign and combination
 STOP and Street Sign to be located 18"
 from Face of Curb.

Standard Street Sign to be located of back
 edge of Sidewalk.

Insert Sign Tubing into Sleeve 8"



See City Standard Detail No. 208,
 Sheet 2 of 3 for Specific Details
 and Notes.

DETAIL "A"

CITY OF PETALUMA
 Department of Engineering

22 Bassett Street - Petaluma California 94952
 707 778 4304 - Fax 707 778 4413

Approved By

John Hargin
 Thomas S. Hargin, P.E., C.E.

Standard Details
STREET
 &
STOP SIGNS

Drawn By
Butch Smith

Scale

N T S

Date

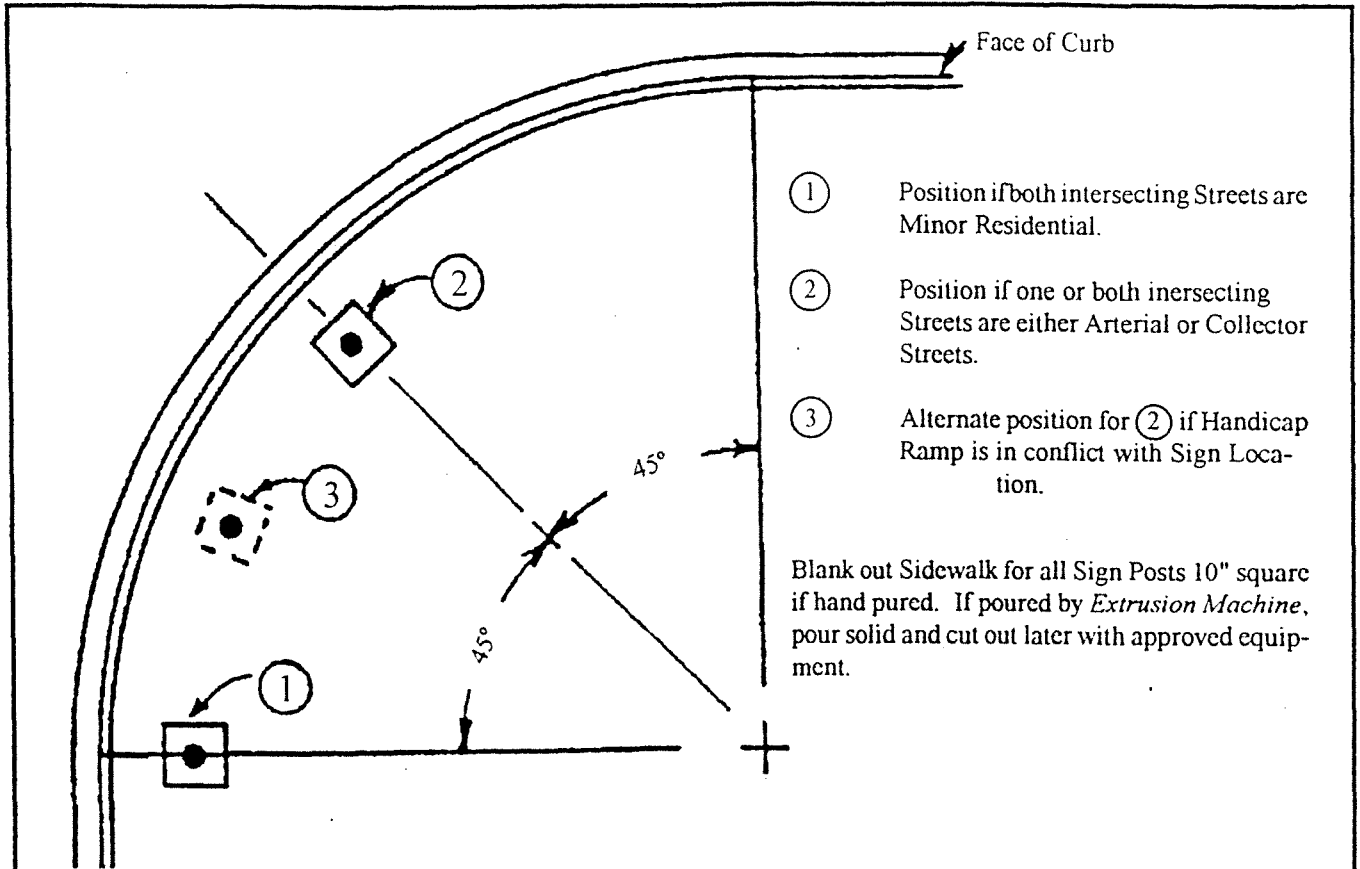
September 4th 1996

File Number

208-1-SSS0000 208



Sheet 3 of 3



NOTE:

- 1 The Street name and Stop signs shall consist of the specified post, base, street signs, and mounting completely installed.
BASE: A concrete base 8" in diameter and 26" deep shall be constructed around each post, the top edge being flush with the back of sidewalk and the bottom 2" below the end of the post.
POST: The post shall be *TELESPAR 20F12* Green or equal. 2" telescoping square tubing, 12-Gauge, Galvanized finish, painted Green, 7/16" diameter holes at 1" on center four sides. Pole to be 11'-6" in length with one end finished to receive mounting cap and fittings.
SIGN: All Signs shall be *SCOTCHLITE* reflective or equal, mounted on aluminum, minimum thickness of 0.080". Letters shall be Silver mounted on Green.

2. If Post to be set in concrete:
 1 - 18" x 2-1/4" square tubing Anchor Base
 1 - 18" x 2-1/2" square tubing Support Sleeve.
 If Post is installed in Native Soil:
 1 - 30" x 2-1/4" square tubing Anchor Base.
 1 - 30" x 2-1/2" square tubing Support Sleeve.

3. Generally, Regulator Signs (STOP, Speed Limit, Etc.) will be located 18" behind Face of Curb. Informational Signs (Curve Arrows, Pavement Narrows, Etc.) usually are located behind the Sidewalk.

- 4 All Signs shall conform to the current State of California, Department of Transportation Traffic Manual and these Standard Details

CITY OF PETALUMA
 Department of Engineering
 22 Bassett Street - Petaluma California 94952
 707 778 4304 - Fax 707 778 4437

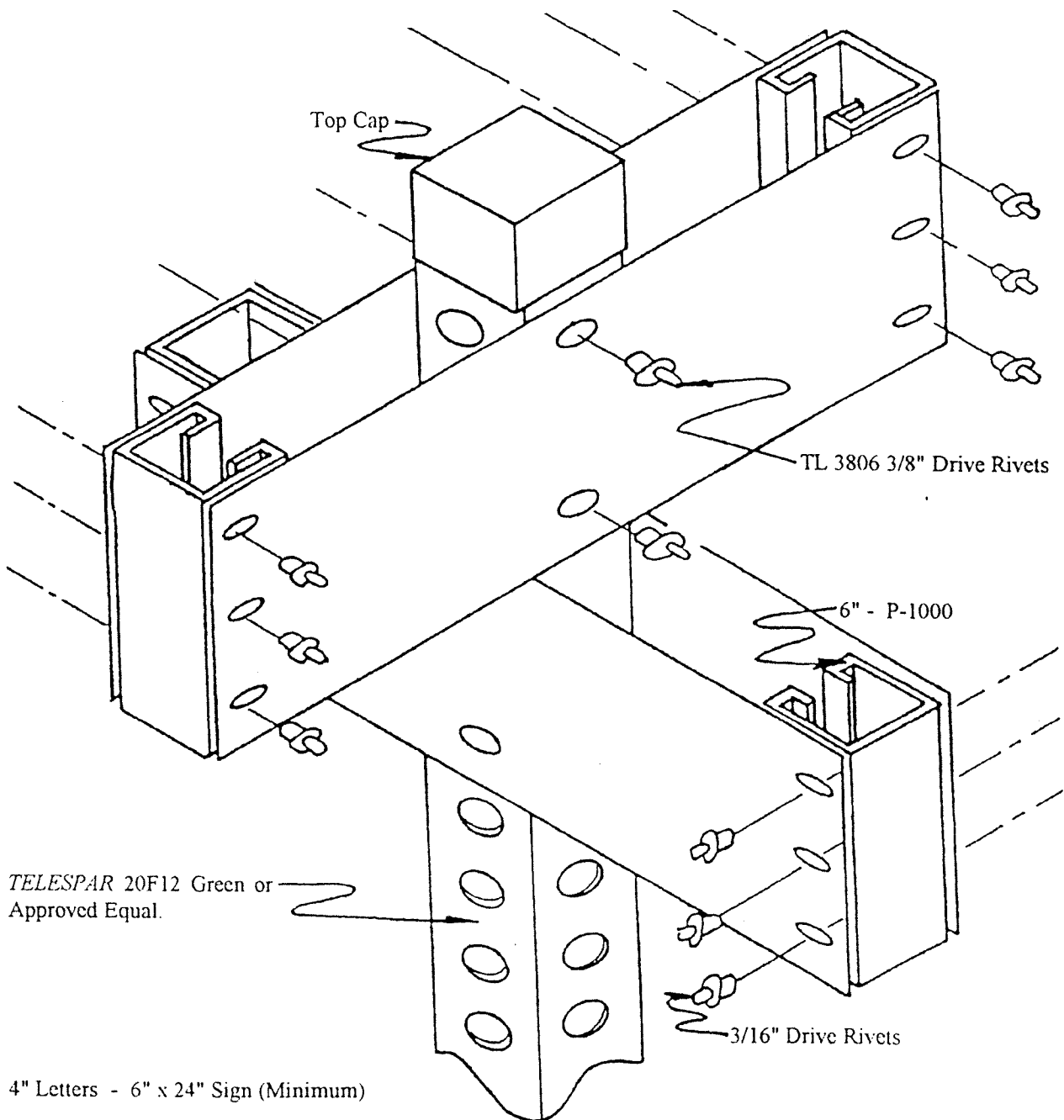
Approved By:

 Thomas S. Hargis - FCE 22366

Standard Details
STREET
 &
STOP SIGNS
 Location and Notes

Drawn By:
 Butch Smith
 Scale:
 N. T. S.
 Date:
 October 30th 1996
 File Number:
 Std Det. SSD000 208 2 of 3


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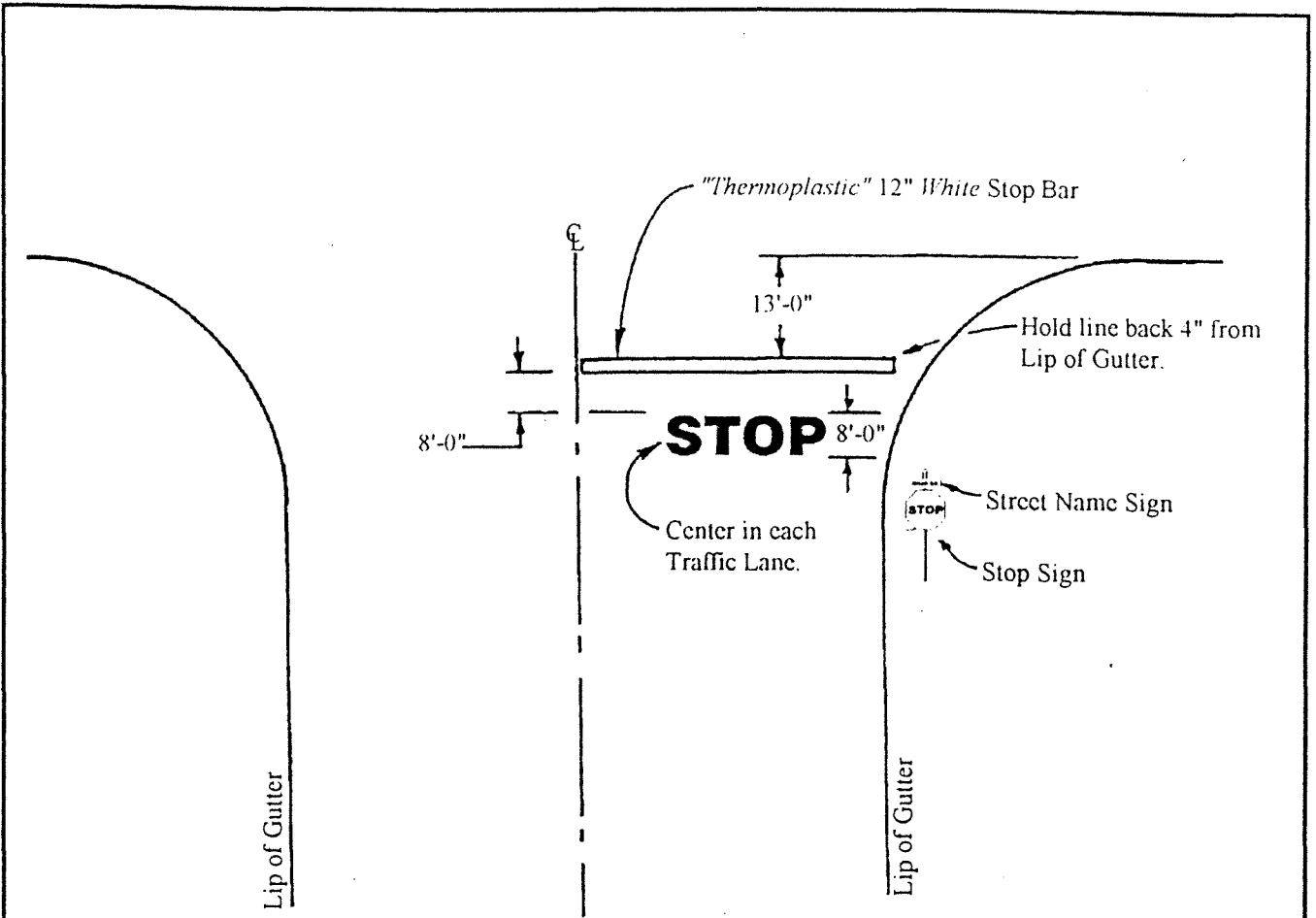


TELESPAR 20F12 Green or
Approved Equal.

4" Letters - 6" x 24" Sign (Minimum)

All Signs shall be *SCOTCHLITE* Reflective or equal mounted on Aluminum,
Minimum thickness 0.080" Letters shall be Silver mounted on Green back-
ground

<p>CITY OF PETALUMA Department of Engineering 22 Bassett Street - Petaluma, California 94952 707 778-4304 - Fax 707 778-4157</p> <p>Approved By <i>Thomas S. Harris</i> Thomas S. Harris - R.C.E. 22360</p>	<p>Standard Details STREET NAME SIGN Detail</p>	<p>Drawn By Butch Smith Scale N T S Date October 30th 1996 File Number Std Det SSD0000 208 1 10 3</p>	 <p>Page 208</p>
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NOTE

1. All intersections designated for STOP signs shall include the "Thermoplastic" STOP and stop bar.
2. STOP Letters shall be "Thermoplastic" using *State of California Department of Transportation* approved stencils. Letters shall be a minimum of 8'-0" in height.

CITY OF PETALUMA
Department of Engineering

22 Bassett Street - Petaluma California 94952
707 778 4304 - Fax 707 778 4457

Approved By

Ed Hargis

Standard Details
STOP BAR
&
STOP WORD
Detail

Drawn by

Butch Smith

Scale

N T S

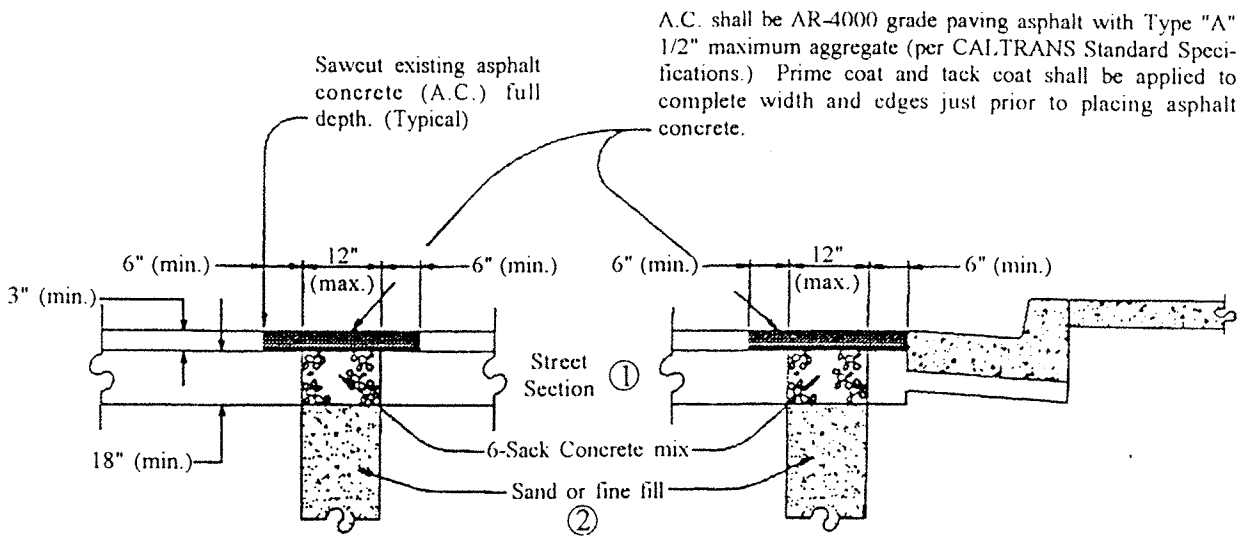
Date

September 4th 1996

File Number

See Detail 205

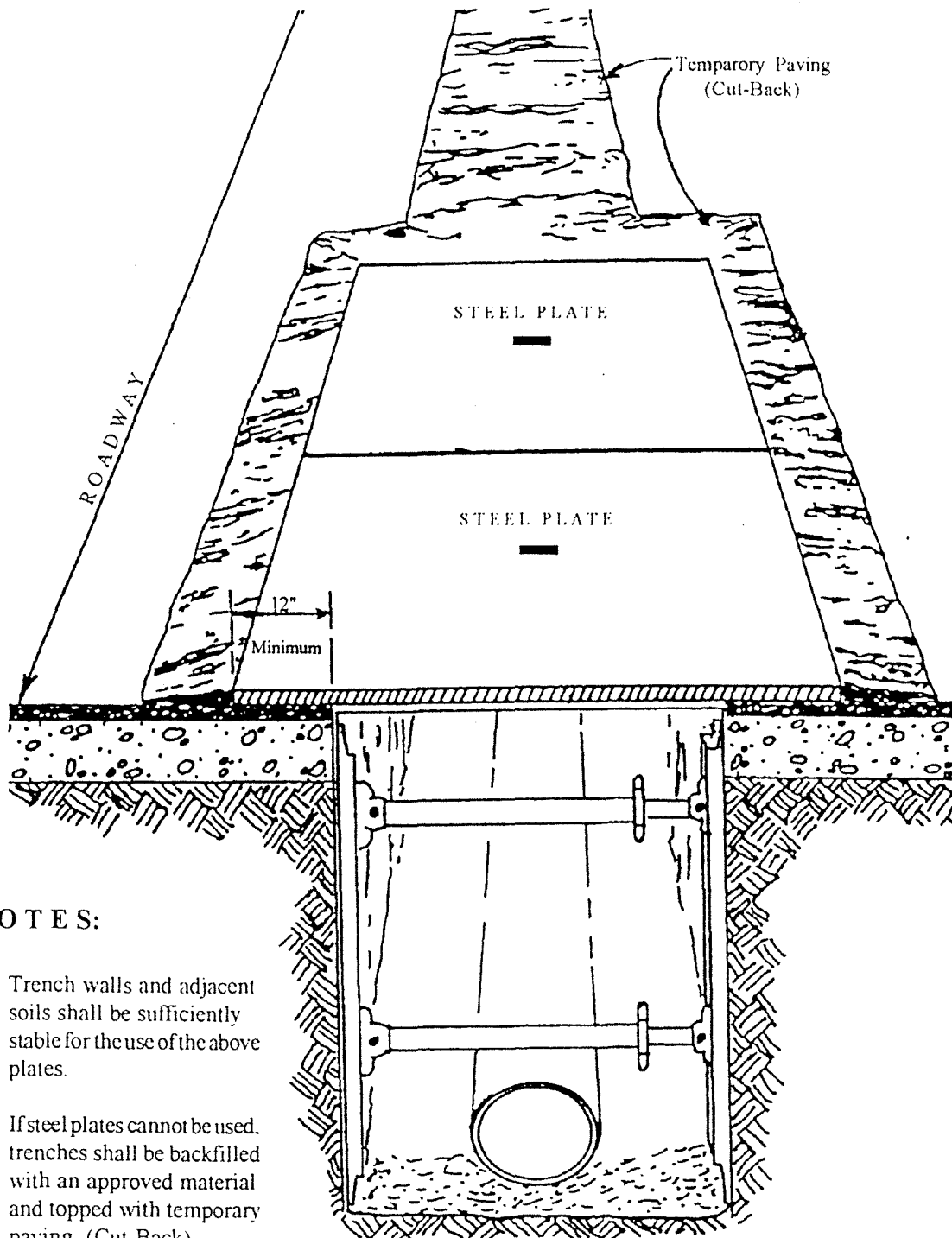




- ① The street structural section shall be a minimum of 3" Asphalt Concrete (A.C.) on 18" of 6-sack concrete mix minimum, to be used as directed by the City Engineer.
- ② Sand slurry backfill per CALTRANS Specification 19-3.062, or controlled density fill of approved mix design may be substituted as authorized by the City Engineer

NOTES:

1. A Street Encroachment Permit will be required for all work within the public right-of-way.
2. All work to be done in accordance with the City of Petaluma Standards and Specifications.
3. Underground service alert (U.S.A.) shall be notified prior to beginning work.
4. All excavations shall conform to the requirements of the State of California Division of Occupational Safety and Health (O.S.H.A.)
5. Bedding for the conduit shall meet the requirements of the utility having jurisdiction or ownership of the conduit.



NOTES:

1. Trench walls and adjacent soils shall be sufficiently stable for the use of the above plates.
2. If steel plates cannot be used, trenches shall be backfilled with an approved material and topped with temporary paving. (Cut-Back)

WIDE OF TRENCH	MINIMUM THICKNESS OF STEEL PLATES
1'-0"	1/2"
1'-6"	3/4"
2'-0"	7/8"
3'-0"	1"
4'-0"	1-1/4"

CITY OF PETALUMA
Department of Engineering

22 Bassett Street - Petaluma California 94952
707 778 4304 - Fax 707 778 4413

Approved By
J. A. Hargin
Thomas S. Hargin

Standard Details
TRENCH PLATING
In Streets

Drawn By
Butch Smith

Scale

N T S

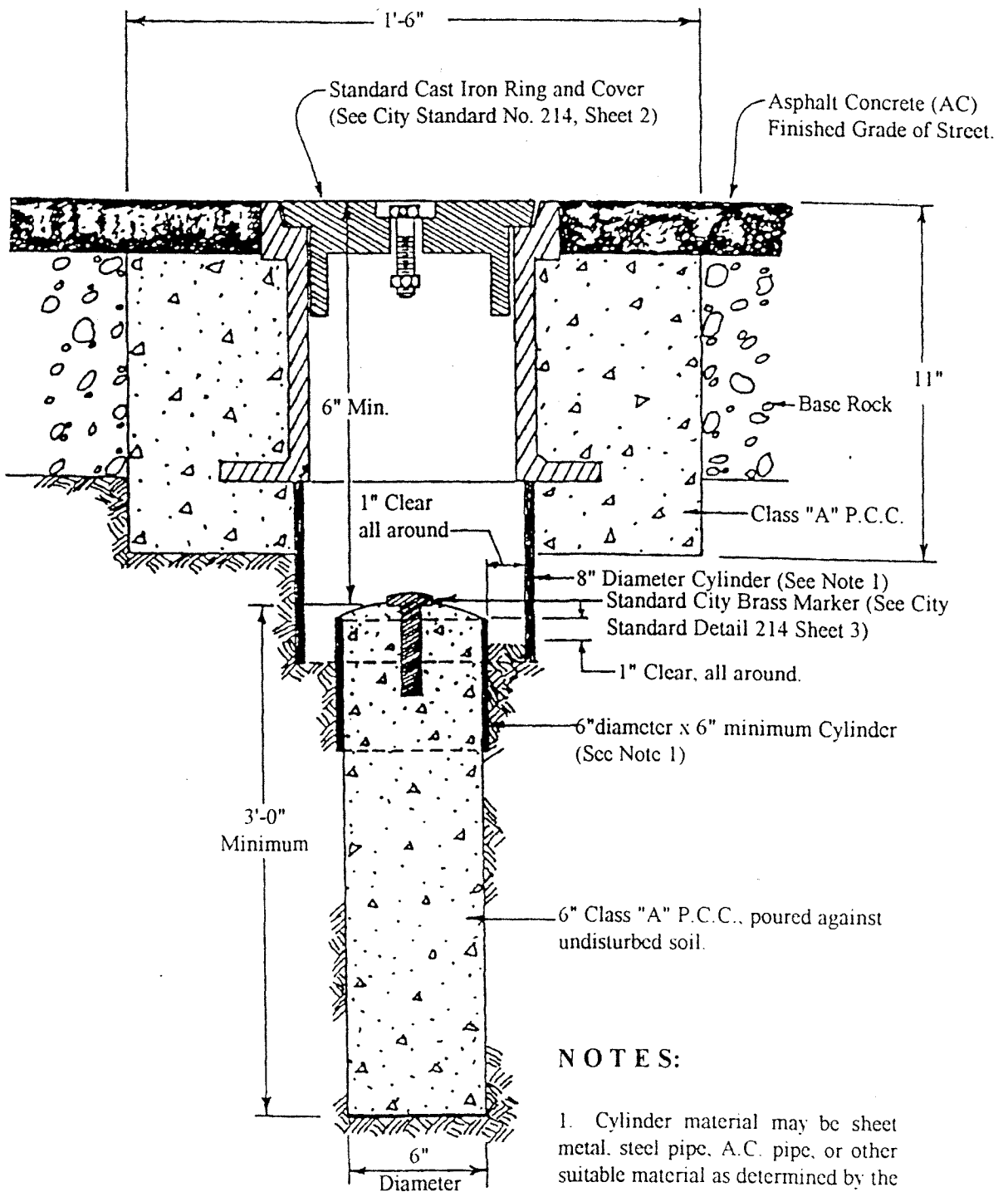
Date

October 30th 1996

File Number

SS00000 213





NOTES:

1. Cylinder material may be sheet metal, steel pipe, A.C. pipe, or other suitable material as determined by the City Engineer.

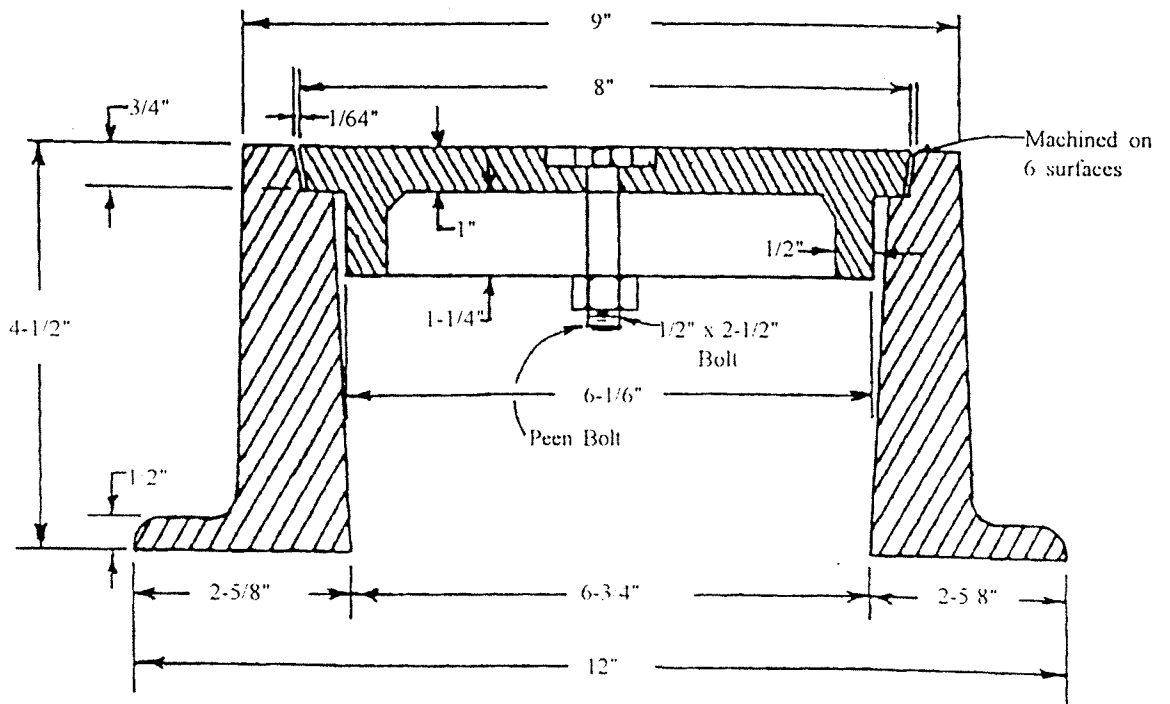
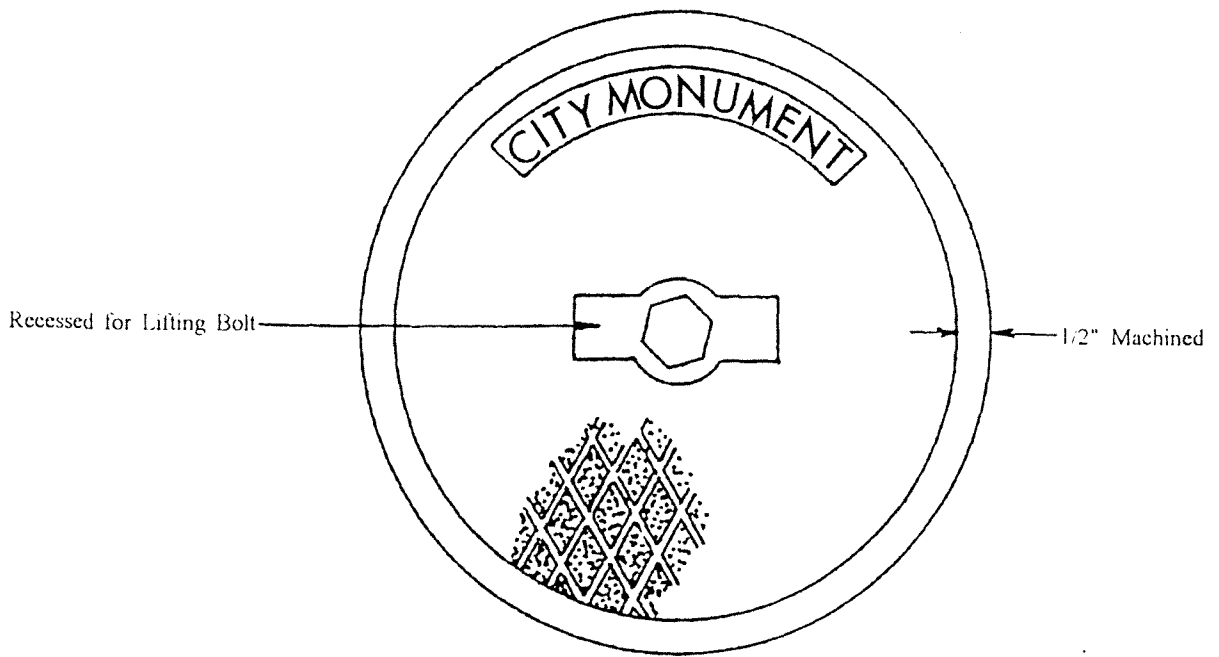
CITY OF PETALUMA
 Department of Engineering
 22 Bassett Street - Petaluma California 94952
 707 778 4304 - Fax 707 778 4437

Approved By
Thomas S. Hargis
 Thomas S. Hargis - R.C.E. 22366

Standard Details
**CITY
 MONUMENT**
 Detail

Drawn By
Butch Smith
 Scale
N T S
 Date
October 30th 1996
 File Number
 Std Det SSD0000 214 1 OF 3


 Page
 214



NOTES:

A.S.T.M. Class 30 Iron Castings
to dipped in Asphalt Pain.

APPROVED MONUMENT CASTINGS

Phoenix, No. P-2001-A or P-2001-E
Visco, No. 129
American Brass and Iron Foundry Model No. 5020-21
Artmark Product Company, No. APC-51
Sant Rosa Cast Products, No. sp-51

CITY OF PETALUMA
Department of Engineering

22 Bassett Street - Petaluma California 94952
707 778 1304 Fax 707 778 1137

Approved By

J. A. Hargis

Electronic Signatures - Not Valid

Standard Details
**CITY
MONUMENT
COVER**

Drawn By

Butch Smith

Scale

N T S

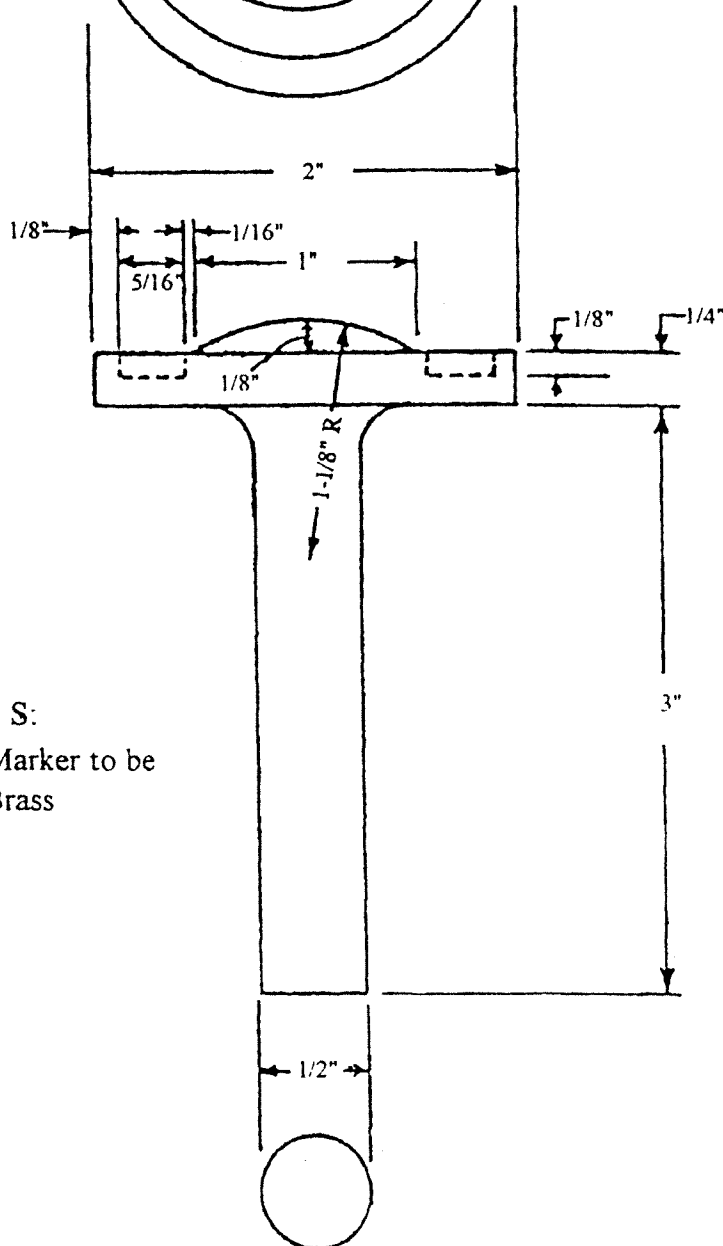
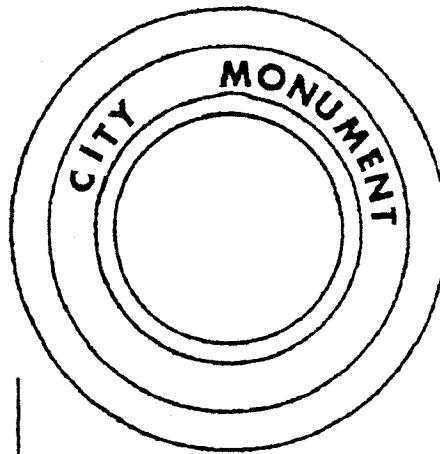
Date

September 6th 1996

File Number

SEE DRAWING FOR CITY MONUMENT COVER





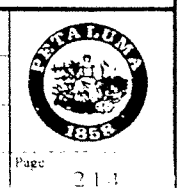
NOTES:
 Survey Marker to be
 Cast in Brass

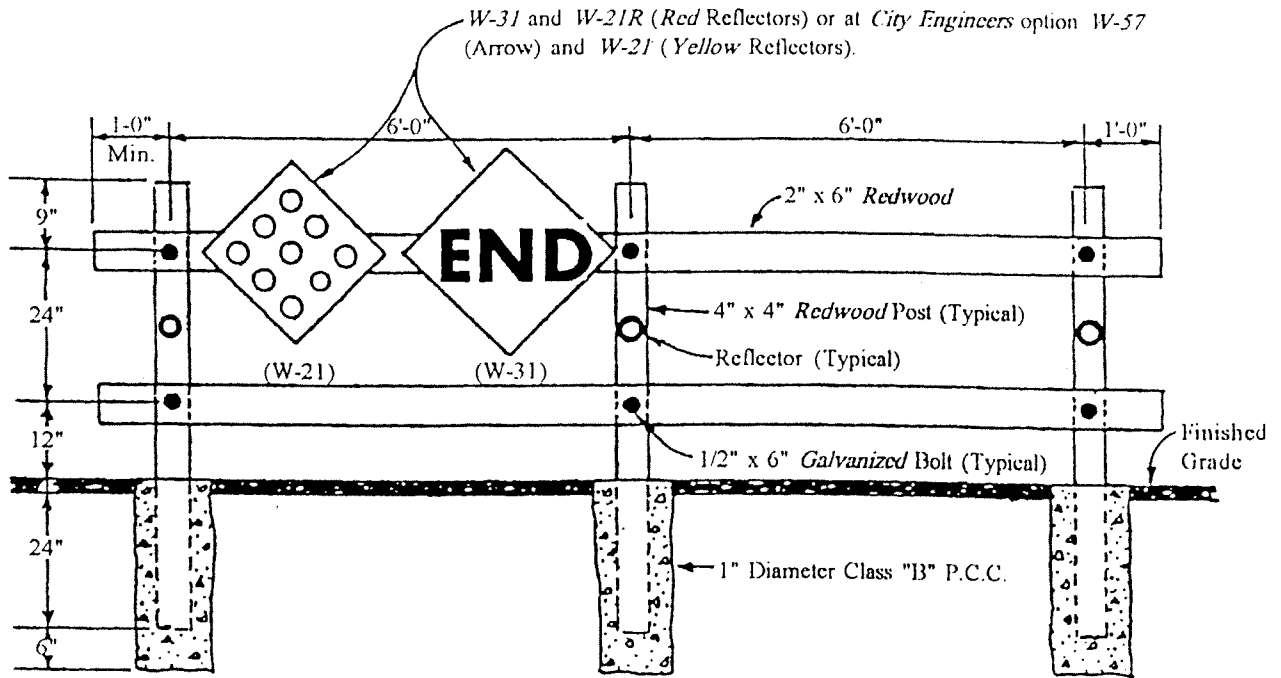
CITY OF PETALUMA
 Department of Engineering
 22 Bassett Street · Petaluma California 94952
 707 778 4304 · Fax 707 778 4437

Approved By
Thomas S. Vargas
 Thomas S. Vargas · R.C.E. 22366

Standard Details
**BRASS
 SURVEY
 MARKER**

Drawn By
Butch Smith
 Scale
N T S
 Date
October 30th 1996
 File Number:
 Std Det: **SSD000 214 3 of 3**





NOTES:

1. The *W-21* to be centered in traffic lane.
2. Two coats of Exterior *White* paint on structure.
3. All bolts, nuts, and washers to be *Galvanized*.
4. Barricade to be placed as shown on plan or as directed by the *City Engineer*.

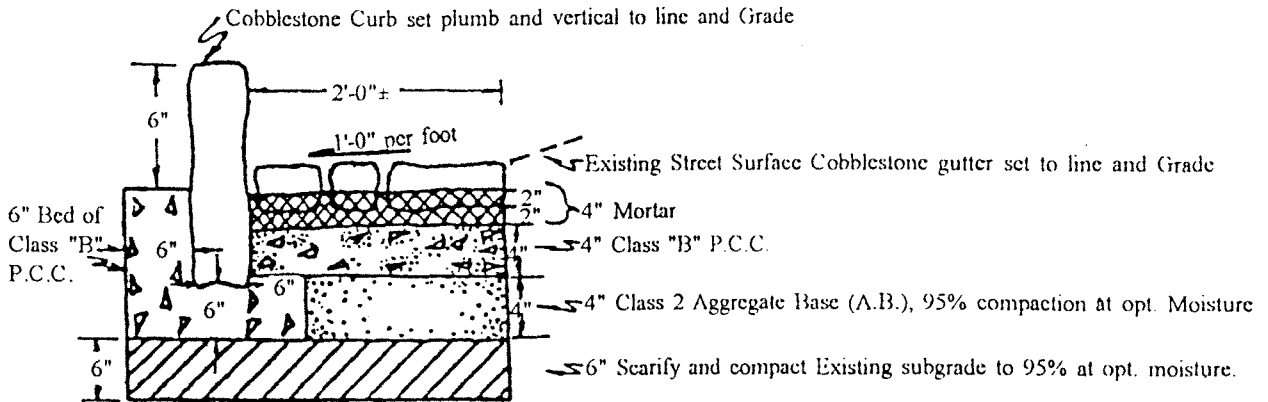
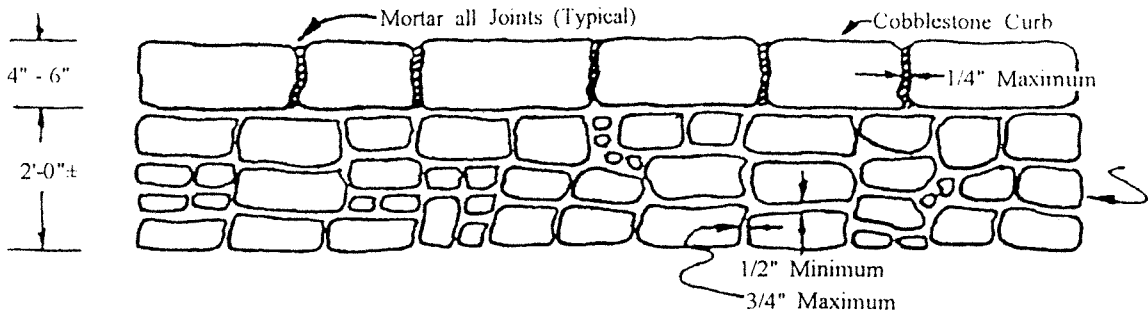
CITY OF PETALUMA
 Department of Engineering
 22 Bassett Street - Petaluma, California 94952
 707 778 4504 - Fax 707 778 4117

Approved By
Thomas S. Harris
 Thomas S. Harris, P.E., C.E.

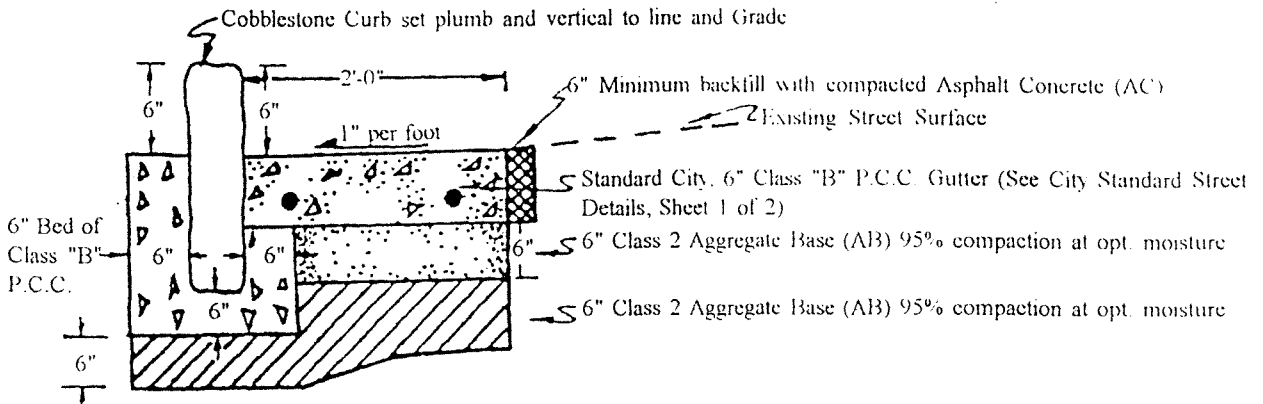
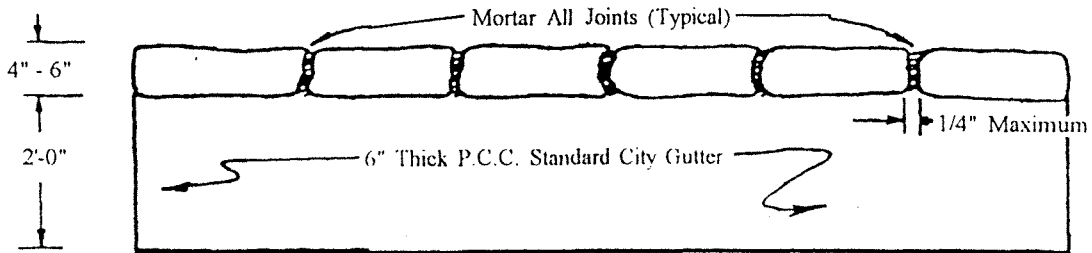
Standard Details
BARRICADE
 Detail

Drawn By
Butch Smith
 Scale
 N T S
 Date
 September 9th 1996
 File Number
 Std Det SSD0000 215





NOTE: Where existing gutter is Cobblestone overlayed with asphalt concrete (AC) - Remove, salvage and deliver stone to *City Street Corporation Yard*. Replace gutter with Standard City P.C.C. Gutter and overlay "In Kind". (See Below)



NOTE: Match "NEW" P.C.C. Gutter to existing P.C.C. Gutter. Replace any Asphalt Concrete (AC) overlay in the gutter "In Kind". *DO NOT* offset flowline of P.C.C. Gutter to conform to any Asphalt Concrete (AC) Overlay

CITY OF PETALUMA
Department of Engineering

22 Bassett Street - Petaluma California 94952
707 778 4304 - Fax 707 778 4437

Approved By

Ed Hays
Ed Hays R.C.E. 22366

Major Reconstruction
**RETENTION OF
COBBLESTONE**

Curb and/or Gutter

Drawn by
Butch Smith

Scale

N T S

Date

September 9th 1996

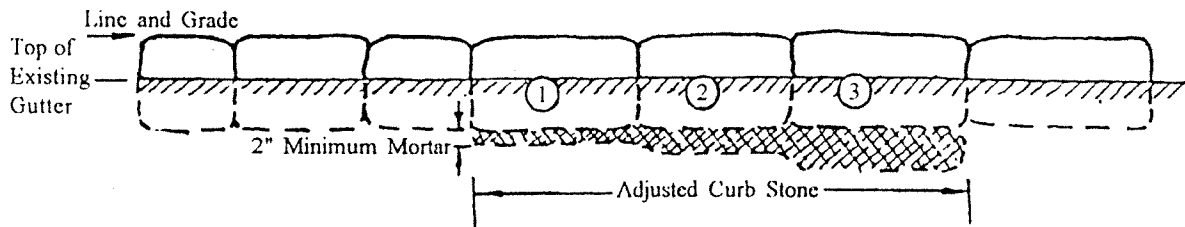
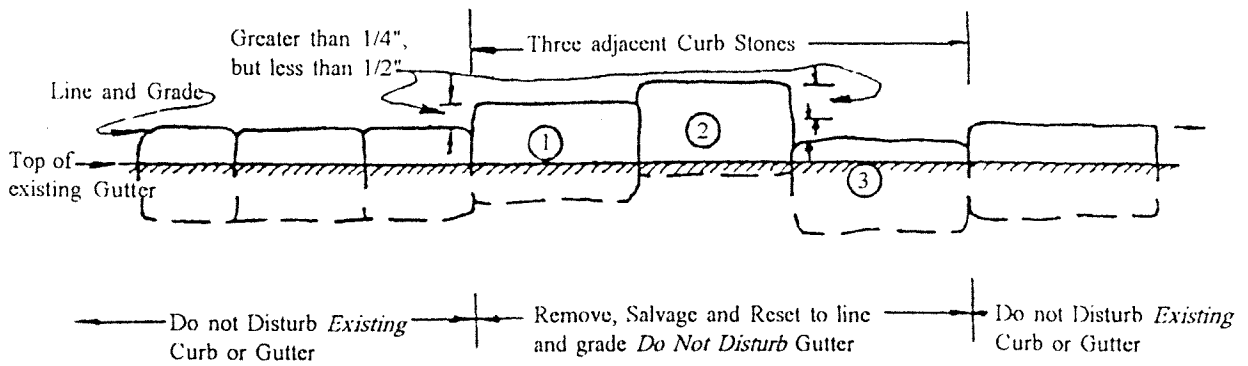
File Number

Std. No. SS00000 216 1 of 3

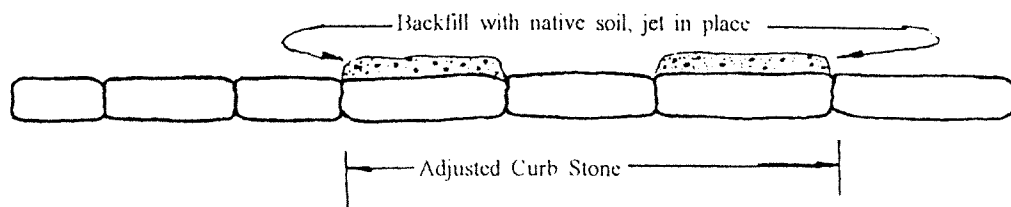
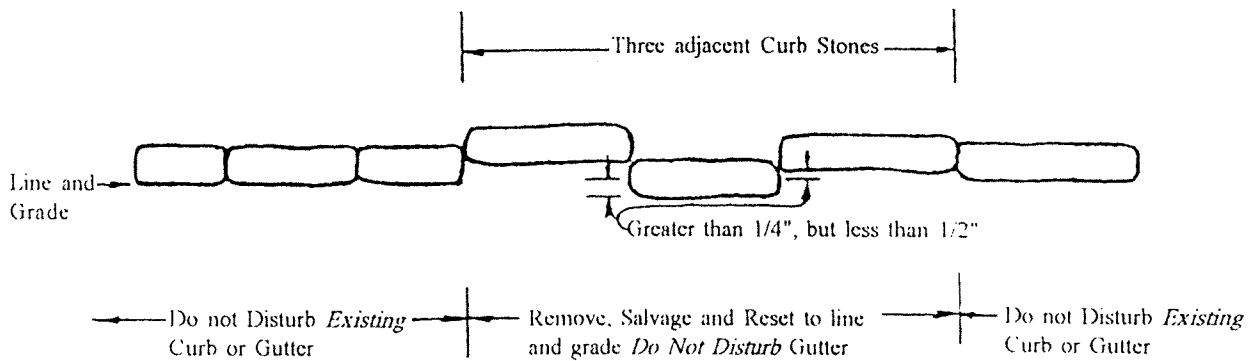


Page

215



ELEVATION



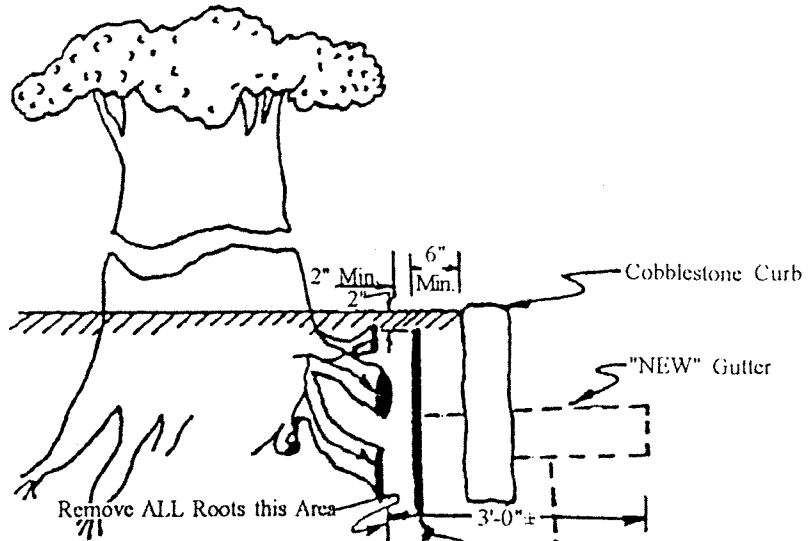
PLAN VIEW

CITY OF PETALUMA
 Department of Engineering
 22 Bassett Street - Petaluma California 94952
 707 778 4301 Fax 707 778 4137
 Approved By
Ed Hargis
 Thomas S. Hargis, P.E. 223466

Minor Reconstruction
**RETENTION OF
 COBBLESTONE**
 Curb and/or Gutter

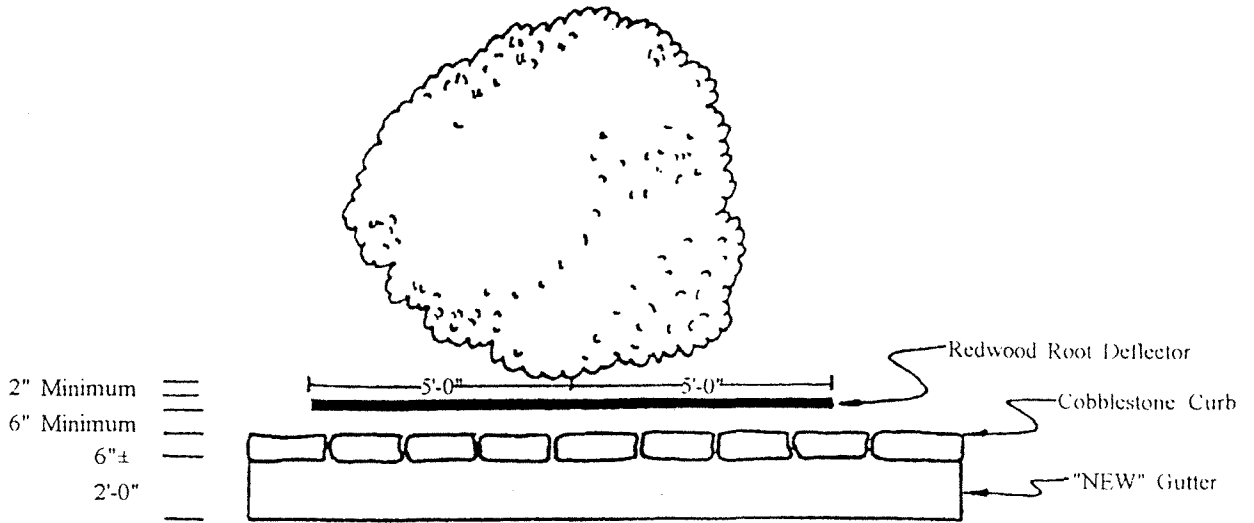
Drawn By
Butch Smith
 Scale
 N. T. S.
 Date
September 9th 1996
 File Number
 Sid Det. SSD00000210 2 of 3






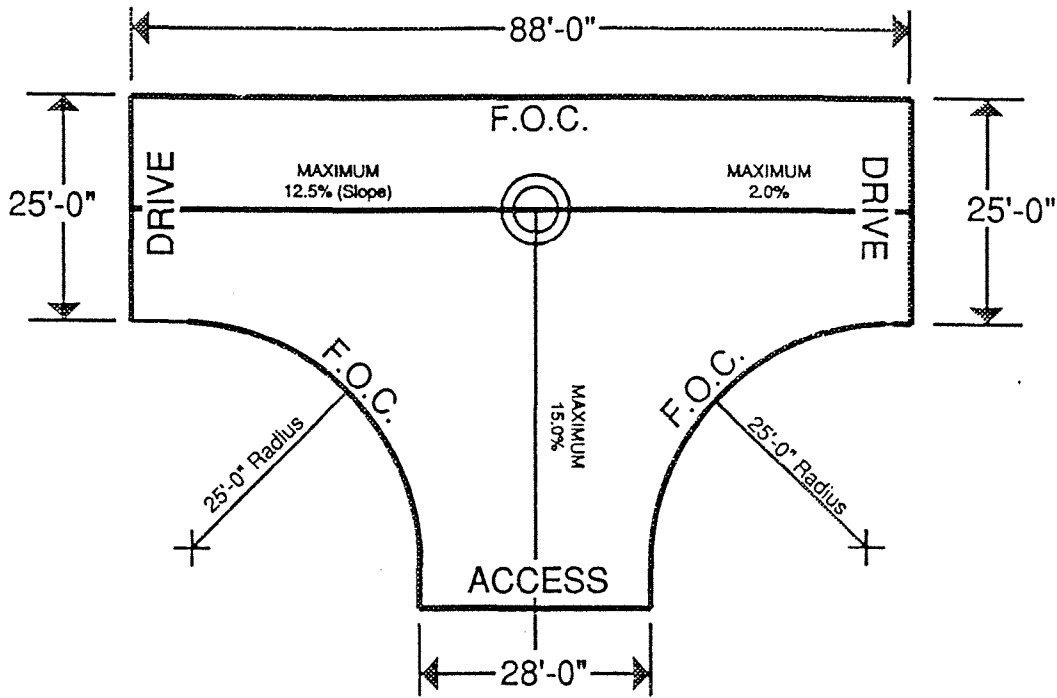
All Heart Redwood 1" x 10" creosoted Root Deflector extend 5 linear feet each way from centerline of the Tree.

ELEVATION



PLAN VIEW

<p>CITY OF PETALUMA Department of Engineering 22 Bassett Street - Petaluma California 94952 707 778-4304 - Fax 707 778-4437</p> <p>Approved By <i>Thomas N. Hartz</i> Thomas N. Hartz - R.C.E. 2237</p>	<p>Major TREATMENT For TREE ROOTS</p>	<p>Drawn By Butch Smith Scale N T S Date September 9th 1996 Site Number SSD0000 216 3 of 3</p>	 <p>216</p>
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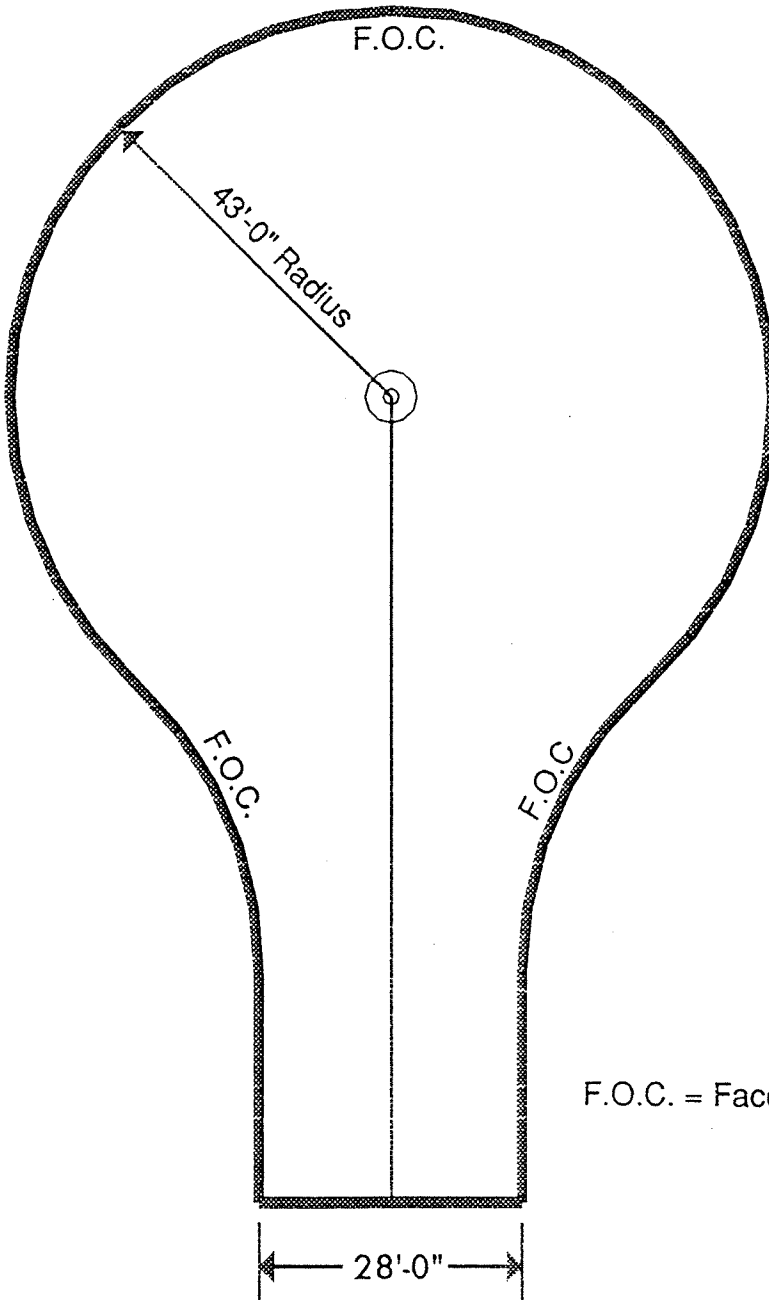
HAMMERHEAD TURN-AROUND

CITY OF PETALUMA
 Department of Engineering
 22 Bassett Street - Petaluma California 94952
 707 778 4304 Fax 707 778 4437
 Approved By
Z. Hargis
 Hammerhead Turn-Around (C.D.) 22360

Standard Detail
**HAMMERHEAD
 TURN
 AROUND**


Drawn By
Butch Smith
 Scale
 N T S
 Date
 September 30th 1996
 File Number
 Std Det - SSD - 22360 - 1 of 4

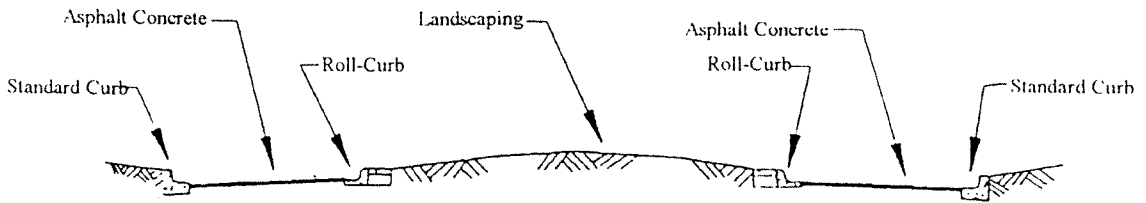




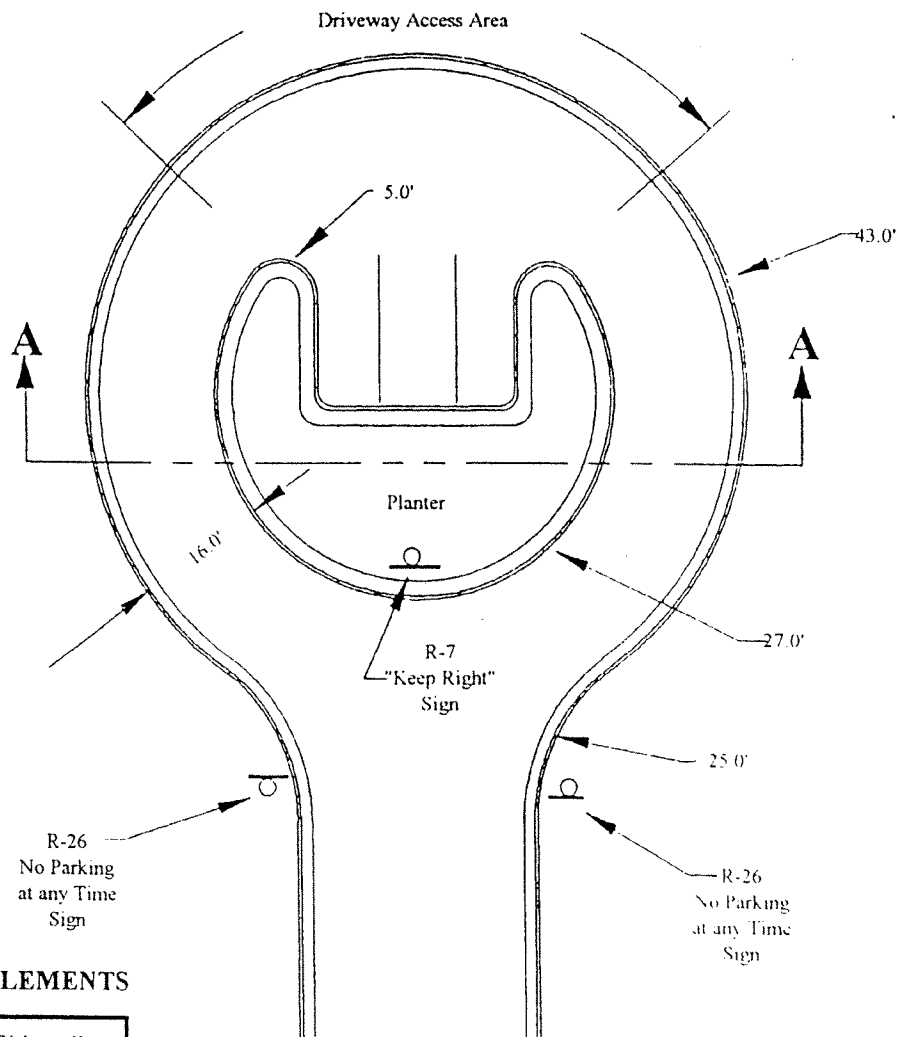
F.O.C. = Face of Curb

CUL-DE-SAC

<p>CITY OF PETALUMA Department of Engineering 22 Bassett Street - Petaluma California 94954 707 778 4304 - Fax 707 778 1137</p> <p>Approved By <i>Tom Harris</i> Thomas S. Harris, P.E., R.C.T., 22376</p>	<p>Standard Detail CUL-DE-SAC</p>	<p>Drawn By Butch Smith Scale N T S Date October 1st 1996 File Number Std Det - SSD0000 217 2 of 3</p>	 <p>1858</p>
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SECTION A-A



STREET DESIGN ELEMENTS

Driveway Access	Sidewalks
Permitted	Yes

CITY OF PETALUMA
Department of Engineering

22 Bassett Street Petaluma California 94952
707 778 1301 Fax 707 778 4437

Approved By

F. J. Hargis
City Engineer R.C.E. 22566

Standard Street Configuration
MINOR
RESIDENTIAL
CUL-DE-SAC STREET

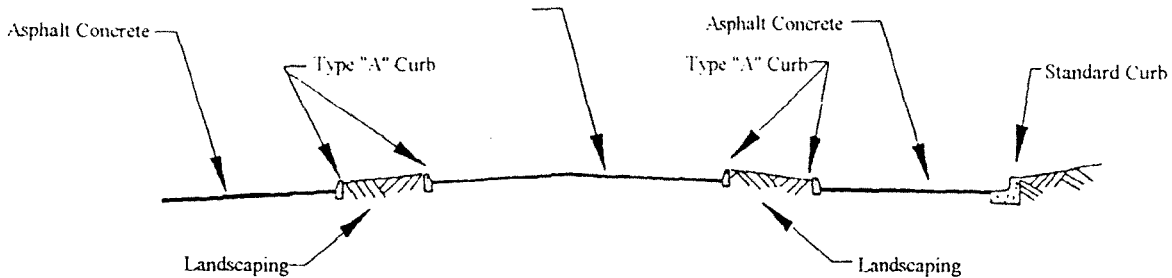
Drawn By
Butch Smith

Scale
N T S

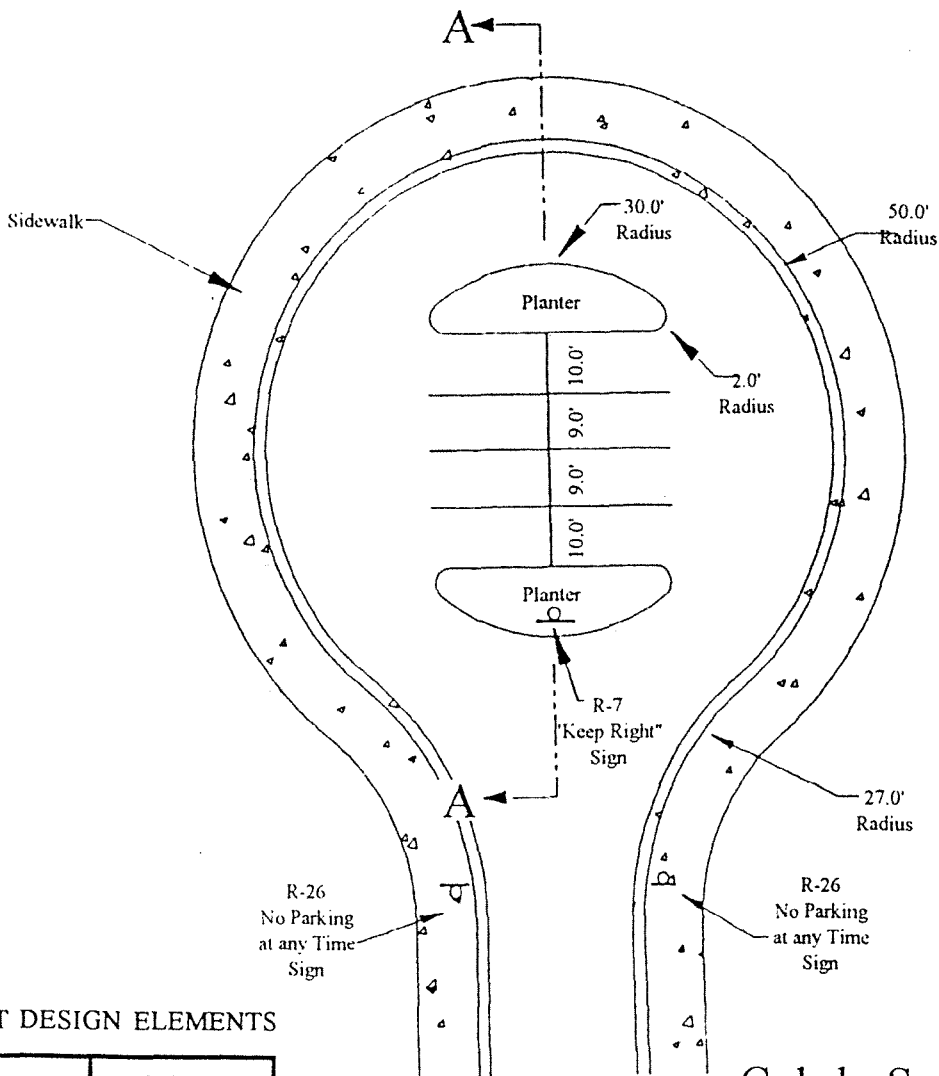
Date
November 13th 1996

File Number
Std Det **SSD 100-217 3 of 4**





SECTION A-A



STREET DESIGN ELEMENTS

Driveway Access	Sidewalks
Permitted	Yes

Cul-de-Sac Serving 6 Dwelling units or more.

CITY OF PETALUMA
 Department of Engineering
 22 Bassett Street - Petaluma California 94952
 707 778 4304 - Fax 707 778 4437

Approved By
Thomas S. Hargis
 Thomas S. Hargis - R.C.E. 22366

Standard Street Configuration
**RESIDENTIAL
 CUL-DE-SAC
 STREET**

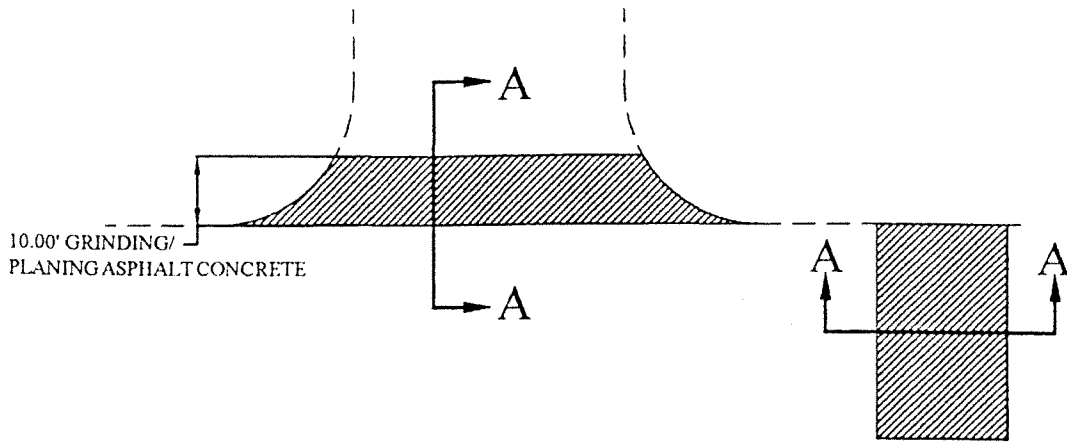
Drawn By
Butch Smith

Scale
 N. T. S.

Date
 May 11th 1999 (Rev.)

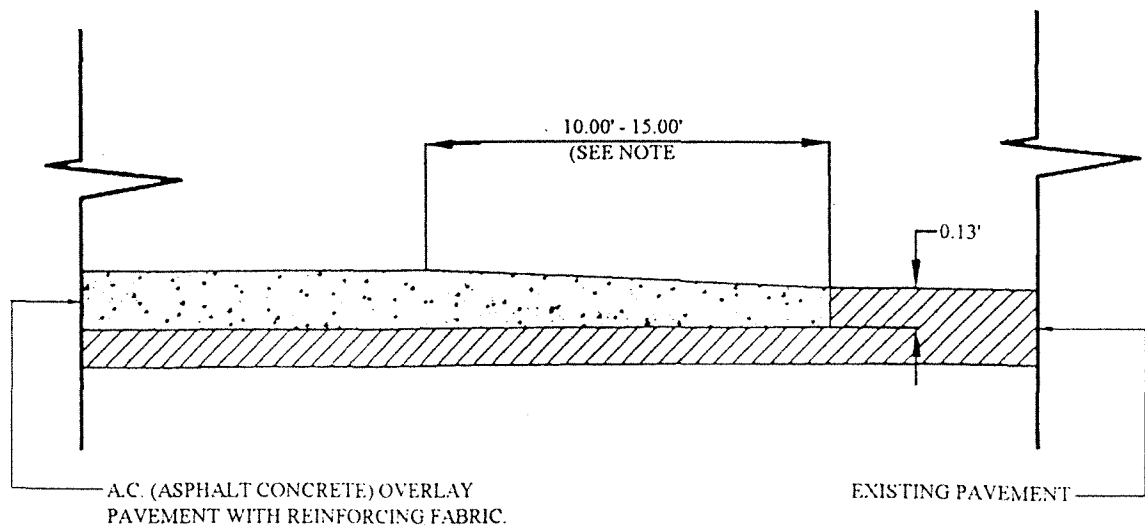
File Number
 Std. Det. SSD0000.217 4 of 4





SIDE STREET AND END OF OVERLAY CONFORM (TYPICAL)

SCALE: N.T.S.




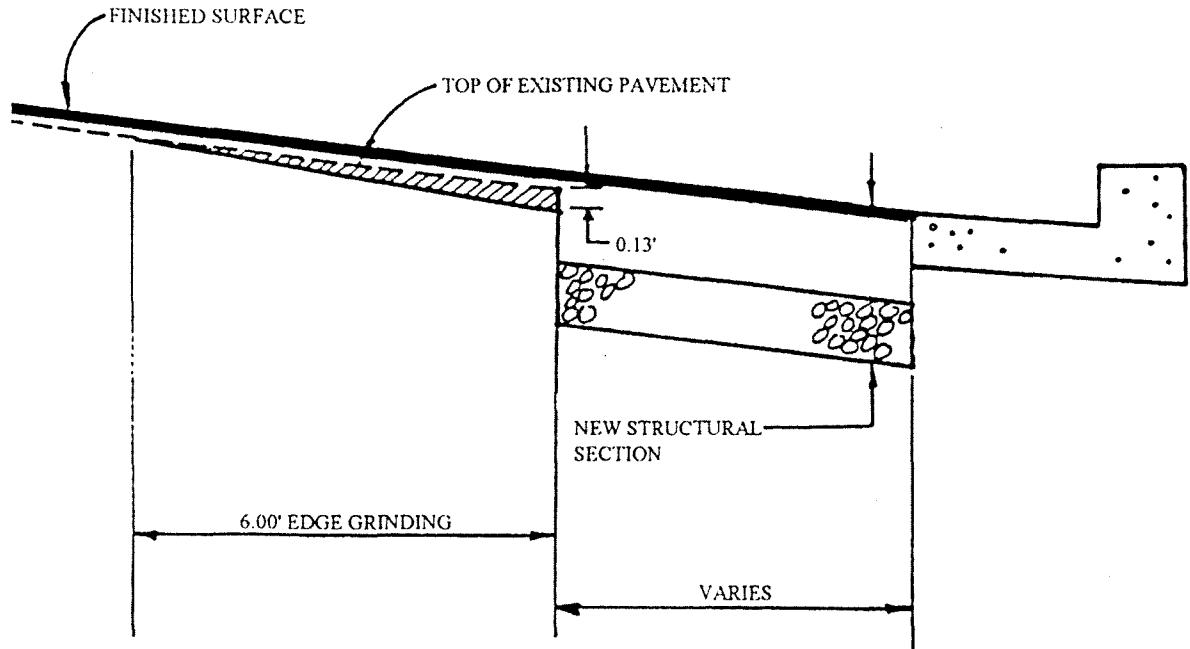
SECTION A-A

NOTE: COLD PLANING 10.00' SIDE STREET COLD PLANING
15.00' AT BEGINNING AND END OF OVERLAY
SCALE: N.T.S.

NOTE:

1. GRINDING / PLANING SHALL BE 0.13'
2. DESIGN SHALL CONFORM TO THESE REQUIREMENTS EXCEPT AS OTHERWISE APPROVED BY THE CITY ENGINEER.

<p>CITY OF PETALUMA Department of Engineering 22 Bassett Street - Petaluma California 94952 707 778 4304 - Fax 707 778 4437</p> <p>Approved By <i>Thomas S. Hargis</i> Thomas S. Hargis - R.C.E. 22366</p>	<p>Street Standard</p> <h2 style="margin: 0;">SIDE STREET AND END OF OVERLAY CONFORM</h2>	<p>Drawn by Butch Smith Scale N. T. S. Date December 30th 1998 File Number Std. Det. SSD0000.218 1 of 3</p>	 Page 218 01
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NOTE:

DESIGN SHALL CONFORM TO THESE REQUIREMENTS EXCEPT AS OTHERWISE APPROVED BY THE CITY ENGINEER.

FINISHED A.C. GRADE SHALL BE 0.02' ABOVE THE LIP OF GUTTER.

CITY OF PETALUMA
 Department of Engineering
 22 Bassett Street - Petaluma California 94952
 707 778 4304 - Fax 707 778 4437

Approved By
Thomas S Hargis
 Thomas S Hargis - R.C.E. 22366

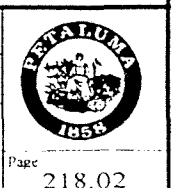
Street Standard
**EDGE GRINDING
 AT NEW
 STRUCTURAL SECTION**

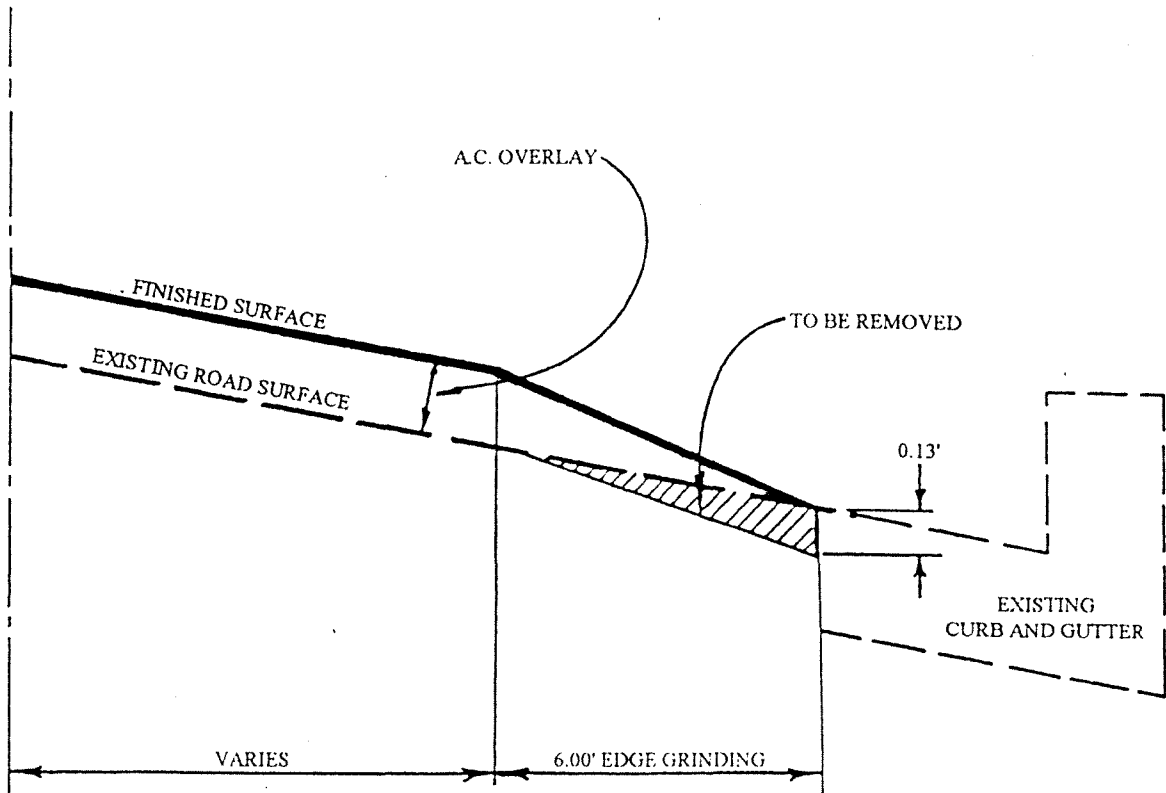
Drawn By
Butch Smith

Scale
 N. T. S.

Date
 December 30th 1998

File Number
 Std.Det. SSD0000.218 2 of 3





NOTE:

DESIGN SHALL CONFORM TO THESE REQUIREMENTS EXCEPT AS OTHERWISE APPROVED BY THE CITY ENGINEER.

FINISHED A.C. GRADE SHALL BE 0.02' ABOVE THE LIP OF GUTTER

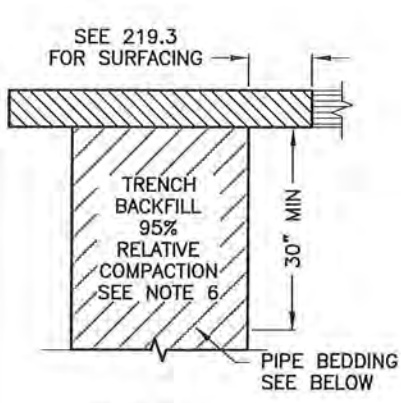
CITY OF PETALUMA
 Department of Engineering
 22 Bassett Street - Petaluma California 94952
 707 778 4304 - Fax 707 778 4437

Approved By
Thomas S Hargis
 Thomas S Hargis - R.C.E. 22366

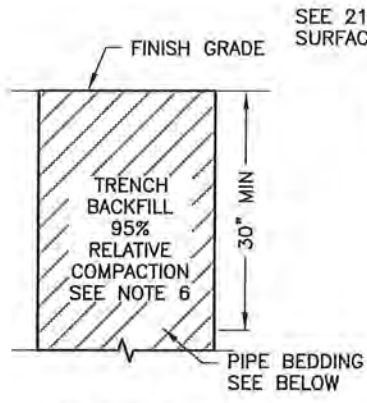
Street Standard
**EDGE GRINDING
 AT LIP OF GUTTER WITH
 OVERLAY SECTION**

Drawn By
 Butch Smith
 Scale
 N T S
 Date
 December 30th 1998
 File Number
 Std Det SSD0000.218 3 of 3

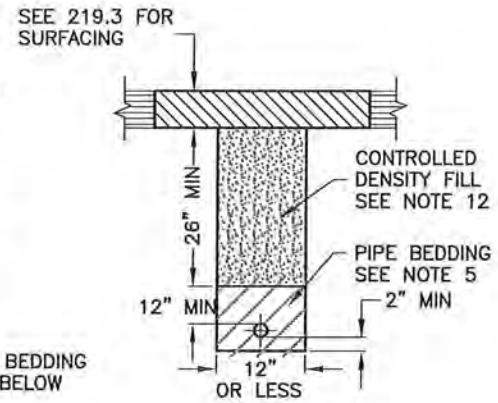




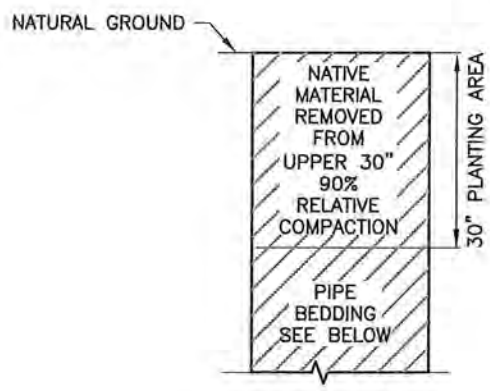
TYPE A
PAVED AREA



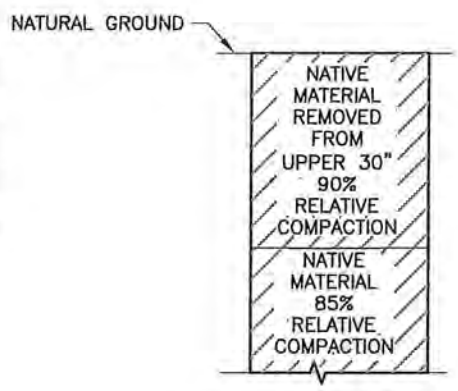
TYPE B
SHOULDER AREA



TYPE C
NARROW TRENCH

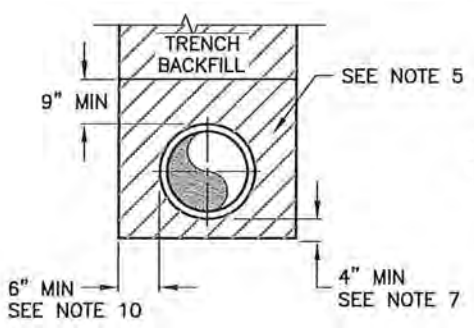


TYPE D
PUBLIC UTILITY EASEMENT
NON TRAFFIC LOADING AREA

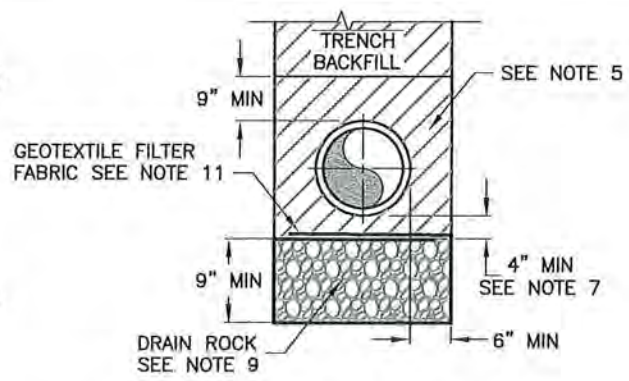


TYPE E
PUBLIC UTILITY EASEMENT
UNDEVELOPED AREAS
(APPROVAL REQUIRED)

TRENCH BACKFILL



STABLE TRENCH



UNSTABLE TRENCH

PIPE BEDDING

NOTES:
1. SEE 219.2 FOR NOTES



CITY OF PETALUMA
PUBLIC WORKS & UTILITIES
UTILITIES DIVISION
202 N. McDOWELL BLVD. TEL. 707-778-4546
PETALUMA, CALIFORNIA 94954 FAX. 707-778-4508

**STANDARD TRENCH
DETAILS**

DATE: JAN 7, 2019 SCALE: N.T.S.
APPROVED BY:
Kent R. Carothers
Kent R. Carothers, P.E. Operations Manager C60671
DRAWN BY: TKM NO. 219.1

NOTES:

1. REFER TO ORDINANCE 2266 N.C.S. FOR PAVEMENT CUT IN STREETS WITH 5 YEARS FOR NEWLY CONSTRUCTED, RECONSTRUCTED, OR RESURFACED AND 2 YEARS FOR RESURFACING FOR SLURRY SEAL OR MICROSURFACE.
2. ASPHALTIC CONCRETE SHALL CONFORM TO THE REQUIREMENTS OF THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS, SECTION 39.
3. SAW CUT PAVEMENT NEAT LINE STRAIGHT, AS SHOWN ON STD DETAIL 219.1, FROM TRENCH WALL TO SUBGRADE. PAINT BINDER (TACK COAT) SHALL BE APPLIED TO ALL VERTICAL SURFACES. MATCH EXISTING A.C. THICKNESS OR USE A.C. THICKNESS TABLE WHICHEVER IS GREATER.

ADDITIONAL PAVEMENT REMOVAL:

REMOVE ADDITIONAL PAVEMENT TO A PAINTED VEHICLE LANE STRIPE, LIP OF GUTTER, CURB, A CENTERLINE OR EDGE OF PAVEMENT IF SUCH STREET FEATURE IS WITHIN 3' (FEET) OF THE FINAL SAW CUT, SUBJECT TO CITY APPROVAL. REMOVAL OF ADDITIONAL PAVEMENT TO ADJACENT EXISTING OR NEW PAVEMENT PATCH, IF PATCH IS WITHIN 5' OF FINAL SAWCUT.

4. DIFFERENT TRENCH SECTIONS MAY BE REQUIRED AND SPECIFIED BY PUBLIC WORKS & UTILITIES.
5. PIPE BEDDING MATERIAL SHALL BE CLASS 2 AGGREGATE BASE COMPACTED TO 90% RELATIVE COMPACTION AT OPTIMUM MOISTURE OR AS APPROVED BY PUBLIC WORKS & UTILITIES.
6. TRENCH BACKFILL SHALL BE CLASS 2 AGGREGATE BASE. THE UPPER 30" SHALL BE COMPACTED AT OPTIMUM MOISTURE AND SHALL CONFORM TO THE REQUIREMENTS OF THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS, SECTION 26 OR AS APPROVED BY PUBLIC WORKS & UTILITIES. (USE OF RECYCLED CL2 AB ONLY UPON APPROVAL BY THE CITY AND PROJECT GEOTECHNICAL ENGINEER.)
7. 1/4 PIPE OUTSIDE DIAMETER MINIMUM WHEN EXCAVATION IS IN ROCKY GROUND.
8. OPTIONAL BACKFILL- CONTROLLED DENSITY FILL (C.D.F.) MIX NO. 1500 (95% RELATIVE COMPACTION) SHALL CONFORM TO NOTE 12.
9. DRAIN ROCK MAY BE USED AS BEDDING UNDER PIPE FOR SLOPES LESS THAN 8%. DRAIN ROCK SHALL BE 100% CRUSHED AND SHALL CONFORM TO THE FOLLOWING GRADING:

1-1/2"	1"	1/2"	#4
100	95-100	0-30	0-4

DRAIN ROCK SHALL BE COMPACTED WITH A SURFACE VIBRATOR. PIPE BEDDING MATERIAL WHEN PLACED OVER DRAIN ROCK SHALL BE SEPARATED BY GEOTEXTILE FILTER FABRIC (MIRAFI 140NC) TO PREVENT MIGRATION AND COMPACTED WITH A SURFACE VIBRATOR CONFORMING TO NOTE 5.

10. IF PIPE DIAMETER IS LESS THAN 18" = 9" MAX.
IF PIPE DIAMETER IS GREATER THAN 18" = 12" MAX.
11. GEOTEXTILE FILTER FABRIC (MIRAFI 140NC OR EQUAL) SHALL BE APPLIED AS SHOWN IN THE UNSTABLE TRENCH DETAIL WRAPPED AROUND THE DRAIN ROCK WITH A 1' (ONE FOOT) MINIMUM OVERLAP.
12. CONTROL DENSITY FILL (CDF):
SHALL BE MIX DESIGN NO. 1500 MANUFACTURED BY SHAMROCK MATERIALS, INC. OR MIXTURE OF PORTLAND CEMENT, SAND AND 1" MAXIMUM COARSE AGGREGATE, AIR ENTRAINING AGENT AND WATER, BATCHED BY A READY-MIXED CONCRETE PLANT AND DELIVERED TO THE JOB SITE BY MEANS OF TRANSIT MIXING TRUCKS. CONTROL DENSITY FILL MAY ALSO CONTAIN CLASS F POZZOLAN (FLY ASH). CONTROL DENSITY FILL SHALL BE FREE OF ASPHALTIC MATERIAL.

MATERIALS:

CEMENT SHALL MEET THE STANDARDS AS SET FORTH IN ASTM C-150, TYPE II CEMENT.
FLY ASH SHALL MEET THE STANDARDS AS SET FORTH IN ASTM C-618, FOR CLASS F POZZOLANS. THE FLY ASH SHALL NOT INHIBIT THE ENTRAINMENT OF AIR.

AGGREGATE SIZE 1" MAX.
SAND - ASTM C33

MIX PROPORTIONS:

THE MIX PROPORTIONS SHALL BE DETERMINED BY THE PRODUCER OF THE CONTROL DENSITY FILL TO PRODUCE A FLOWABLE FILL MIXTURE WHICH WILL NOT SEGREGATE. EACH YARD SHALL CONTAIN NOT LESS THAN 50 POUNDS OF PORTLAND CEMENT AND NOT LESS THAN A TOTAL OF 100 POUNDS OF CEMENTIOUS MATERIAL. THE CONTRACTOR SHALL SUPPLY A MIX DESIGN TWO WEEKS PRIOR TO ANY USE OF CONTROL DENSITY FILL.

MIXTURE PROPERTIES:

COMPRESSIVE STRENGTH 75-200 PSI AT 28 DAYS
SLUMP = FLOWABLE (6"-9")

THE CONSISTENCY OF CDF SHALL BE SUCH THAT ALL TRENCH VOIDS ARE FILLED WITH MINIMUM RODDING OR VIBRATING BUT NOT SO WET AS TO CAUSE EXCESSIVE SHRINKAGE.

PAVING:

13. PERMANENT PAVEMENT MAY BE PLACED DIRECTLY UPON THE CONTROL DENSITY FILL AS SOON AS IT HAS CONSOLIDATED FOR THE SURFACE TO WITHSTAND THE PROCESS OF PAVING WITHOUT DISPLACEMENT. THE SURFACE OF THE CONTROL DENSITY FILL SHALL BE FIRM AND UNYIELDING. ANY VISIBLE MOVEMENT VERTICALLY OR HORIZONTALLY OF THE CONTROL DENSITY FILL UNDER THE ACTION OF CONSTRUCTION EQUIPMENT OR OTHER MAXIMUM LEGAL AXLE LOADS SHALL BE CONSIDERED AS EVIDENCE THAT THE CONTROL DENSITY FILL DOES NOT MEET THIS REQUIREMENT. THE CONTRACTOR SHALL PROVIDE TRENCH PLATES TO ALLOW TRAFFIC FLOW FOR ALL LOCATIONS UNTIL CONTROL DENSITY FILL IS READY TO BE PAVED.
14. FULL TACK COAT COVERAGE ON ALL VERTICAL SURFACES.
15. TRENCH SHALL BE PAVED WITH ASPHALT CONCRETE WHERE THICKNESS IS EQUAL TO THE THICKNESS OF THE EXISTING PAVEMENT BUT IN NO CASE SHALL THICKNESS BE LESS THAN SHOWN IN THE ASPHALT CONCRETE THICKNESS TABLE. ASPHALT SHALL BE 1/2" TYPE A CONFORMING TO SECTION 39 OF THE STANDARD SPECIFICATIONS.



CITY OF PETALUMA
PUBLIC WORKS & UTILITIES
UTILITIES DIVISION

202 N. McDOWELL BLVD. TEL. 707-778-4546
PETALUMA, CALIFORNIA 94954 FAX. 707-778-4508

**STANDARD TRENCH
DETAILS
(NOTES)**

DATE: JAN 3, 2019

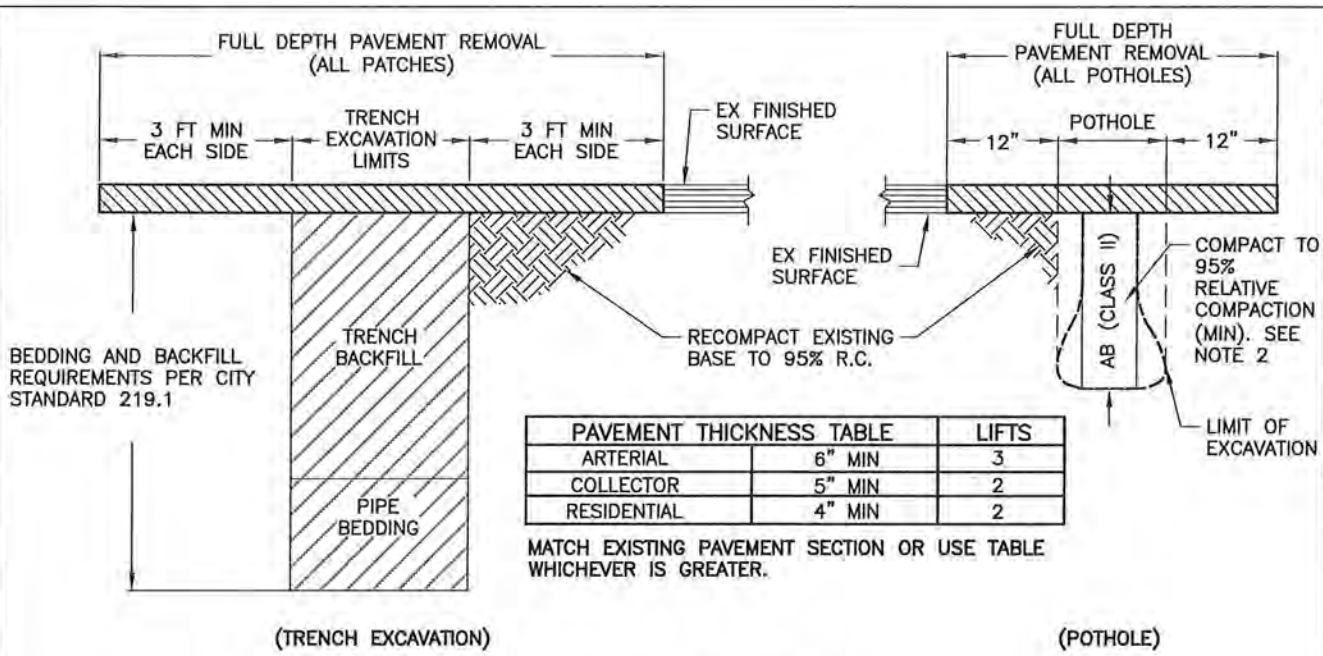
SCALE: N.T.S.

APPROVED BY:

[Signature]
Kent R. Carolthers, P.E. Operations Manager C80671

DRAWN BY: TKM

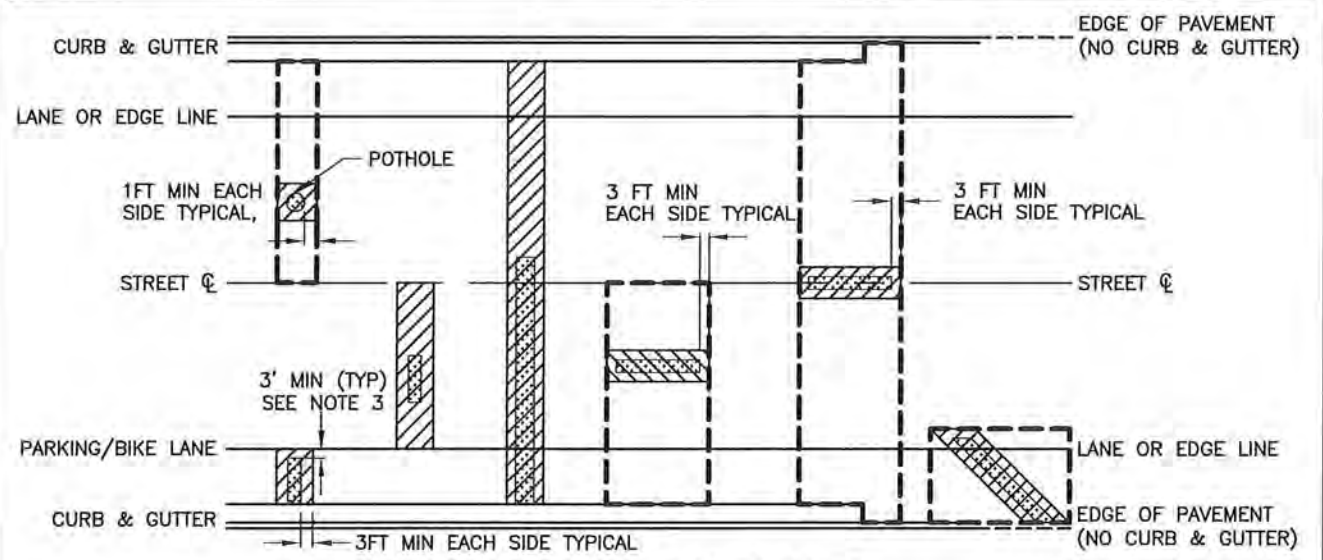
NO. 219.2



PAVEMENT THICKNESS TABLE		LIFTS
ARTERIAL	6" MIN	3
COLLECTOR	5" MIN	2
RESIDENTIAL	4" MIN	2

MATCH EXISTING PAVEMENT SECTION OR USE TABLE WHICHEVER IS GREATER.

TYPICAL LIMITS OF REMOVAL



TYPICAL PAVEMENT CUTS

- REPLACEMENT LIMIT FOR ASPHALT 5 YEARS & NEWER, MICROSURFACE/SLURRY SEAL 2 YEARS & NEWER - 2" GRIND AND OVERLAY
- REPLACEMENT LIMIT FOR ASPHALT OLDER THAN 5 YEARS, MICROSURFACE/SLURRY SEAL OLDER THAN 2 YEARS - TYP. TRENCH SECTION (ABOVE)
- EXCAVATED AREA

NOTES:

1. PAVEMENT SURFACING SHALL CONFORM TO: CITY ORDINANCE NO. 2266 N.C.S. RESTRICTIONS ON EXCAVATION IN NEWLY CONSTRUCTED OR RESURFACED PUBLIC RIGHT-OF-WAY.
2. COMPACTION TESTS SHALL BE REQUIRED AS DEEMED NECESSARY BY THE CITY ENGINEER OR INSPECTOR.
3. SEE STANDARD 219.2 FOR ADDITIONAL NOTES.



CITY OF PETALUMA
PUBLIC WORKS & UTILITIES
 202 N. McDOWELL BLVD. TEL. 707-778-4546
 PETALUMA, CALIFORNIA 94954 FAX. 707-778-4508

PAVEMENT RESURFACING
LIMITS FOR PUBLIC
RIGHT-OF-WAY

DATE: JAN 9, 2019 SCALE: N.T.S.
 APPROVED BY:
 Kent R. Carolers, P.E. Operations Manager C60871
 DRAWN BY: TKM NO. 219.3

(Revised 7/27/98)

City of Petaluma
Petaluma, California

STREET CONSTRUCTION
DETAIL SPECIFICATION NO. 41

Description

- 4101.1 Description. The work to be done consists of furnishing machinery and materials, except as otherwise specified, which are required to construct and complete the work in a good and workmanlike manner, including the removal of any abandoned underground facilities, maintenance of any existing underground utilities, the disposal of excess excavation and final clean-up, to the satisfaction of the Engineer. Reference to the Standard Specifications shall mean the California Department of Transportation, (CALTRANS), July 1992, (or current revision) Standard Specifications.

Construction Methods

- 4102.1 Clearing and Grubbing and Concrete Removal. Clearing and grubbing shall consist of removing brush, trees and stumps, fences and all other obstructions to be removed for which a pay item has not been included in the proposal, within the construction limits indicated on the plans, and shall conform to the Division of Highways Standard Specifications, Section 15 and 16, as herein modified.

Attention is directed to Sections 7-1.11, 7-1.12 and 7-1.13, "Preservation of Property," "Responsibility for Damages," and "Disposal of Materials," of the Standard Specifications. Existing improvements, facilities, adjacent property, and trees and shrubbery that are not to be removed shall be protected from injury by the Contractor's operations. The Contractor shall give ample notification to and cooperate during clearing and grubbing operations with public utility companies or others having overhead and/or underground facilities within the limits of work. Existing traffic, directional, and street signs shall be maintained until final relocation after sidewalks are constructed.

Fencing, mail boxes, and signs not removed by property owners prior to this work shall be carefully removed and left for the re-use of the owner. All other materials cleared and/or grubbed shall become the property of the Contractor and shall be disposed of outside the limits of the work at a location to be provided by the Contractor and satisfactory to the Engineer.

Mail boxes that are designated for relocation on the plans shall be moved to the new locations as shown on the plans or as designated by the Engineer. Access, satisfactory to the Post Office Department, shall be maintained at all times to the new locations and to those mail boxes that are not moved.

Property fences which are designated for replacement or relocation shall be constructed at the new locations as designated on the plans or as directed by the

Engineer. Replacement fences shall be of the same quality and design as the original fence fronting the property.

The contract lump sum price for clearing and grubbing and concrete removal shall be full compensation for all costs necessary and incidental to clearing, grubbing and concrete removal, all as specified herein and as shown on the plans. Watering required for processing the work or mixing materials shall be furnished by the Contractor. The cost of water and watering shall be considered included in the various other items of work and no additional allowance will be made therefor.

If required by the Engineer, a dust palliative conforming to Section 18 of the Standard Specifications shall be used for the prevention of dust nuisance. Payment for the binder for dust palliative and all of the work involved in the application shall be considered included in the various other items of work and no additional allowance will be made therefor.

4102.2 Earthwork and Subgrade Preparation for Roadbed. Earthwork and subgrade preparation for roadbed shall consist of performing all operations necessary to prepare a suitable subgrade for roadbed conforming to the applicable provisions of Section 19 of the Standard Specifications, except as modified herein; to excavate all materials from the street right-of-way, roadway prism, or adjacent thereto when shown on the plans or ordered by the Engineer; to excavate all material of whatever nature necessary for construction of foundations for structures and drainage facilities; to excavate trenches for sewers, drainage pipes, water facilities, and electrical facilities; to place backfill around structures and drainage facilities and over underground pipes; to backfill ditches and depressions resulting from the removal of obstructions; to backfill holes, pits and other depressions within the roadway area; to remove unsuitable roadway material and replace with suitable material; to excavate and grade driveway approaches and connections; all as shown on the plans and typical cross sections or directed by the Engineer and as specified; and to furnish all labor, materials, tools and equipment, and do all the work of whatsoever nature which may be required to grade the roadway, curbs, gutters, sidewalks, prepare the roadbed subgrade and maintain them in the form specified until the acceptance of the contract.

All work shall conform to the applicable provisions of Section 19 of the Standard Specifications except as modified herein:

Relative Compaction. Shall conform with Section 19 of the State Standard Specification except as modified herein.

Relative compaction of subgrade in expansive soils shall be a minimum of 92 percent and be between 4 and 6 percentage points above optimum moisture content. Relative compaction of non-expansive soils shall be 95 percent at optimum moisture content.

Expansive soils are herein defined as soils with a "free-swell" of 50 or greater - non-expansive soils 50 or less.

Street Proof Rolling. After the street subgrade has been brought to the proper moisture content, compacted and fine graded, the Contractor shall furnish

subgrade "Proof Rolling" equipment equivalent to an "H-20" wheel load, subject to the approval of the Engineer, and thoroughly "proof-roll" the street subgrade in the presence of and to the satisfaction of the Engineer. Soft or yielding local subgrade spots shall be marked by the Engineer for repair by the Contractor. Subgrade in non-expansive soils shall be "unyielding." Subgrade in expansive soils may have a "temporary blanket yielding" not to exceed one-half (1/2) inch. Subgrade cracking or permanent indentation of wheel tracks shall be unacceptable.

Order of Subgrade Work. Unless otherwise specified in the special provisions, or on the plans, the street subgrade shall be completed and approved within the City right-of-way property line to property line, prior to placement of any aggregate on the subgrade.

Maintenance of Street Subgrade. The specified geometric shape, relative compaction and moisture content of the street subgrade shall be continuously maintained by the contractor and is subject to testing by the Engineer at any time prior to final acceptance of work by the City.

All rocks or solid lumps of material over four (4) inches in greatest dimension shall be broken up and removed from the upper six (6) inches of the graded roadbed and the resulting spaces refilled with approved material.

The cost of excavation, backfill, and subgrade preparation for structures and underground facilities shall be considered included in the contract price paid for the appropriate items of work.

The contract lump sum price for earthwork and subgrade preparation for roadbed shall be full compensation for all costs necessary and incidental to excavating and compacting the roadway prism and preparing the roadbed subgrade all as specified herein and as shown on the plans.

Watering and dust palliative, as specified in Section 4102.1 of these specifications, shall be considered included in the various other items of work and no additional allowance will be made therefore. (For the purpose of these "Detail Specifications," the term "roadbed" is used as defined in Section 1-1.34 of the Standard Specifications.)

4102.3

Aggregate Subbase. Aggregate subbase shall be Class 2 aggregate subbase conforming to the applicable provision of Section 25 of the Standard Specifications, and these special provisions. Test samples of the proposed material shall be taken by the Engineer. Sufficient time shall be provided to permit evaluation of the samples. No material may be placed without approval by the Engineer.

Measurement and Payment. Quantities of aggregate subbase shall be measured and paid for by the square foot unless specified otherwise in the Special Provisions or Bid Schedule.

The contract unit price for aggregate subbase, in place, shall include full compensation for furnishing all materials, labor, equipment, and performing all work necessary, including water and watering, to complete the road subbase as

specified and where shown on the plans, and no additional allowance will be made.

- 4102.4 Aggregate Base. Aggregate base shall be Class 2, three-quarter (3/4) inch maximum, aggregate base conforming to the applicable provisions of Section 26 of the Standard Specifications, and these Detail Specifications.

Measurement and Payment. Quantities of aggregate base shall be measured and paid for by the square foot unless specified otherwise in the Special Provisions or Bid Schedule.

The contract unit price for aggregate base, in place, shall include full compensation for furnishing all materials, labor, equipment, and performing all work necessary including water and watering, to complete the aggregate base as specified and where shown on the plans, and no additional allowance will be made.

- 4102.5 Plant Mixed Cement Treated Base. Plant mixed cement treated base shall be Class A cement treated base conforming to the applicable provisions of Section 27 of the Standard Specifications.

Test samples of the proposed material shall be taken by the Engineer. Sufficient time shall be provided to permit evaluation of the samples. No material may be placed without approval by the Engineer.

Measurement and Payment. Quantities of plant mixed cement treated base will be measured and paid for at the contract price per square foot.

- 4102.6 Asphalt Concrete. Asphalt concrete shall be Type A, 1/2-inch maximum, medium and shall conform to the provisions in Section 39, "Asphalt Concrete", of the Standard Specifications and these special provisions.

Asphalt concrete shall be placed only when the atmospheric temperature is above 50⁰F.

The Contractor shall submit the asphalt concrete mix design for the Engineer's approval not less than ten (10) working days prior to commencing paving operations. Asphalt windrow pickup machine is not allowed to be used for paving. The amount of asphalt binder to be mixed with the aggregate shall be approximately 5.6 percent by weight of the dry aggregate. Exact rate shall be determined by the Engineer and shall not vary by more than 0.3 percent above or 0.3 percent below the amount designated by the Engineer. Asphalt concrete shall be obtained from a source located no more than 30 miles from the job site.

All costs involved in placing asphalt concrete used for trench resurfacing shall be included in the prices paid for the various contract items of work and no additional payments will be allowed therefore.

Tack coat of 70 percent SS-1 and 30 percent water shall be furnished and applied uniformly to a pavement to be surfaced and to contact surfaces of all cold pavement joints, curbs, gutters and to other surfaces designated by the Engineer. Tack coat shall be applied at the rate of 0.10 gallons per square yard. A prime coat of liquid asphalt SC-70 shall be applied at the rate of 0.25 gallons per square yard when required by the plans or specifications.

Tack coat and prime coat will not be measured for payment and full compensation therefore will be considered as included in the prices paid for the various contact items of work and no additional payments will be allowed.

Relative compaction will be determined by California Test 375. Laboratory specimens will be compacted in conformance with California Test 304. If the test results for any lot of asphalt concrete indicate that the relative compaction is less than 93.0 percent, the asphalt concrete represented by that lot shall be removed and replaced at Contractor's expense. Asphalt concrete spreading operations shall not continue until the Contractor makes significant adjustments to his/her materials or procedures or both in order to meet the required compaction. The adjustments shall be as agreed to by the Engineer.

All existing water valves, sewer clean-outs, monuments, and manhole castings shall be adjusted to the finished grade by the Contractor within 48 hours after paving over each structure.

A Certificate of Compliance shall be furnished to the Engineer in accordance with the provisions in Section 6-1.07, "Certificate of Compliances", of the Standard Specifications. The Contractor shall be charged for the costs of all tests where the test results do not meet the specifications.

Measurement and Payment: Asphalt concrete shall be measured and paid for by the tonnage unless specified otherwise in the Special Provisions or Bid Schedule. The contract prices and payments for asphalt concrete shall include full compensation for furnishing all labor, materials, tools, equipment, incidentals, and for doing all the work involved in constructing asphalt concrete, complete in place, as shown on the plans and as specified in these specifications and these special provisions, and as directed by the Engineer.

4102.7 Fog Seal Coat. A fog seal coat as specified in Section 37 of the Standard Specifications shall be applied to the finished pavement surface.

The contract lump sum price for mixing type asphaltic emulsion shall be full compensation for all costs necessary and incidental to placing the fog seal coat, including material, labor and equipment, all as specified herein and as shown on the plans.

4102.8 PCC Concrete Curbs, Gutters, Sidewalks, Driveways, Islands, Valley Gutters, and Curb Ramps. Concrete curbs, gutters, sidewalks, driveways, islands, valley

gutters and curb ramps shall conform with Section 73 of the Caltrans Standard Specifications except as modified herein and shall be as shown on Standard Plans 202, 203, 204, and 205 of the City of Petaluma Street Standard Details 200 Series.

The Contractor shall adjust all existing and new water meter boxes and any other service castings falling within the limits of work (except existing structures belonging to PG&E and Pacific Bell) to exact grade at the same time the concrete improvements are being constructed and shall maintain these appurtenances to true and exact grade until concrete is thoroughly set. The Contractor shall mark on the face of the curb and location of each sewer lateral with an "S" and each water service with a "W". Letters shall be approximately two and one-half (2-1/2) inches high, neatly stamped while the concrete is still green, and to the Engineer's satisfaction.

PCC - Placement by Extrusion Machine.

Portland Cement Concrete curbs, gutters, sidewalks and driveway approaches may, at the option of the Contractor, be placed using an approved extrusion machine provided:

1. All work shall conform with Section 73 of the State Standard Specifications as modified herein.
2. The PCC curb, gutter, sidewalk and driveway approaches shall conform with "City of Petaluma, Department of Public Works, Standard Street Details," Sheet 1 of 1, Current Revision, plans except as herein modified.
3. The aggregate base or subbase under the curb, gutter, sidewalk and driveway approaches shall be extended to the back of the sidewalk with a minimum thickness of 12 inches, under the sidewalk or driveway approach, compacted to a minimum of 90% relative compaction.
4. Subgrade shall have 95% compaction.
5. No expansion joints will be required.
6. Deep (1-1/2" minimum) transverse score marks shall be made at ends and center of driveways and at a maximum of 10-foot intervals along the sidewalk.
7. Four #4 x 20" reinforcing bar dowels and 4 - #4 bars shall be installed at drop inlet or other "block-out" locations.
8. Four #4 x 20" reinforcing steel dowels shall be placed at the location each placement "cut-off" where placement of PCC curb, gutter and sidewalk is to continue at a later date.
9. Other than as required above, no reinforcing steel, wire mesh or dowels will be required.
10. Concrete shall be 5 1/2 sack 3/4 maximum aggregate graded as required in Paragraph 73-1.01 of the 1984 State Standard Specifications.

Measurement and Payment - Curb and Gutter. Payment for PCC curb and gutter including island curb and gutter measured along and at the face of curb shall be made at the contract unit price per linear foot, in place, and shall be full compensation for furnishing and placing concrete gutter and integral curb, including reinforcing steel (where required) weakened plane and construction joints, "S" and "W" letters and subgrade preparation. Unless stipulated elsewhere in the contract documents, payment for curb and gutter shall also include furnishing, placing and compacting six (6) inches of aggregate base material under the curb and gutter.

Sidewalk, Driveway, PCC Island and Valley Gutter. Payment for sidewalks, driveways, island PCC paving and valley gutters shall be made at the contract unit price per square foot measured six (6) inches behind face of curb for all but valley gutters which shall be measured from lip of gutter to lip of gutter. Payment shall be full compensation for furnishing and placing PCC sidewalk, driveways, islands and valley gutters complete, in place, and shall include subgrade preparation, reinforcing bars and wire mesh where required, weakened place and construction joints and scoring. Unless stipulated elsewhere in the contract documents, payment for PCC sidewalk, driveways, islands and valley gutters shall also include furnishing, placing and compacting Class 2 aggregate base material under the facility.

4102.9 Redwood Headerboards. Headers shall be installed in locations indicated on drawings, and where specified. All headers shall be held in place with two (2) inch by three (3) inch stakes of lengths necessary to extend a minimum of twelve (12) inches into solid ground. All stakes shall be of sound material, neatly pointed, driven vertically and securely nailed to the headers.

Headers shall have a continuous bearing on undisturbed earth or compacted base rock. The backfill on the unimproved side of the header shall be compacted to the density of the undisturbed adjoining earth.

All headers and stakes shall be of heart structural redwood or dense structural redwood.

Additional stakes and anchorage required to hold the headers in place to true line and grade during construction shall be provided and placed by the Contractor at no extra cost.

The contract unit price per lineal foot for redwood headers, in place, shall include full compensation for furnishing all materials, labor, equipment, and performing all work necessary to complete the headerboards as shown on the plans and as herein specified.

4102.10 Monuments. Standard City monuments shall conform with the "City of Petaluma, Department of Public Works, Standard Street Details" Drawing Sheet 1 of 1, current revision and shall be constructed where shown on the plans and located by the Engineer for the Contractor.

Concrete shall be Class "A" conforming to the provisions of Section 90 of the Standard Specifications. The monument shall be constructed after placing of the asphalt concrete street surface.

The solid brass monument marker, as shown on the plans, shall be set in the concrete before the concrete begins to set. The Engineer shall stamp the marker for the Contractor.

The contract unit price for each monument, in place, shall include full compensation for furnishing all materials, labor, equipment, and performing all work necessary to complete the monuments, but not including locating and stamping the marker, and no additional allowance will be made.

4102.11 Standard City Street Barricade. Standard City Street Barricade shall be constructed as shown on "City of Petaluma, Department of Public Works, Standard Street Details" Drawing Sheet 1 of 1 current revision.

The contract unit price per lineal foot measured horizontally from end of railing to end of railing shall be full compensation for furnishing and placing the barricade complete in place including the redwood rails, posts, post holes, concrete, reflectors, paint, bolts, nuts, and traffic signs.

4102.12 Signing. Under this item the Contractor shall provide all the necessary equipment, labor and materials required to salvage, relocate and install new street signs and directional signs, complete in accordance with the Plans and as specified herein.

1. Traffic Sign Material

The base metal of all signs shall be new sheet aluminum of alloys 6061-T6 or 5052-H38 conforming to the requirements of ASTM Designation B 209.

Unless otherwise specified by the Engineer, the thickness of all signs shall be .080 inches, except for mast-arm mounted signs which shall be 0.125 inches.

All regulatory and warning signs shall be constructed to the standard size and specifications of the State of California, Department of Transportation. Signs larger than the standard sign may be required or may be granted approval by the Engineer.

All mast-arm mounted street name signs, advance street name signs and street name signs shall be constructed to Caltrans dimensions and specifications or as specified by the Engineer.

The following signs shall be constructed using High Intensity encapsulated lens sheeting and lettering: Stop signs (R1), yield signs (R1-2), keep right signs (R7), no u-turn (R34), stop ahead signs (W17), chevron signs (W81), mast-arm mounted street name signs, advanced street name signs, street name signs and Type N markers. This sheeting

and lettering shall hold a minimum warranty of ten (10) years. All other traffic signs shall be high intensity sheeting and lettering.

2. Traffic Signs Installation

Signs shall be placed in a concrete foundation in a fashion as shown on the City Standard Plans. Foundation concrete shall be Class "A". The sign posts sleeves shall have a minimum of two (2) inch clear space between post and native earth to be filled with concrete. Selected signs shall be placed on the street light standards at the designed height.

Signs shall be installed as per these specifications and facing traffic in the lane adjacent to which the sign is installed. "No Parking" signs shall be installed at a 30° angle toward the traveled way. All other signs shall be installed at an angle toward the traveled way. All other signs shall be installed at an angle toward the traveled way per the sign manufacturer's reflective requirements.

Signs in the median area shall be placed midway between curbs. These signs shall be mounted no closer than six (6) inches to, and no farther than six (6) feet from, the edge of the traveled way which the sign faces.

The minimum mounting height for signs shall be seven (7) feet measured from the bottom of the sign to the near edge of the pavement, except as otherwise noted below, or as specifically approved by the Engineer.

The height to the bottom of a secondary sign mounted below a primary sign shall be a minimum of six (6) feet measured from the bottom of the sign to the near edge of the pavement.

In areas not subject to pedestrian traffic, the Chevron (W81) and one way signs (R10) shall be mounted at a height of three (3) feet, measured from the bottom of the sign to the near edge of the pavement.

4102.13 Quality Test. The Contractor will be charged for the cost of all Quality Control Tests - i.e., compaction, sand equivalent, R. value, gradation, etc. - where the test results do not meet the required specifications.

Testing of aggregate bases shall be performed for every 500 cubic yards or one day's production, whichever is smaller. Testing of asphalt concrete shall be performed for every 500 tons or one day's production, whichever is smaller. Testing of Portland Cement Concrete shall be performed for every 300 cubic yards or one day's production, whichever is smaller.

4102.14 Adjusting Utility Structures to Grade. Work includes adjusting to finish grade any and all new or existing manholes, sewer cleanouts, water valve boxes, survey monument boxes, etc., which are included in the contract.

The Contractor shall mark the location of all structures to be adjusted to grade and shall be responsible for the location after paving operations are completed.

After surfacing or resurfacing is completed, the Contractor shall construct or reconstruct the structures to grade as shown on the plans.

Payment for adjusting structures to grade shall be by the unit price bid per each and shall be full compensation for adjusting and furnishing new or salvaging existing manhole frames and covers, water valve boxes, sewer clean out frames and cover, and monument covers.

4102.15 Permanent Surfacing. Permanent surfacing shall not be constructed until the compaction requirements are satisfied. The wearing surface for permanent surfacing shall be replaced "in kind", but in no case shall the new surfacing be less than two (2") inches thick for asphalt concrete or less than six (6") inches thick for Portland cement concrete. A permanent surface shall be installed no later than ten (10) calendar days from completion of backfill.

4102.16 Slurry Seal. Slurry seal shall be Type II and shall conform to the provisions in Section 37-2, "Slurry Seal", of the Standard Specifications and these special provisions.

At least five (5) days prior to the slurry seal operation, the Contractor shall hand out written notices to all local residents and/or businesses advising them of the operation and road and/or lane closures. The notices shall include the type of work, limits, date and the time period of road closure and/or no parking. Details of the notice shall be reviewed and approved by Director of Engineering at least five (5) working days prior to posting and/or delivery. "No parking" signs shall be placed behind the curbs at least 48 hours in advance of work and shall include date and time.

The Contractor's failure to comply with the requirements of this section will be sufficient cause for the Engineer to suspend work at no costs to the City.

In addition to providing the mix design, the Contractor shall provide the Engineer with a Certificate of Compliance certifying that the materials meet the specifications.

The contractor shall replace existing striping, pavement markings and pavement markers within the slurry seal areas. Pavement markings shall be thermoplastic applied at a minimum thickness of 0.125-inch. Pavement markers conforming to Section 85, "Pavement Markers", of the Standard Specifications shall be used for traffic stripes. Permanent striping, pavement markings and pavement markers shall not be placed until the new surface has been opened to traffic for a period of not less than seven (7) days.

Temporary pavement delineation, crosswalks and limit lines consisting of traffic paint conforming to Section 84-3, "Painted Traffic Stripes and Pavement Markings", of the Caltrans Standard Specifications, shall be in place at the end of the first day of slurry seal and shall be maintained until replaced by the permanent delineation and pavement markings.

Slurry seal shall be measured by and paid for per square yard.

Slurry seal shall not be placed when the atmospheric temperature is below 70 degrees F. (between placement and curing), during unsuitable weather, after 1:00 p.m., or between November 15th and April 30th. Due to seasonal conditions, the slurry seal work may have to wait until late spring. Under these circumstances, the Contractor shall continue to maintain insurance and bond requirements. The retention money will be held until all work is complete and no partial release of the retention will be allowed.

Before placing the slurry seal, the pavement surface shall be cleaned by sweeping, flushing or other means necessary to remove all loose particles of paving, all dirt and all other extraneous material.

Immediately prior to commencing the slurry seal operations, all surface metal utility covers (including survey monuments) and pavement markers shall be protected with appropriate adhesive and oiled or plastic paper. No adhesive material shall be permitted to cover, seal or fill the joint between the frame and cover of the structure. Covers and markers are to be uncovered and cleaned of slurry material by the end of the same work day.

If necessary, the Contractor may pre-wet the existing surface immediately prior to the application of the slurry seal with water at the rate of 0.05 to 0.10 gallon per square yard of surface as approved by the Engineer.

4102.17

Preservation of Existing Cobblestone Curbs and Gutters. Existing cobblestone curbs and gutters shall be preserved "in place" and shall not be disturbed unless otherwise directed, in writing, by the Director of Engineering and/or Director of Public Works.

A. PRESERVATION OF EXISTING COBBLESTONE CURBS AND/OR GUTTERS

In City street areas of reconstruction involving existing City street curbs and/or gutters where existing curbs and/or gutters are constructed of cobblestone, the cobblestone structures shall be retained as described herein:

1. Conditions and Tolerances for Existing Cobblestone: If the existing "exposed" curb and/or gutter face and/or top of curb is true to line and grade within one-fourth (1/4") inch in ten (10') linear feet, relative to the existing structure, and if there are no visible gaps between the stones that exceed one-fourth (1/4") inch and further if the stones are stable, i.e., can withstand a 200 pound concentrated load directed against any one stone at any horizontal or downward angle for a period of no less than five minutes, and if there is no unevenness from stone, exposed, surface to adjacent stone, exposed, surface that exceeds one-fourth (1/4") then the cobblestone curb and/or gutter is to be retained "as is", undisturbed, "in place" except that cobblestones may be removed

and salvaged and delivered to the City where new driveways or wheelchair ramps are to be constructed.

2. Where the existing cobblestone does not meet the above tolerances and where minor, less than one-half inch (1/2") in any direction, adjustments of the stones will correct the alignment and where the existing visible gaps between adjacent stones do not exceed one (1") inch and the exposed surface unevenness between adjacent stones does not exceed one-half (1/2") inch and further, if no more than three adjacent stones require adjustment, then the structure may be corrected in accordance with the Street Standard Details Drawing No. 216 entitled, "Retention of Cobblestone Curbs and/or Gutters, Minor Reconstruction".
3. Where the existing cobblestone does not meet the tolerances in Items 1 and 2 above, then the structure shall be corrected in accordance with these specifications and Street Standard Details Drawing No. 216 entitled, "Retention of Cobblestone Curbs and/or Gutter, Major Reconstruction".

Where existing cobblestone gutter is overlaid with asphalt concrete the contractor shall remove the asphalt, salvage and deliver the gutter stone to the City and replace the gutter with standard City P.C.C. gutter and overlay with asphalt "in kind".

4. Removing & Salvaging Cobblestones: This work shall conform with the applicable portions of Section 15, "Existing Highway Facilities" of the State Standard Specifications as modified herein:
 - a. Cobblestone Curb: Prior to disturbing any curb cobblestone, the curb stones to be removed and salvaged shall be consecutively numbered on the stone with crayon. All curb stones shall be hand removed. No metallic, Portland cement concrete, asphalt concrete, stone or gravel material shall come in contact with the curb stone. No metal tool, equipment or implements shall be used to pry, loosen, move or lift the curb stones. All curb stone removal and salvaging shall be done by hand and with wooden or hard rubber tools. All removable marks of any kind imposed on the curb stone exposed face or top by the contractor shall be removed by soft cloth and water, hand rubbing. All earth shall be hand-water-washed from the curb stone. All mortar shall be hand removed by wooden or hard, rubberized tools. Recrayon the number on exact stone after washing, if required.

- b. Cobblestone Gutter: The contractor may remove and salvage the cobblestone gutter in any convenient manner that results in the saving of the cobblestone undamaged. Gutter stone need not be washed or cleaned. Any type equipment and tools may be used provided no damage is done to the gutter stone except that the adjacent gutter stone in contact with cobblestone curb shall be removed as described in 4-A, "Cobblestone Curb", above, except gutter stone does not require numbering.

5. Temporary or Permanent Storing of Cobblestone:

- a. Curb Stone: Curb stone shall be hand lifted and placed flatwise on three-quarter (3/4") inch maximum thickness plywood. No curb stone shall be on contact with any substance other than plywood. The curb stone shall have a minimum of three (3") inches and a maximum of six (6") inches horizontal clearance between stored stone. Curb stone may be stored in progressive vertical layers with three-quarter (3/4") inch plywood sandwiched between each layer up to and including four (4') of vertical feet height. The contractor shall be responsible for all stored cobblestone until delivery and permanent storage at the City Corporation Yard.
- b. Gutter Stone: Gutter stone may be temporarily, equipment-piled on approved City right-of-way out of the traveled way on any approved surface convenient to the contractor which is made safe for pedestrians and vehicular traffic with approved barricades. Permanent storage shall be in piles on the ground as designated by the Engineer at the City, Street, Corporation Yard. Gutter stone may be lifted and piled with any equipment convenient to the contractor which will not damage City streets or gutter stone.

6. Loading, Transporting & Unloading of Cobblestone:

- a. Curb Stone: Curb stone to be delivered to the City Corporation Yard shall be hand lifted, loaded and placed in layers, flatwise on three-quarter (3/4") inch minimum plywood mats between the stone on the bed of a flatbed truck. Dump trucks shall not be used to transport cobblestone curb.

The stone shall not be in contact with other stones or any metal portion of the truck. The stone may be sandwiched

in layers of plywood up to but not to exceed the legal weight limit of the vehicle or in any case not above four (4) horizontal layers of stone. Curb stone shall be hand lifted, unloaded and placed on plywood as detailed on "storing curb stone". Curb stone shall not be chipped, dropped, scratched or damaged by the contractor.

- b. Gutter Stone: The contractor may load, haul and unload gutter stone in any convenient manner that will not damage the stone.
7. Clear, Grub & Concrete Removal: Shall conform with Clause 4102.1 of the City of Petaluma Street Construction Detail Specification No. 41. The contractor shall not clear, grub or remove PCC gutter until all cobblestone is removed.
- a. Tree Root Treatment: Where tree roots have displaced cobblestone curb and/or gutter, the contractor shall remove and seal the roots and install a root barrier as shown on the Street Standard Details Drawing No. 216 entitled, "Treatment for Tree Roots".
 - b. Existing PCC Gutter Removal is included in this item.
8. Excavation for Cobblestone Curb & Gutter: Shall conform with Clause 4102.2 of the City of Petaluma Street Construction Detail Specification No. 41. All excavation shall be loaded directly onto trucks and disposed of by the contractor. The contractor shall not excavate until all cobblestone is removed.
9. Aggregate Base: Base rock shall conform with Clause 4102.4 of the Detail No. 41 Specifications. All aggregate base shall be Class 2, three-quarter (3/4") inch minus compacted to ninety-five (95%) percent at optimum moisture content.
10. Portland Cement Concrete Gutter: Shall conform with Clause 4102.8 of the No. 41 Detail Specifications. PCC gutter shall not be placed until all cobblestone gutter is reset and the concrete foundation has cured seven (7) days.
11. Cement Mortar: Shall conform with Paragraph 51-1.135 Mortar of the State of California Standard Specifications dated July 1984, except that mortar exposed to view shall have one (1 oz.) ounce of lamp black added to each cubic foot of mortar.

B. RESETTING COBBLESTONE:

1. Tolerances: Reset cobblestone shall be within the following tolerances:
 - a. Reset Cobblestone Curb: Horizontal and vertical within one-eighth (1/8") inch of line and grade in ten (10') linear feet. Individual stone face or top must not vary beyond one-sixteenth (1/16") inch from the adjacent stone face or top, respectively. Individual curb stone shall not vary more than one-sixteenth (1/16") inch per foot from plumb or vertical.
 - b. Cobblestone Gutter: Gutterstone shall be set flat and true and not vary from line and grade more than one-fourth (1/4") inch in ten (10') linear feet. Individual stones surfaced shall not vary more than one-eighth (1/8") inch from any adjacent gutter stone surface.
2. Reset Curb Stone: Stone shall be reset in accordance with the plans and specifications. Each curb stone shall be reset in the same numerical order and to the same face and top orientation as the original curb. Each stone shall be set in a concrete foundation as shown on the Street Standard Details Drawing No. 216 entitled, "Retention of Cobblestone Curbs and/or Gutters, Major Reconstruction". The concrete foundation shall be five sack Portland cement concrete in conformance with Section 90-10 Minor Concrete of the State Standard Specifications. The aggregate size for the foundation shall not exceed three-quarters (3/4") inch. Slump for foundation concrete shall not exceed two and one-half (2 1/2") inches. Curing of concrete foundation shall be in accordance with Paragraph 90-7.01 Curing Compound Method of the State Specifications. Water shall not be used to cure the foundation concrete due to the possibility of supersaturation and softening of the subgrade. Concrete foundation shall cure for seven (7) days prior to installing the gutter if the foundation and gutter are placed separately. All joints of reset curbstone shall be mortared.
3. Reset Gutter Stone: Stone shall be reset in accordance with the plans and specifications. Gutter stone shall be bedded a minimum of two (2") inches deep and a maximum of four (4") inches deep in a one (1) part cement to two (2) parts sand. Installation of mortar shall conform with Paragraph 51-1.135 Mortar of the State Standard Specifications. Gutter stone mortar shall be water cured using continuously wetter cotton mats, burlap sack or other approved wetted material all in conformance with Paragraph 90-

7.01A Water Method of the State Standard Specifications except that earth blankets shall not be used. Curing compound shall not be used to cure mortar in cobblestone gutter due to the possibility of discoloration of the cobble. Gutter mortar shall cure seven (7) days prior to opening gutter to traffic.

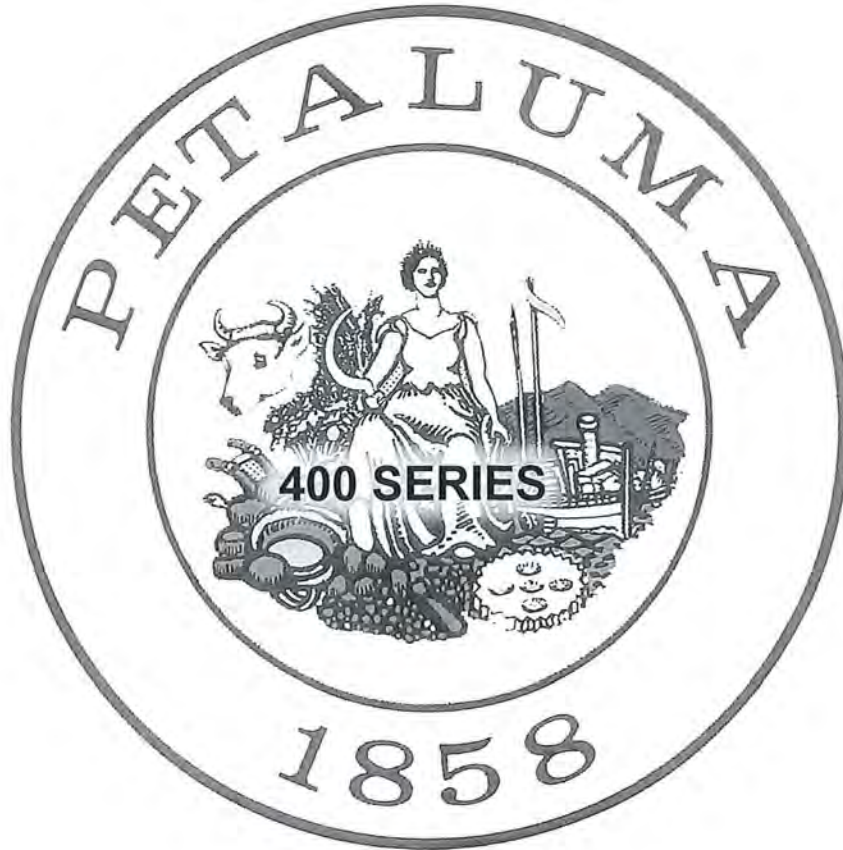
Subgutter concrete shall be five (5) sack, one (1") inch maximum aggregate conforming with Section 90-10 Minor Concrete of the State Standard Specification. Subgutter concrete, i.e., four (4") inch concrete slab under cobblestone paved gutter shall a four (4") inch maximum slump, shall be compound cured in conformance with Paragraph 90-7.01B Curing Compound Methods of the State Standard Specifications.

Water shall not be used to cure subgutter concrete.

Detail41

Storm Drain System

- Design and Construction Standards
- Storm Drain Installation Detail Specifications No. 31



City of Petaluma - Sonoma County - California
Public Works & Utilities
202 North McDowell Boulevard
Petaluma, CA 94954

APPROVED BY:

Kent R. Carothers, P.E., Operations Manager

1/8/19

Date

Storm Drain System Construction Standards

Standards List

<u>Std. No.</u>	<u>Title</u>	<u>Date Approved</u>
400	Standard Precast Concrete Manhole	April 1999
401-A	Standard Type "A" Catch Basin	December 1998
401-B	Standard Type "E" Catch Basin	December 1998
401-C	Standard Type "E" Catch Basin Grate Detail	August 1999
401-D	Catch Basin and Drop Inlet Notes	December 1998
401-E	Standard Modification of Existing Catch Basin to Accommodate Curb Ramps	August 1999
402	Standard Temporary Redwood Drain Box.....	February 1998
403	Standard Precast Catch Basin Cover.....	February 1998
404	Standard Sidewalk Underdrain	February 1998
405	Standard Precast Concrete Manhole Reducer Slab	February 1998
406	Standard Catch Basin Gallery	February 1998
407	Standard Drop Inlet.....	February 1998
408	Standard Trench Details	January 2019
409	Standard Type "A" Catch Basin over Cast-in-Place Pipe.....	February 1998
410	Standard Manhole over Cast-in-Place 1' to 2.5' of Cover	February 1998
411	Standard Manhole over Cast-in-Place 2.5' to 4.5' of Cover	February 1998
412	Standard Manhole over Cast-in-Place 4.5' or Greater Cover.....	February 1998
	Detail Specification No. 31	April 1992

NOTE NO. 1

When manholes are installed in unimproved areas, the top of the cover shall be a minimum of 1 foot above adjacent grade.

FOR MANHOLE COVER AND FRAME
(See Sewer Standards)

NOTE NO. 2

Minimum of one 3" and 6" grade adjustment rings. Maximum height of grade adjustment ring 20". Alternately, contractor may cast grade rings in place.

NOTE NO. 3

Gasket Sealer. "Ram-nek" or equal, may be used in joints, eliminating necessity for outside plastering of joints. Typical joint uses one 3 4"x2-1 2" "Ram-nek" seal or two seals in high water table areas.

NOTE NO. 4

Cone Section may be either concentric or eccentric unless otherwise specified by the Engineer.

NOTE NO. 5

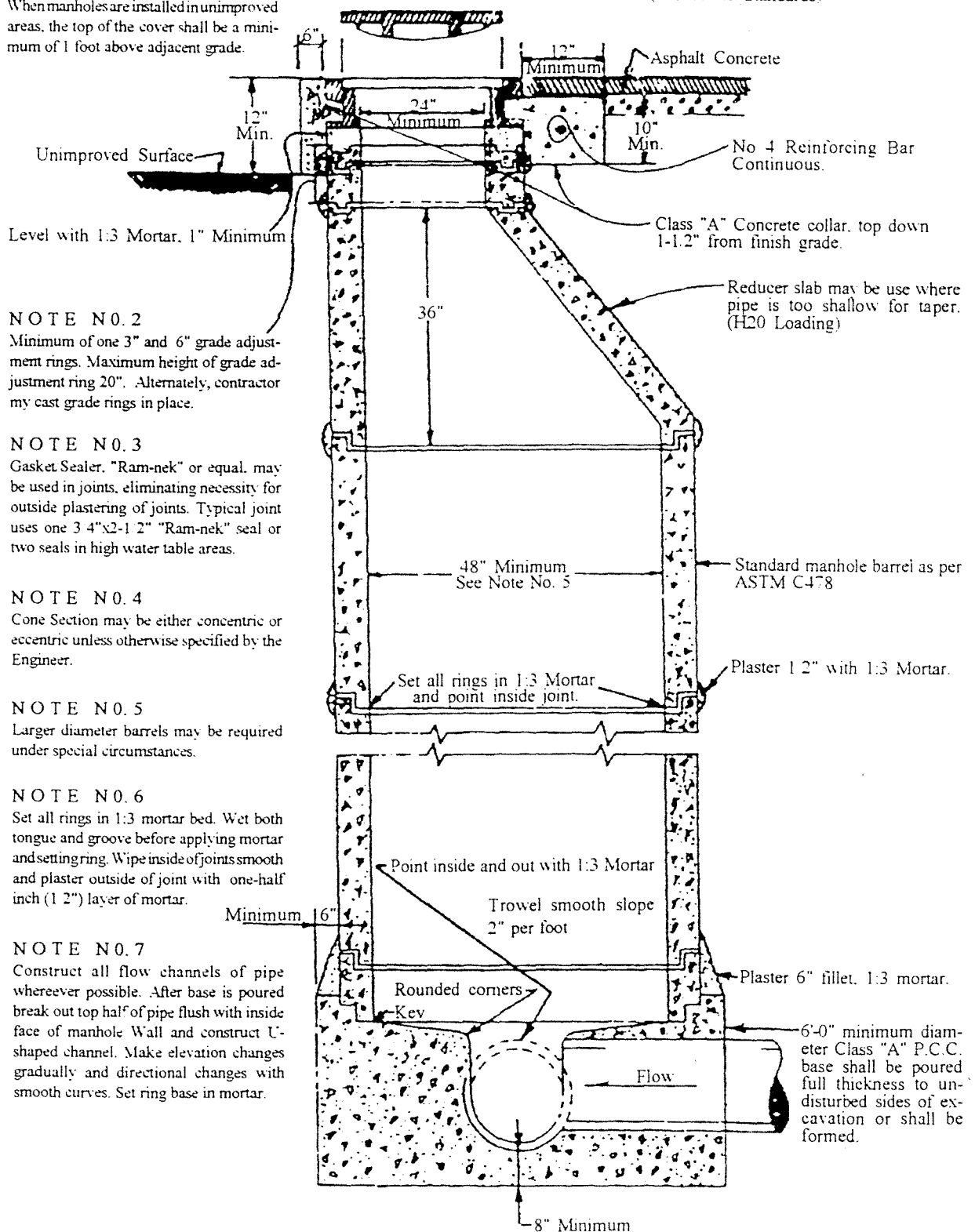
Larger diameter barrels may be required under special circumstances.

NOTE NO. 6

Set all rings in 1:3 mortar bed. Wet both tongue and groove before applying mortar and setting ring. Wipe inside of joints smooth and plaster outside of joint with one-half inch (1 2") layer of mortar.

NOTE NO. 7

Construct all flow channels of pipe wherever possible. After base is poured break out top half of pipe flush with inside face of manhole wall and construct U-shaped channel. Make elevation changes gradually and directional changes with smooth curves. Set ring base in mortar.




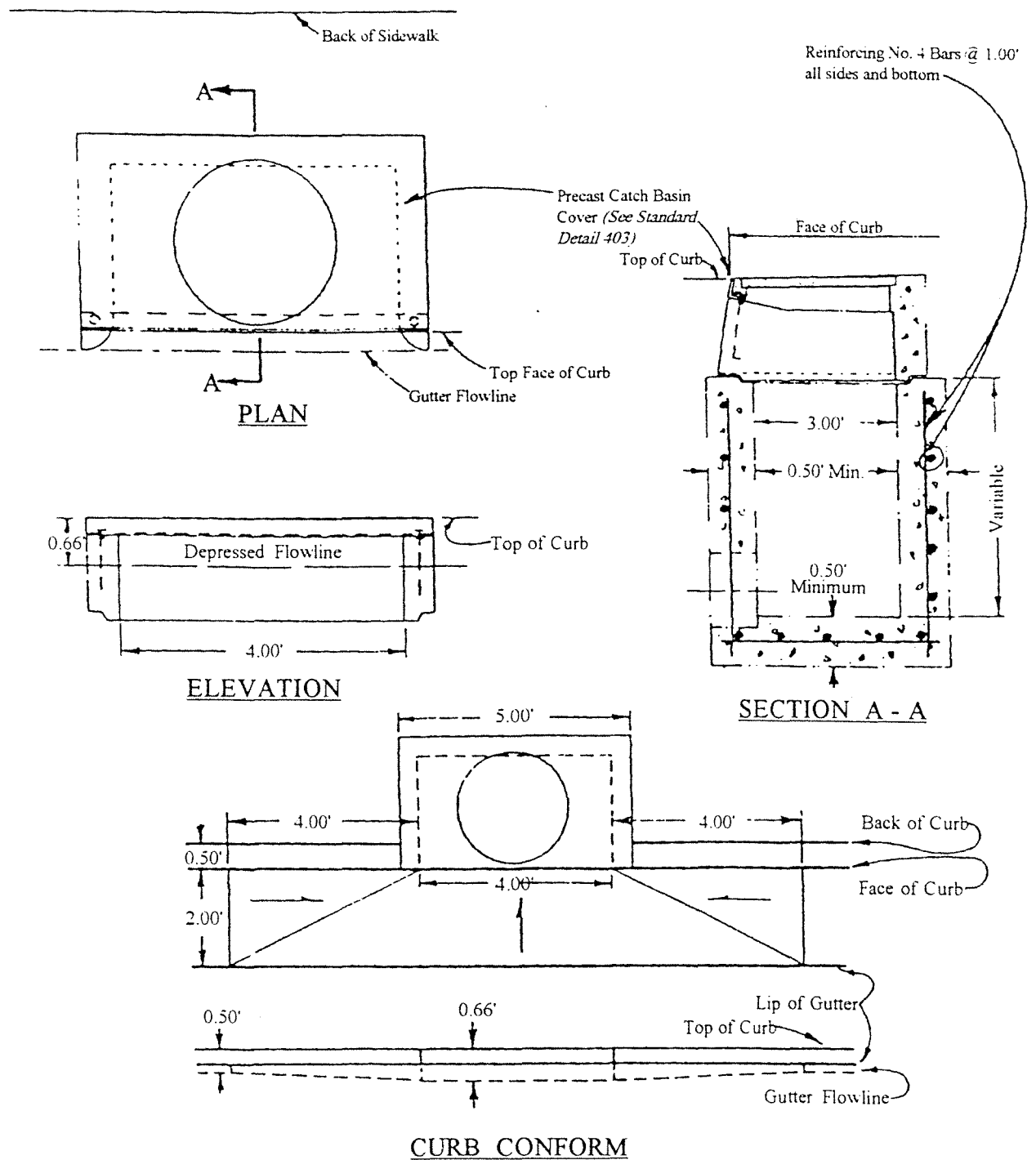
CITY OF PETALUMA
Department of Engineering
22 Bassett Street - Petaluma California 94952
707-738-4304 - Fax 707-738-4437

Approved By
Thomas S. Hargis
Thomas S. Hargis - R.C.E. 222566

Standard Precast
CONCRETE
MANHOLE
Storm Drain

Drawn By
Butch Smith
Scale
N. T. S.
Date
April 14th 1999 (Rev.)
File Number
Std. Det. SDS0000.400


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400




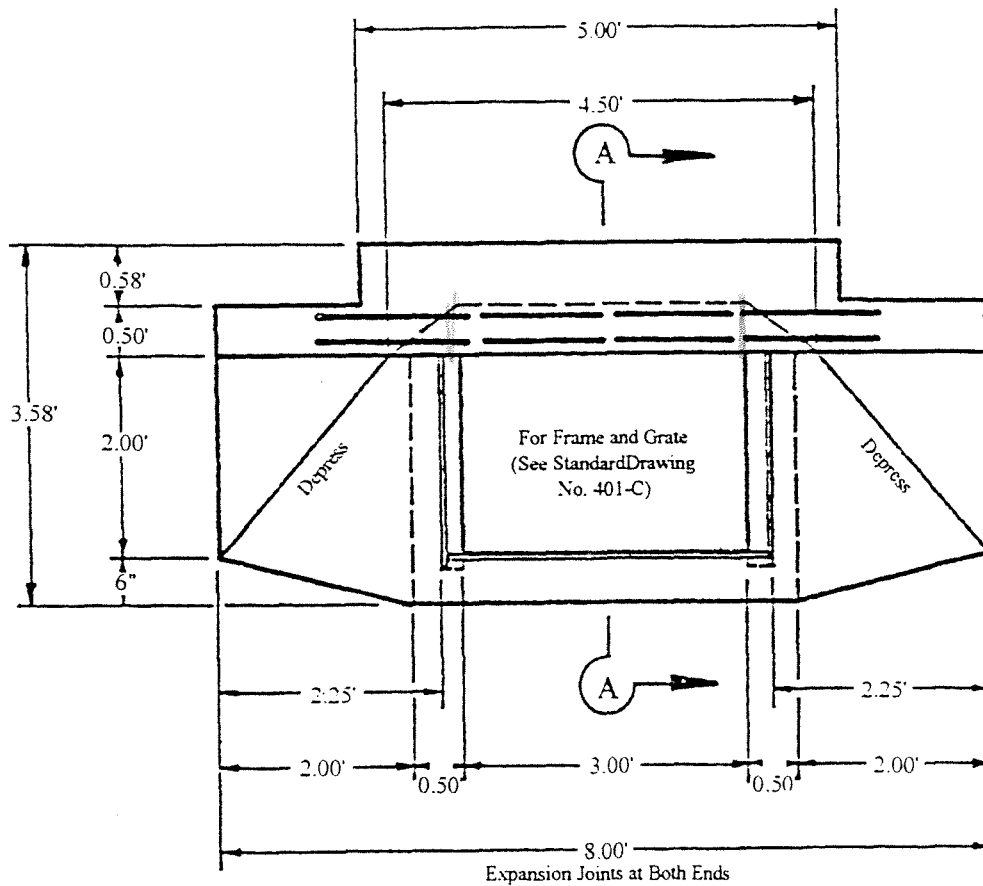
CITY OF PETALUMA
 Department of Engineering
 22 Bassett Street - Petaluma California 94952
 Phone "0" 8 4304 - Fax "0" 8 443"

Approved By:
Thomas S. Hargis
 Thomas S. Hargis - R.C.E. 22366

Standard Type "A"
**CATCH
 BASIN**
 Storm Drain

Drawn By:
 Butch Smith
 Scale:
 N. T. S.
 Date:
 December 2nd 1998 (Rev.)
 File Number:
 Std.Det. SDS0000.401-A

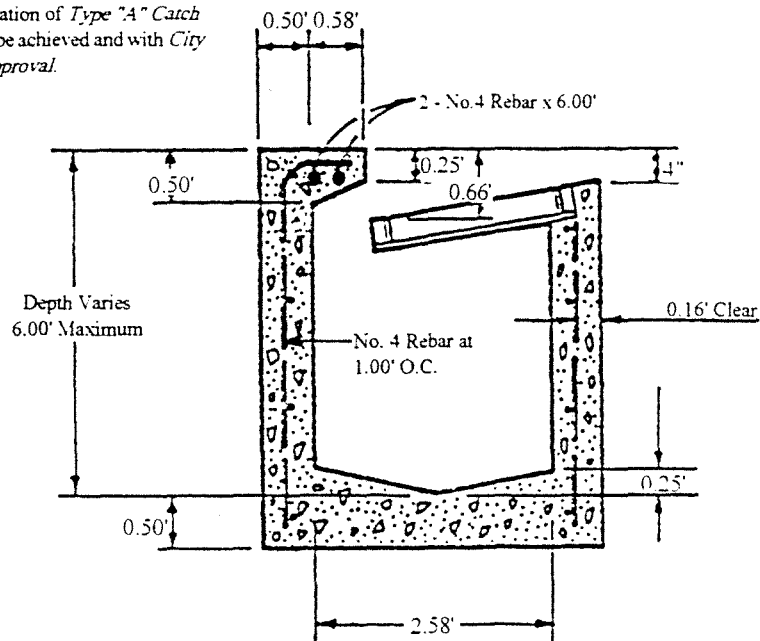

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 401-A



Expansion Joints at Both Ends

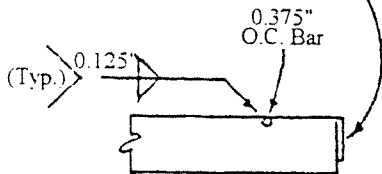
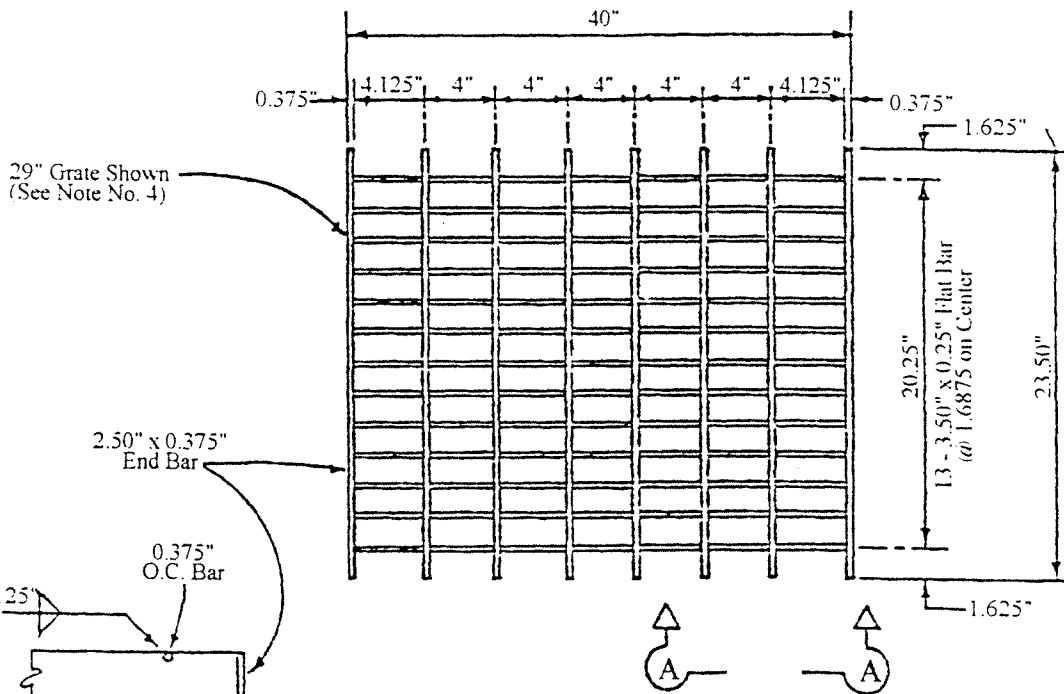
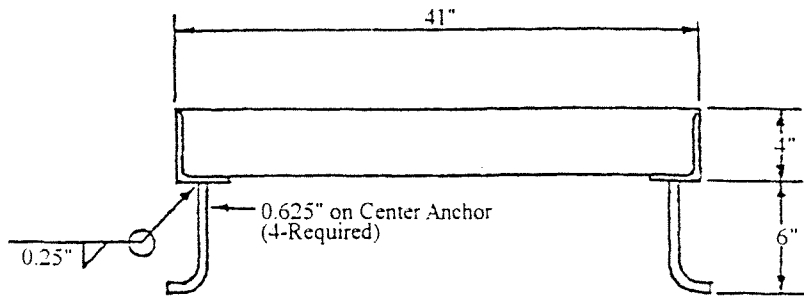
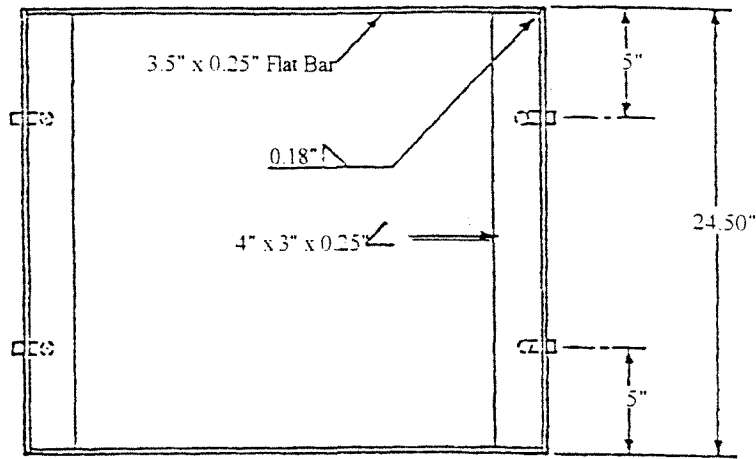
- NOTE:
1. See *Standard Drawing No. 401-D* for General Notes.
 2. *Type "E" Catch Basin* will be installed only if installation of *Type "A" Catch Basin* can not be achieved and with *City Engineer's Approval*.

PLAN



SECTION A-A

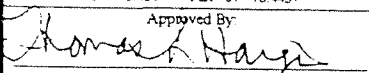
<p>CITY OF PETALUMA Department of Engineering 22 Bassett Street - Petaluma California 94952 707.778.4304 - Fax 707.778.4437</p>	<p>Standard Type "E" CATCH BASIN Storm Drain</p>	<p>Drawn by: Butch Smith Scale: N. T. S. Date: February 3rd 1999 File Number: Std. Det. SDS0000.401-B</p>	 <p>Page: 401-B</p>
<p>Approved By: <i>Thomas S. Hargis</i> Thomas S. Hargis - R.C.E. 22366</p>			



SECTION A-A

- NOTE:
1. All steel shall be structural grade.
 2. All steel shall be "Hot Dipped Galvanized" after fabrication.
 3. Top and Bottom surfaces of grate shall be ground flush after welding.
 4. For 40" Grate use *CALTRANS Standard Grate 24-12X or 24-10S*.

CITY OF PETALUMA
 Department of Engineering
 22 Bassett Street - Petaluma California 94952
 707-768-4304 - Fax 707-768-4437

Approved By:

 Thomas S. Hargis - R.C.E. 22366


Standard
Type "E"
CATCH BASIN
GRATE
DETAIL

Drawn By:
Butch Smith

Scale:
N. T. S.

Date:
December 2nd 1998

File Number:
Std. Det. SDS0000.401-C




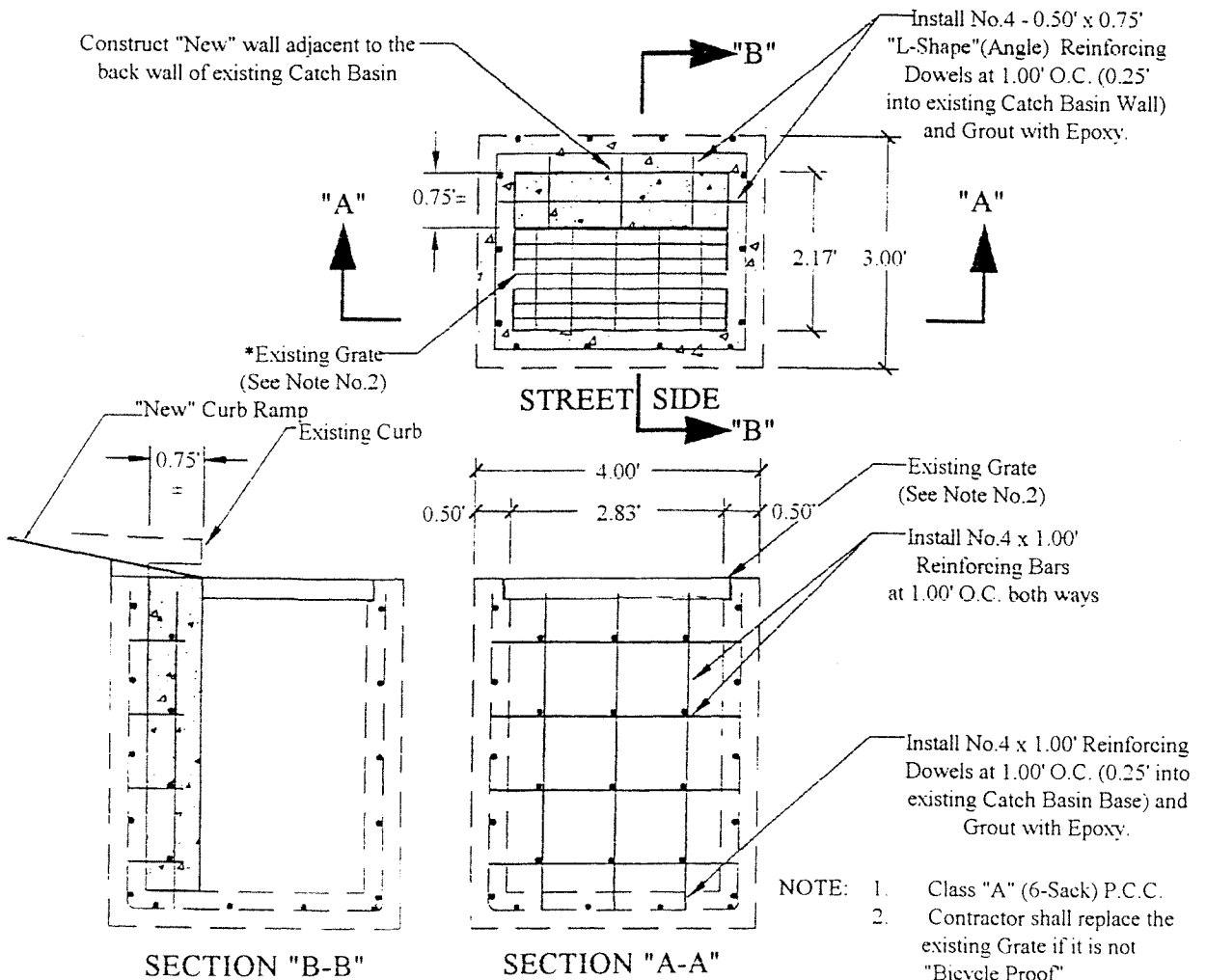
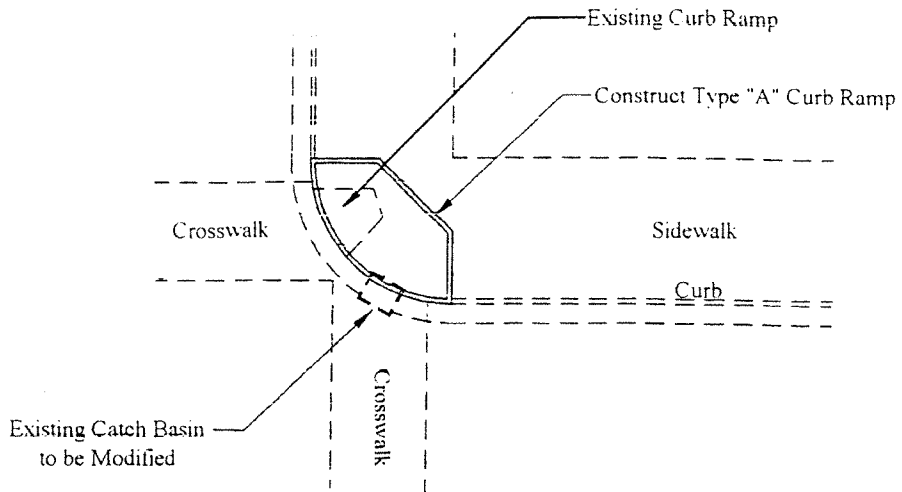
Page
401-C

CATCH BASIN AND DROP INLET NOTES

1. All concrete shall be *Class "A"* (6-sack mix) unless otherwise noted.
2. Base shall be placed against undisturbed earth. Sides may be formed or place against undisturbed earth.
3. Where conduits are encountered larger in diameter than the width of the wall through which they pass, the inside dimension of the walls normal to the direction of the pipe shall be increased to the outside diameter of the pipe.
4. Expansion joints shall be placed thru curb and sidewalk at both sides of catch basins and shall be limit of payment for curb and gutter. Unit prices for drainage structures shall include curb, gutter and sidewalk poured with drainage structure.
5. No concrete shall be placed prior to form and steel approval by the City Engineer.
6. See Standard Drawing Number 401-C for *Type "E" Catch Basin Grate Detail*.
7. Wall thickness and reinforcing shall be determined from the table below.
8. Place 0.75" weep holes as required by the *City Engineer*.
9. Equivalent precast structures may be substituted as approved by the *City Engineer*.

DEPTH	WALL THICKNESS	WALL REINFORCEMENT
Less than or equal to 8.00'	0.50'	No. 4 Rebar at 1.00' both ways
Over 8.0'	0.66'	No. 4 Rebar at 1.00' both ways

<p>CITY OF PETALUMA Department of Engineering 22 Bassett Street - Petaluma California 94952 Tel "707" 435-4304 - Fax "707" 435-4437</p> <p>Approved By <i>Thomas S. Hargis</i> Thomas S. Hargis - R.C.E. 22568</p>	<p>CATCH BASIN AND DROP INLET NOTES</p>	<p>Drawn by Butch Smith Scale N. T. S. Date August 13th 1999 (Rev.) File Number Std. Det. SDS0000.401-D</p>
		 Page 401-D



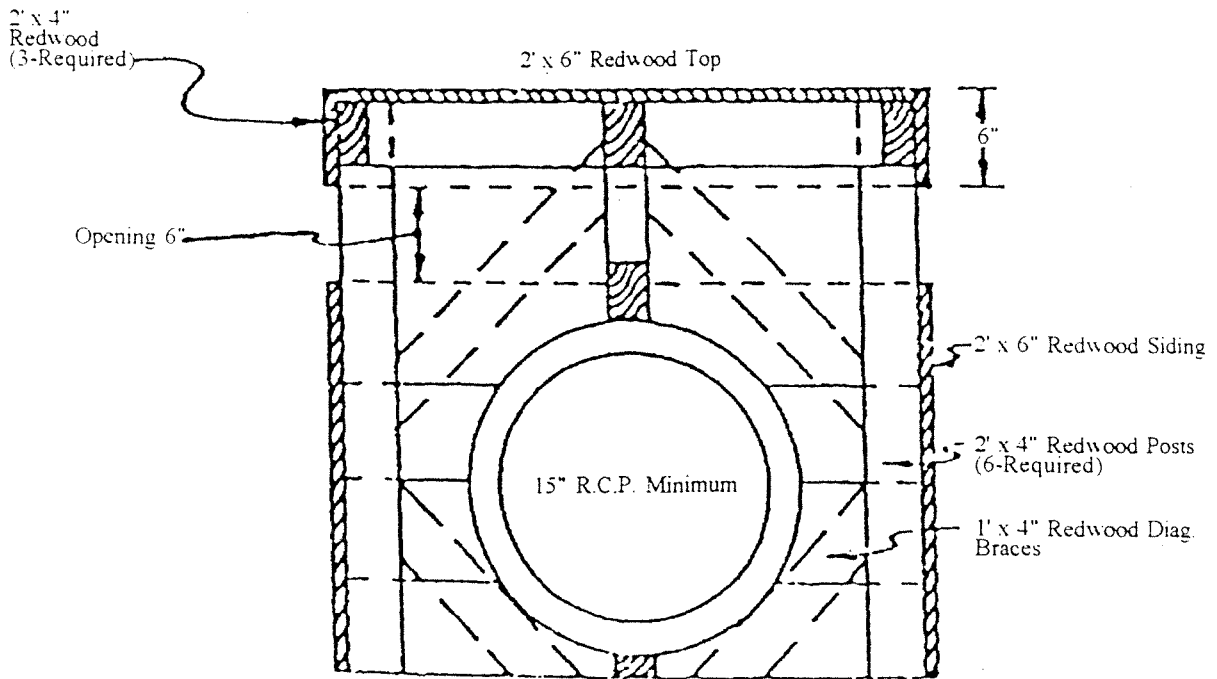
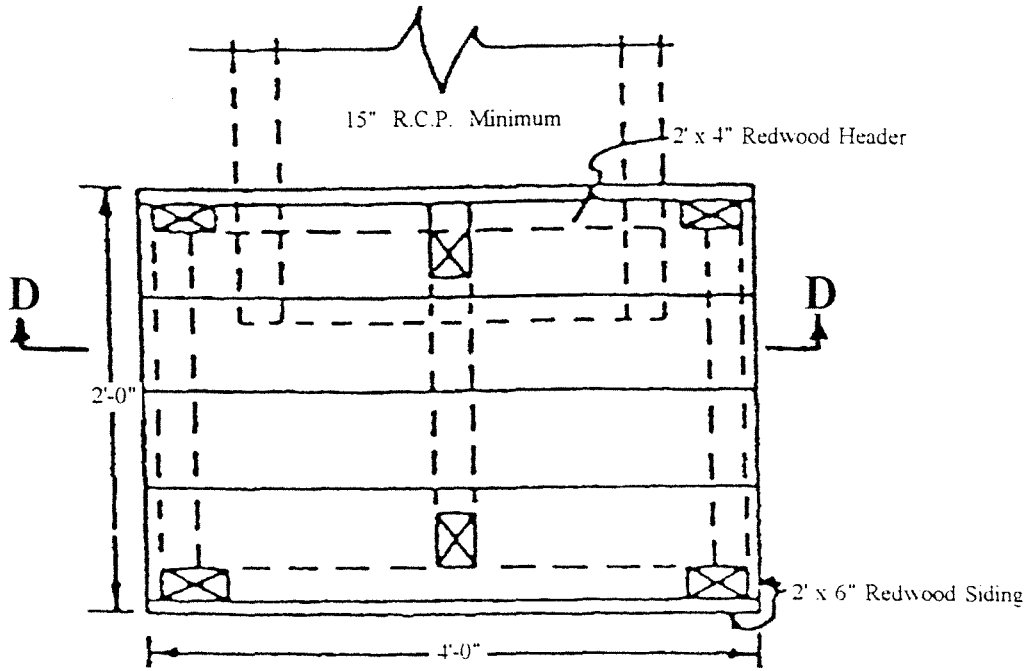
CITY OF PETALUMA
 Department of Engineering
 22 Bassett Street - Petaluma California 94952
 *07 778 4304 - Fax *07 778 4437

Approved By
Thomas S. Hargis
 Thomas S. Hargis - R.C.E. 22266

Standard
 Modification of Existing
Catch Basin
 to Accomodate the Installation
 of "New" Curb Ramp

Drawn by
Butch Smith
 Scale
 N. T. S.
 Date
 August 2nd 1999
 File Number
 Std.Det. SDS0000.401-E

Page
 401-E



NOTE:

Redwood Material shall be construction grade or better.


SECTION D-D

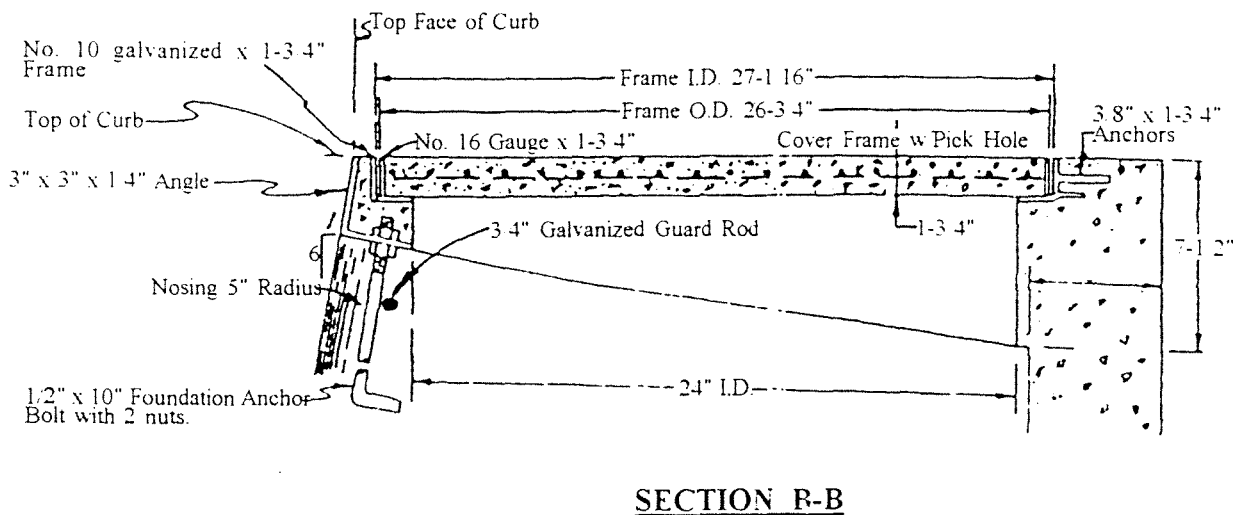
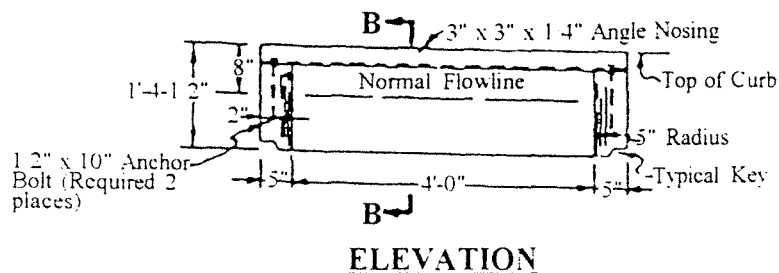
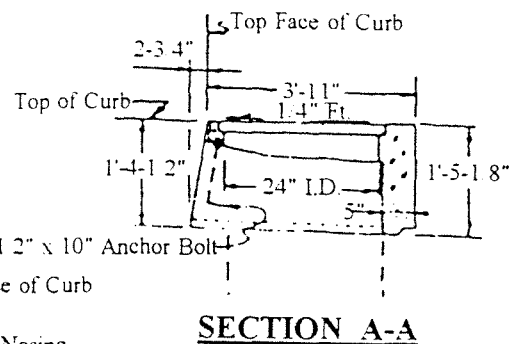
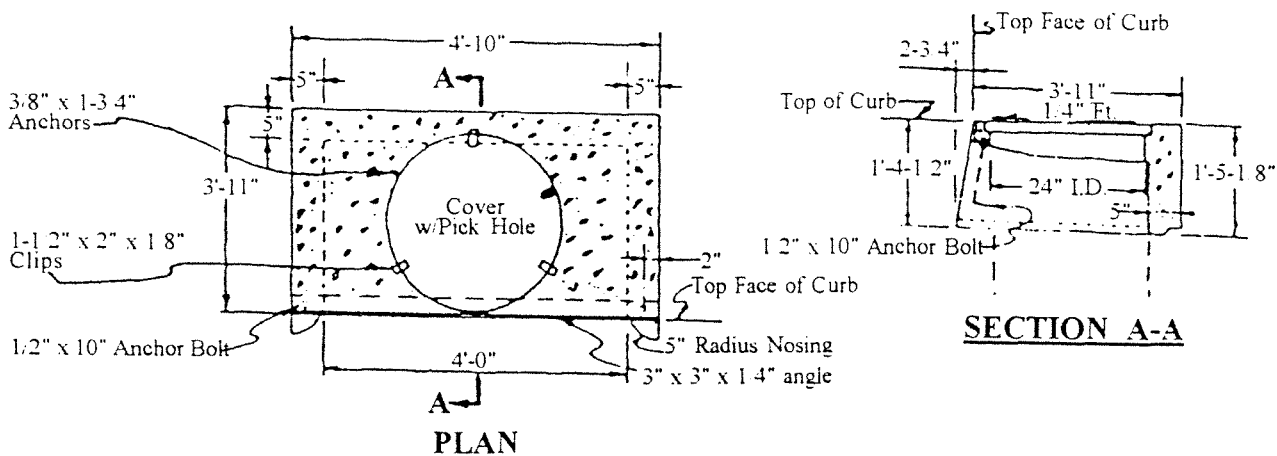
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 Department of Engineering
 22 Bassett Street - Petaluma California 94952
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Approved By
Thomas S. Hargis
 Thomas S. Hargis - R.C.E. 22276

Standard Temporary
REDWOOD
DRAIN BOX
 Storm Drain

Drawn By
 Butch Smith
 Scale
 N. T. S.
 Date
 February 9th 1998 (Rev.)
 File Number
 Std Det. SDS0000 402


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NOTE:

1. The Contractor, at his option, may use a fiberglass liner and cast the catch basin top in place.
2. A cast iron frame ring may be substituted for the galvanized frame for the cover opening provided that the frame I.D. remains as shown.

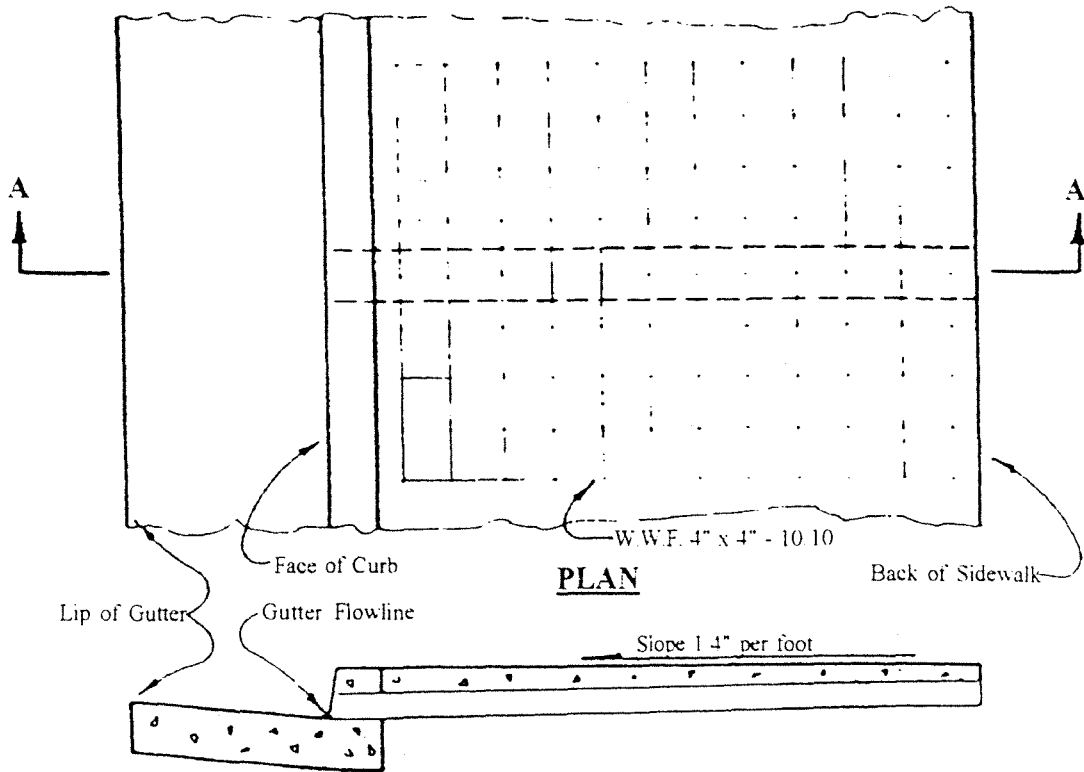
CITY OF PETALUMA
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 707 784304 - Fax 707 784437

Approved By
Thomas S. Hargin
 Thomas S. Hargin - R.C.E. 22366

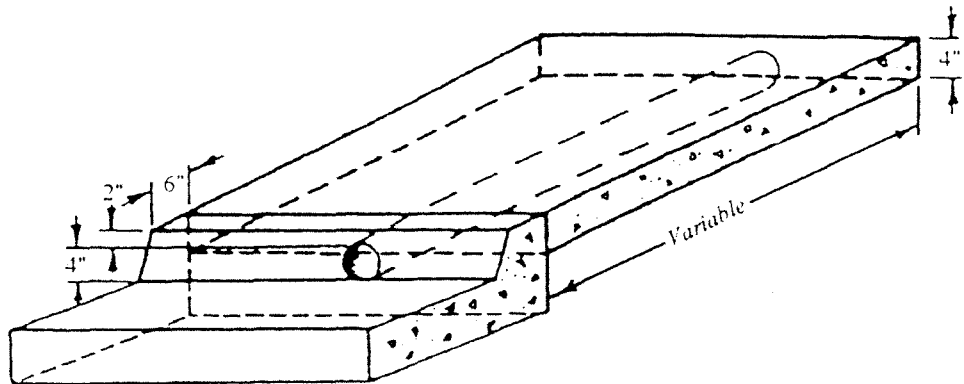
Standard Precast
CATCH BASIN
COVER
 Storm Drain

Drawn By
Butch Smith
 Scale
 N. T. S.
 Date
 February 9th 1998 (Rev.)
 File Number
 Std Det. SDS0000.403





SECTION A-A



CURB OPENING DETAIL

NOTE:

1. Wire mesh shall be 4'-0" wide (minimum). Length shall equal sidewalk with minus 4".
2. On site drainage and location of curb outlets shall be by owner to the satisfaction of the City Engineer.
3. Drain pipe shall be installed so that top of pipe is 3" minimum below finish grade at back of sidewalk.
4. Sidewalk drain to be 3" schedule 40 heavy wall rigid polyvinyl chloride pipe or approved equal.

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 Department of Engineering
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Approved By:
Thomas S. Hargis
 Thomas S. Hargis - R.C.E. 22566


Standard
**SIDEWALK
 UNDERDRAIN**
 Storm Drain

Drawn by
Butch Smith

Scale
 N. T. S.

Date
 February 9th 1998 (Rev)

File Number
 Std. Det. SDS0000.404

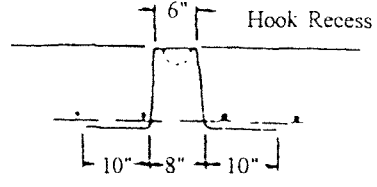
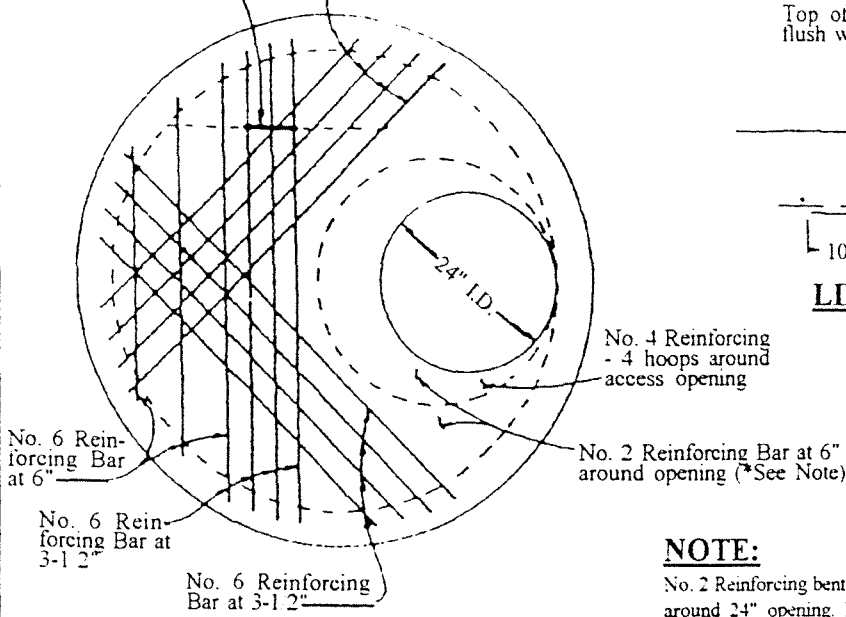


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 404

Lifting eyes at balance point, two places

No. 6 Reinforcing Bar at 3-1 2"

Top of lifting eye to be flush with top of slab



**LIFTING EYE
DETAIL**

No. 4 Reinforcing - 4 hoops around access opening

No. 2 Reinforcing Bar at 6" around opening (*See Note)

NOTE:

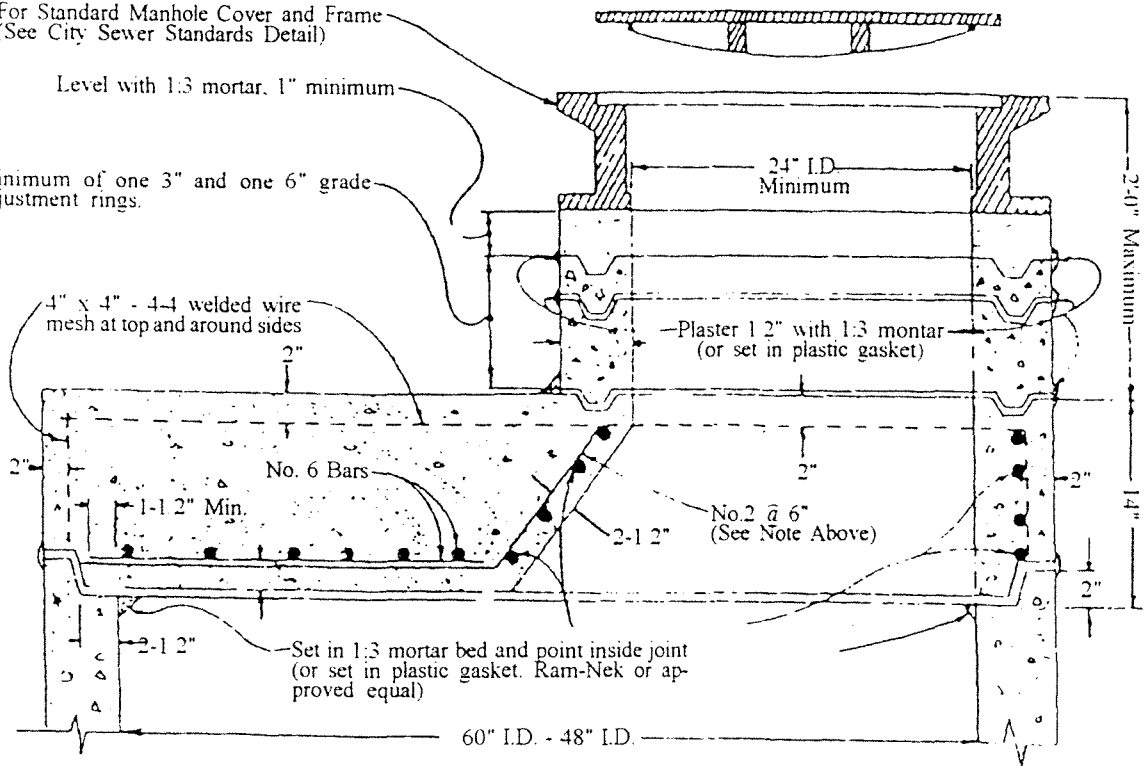
No. 2 Reinforcing bent up and spaced 6" on center around 24" opening. Horizontal legs to fan out equally spaced, to 2-1 2" clear at edge of slab.

SLAB PLAN

For Standard Manhole Cover and Frame (See City Sewer Standards Detail)

Level with 1:3 mortar, 1" minimum

Minimum of one 3" and one 6" grade adjustment rings.



**CITY OF PETALUMA
Department of Engineering**

22 Bassett Street - Petaluma California 94952
707 784 4304 - Fax 707 784 443

Approved By:
Thomas S. Hargis
Thomas S. Hargis - R.C.E. 22366

Standard Precast Concrete
**MANHOLE
REDUCER SLAB**
Storm Drain

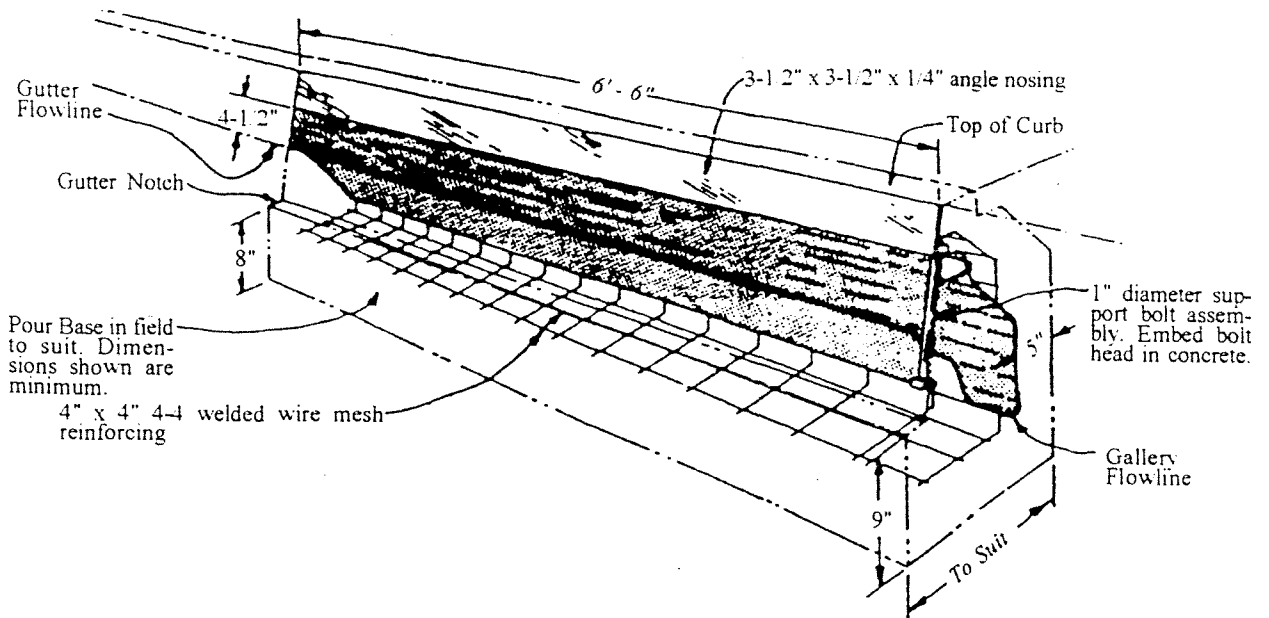
Drawn By:
Butch Smith

Scale:
N. T. S.

Date:
February 9th 1998 (Rev.)

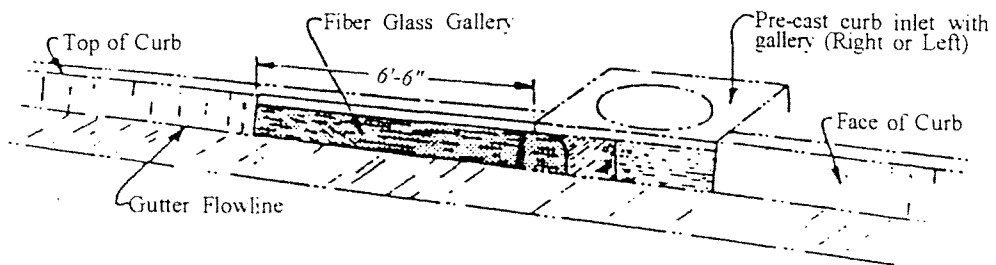
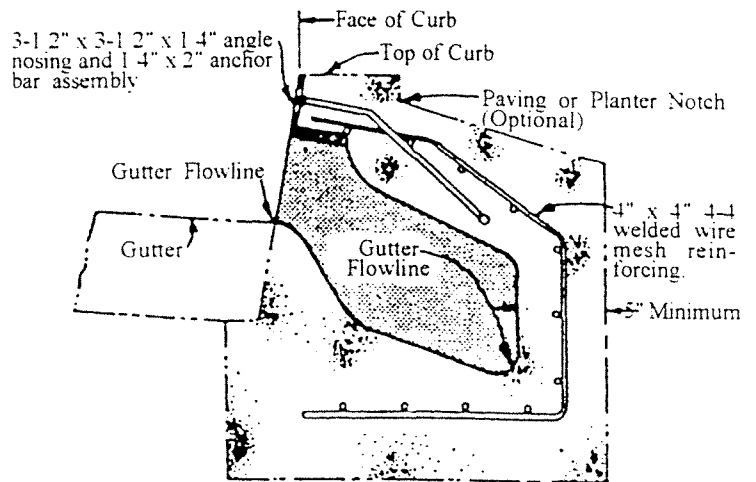
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Std. Det. SDS0000.405





NOTE:

1. Concrete shall be 3000 p.s.i. at 28-days.
2. Nosing assembly (angle and welded anchor bars) shall be hot dipped galvanized after fabrication per ASTM Spec. A123-59
3. Either cast-in-place or precast units are acceptable.



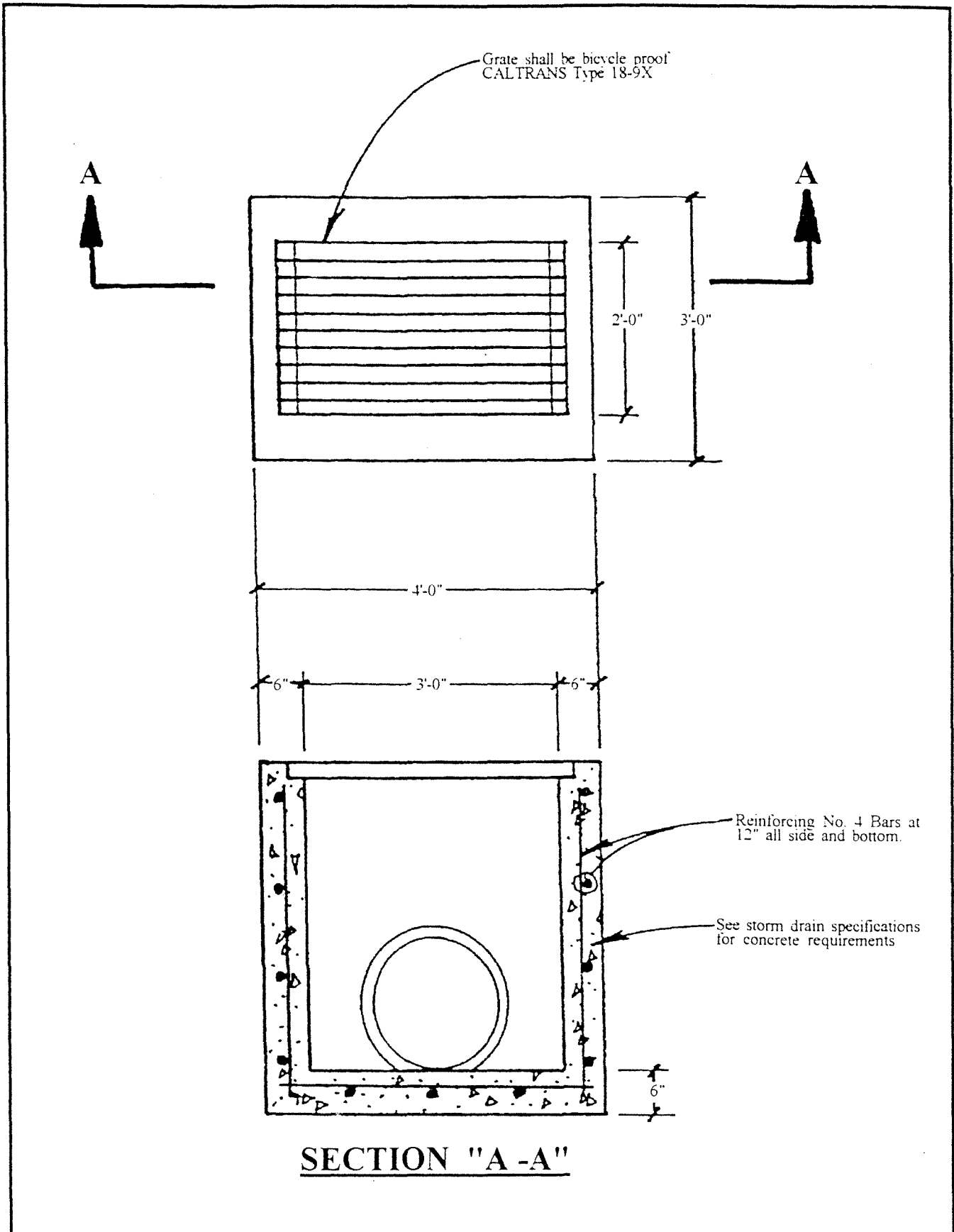
CITY OF PETALUMA
 Department of Engineering
 22 Bassett Street - Petaluma California 94952
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Approved By:
Thomas S. Hargis
 Thomas S. Hargis - R.C.E. 22706

Standard
CATCH BASIN
GALLERY
 Storm Drain

Drawn By:
Butch Smith
 Scale:
 N. T. S.
 Date:
 February 9th 1998 (Rev.)
 File Number:
 Std. Det. SDS0000.406





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 Department of Engineering
 22 Bassett Street - Petaluma California 94952
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Approved By:
Thomas S. Hargis
 Thomas S. Hargis - R.C.E. 22706

Standard
**DROP
 INLET**
 Storm Drain

Drawn by:
 Butch Smith
 Scale:
 N. T. S.
 Date:
 February 9th 1998 (Rev.)
 File Number:
 Std Det. SDS0000 407

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 407

PLEASE REFER TO CITY STANDARDS
219.1 – 219.3



CITY OF PETALUMA

PUBLIC WORKS & UTILITIES
UTILITIES DIVISION

202 N. McDOWELL BLVD. TEL. 707-778-4546
PETALUMA, CALIFORNIA 94954 FAX. 707-778-4508

**STANDARD TRENCH
DETAILS**

DATE: JAN 7, 2019

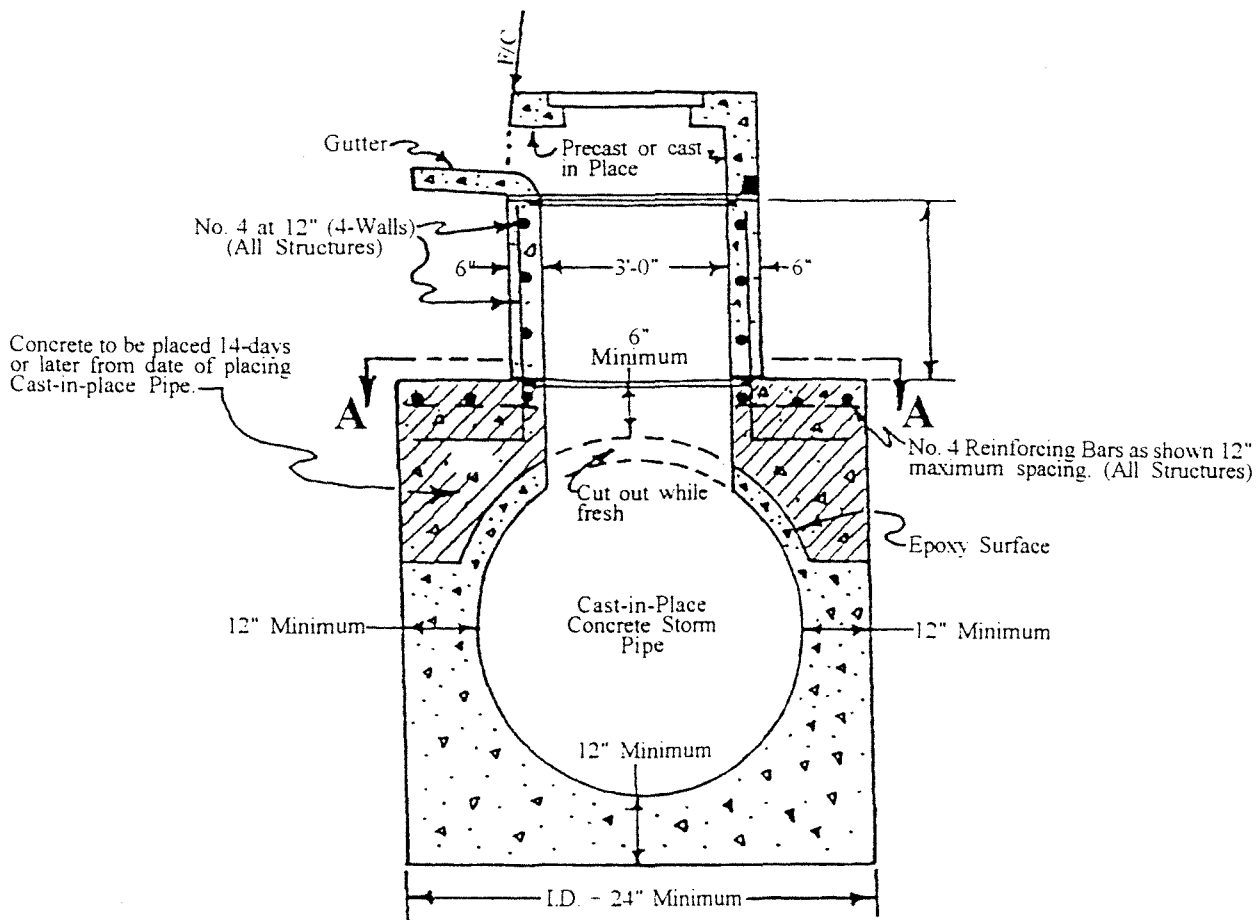
SCALE: N.T.S.

APPROVED BY:

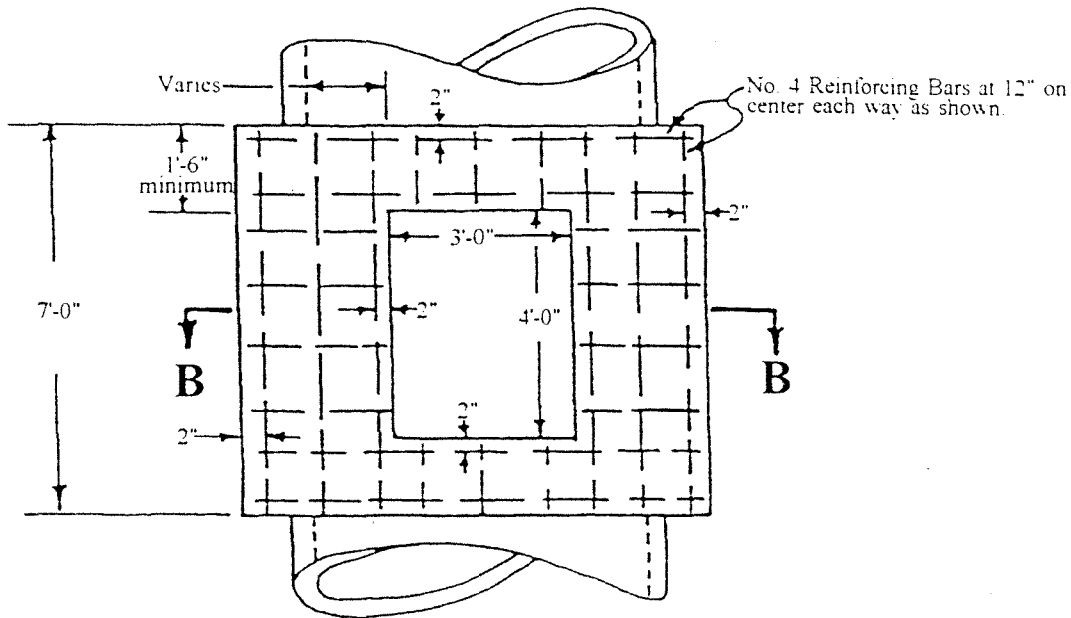
Kent R. Carothers, P.E. Operations Manager C60671

DRAWN BY: TKM

NO. 408



SECTION "B-B"



SECTION "A-A"

CITY OF PETALUMA
 Department of Engineering
 22 Bassett Street - Petaluma California 94952
 707 778-4304 - Fax 707 778-4457

Approved By
Thomas S. Hargis
 Thomas S. Hargis - R.C.E. 22366

Standard "Type A"
CATCH BASIN
 Over Cast-in-Place Pipe
 Storm Drain

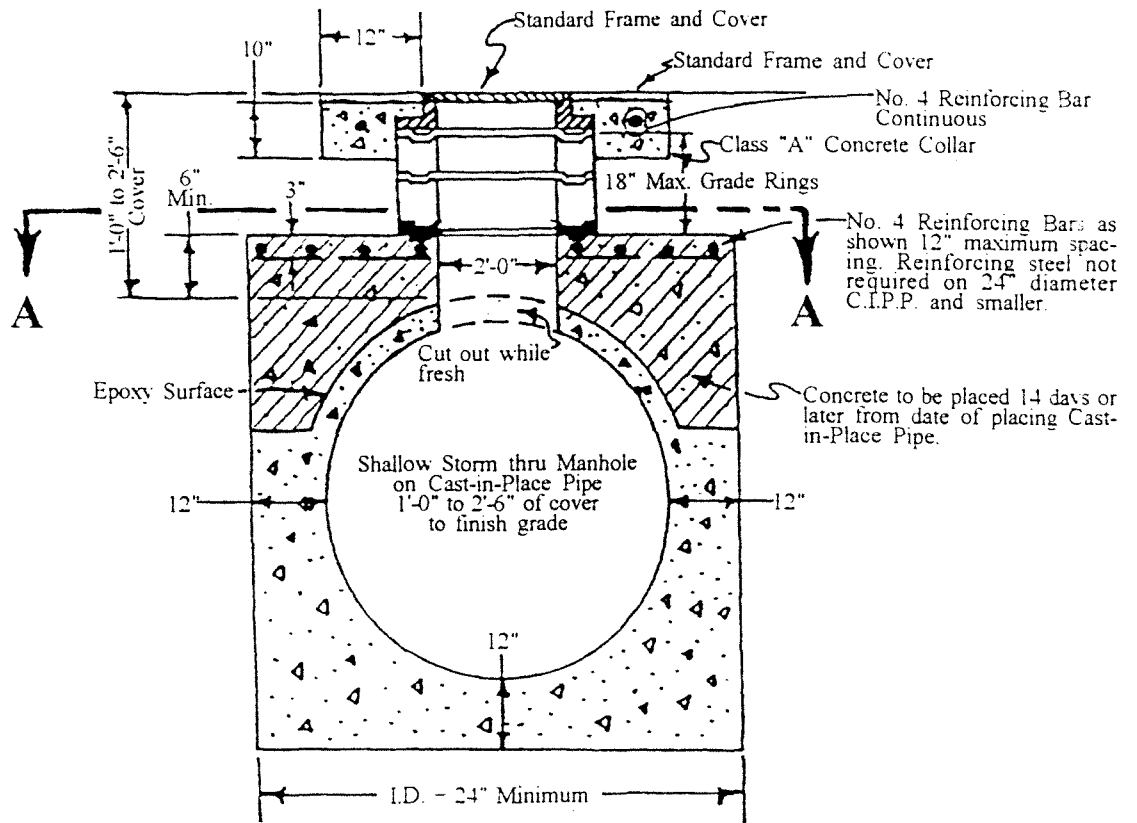
Drawn by
Butch Smith

Scale
N. T. S.

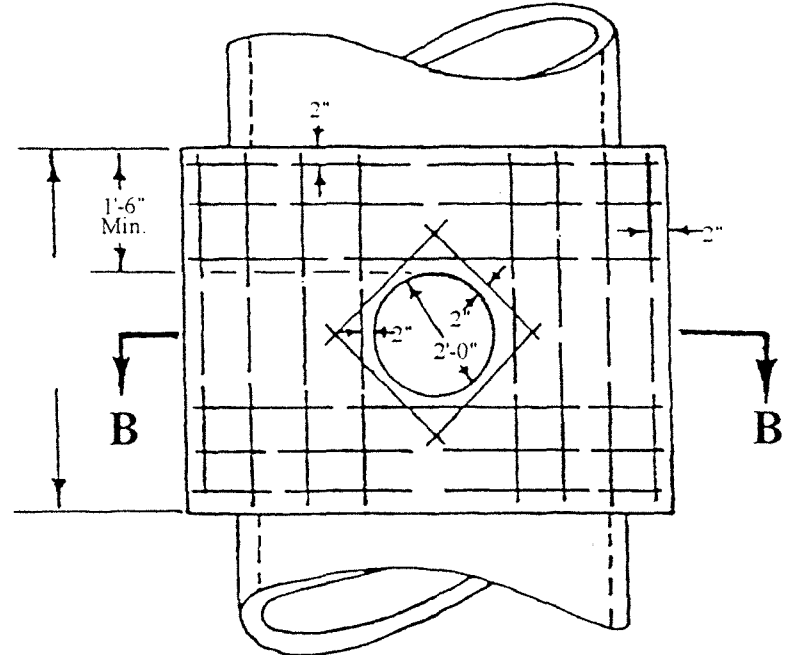
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February 9th 1998 (Rev.)

File Number
Std. Det. SDS0000.409



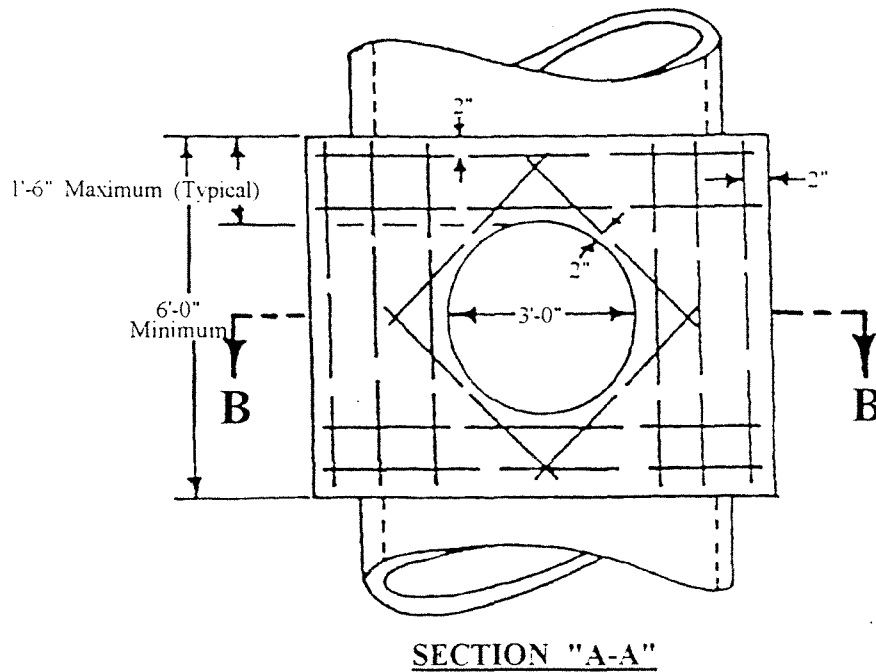
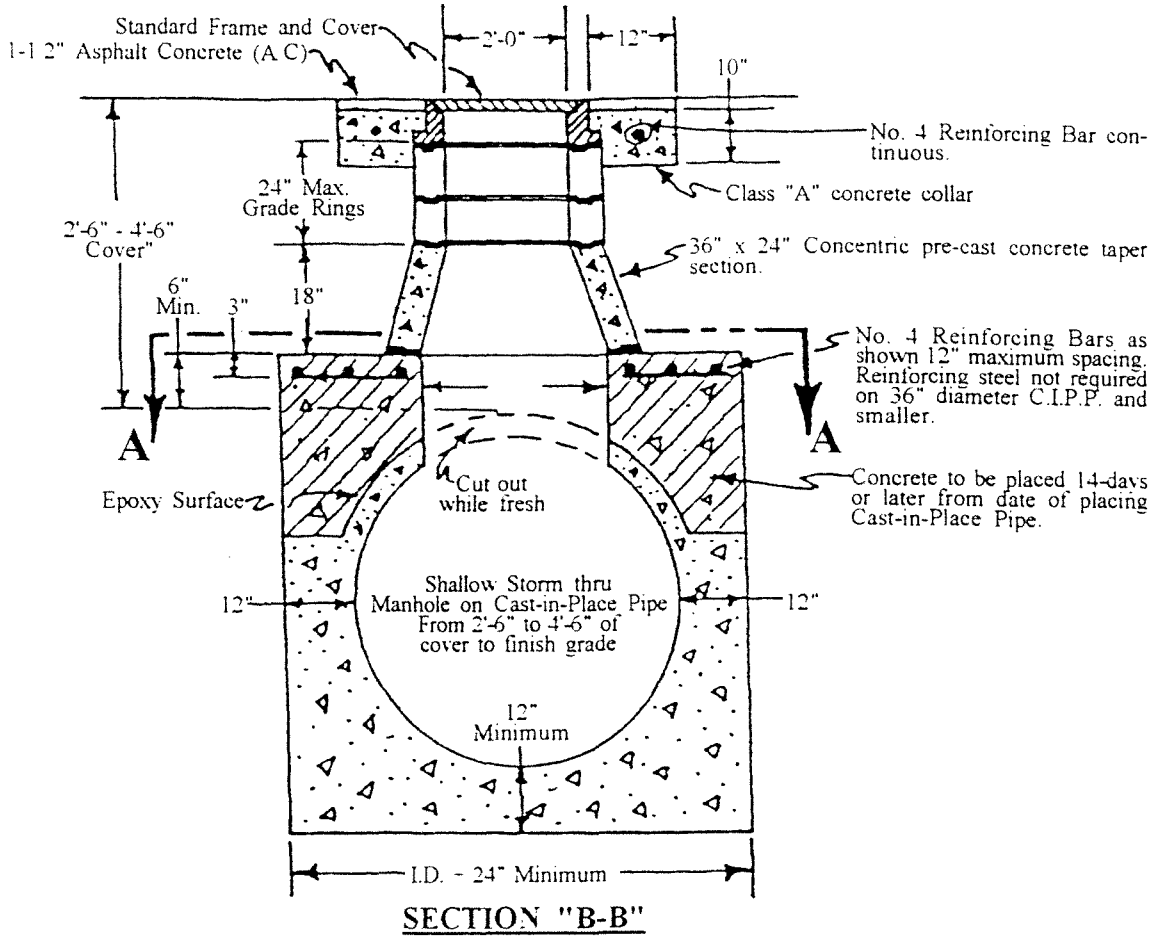



SECTION "B-B"

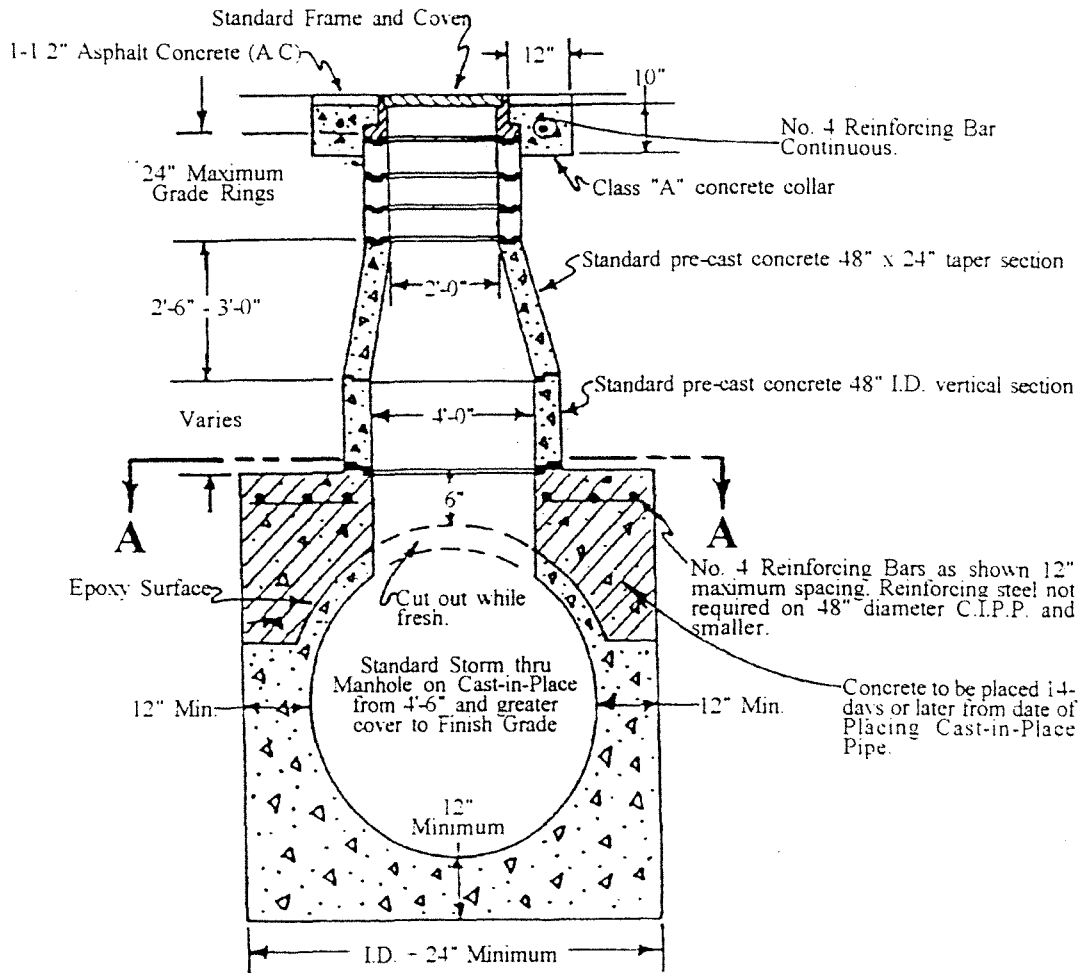


SECTION "A-A"

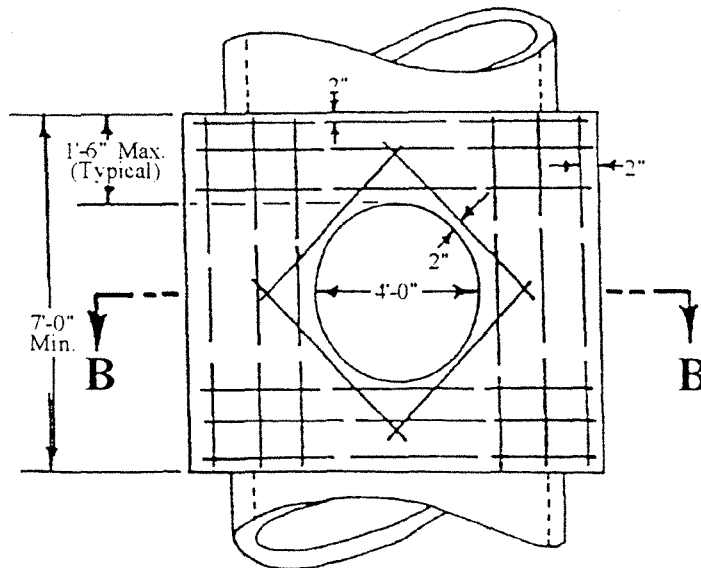
<p>CITY OF PETALUMA Department of Engineering 22 Bassett Street - Petaluma California 94952 707 784304 - Fax 707 784415</p> <p>Approved By <i>Thomas S. Hargis</i> Thomas S. Hargis - R.C.E. 22266</p>	<p>Standard STORM DRAIN MANHOLE Over Cast-in-Place Pipe 1.0' to 2.5' of Cover</p>	<p>Drawn By Butch Smith Scale: N. T. S. Date February 9th 1998 (Rev.) File Number Std. Det. SDS0000.410</p>	 <p>Page 410</p>
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<p>CITY OF PETALUMA Department of Engineering 22 Bassett Street - Petaluma California 94952 07-784304 - Fax 07-784437</p>	<p>Standard STORM DRAIN MANHOLE Over Cast-in-Place Pipe 2.5' to 4.6' of Cover</p>	<p>Drawn By Butch Smith Scale N.T.S. Date February 9th 1998 (Rev.) File Number Std. Det. SDS0000.411</p>	 <p>Page 411</p>
<p>Approved By <i>Thomas S. Hargis</i> Thomas S. Hargis - R.C.E. 22866</p>			



SECTION "B-B"



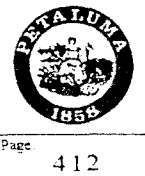
SECTION "A-A"

CITY OF PETALUMA
 Department of Engineering
 22 Bassett Street - Petaluma California 94952
 707 778 4304 - Fax 707 778 4437

Approved By:
Thomas S. Hargis
 Thomas S. Hargis - R.C.E. 22566

Standard
STORM DRAIN
MANHOLE
 Over Cast-in-Place
 4.5' and Greater Cover

Drawn by:
 Butch Smith
 Scale:
 N. T. S.
 Date:
 February 9th 1998 (Rev.)
 File Number:
 Std. Det. SDS0000 412



City of Petaluma
Petaluma, California

STORM DRAIN INSTALLATION
DETAIL SPECIFICATIONS NO. 31

Description

- 3101.1 Description. The work shall include the furnishing of all material, labor, tools, implements, and equipment necessary to construct the storm drains, drop inlets, and manholes, complete and ready to operate; all construction to be in accordance with the details shown on the plans and with these specifications.

Materials

- 3102.1 Portland Cement Concrete. Portland Cement Concrete shall conform to the requirements of Section 90 of the Standard Specifications and as herein specified. The concrete shall be Class "A" containing size (6) sacks of Portland Cement per cubic yard of concrete. The grading of the combined aggregate shall conform with the requirements for one and one-half (1-1/2) maximum. The consistency of the fresh concrete shall be such that the slump does not exceed four (4") inches as determined by Test Method No. California 519A.
- 3102.2 Portland Cement. Portland Cement shall conform to ASTM Designation C150.67, Type II, and shall be delivered in the original package with the brand name of the manufacturer plainly marked thereon.
- 3102.3 Reinforcing Steel. Reinforcing Steel shall be intermediate grade steel of the sizes and spacings called for on the plans. Steel shall meet the requirements of the ASTM Designation A-15-65.
- 3102.4A Reinforced Concrete Culvert Pipe. The storm sewer shall be constructed in accordance with Section 65-102A of the State Specifications or where called for on the plans shall be centrifugally spun reinforced concrete pipe with self-centering type joints as manufactured by the American Pipe & Construction Company or approved equal. The pipe shall be manufactured in accordance with the design requirements for Class III (unless otherwise indicated on the plans) reinforced concrete pipe, ASTM Designation C76-66T. The wall design shall be at the option of the manufacturer.
- 3102.4B Cast in Place Concrete Pipe. Cast in place concrete pipe shall conform with Section 63 of the Standard Specifications. After the pipeline has been completed and protected for at least forty-eighty (48) hours and/or the concrete strength reaches one thousand (1000) psi, the subsequent backfill may be installed in accordance with Section 3103.8B of this specifications.

In all cases, the contractor shall be responsible for correcting any damage to cast-in-place concrete pipe caused by premature or excessive loading.

At the option of the contractor, Class III reinforced concrete pipe, conforming to Section 3102.4, may be substituted for cast-in-place concrete pipe. Pipe and installation shall conform to Section 65, "Reinforced Concrete Pipe", of the Standard Specifications, except that backfill shall conform to the provisions under Section 3103.8, "Backfilling", of these specifications. Regardless of which optional material the contractor selects, pipe laid at the locations shown on the plans for cast-in-place concrete pipe will be paid for at the contract price per linear foot for cast-in-place concrete pipe, which includes payment for excavation and backfill, as provided under Section 3103.13A, "Payment", of these provisions.

3102.4C Abestos Cement Pipe. The storm sewer shall be constructed with asbestos cement pipe culvert conforming to Section 64-1.02 and 64-1.03 of the January 1973 Standard Specifications of the Department of Public Works Division of Highways, State of California. The asbestos cement pipe shall be Class III, unless shown otherwise on the plans or specified in the Special Provisions and designated in the contract item. Section 3103.7 of these specifications shall not apply when asbestos cement pipe is used in a storm drain culvert.

3102.4D Corrugated Aluminum Pipe. The storm sewer shall be constructed with corrugated aluminum pipe conforming to Section 66-2 of the January, 1973, Standard Specifications of the Department of Public Works, Division of Highways, State of California. The pipe shall be either riveted or spirally corrugated.

The gauges shall be in accordance with the U.S. Department of Transportation, Federal Highway Administration, Bureau of Public Roads, 1970 revision, titled, "Corrugated Metal Pipe-Structure Design Criteria & Recommended Installation Practice". Fill Height Table 8 for circular pipe and Fill Height Table 14 for arch pipe.

3102.4E Corrugated Polyethylene Pipe. The storm sewer pipe shall be constructed of high density polyethylene (HDPE) in conformance with AASHTO Specifications M-294 latest addition, nominal diameters 15" through 36".

Minimum pipe stiffness at 5% deflection per ASTM D-2412 shall be as follows:

<u>Diameter</u>	<u>Stiffness</u>
15"	42
18"	40
24"	34
30"	28
36	22

The HDPE storm pipe shall have outer corrugation with smooth inner liner. The Mannings "n" factor for the interior of the pipe shall be a minimum of 0.012.

Minimum allowable cover shall be 24" to finish grade. Maximum cover shall be in accordance with the HDPE pipe manufacturer's recommendations. Pipe shall be N-12 as manufactured by Advanced Drainage Systems, Inc., Hancor, Inc., or equal.

Joints

Pipe shall be joined with the bell-and spigot joint and shall provide a minimum pull-apart strength of 400 lbs. The bell shall be an integral part of the pipe.

The joint shall use a gasket for form a silt-tight connection. Gaskets shall be installed in the bell by the pipe manufacturer. Joints shall remain silt-tight when subjected to a 1.5° axial misalignment.

3102.5 Reinforced Concrete Manhole Sections. These sections shall conform to size, shape and details shown on the plans. Pipe sections shall conform to ASTM Specification C76-66T, Class II. A minimum of one cage of reinforcing is required, the cross-sectional area of which is equal to that specified for the inner cage of the above ASTM Specification.

3102.6 Castings. Castings for manhole rings, cover and other purposes, shall conform accurately to the form and dimensions shown on the detailed drawings. Castings must be of workmanlike finish, free from blow and sandholes or defects of any kind, and shall be made from a superior quality of tough even-grained gray iron, and shall possess a tensile strength of not less than twenty thousand (20,000) pounds per square inch.

Before leaving the foundry, they shall be thoroughly cleaned and coated by dipping in asphalt applied at a temperature of three hundred (300) degrees Fahrenheit in such a manner as to provide a firm, durable, tenacious coating.

3102.7 Mortar. All mortar used in the construction of pipe joints and manholes shall consist of one (1) part by volume of Portland Cement and two (2) parts by volume of clean sand, and shall otherwise conform to Section 65-1.06A of the Standard Specifications.

3102.8 Select Backfill Material. Select backfill shall be granular material of the quality herein specified. Select backfill material shall have a size and gradation falling within the following limits:

<u>Sieve Size</u>	<u>% Passing Sieve</u>
1"	100
3/4"	90 to 100
No. 4	35 to 55
No. 30	10 to 30
No. 200	2 to 9

The material shall compact to a relative compaction of ninety (90) percent. The relative compaction is that determined by Test Method No. California 216 Materials and Research Department, California Division of Highways. The material shall have a minimum sand equivalent value of twenty-five (25) as

determined by the test method currently in use by the California Division of Highways.

The in-place density and moisture of solid and aggregates may be determined by the use of nuclear methods and the area concept as per Test Method No. California 231 with the following conditions. The test maximum density shall be determined as specified in Part II of Test Method No. California 216. A minimum of one in-place density test using the sand volume method as prescribed in Part I of Test Method No. California 216 shall be taken to standardize the nuclear gauge for each type of soil or aggregate. After correlation is assured and the equipment standardized then the nuclear gauge may be used as directed by the Engineer.

Construction Methods

- 3103.1 Trench Excavation. Trench excavation shall include the removal of all materials or obstructions of any nature, the installation and removal of all sheeting and bracing and the control of water, necessary to construct the work as shown. Unless otherwise indicated on the drawings or permitted by the Engineer, excavation for storm drains shall be by open cut. Trenching machines may be used, except where their use will result in damage to existing facilities. Trenches shall be excavated to the line and grade shown on the plans.
- 3103.2 Trench Width. The maximum allowable width of trench measured at the top of the pipe shall be the outside diameter of the pipe exclusive of bells and collars, plus twenty-four (24) inches, and such maximum width shall be inclusive of all trench timbers. Minimum width of trench shall be outside diameter, plus eighteen (18) inches. Whenever the maximum allowable trench width is exceeded for any reason, the contractor shall, at his expense, embed or cradle the pipe in concrete in a manner satisfactory to the Engineer.
- 3103.3 Bracing & Shoring. The contractor's attention is directed to Section 3(f), "Excavation and Trenching Safety", of the General Provisions. Excavation shall be supported as set forth in the rules, orders and regulations of the California Industrial Accident Commission. Failure to comply with any of these rules, orders and regulations shall be sufficient cause for the Engineer to immediately suspend all work. Compensation for losses incurred by the contractor by such an emergency suspension shall not be allowed. During backfilling the bottom of the shoring shall be kept above the level of the backfill at all times.
- 3103.4 Control of Water. The contractor shall furnish, install and operate all necessary machinery, pumps and equipment to keep excavations reasonably free from water during construction, and shall dispose of the water so as not to cause injury to public or private property, or to cause a nuisance or a menace to the public. He shall at all times have on hand sufficient pumping equipment and machinery in good working condition for all ordinary emergencies and shall have available at all times competent mechanics for the operation of all pumping equipment. During pouring of concrete and until concrete has set hard, excavations shall be kept free of water.
- 3103.4A Trench Bottom Drainage & Stabilization. When additional gravel or crushed rock are required to stabilize a soft, wet or spongy foundation caused by the operations

of the contractor, such gravel or crushed rock shall be furnished at the contractor's expense.

The Engineer shall be the sole judge of the suitability of the trench bottom and as to the amount of gravel required to stabilize a soft foundation. The contractor shall remove any soft material and replace it with gravel or crushed rock when ordered to do so by the Engineer.

Gravel or crushed rock shall have a size and gradation falling within the following limits:

<u>Sieve Size</u>	<u>% Passing Sieve</u>
2"	100
1 1/2"	90 to 100
3/4"	5 to 30
3/8"	5 to 20
No. 200	0 to 4

Payment for trench bottom drainage and stabilization shall be made at the contract unit price bid per ton of gravel or crushed rock in place, complete including excavation and disposal of soft material and dewatering the trench.

3103.5 Disposal of Excess Excavated Material. Arrangements for disposing of excess excavated material shall be made by the contractor. Excavated material suitable for backfilling shall be stored temporarily in such a manner as will facilitate work under the contract and not cause undue inconveniences to property owners along the sewer route.

3103.6 Pipe Laying. No pipe shall be laid until the Engineer inspects and approves the condition of the bottom of the trench. Pipe laying shall proceed upgrade with the tongue ends of tongue and groove pipe pointing in the direction of flow. Each piece shall be laid true to line and grade and in such a manner as to form a close concentric joint with the adjoining pipe and to prevent sudden offsets in the flow line.

As the work progresses, the interior of the storm drain shall be cleared of all dirt and debris of every description. Where clearing after laying is difficult because of small pipe size, a suitable swab or squeegee shall be kept in the pipe and pulled forward past each joint immediately after jointing has been completed. Pipe shall not be laid when the condition of the trench or the weather is unsuitable. At time when work is not in progress, open ends of pipe and fittings shall be closed.

Pipe shall be placed on prepared subgrade of imported material at least four (4) inches deep below the barrel of the pipe. The imported material shall meet the requirements specified herein for "initial backfill" and be thoroughly compacted to obtain a final density of at least ninety (90) percent of maximum at optimum moisture as determined by Test Method No. California 216. After compaction, the bottom of the trench shall be shaped so the pipe, when laid, will have a uniform bearing under the full length of the pipe.

3103.7 Pipe Jointing. Joints in pipes eighteen (18) inches in diameter and smaller shall be made prior to closure by buttering with mortar the joint space of the bell end of

the pipe section previously laid. After inserting the spigot, the excess mortar squeezed from the joint shall be removed by an inflated swab or squeegee. Joints in pipe twenty-one (21) inches in diameter and larger shall be made by partially filling the inside joint with mortar after the pipe has been laid and before the initial backfill has been placed. No mortar will be required in the outside joints of tongue and groove pipe. After the final backfill has been placed and completely compacted by jetting, joints in pipe twenty-one (21) inches in diameter and larger shall be finished by completely filling the inside joint with mortar. Before final acceptance, the joints shall be left smooth without any abrupt rise or drop in the flow line and without any cracks which will permit leakage.

The connecting bands for corrugated aluminum pipe shall conform to the requirements of AASHO M-106.

3103.8 Backfilling.

3103.8A Initial Backfill. "Select Backfill Material" as specified in Section 3102.8 of these specifications shall be used for initial backfill. After the pipe has been properly laid and inspected, select backfill material shall be placed on both sides and over the pipe to such a depth that after thorough compaction, the final depth shall be at least twelve (12) inches above the top of the pipe. The contractor shall be wholly responsible for damage to the pipe.

The initial backfill shall be compacted by hand tamping. The use of machine tampers will not be permitted. The initial backfill material shall be hand tamped in layers not exceeding four (4) inches in uncompacted depth. The final depth of compacted initial backfill shall be at least twelve (12) inches above the top of the pipe.

After handtamping, the relative compaction of the initial backfill material shall be not less than ninety (90) percent as determined by Test Method California No. 216.

3103.8B Subsequent Backfill. Above the level of the initial backfill, the trench shall be backfilled with structural backfill (excluding pea gravel) as specified in Paragraph 19-3.06 Structure Backfill of the State of California, Department of Transportation, Standard Specifications, dated January 1988. Unless otherwise specified in the special provisions or certified by an approved soil testing laboratory that the native trench excavated material meets the requirements of structural backfill as stated above - native excavated trench material shall not be used for backfill in any portion of the trench.

The contractor shall compact by tamping and/or rolling, the backfill material in layers not exceeding eight (8) inches in loose depth, each layer being thoroughly compacted by tamping and/or rolling before succeeding layers are placed. "Stomper" type equipment for compaction shall not be permitted. Vibrating equipment that does not damage the pipe or adjacent facilities may be used for compaction.

Subsequent backfill compacted by tamping and/or rollings shall be free from stones or lumps exceeding three (3) inches in greatest dimension, vegetable matter, or other unsatisfactory material, and shall be compacted to a relative compaction of not less than ninety (90) percent as determined by Test Method No. California 216, except that within two and one-half (2 1/2) feet of finished

permanent surfacing grade the relative compaction shall not be less than ninety-five (95) percent. The contractor will be charged for the cost of all compaction tests where the test results do not meet the above specifications.

3103.8C Re-excavation. If the compaction requirements as specified above are not met, the trench shall be re-excavated. Backfill material shall then be compacted by tamping and/or rolling as specified above until the compaction requirements are satisfied.

3103.8D Restoration of Existing Facilities. Whenever existing improvements, such as pavements, curbs, gutters, sidewalks, driveways, storm drains, sanitary sewers, laterals, utilities, utility services, etc., have been cut or damaged in order to construct storm drains and appurtenances, the backfill shall be thoroughly compacted and all improvements restored to their original conditions. The cost of restoring all original improvements shall be included in the unit bid price for storm sewer pipe, or appurtenances, and no additional allowance shall be made therefor.

3103.9 Subgrade Preparation. The finished subgrade immediately prior to placing base material thereon shall have a relative compaction of not less than ninety-five (95) percent, for a depth of two and one-half (2 1/2) feet below finished permanent surfacing grade, as determined by Test Method No. California 216. Mud or other soft or spongy material shall be removed and the space filled with select backfill material and rolled or tamped in layers not exceeding eight (8) inches in thickness until the above relative compaction requirement is satisfied. Subgrade preparation is not required in unimproved areas where trench surfacing is not required.

3103.10 Trench Surfacing.

3103.10A General. Where an unimproved surface is encountered the trench shall be restored to its original surface.

Where a gravel surface is encountered, it shall be replaced over the width of the trench with Class 2 Aggregate Base six (6) inches in depth as specified in Section 26 of the Standard Specifications. Where the existing surface is some type of asphalt concrete, it shall be restored with a temporary surface followed by a permanent surface as specified herein.

3103.10B Temporary Surfacing. The temporary surfacing shall be Class 2 Aggregate Base as specified in Section 26 of the Standard Specifications. The aggregate base shall be equal in depth to the existing pavement structural section, but in any case not less than fourteen (14) inches in depth.

The aggregate base shall be given a penetration treatment as specified in Section 36 of the Standard Specifications. Liquid asphalt used for the treatment shall be grade MC-70 or SC-70. The rate of application of the liquid asphalt shall be the maximum that will, under favorably weather conditions, be completely absorbed by the base material within twenty-four (24) hours from the time of application. A sufficient amount of liquid asphalt shall be applied to bind the aggregate base and prevent raveling. Care shall be taken that no liquid asphalt is applied to the adjoining pavement surface.

All temporary surfacing shall be laid within two (2) days after backfilling. Before the street is opened for traffic, all excess dirt, rock and debris shall be removed and the street surface shall be swept clean. Temporary surfacing shall be maintained constantly so that at no time will there be any mudholes nor shall the surface settle below one (1) inch nor be raised more than one (1) inch from the existing pavement. All temporary asphalt shall comply fully with the Bay Area Air Quality Management District's Regulation 8, Rule 15.

Section 302 of Rule 15 prohibits the use of "cut back" asphalt (including MC-70) during the months of April through October in paving material or in paving and maintenance operations. The contractor shall use only slow-cure (SC) liquid asphalts for temporary trench paving during April through October.

3103.10C Permanent Surfacing. Permanent surfacing shall not be constructed until the compaction requirements of Section 3103.8 of these specifications are satisfied. The wearing surface for permanent surfacing shall be replaced "in kind", but in no case shall the new surfacing be less than two (2) inches thick for asphalt concrete or less than six (6) inches thick for Portland Cement Concrete. A permanent surface shall be installed no later than ten (10) calendar days from completion of backfill.

3103.10C1 Asphalt Concrete. The existing pavement shall be neatly cut to a depth of two (2) inches and removed to at least five (5) inches outside each side line of the pipe trench to permit proper keying in the restored pavement. The existing pavement cut shall be straight, vertical and with no ragged edges.

The base course for permanent surfacing shall be Class 2 aggregate base as specified in Section 26 of the Standard Specifications. The aggregate base shall be equal in depth to the existing pavement structural section, but in any case not less than twelve (12) inches in depth.

The wearing surface for permanent surfacing shall be asphalt concrete two (2) inches minimum in depth. The asphalt concrete shall be "Type B Asphalt Concrete" with one-half (1/2) inch maximum, medium grading aggregate conforming to the requirements of Section 39 of the Standard Specifications.

3103.10C2 Portland Cement Concrete Paving. The existing pavement shall be neatly sawcut to a minimum depth of two (2) inches and at least five (5) inches outside each side line of the pipe trench to permit proper keying in the restored pavement. The contractor shall chip along the edge of the existing concrete pavement and remove all loose pieces prior to replacing the wearing surface for permanent surfacing.

The base course for permanent surfacing shall be Class 2 aggregate base as specified in Section 26 of the Standard Specifications. The aggregate base shall be equal in depth to the existing pavement structural section less six (6) inches, but in any case not less than six (6) inches in depth.

The wearing surface for permanent surfacing shall be Portland Cement Concrete in conformance with Section 90 of the Standard Specifications.

3103.11 Storm Sewer Manholes. Storm manholes shall be reinforced concrete, constructed at the locations shown on the plans and to the form and dimensions shown on the detailed plans.

In the construction of reinforced concrete manholes, joints shall be made in the same manner and sequence as heretofore specified for reinforced concrete pipe, tongue and groove jointed.

The storm sewer pipe shall be carried through the manhole structure and the concrete base of the manhole shall be constructed around the pipe. The top of the pipe shall be broken out flush with the inside of the manhole wall and top of platform. Pipe stubs for main and lateral sewers shall be built into the structure as shown on the plans.

- 3103.12 Drop Inlets. Drop inlets shall be constructed to the lines and grades shown on the plans and in accordance with the provisions of Sections 51 and 70 of the Standard Specifications as herein modified. Inlet boxes shall conform to "Type A Inlets" as detailed on the plans, or as otherwise specified.

The floor and the walls of the inlet box may be poured monolithically using Class "A" Concrete. "Ordinary Surface Finish" shall be applied to all the inside surfaces of the box. No concrete shall be poured when subgrade is excessively wet. The interior of the box shall be kept free of dirt, excess mortar and other foreign materials and shall be left clean at the completion of the inlet lateral.

Backfill around the completed drop inlet shall be thoroughly tamped into place by use of pneumatic tamper where possible, or other means approved by the Engineer. The relative compaction shall be ninety-five (95) percent.

- 3103.13 Payment.

- 3103.13A Storm Sewer Pipe. Quantities for payment shall be made by measuring horizontally along the centerline of the storm drain less the design distance between the ends of the pipe in manholes through which the pipe does not pass. Whenever split pipe is required through a manhole, such pipe shall be included in the measurement.

The contract unit price per linear foot for reinforced concrete pipe or cast-in-place concrete pipe shall include full compensation for all costs necessary and incidental to the complete installation of the concrete pipe storm sewer of the designated size and class, as specified herein and as designated on the plans.

- 3103.13B Storm Sewer Manholes. The contract unit price per each for "Storm Sewer Manholes" of the applicable diameter, four (4) feet or five (5) feet shall include full compensation for all costs necessary and incidental to furnishing and installing a storm sewer manhole complete including excavation, backfill, ring and cover, as herein specified and detailed on the plans. The cost of setting the manhole cover to grade after the asphalt concrete pavement is placed shall not be included in the contract unit price per each for storm sewer manhole, but paid for under asphalt concrete paving.

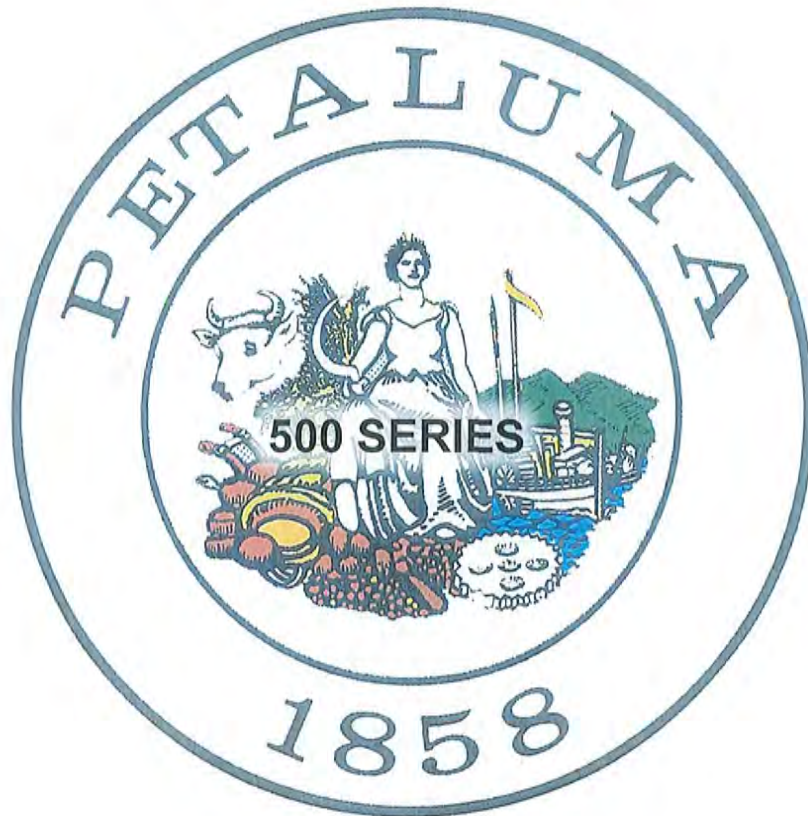
- 3103.13C Drop Inlets. The contract unit price for each "Drop Inlet" in place shall include full compensation for furnishing all labor, materials, tools, equipment and performing all work necessary to complete the drop inlet, including backfilling, and no additional allowance will be made.

3103.13D Cast In Place Payment. The contract unit price per linear foot measured along the centerline of the pipe shall include full compensation for the pipe in place including excavation, curing and backfill.

detail31

Sewer System

- Design and Construction Guidelines
- Construction Standards
- Approved Materials List



City of Petaluma - Sonoma County - California
Public Works & Utilities
202 North McDowell Boulevard
Petaluma, CA 94954

APPROVED BY:

Kent R. Carothers, P.E., Operations Manager

1/3/21

Date

Sewer System Construction Standards

Standards List

<u>Std. No.</u>	<u>Title</u>	<u>Date Approved</u>
500	Standard 48" Diameter precast Concentric Cone Concrete Manhole	January 2021
501	Standard 60" Diameter precast Eccentric Cone Concrete Manhole	January 2021
502	Standard Trench Details	January 2019
503	Inside Drop-in Sanitary Sewer Manhole	January 2021
504	Outside Drop In Sanitary Sewer Manhole	January 2021
505	Permanent Mainline Cleanout	January 2021
506	4" and 6" Service Lateral and Cleanout	January 2021
507	Sewage Backwater Valve Assembly	June 2016
508	Abandoned Pipe Plug	June 2016
509	Abandoned Manhole.....	June 2016
510	Precast Concrete Manhole Reduce Slab	June 2016
511	Manhole Frame and Cover	June 2016
512	Pipe-Pipe Crossing Details	January 2021
513	Pipe-Structure Crossing Detail	January 2021
514	Precast Grease Interceptor	June 2016
515	Sand and Grease Interceptor	January 2021
516	Sampling Manhole Exterior Use	January 2021
517	Standard Sampling Port Detail	June 2016
518	Sampling Box Building Interior	June 2016
519	Engineer's Approved List.....	June 2016
520	Deflection Mandrel for PVC Sewer Pipe.....	January 2021
	Detail Specification No. 21.....	October 1998

Great Britain Localities Statistics

Table 12

Year	Population	Area (sq. miles)	Density (per sq. mile)
1801	1,000,000	25,000	40
1811	1,100,000	25,000	44
1821	1,200,000	25,000	48
1831	1,300,000	25,000	52
1841	1,400,000	25,000	56
1851	1,500,000	25,000	60
1861	1,600,000	25,000	64
1871	1,700,000	25,000	68
1881	1,800,000	25,000	72
1891	1,900,000	25,000	76
1901	2,000,000	25,000	80
1911	2,100,000	25,000	84
1921	2,200,000	25,000	88
1931	2,300,000	25,000	92
1941	2,400,000	25,000	96
1951	2,500,000	25,000	100
1961	2,600,000	25,000	104
1971	2,700,000	25,000	108
1981	2,800,000	25,000	112
1991	2,900,000	25,000	116
2001	3,000,000	25,000	120
2011	3,100,000	25,000	124
2021	3,200,000	25,000	128

Sewer System Design and Construction Guidelines

A. PURPOSE

To provide guidelines for the design and construction of sanitary sewer utility projects and thereby reduce the time required for processing the plans. These guidelines do not include, but may reference, additional conditions, which may be promulgated by all other pertinent ordinances, codes, and official policy set forth by other departments of the City of Petaluma or other government agencies. These guidelines are intended to impose minimum acceptable design criteria. More stringent requirements may be imposed at the discretion of Public Works & Utilities (PW&U) based on specific project conditions. It is the responsibility of the design engineer to initiate written requests for approval of any design concepts contrary to these criteria, to verify additional requirements imposed, perform any necessary calculations or studies, and resolve specific design problems with the appropriate department or division.

B. SANITARY SEWER SYSTEM

1. Sanitary Sewer Main Materials

- a. Sanitary Sewer mains shall be Ductile Iron Pipe (DIP) or Polyvinyl Chloride (PVC) SDR 26 pipe.
- b. Ductile Iron Pipe (DIP) shall be class 50 and shall conform with the City of Petaluma Water System Design Guidelines except that six-inch (6") and eight-inch (8") DIP for sanitary sewers--in residential areas only--shall have an inside coating of type V cement mortar, a minimum of one-sixteenth inch (1/16") thick and a petroleum asphaltic material a minimum of three (3) mils thick over the cement mortar both conforming to the requirements of ANSI/AWWA C104/A21.4-80. Ten (10") inch and larger DIP and fittings used for sanitary sewer in any area and **all** other DIP and fittings regardless of size used in industrial areas shall have an inside coating of minimum 40-mil thick polyurethane.
- c. PVC gravity sewer pipe shall conform with ASTM D3034 SDR 26, domestically produced rigid polyvinyl chloride (PVC) compound, Type I Grade I, with a Cell Classification of 12454 or 13343 in accordance with, and certified by the National Sanitation Foundation (NSF) as defined in ASTM D1784 for pipe diameters from 4" through 15" and ASTM F 679 for pipe diameters from 18" through 48" with integral bell gasketed joints Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Gasketed Sewer Fittings, except that service bends shall be long radius sweeps. Bends shown on Table 3 "Laying Lengths of Long Bend Fittings (min)" of ASTM D3034 shall not be used for PVC service sweeps. PVC sweeps shall have a minimum radius of 36 inches. PVC shall have a uniform minimum "Pipe Stiffness" ($F/\Delta Y=46$ PSI) as defined in ASTM 2412. PVC pipe dimensions shall conform to ASTM D3034 Table 1.
- d. PVC gasketed sewer pipe and fittings shall have bell and spigot type joints with elastomeric sealing rings all in conformance with ASTM D3212 Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals. Rubber sealing gaskets shall meet the requirements of ASTM designation F 1336.

- e. PVC SDR 26 gasketed sewer pipe and fittings shall be "ring-tyte" as manufactured by J-M Pipe, "Fluid-Tite" as manufactured by Certainteed or approved equal.
- f. Minimum wall thickness for SDR 26 PVC shall be as follows:

Nominal Diameter	4"	6"	8"	10"	12"
Minimum Wall Thickness	0.173"	0.255"	0.332"	0.413"	0.490"

- g. Maximum allowable deflection for PVC sewer pipe shall be five (5%) percent of the average inside pipe diameter. Deflection shall be measured after trench backfill is in place and compacted and after aggregate subbase (if specified) but prior to installation of aggregate base and/or asphalt concrete.
- h. Installed PVC sewer pipe deflection shall be checked by means of the Mandrel Test in accordance with Section 6c of these Guidelines except that maximum allowable deflection shall be five (5%) percent in lieu of four (4%) percent and the Mandrel shall be ninety-five (95%) percent of the specified average inside pipe diameter in lieu of ninety-six (96%) percent.
- i. Select Backfill Material shall be Class 2 Aggregate Base, 3/4" maximum gradation. Select backfill material shall have a size and a gradation falling within the following limits:

<u>Sieve Size</u>	<u>% Passing Sieve</u>
1"	100
3/4"	90 to 100
No. 4	35 to 60
No. 30	10 to 30
No. 200	2 to 9

The material shall compact to a relative compaction of ninety (90%) percent. The relative compaction is that determined by Test Method No. California 216. The material shall have a minimum sand equivalent value of twenty-five (25) as determined by the test method currently in use by the California Division of Highways.

The in-place density and moisture of soils and aggregates may be determined using nuclear methods and the area concept as per Test Method No. California 231 with the following conditions. The test maximum density shall be determined as specified in Part II of test Method No. California 216. A minimum of one in-place density test using the sand volume method as prescribed in Part I of Test Method No California 216 shall be taken to standardize the nuclear gauge for each type of soil or aggregate. After correlation is assured and the equipment standardized, then the nuclear gauge may be used as directed by the Engineer.

- j. Optional backfill material may be Controlled Density Fill (CDF) Mix No. 1500 (95% relative compaction). CDF shall be a mixture of Portland cement, sand, and 1" maximum coarse aggregate, air entraining agent and water, batched by a ready-mixed concrete plant and delivered to the job site by means of transit mixing trucks.

CDF may also contain Class F Pozzolan (Fly Ash). CDF shall be free of asphaltic material.

Cement shall meet the standards as set forth in ASTM C-150, type II Cement. Fly ash shall meet the standards as set forth in ASTM C-618, for Class F Pozzolans. The fly ash shall not inhibit entrainment of air. Sand shall meet the standards as set forth in ASTM C33.

Mix proportions shall be determined by the producer of the control density fill to produce a flowable fill mixture which will not segregate. Each yard shall contain not less than 50 pounds of Portland cement and not less than a total of 100 pounds of cementitious material. The contractor shall supply a mix design two weeks prior to any use of control density fill. CDF shall have a compressive strength of 75-200 PSI at 28 days and a minimum slump of 6".

The consistency of CDF shall be such that all trench voids are filled with minimum rodding or vibrating, but not so wet as to cause excessive shrinkage.

2. Sanitary Sewer Manhole Materials

- a. Precast manhole sections shall conform with the plans and with ASTM C478-68 as amended to date. Manhole cones shall be the concentric type unless otherwise shown on the plans or required by the Technical Specifications. Manholes shall be constructed without steps. A minimum of nine inches (9") and a maximum of twenty-four inches (24") total depth of three-inch (3") and six-inch (6") grade rings, as shown on the standard drawings, shall be required on all manholes unless otherwise required by the Technical Specifications or contract plans.
- b. Casting for manhole ring, cover, and other purposes, shall conform accurately to the form and dimensions shown on the detailed drawings. Castings must have workmanlike finish, free from blow and sand holes or defects of any kind and shall be made from a superior quality of tough even-grained gray iron and shall possess a tensile strength of not less than twenty thousand (20,000) pounds per square inch.
- c. Before leaving the foundry, they shall be thoroughly cleaned and coated by dipping in asphalt applied at a temperature of three hundred degrees Fahrenheit (300°F) in such a manner as to provide a firm, durable, tenacious coating.
- d. Portland Cement shall conform to ASTM designation C150-67, Type II.
- e. Portland Cement Concrete for manhole bases shall conform to the requirements of Section 90, "Concrete," of the Standard Specifications current revision and as herein specified.
- f. The concrete shall be class "A" containing six (6) sacks of Portland Cement per cubic yard of concrete. The grading of the combined aggregate shall conform with the requirements for one and one-half (1 ½") inch maximum. The consistency of the fresh concrete shall be such that the slump does not exceed four inches (4") as determined by Test Method No, California 519A or 520. The test method used shall be determined by the Engineer.

- g. All mortar used in the construction of manholes shall consists of one (1) part Portland Cement and two (2) parts sand, and shall conform to Section 51-1.02F, "Mortar," of the Standard Specifications and as herein specified.

3. Sanitary Sewer Main Trench Excavation

- a. Alignment shall be in accordance with the provisions of the City Standard.
- b. Any existing pavement over the trench shall be cut, removed, and hauled away from the job. Pavement shall be cut as specified in Section 2103.9-C of these specifications. All sewer mains shall be laid in open trench or tunnels and open trench as indicated on the plans or as directed by the Engineer. Trenches having a depth greater than eight (8') feet shall be limited in width at the top of the pipe to the following:

<u>Pipe</u>	<u>Trench Width</u>
6"	24"
8"	27"
10"	30"
12"	33"
15"	36"

- c. Whenever the maximum allowable trench width is exceeded for any reason, the Contractor shall, at his expense, embed or cradle the pipe in concrete in a manner satisfactory to the Engineer. In no case shall the free working space on each side of the pipe be less than six (6") inches.
- d. The trench shall be excavated a minimum of four (4 ") inches below the grade of the bottom of the pipe and sufficient "Select Backfill Material" shall be placed in the trench and tamped to bring the trench bottom up to the grade of the bottom of the pipe. The relative compaction of the tamped material shall not be less than ninety (90%) percent as determined by Test Method No. California 216. It is the intention of these requirements to provide firm, uniform bearing for the pipe.
- e. At street crossings or where existing driveways occur on a street, the Contractor shall make provisions for trench crossings at these points, either by means of backfill or temporary bridges, as the Engineer may direct. Free access must be provided to all fire hydrants, water gate valves and private drives. Means shall be provided whereby all storm and wastewater can flow uninterrupted in the gutters or drainage channels.
- f. All trench excavation shall be properly braced and supported with shoring equipment, as set forth in the rules, orders and regulations of the State of California Division of Occupational Safety and Health (Cal/OSHA). Failure to comply with any of these rules, orders and regulations shall be sufficient cause for the Engineer to immediately suspend all work. Compensation for losses incurred by the Contractor by such an emergency suspension shall not be allowed. The Contractor shall backfill the ditch in a manner such that the removal of the shoring will not disturb the initial backfill.

- g. The Contractor shall, at all times, keep the streets sufficiently watered and swept of all loose material produced by the excavating operations in order that traffic and construction does not raise an objectionable amount of dust. When directed by the Engineer, the Contractor shall apply a suitable dust palliative to control dust.
- h. The Contractor shall furnish, install, and operate all necessary equipment to keep trenches reasonably free from water. All water removed from trenches or flushed from pipes shall be disposed of in a manner that will cause no injury to public or private property or cause no nuisance or menace to the public. Under no circumstances will the laying of pipe or the placing of concrete in water be permitted.

4. Sanitary Sewer Pipe Laying

- a. No pipe shall be laid until PW&U inspects and approves the condition of the bottom of the trench.
- b. Pipe laying shall proceed upgrade with the spigot ends of bell and spigot pipe pointing in the direction of flow. Each piece shall be laid true to line and grade and in such a manner as to form a close concentric joint with the adjoining pipe and to prevent sudden offsets in the flow line. As the work progresses, the interior of the sewer shall be cleaned of all dirt and debris of every description. Pipe shall not be laid when the condition of the trench or the weather is unsuitable. At times when work is not in progress, open ends of pipe and fittings shall be closed.
- c. Unless otherwise indicated on the drawings or directed by PW&U, pipe shall be placed on prepared subgrade of imported material at least four inches (4") deep below the barrel of the pipe. The imported material shall be Class 2 Aggregate Base, as specified in Section 1, "Sanitary Sewer Main Materials," of these specifications, and thoroughly compacted to obtain a final density of at least ninety percent (90%) of maximum at optimum moisture as determined by Test Method No. California 216.
- d. When additional gravel or crushed rock is required to stabilize a soft, wet, or spongy foundation caused by the operations of the Contractor in order to stabilize a trench bottom, such gravel or crushed rock shall be furnished at the Contractor's expense.

PW&U shall be the sole judge of the suitability of the trench bottom and as to the amount of gravel required to stabilize a soft foundation. The contractor shall remove any soft material and replace it with gravel or crushed rock when ordered to do so by the Engineer.

Gravel or crushed rock shall have a size and gradation falling within the following limits:

<u>Sieve Size</u>	<u>% Passing Sieve</u>
1 1/2"	100
1"	95-100
1/2"	0-30
No. 4	0-4

5. Excavation, Backfill, and Resurfacing

- a. All excavation, backfill, and resurfacing required for installation of sewer system facilities shall be as shown on City Standard Trench Details.
- b. Excess material from excavation shall become the property of the contractor and shall be disposed of to the satisfaction of PW&U and in accordance with all applicable waste-disposal regulations.
- c. The contractor shall not excavate within six feet (6') of any City Valve, tie-down, thrust block, or fire hydrant without prior approval of PW&U.

6. Sanitary Sewer Testing

Testing of all portions of the sewer including manholes is required, and it is the Contractor's responsibility to coordinate all testing and inspections with the Engineer.

The Contractor, at their option, may conduct testing at any time during construction, however, final inspection and testing for acceptance shall take place only after all sewer facilities have been installed and all trenches backfilled and compacted, including roadway base rock as specified elsewhere in these specifications.

Manholes, after all inlets and outlets have been plugged, shall be filled with water to the rim of the frame casting and shall lose no more than 2 inches over a period of 30 minutes.

Even though the test for leakage is within the prescribed limits, the Contractor shall repair any obvious leaks.

In lieu of the water test, testing of sewer manholes may be done by vacuum testing as specified herein. If the vacuum testing method is used, all manholes shall be tested for leakage in accordance with ASTM C 1244-93 as modified herein.

Vacuum testing shall not take place until all permanent paving is complete.

Installation and operation of vacuum equipment and indicating devices must be in accordance with manufacturer's recommendations and performance specifications, which must be provided by the manufacturer and approved by the Engineer. The equipment must be capable of testing the entire manhole, including the cast iron frame and grade adjustment rings.

All new or rehabilitated sanitary sewer manholes shall be tested unless otherwise directed by the Engineer. If the manhole fails the test, the manhole shall be repaired and retested at the Contractor's expense. If manhole joint sealants are compromised during the vacuum test, the manhole must be disassembled, and the joint sealants

replaced. If there is reason to believe that the manhole has been disturbed after the initial vacuum test, additional tests may be requested by the Engineer and performed at the Contractor's expense.

The Contractor may pre-test manholes at any time during construction. Any pre-test results are solely for the Contractor's use and shall not be accepted as the final test.

Testing shall be done in the following manner:

1. All lift holes and joints shall be grouted and the entire manhole, including grade rings, sealed prior to testing.
2. All pipes entering the manhole shall be temporarily plugged, taking care to securely brace the pipes and plugs to prevent them from being drawn into the manhole.
3. The test head shall be placed in accordance with the manufacturer's recommendations. The test unit shall be braced against the manhole frame and not the grade ring(s) or taper.
4. The vacuum gauge and test equipment used for this test shall be supplied by the Contractor and shall be operated per manufacturer's specifications by qualified personnel. Accuracy and calibration of the gauge shall be certified by a reliable testing firm at six-month intervals, or when requested by the Engineer.

A vacuum of 10 inches (4.91 PSI) of mercury (Hg) shall be drawn on the manhole, the valve on the vacuum line of the test head closed, and the vacuum pump shut off. The time it takes the indicator gauge to drop 10 inches Hg (4.91 PSI) to 9 inches Hg (4.4 PSI) shall be measured. The manhole will pass the vacuum test if the time is greater than shown in the following table:

Minimum Test Time Based on Manhole Diameter (seconds)

Manhole Depth in Feet	Manhole Diameter in Inches			Time in Seconds
	48	60	72	
0-4	10	13	16	
4-8	20	26	33	
8-12	30	39	49	
12-16	40	52	67	
16-20	50	65	81	
20-24	59	78	97	
24-30	74	98	121	

After the vacuum test, manholes shall be visually inspected for leaks and defects and repaired as required by the Engineer.

For either exfiltration or infiltration test on sewer lines, the maximum leakage shall not exceed 250 gallons per inch of pipe diameter per mile per 24 hours as measured over a period of 30 minutes minimum. Should the leakage exceed the maximum allowable rate, the contractor shall repair, overhaul, or rebuild the defective portion of

the sewer line to the satisfaction of the Engineer at no additional cost to the City. After repairs have been completed by the Contractor, the line shall be retested as specified above, all at no cost to the City.

If the exfiltration test prescribed above is impractical due to wet trench conditions, these portions of the sewer line where such conditions are encountered will be tested for infiltration. The Engineer shall determine whether the exfiltration or infiltration test will be used.

Low pressure air testing may be used on sewer lines in lieu of water testing at the option of the Contractor. Water testing may still be required by the Engineer for certain installations.

The following procedure shall be used for low pressure air testing:

1. Clean pipe to be tested by propelling a snug fitting inflated rubber ball through the pipe with water. Remove any debris.
2. Plug all pipe outlets with suitable test plugs. Brace each plug securely.
3. If the pipe to be tested is submerged in ground water, insert a pipe probe, by boring or jetting, into the backfill material adjacent to the center of the pipe, and determine the pressure in the probe when air passes slowly through it. This is the back pressure due to ground water submergence over the end of the probe. All gauge pressures in the test should be increased by this amount.
4. Add air slowly to the portion of the pipe installation under test until the internal pressure is raised to 5.0 psig (pounds per square inch gauge)
5. Check exposed pipe and plugs for abnormal leakage by coating with a soap solution. If any leakage is observed, bleed off air and make necessary repairs.
6. After an internal pressure of 5.0 psig is obtained, allow at least two minutes for air temperature to stabilize, adding only the amount of air required to maintain pressure.
7. After the two-minute period, disconnect the air supply and start stopwatch. The pressure of 5.0 psig shall be maintained for 5 minutes.
8. As an alternate, the contractor may request the air testing procedure as presented in Section 306-1.4.4 of the 2012 edition of the "Greenbook" Standard Specifications.

After pipe installation and placement and compaction of backfill, but prior to placement of pavement, all PVC pipe shall be cleaned and then mandrel tested for obstructions, such as, but not limited to, deflections, joint offsets and lateral pipe intrusions. A rigid mandrel, conforming to Standard 520 shall be pulled through the pipe by hand. The minimum length of the circular portion of the mandrel shall be equal to the nominal diameter of the pipe. All obstructions encountered by the mandrel shall be corrected by the Contractor. Obstructions due to deflection shall be corrected by replacement of the over-deflected pipe. Mechanical re-rounding is not permitted.

If a section of pipe fails to meet the mandrel test and is reinstalled and fails the second time, said section(s) of pipe shall be replaced with an approved rigid pipe material.

The contractor shall furnish a mandrel as shown on the City Standards.

The Contractor shall retest PVC pipe using a mandrel conforming to Standard 520 eleven (11) months after recordation of Notice of Completion of a Public Works Sewer Contract of after the acceptance by the City Council of a subdivision. Any pipe which fails to pass the mandrel test shall be replaced at the expense of the Contractor. The City reserves the right to determine the longitudinal limits of any pipe that is required to be replaced. Pipe replacements shall be guaranteed by the project maintenance bond.

7. Flushing and Cleaning Sewer Lines

- a. Two separate hydro flushings are required. The first hydro flushing occurs prior to video inspection and at finished rock grade of street section. The second is to be performed at the conclusion of final paving and iron raising. Debris flushed from the system must be captured and removed from the lowest manhole prior to entering an active sewer system maintained by the City. Care shall be exercised in order that all debris can be removed from each manhole.
- b. All new sanitary sewer mains shall be television (TV) inspected. Pipe joint separations, low or high spots, cracked or chipped pipe, deflection, improper lateral connections, infiltration, and all other pipe material and/or installation defects identified shall be corrected by the Contractor.

The TV inspection shall be conducted after all new main and lateral work, including backfill and pipe testing, is completed and all street structural section aggregate subbase is in place and compacted but prior to placement of aggregate base and A.C. paving.

The Contractor shall hire an independent television inspection service to perform a closed-circuit television inspection of all newly constructed sewers. A video of the television inspection shall be produced and delivered to the Engineer in digital (.wmv) format, together with a typed log of the inspection.

The following conditions shall exist prior to the television inspection.

- i. All sewer lines shall be installed, backfilled, and compacted.
- ii. All structures shall be in place, all channeling complete and all pipelines accessible from structures.
- iii. All other underground facilities, utility piping and conduit within two feet of the sewer main, shall be installed.
- iv. All compaction required shall be completed.
- v. Pipelines to be tested shall be flushed and mandrel tested.
- vi. The final air or water test shall have been completed.
- vii. Immediately before the television inspection, hydro flush all lines.

When the above work has been completed, the Contractor shall notify the Engineer 48 hours in advance of the date for television inspection. During this inspection, the Contractor or his authorized representative shall be present to observe the video pictures as provided by the television camera.

The following video observations shall be considered defects in the construction of the sewer pipelines and will require corrections prior to acceptance.

- i. Off grade – 1" or more deviation from grade
- ii. Joint separations – more than 3/4"
- iii. Offset joints
- iv. Chips in pipe ends – none more than 1/4" deep
- v. Cracked or damaged pipe or evidence of the presence of any external objects bearing upon the pipe (rocks, roots, etc.)
- vi. Infiltration
- vii. Debris or other foreign objects
- viii. Other obvious deficiencies when compared to Approved Plans and Specifications, and these Standards and Standard Drawings

The Contractor shall be notified in writing of any deficiencies revealed by the television inspection that will require repair, following which the Contractor shall excavate and make the necessary repairs and request a television re-inspection. Television re-inspection shall be at the Contractor's expense.

The City Engineer shall be given one-week written notice by the Contractor for TV inspection.

8. Sewer Laterals and Clean Outs

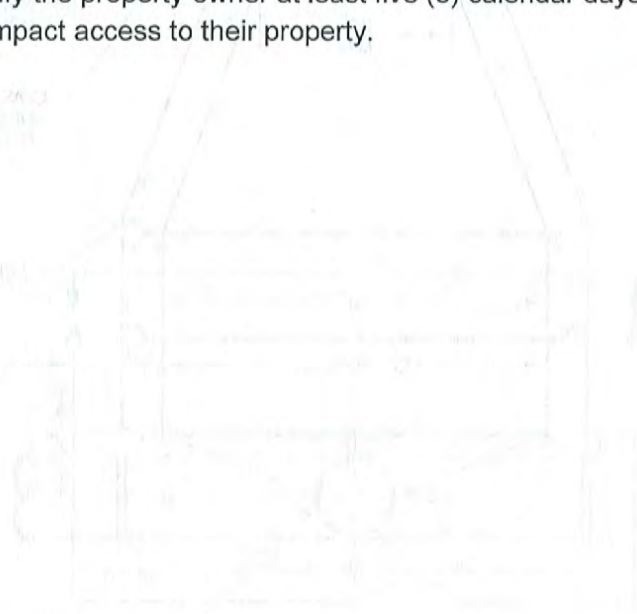
- a. Sewer service laterals shall be constructed at the locations and in accordance with the details shown on the plans and in accordance with these specifications. Four-inch (4") diameter sewer service laterals for single family residences and six-inch (6") sewer service laterals for multiple and commercial dwellings shall be PVC or Ductile Iron Pipe. All new sanitary sewer laterals shall connect to new sanitary sewer mains by means of 1/8 (22 ½°), or forty-five-degree (45°) bends and wyes, or long radius sweeps, as approved by City engineer.
- b. PVC sewer laterals shall conform with the same specifications as the main PVC pipe as specified above. All PVC service bends shall be long radius sweeps (R-36" min).
- c. Ductile iron pipe shall conform to the same specifications as the main specified above.
- d. Sewer clean outs shall be constructed at the locations and in conformance to the details shown on the plan.

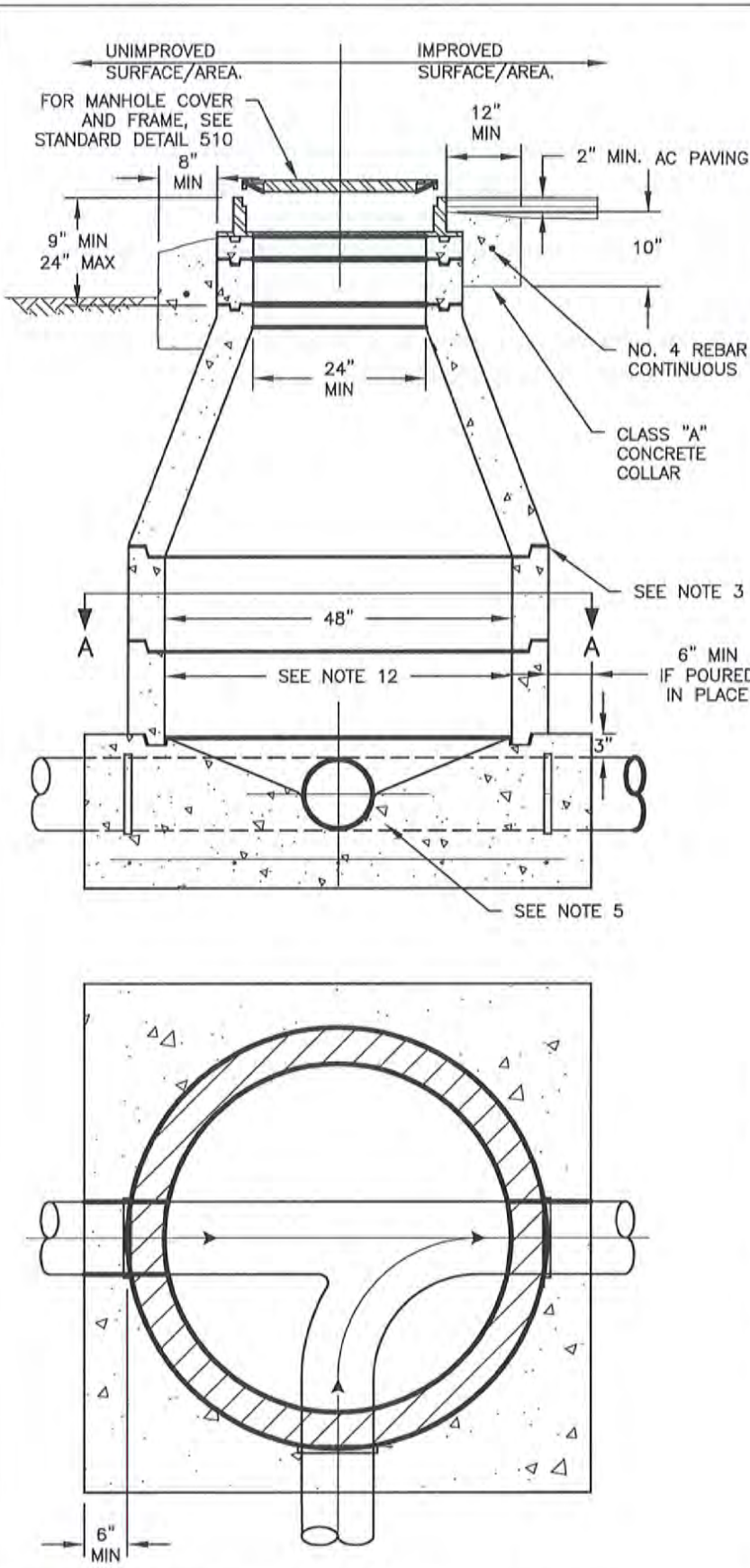
C. TRAFFIC CONTROL

- a. Traffic control shall conform with Section 12 of the State of California 2018 Standard Specifications, shall meet the current edition of the Manual of Uniform Traffic Control Devices (MUTCD CA), and shall be approved by the City of Petaluma.

All costs including flagging shall be the responsibility of the Contractor. The Contractor shall provide safe passage for vehicular, bicycle and pedestrian traffic through the work at all times.

- b. Access to public and private buildings, businesses, and driveways shall be maintained by the Contractor. The Contractor shall provide approved metal "bridge" or temporary backfill for access when and where required within one-half (1/2) hour after request by the City Inspector, except that emergency vehicles and personnel shall be provided immediate access at all times.
- c. The contractor shall notify the property owner at least five (5) calendar days prior to any activity that will impact access to their property.






NOTES:

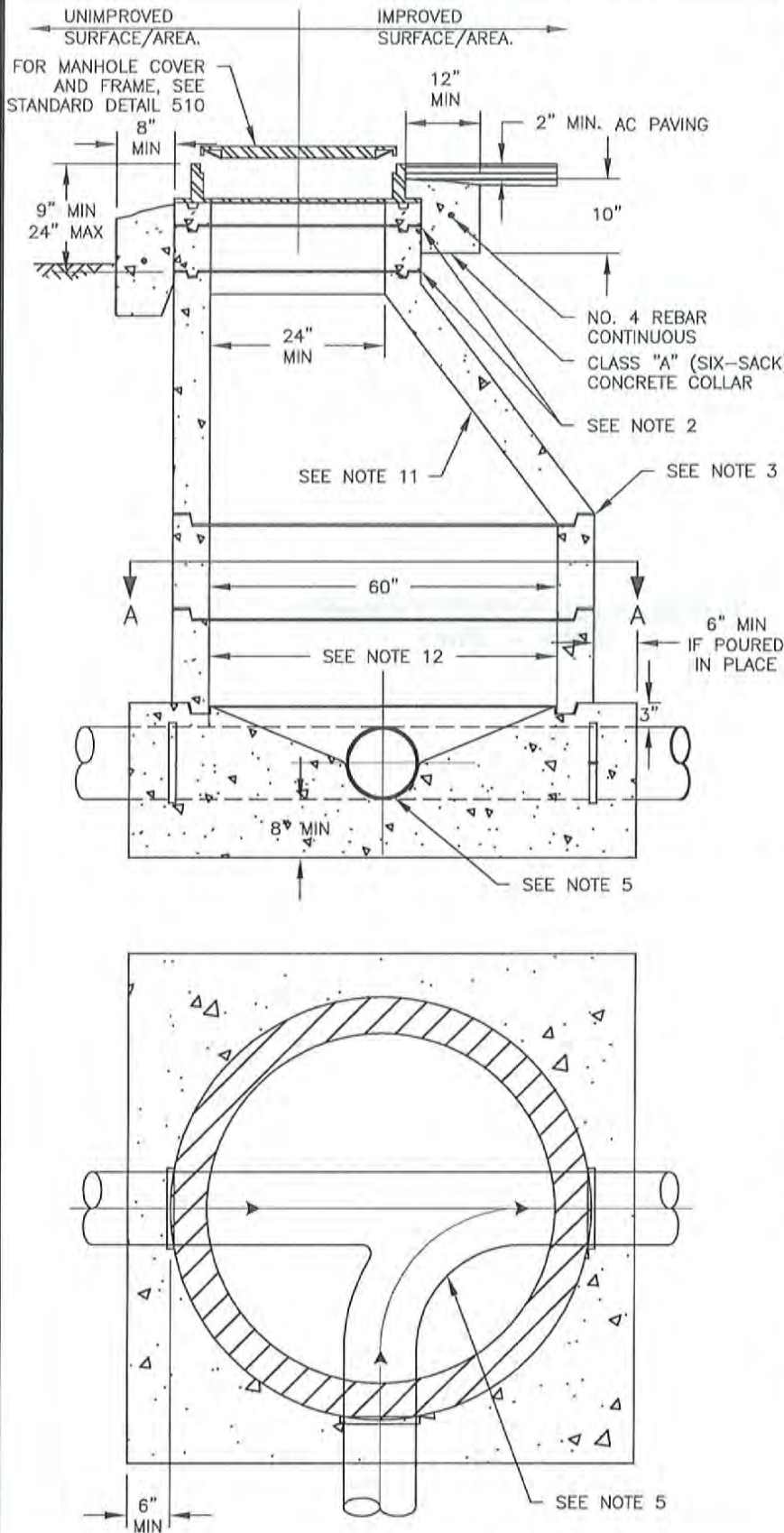
1. WHEN MANHOLES ARE INSTALLED IN UNIMPROVED AREAS, THE TOP OF THE COVER SHALL BE A MIN. OF (1) FOOT ABOVE ADJACENT FINISHED GRADE.
2. MINIMUM OF ONE 3" AND ONE 6" GRADE ADJUSTMENT RINGS. MAXIMUM HEIGHT OF GRADE ADJUSTMENT RINGS - 24". ALTERNATIVELY, CONTRACTOR MAY CAST GRADE RINGS IN PLACE.
3. SET ALL BARREL SECTIONS AND TAPER SECTIONS IN APPROVED GASKET/SEALER. "RAM-NEK" OR APPROVED EQUAL. TYPICAL JOINT USES ONE (1) "RAM-NEK" SEAL OR TWO SEALS IN HIGH WATER TABLE AREAS.
4. CONE SECTION (TAPER) MUST BE CONCENTRIC FOR 48" MANHOLE UNLESS OTHERWISE SPECIFIED AND APPROVED BY THE DIRECTOR.
5. CONSTRUCT ALL FLOW CHANNELS OF PIPE WHERE POSSIBLE AFTER LOW RING SECTIONS IS SET, BREAK OUT OF TOP HALF OF PIPE FLUSH WITH INSIDE FACE OF MANHOLE WALL AND CONSTRUCT SHELF AND U-SHAPED CHANNEL. MAKE ELEVATION CHANGES GRADUALLY AND DIRECTIONAL CHANGES WITH SMOOTHED CURVES.
6. POURED-IN-PLACE BASE SHALL BE POURED FULL THICKNESS TO UNDISTURBED SIDES OF EXCAVATION OR SHALL BE FORMED. PRECAST BASES MAY BE USED ONLY WITH DIRECT APPROVAL OF THE DIRECTOR, AND SHALL BE PLACED ON 12" THICK 3/4" DRAIN ROCK SUB-BASE INSTALLED AGAINST UNDISTURBED EARTH.
7. CLASS "A" CONCRETE COLLAR SHALL BE 2" BELOW FINISHED GRADE.
8. THE GRADE RING, CONCENTRIC CONE, VERTICAL WALL SECTION, AND BASE SHALL HAVE MINIMUM WALL THICKNESS OF 5" AND SHALL BE PRECAST CONCRETE CONFORMING TO ASTM SPECIFICATION C478. THE BASE SHALL BE CAST IN PLACE IN LIEU OF PRECAST.
9. 48" I.D. MANHOLE TO BE USED FOR SEWER MAINS LESS THAN 18" ON CENTER AND LESS THAN 8- FEET DEEP FROM FINISHED GRADE.
10. MANHOLE REDUCER SLAB MAY BE USED WHERE PIPE IS TOO SHALLOW FOR TAPER SECTION.
11. WHEN DIMENSION FROM FINISHED GRADE TO SEWER FLOW LINE IS GREATER THAN 8'-0", THE BASE SHALL HAVE NO. 4 REINFORCING STEEL BARS AT 12" O.C. BOTH WAYS.
12. APPLY TWO (2) COATS OF THORO-SEAL OR XYPEX COATING OR APPROVED EQUAL.
13. GROUT EXTERIOR JOINTS OF BARREL SECTIONS.
14. SEE CITY OF PETALUMA SEWER SYSTEM DESIGN AND CONSTRUCTION GUIDELINES, PARAGRAPH B.2.d



CITY OF PETALUMA
PUBLIC WORKS & UTILITIES
 UTILITIES DIVISION
 202 N. McDOWELL BLVD. TEL. 707-778-4546
 PETALUMA, CALIFORNIA 94954 FAX. 707-778-4508

STANDARD DETAILS
48"Ø PRECAST
CONCENTRIC CONE
CONCRETE MANHOLE

DATE: DECEMBER 2020	SCALE: N.T.S.
APPROVED BY: 	
Kent R. Carothers, P.E. Operations Manager C60671	
DRAWN BY: TM	NO. 500



NOTES:

1. WHEN MANHOLES ARE INSTALLED IN UNIMPROVED AREAS, THE TOP OF THE COVER SHALL BE A MIN. OF 1-FOOT ABOVE ADJACENT FINISHED GRADE.
2. MINIMUM OF ONE 3" AND ONE 6" GRADE ADJUSTMENT RINGS. MAXIMUM HEIGHT OF GRADE ADJUSTMENT RINGS - 24". ALTERNATIVELY, CONTRACTOR MAY CAST GRADE RINGS IN PLACE.
3. SET ALL BARREL SECTIONS AND TAPER SECTIONS IN APPROVED GASKET/SEALER. "RAM-NEK" OR APPROVED EQUAL. TYPICAL JOINT USES ONE (1) "RAM-NEK" SEAL OR TWO (2) SEALS IN HIGH WATER TABLE AREAS.
4. CONE SECTION (TAPER) MUST BE ECCENTRIC FOR 60" MANHOLE UNLESS OTHERWISE SPECIFIED AND APPROVED BY THE DIRECTOR.
5. CONSTRUCT ALL FLOW CHANNELS OF PIPE WHERE POSSIBLE AFTER LOW RING SECTIONS IS SET, BREAK OUT OF TOP HALF OF PIPE FLUSH WITH INSIDE FACE OF MANHOLE WALL AND CONSTRUCT SHELF AND U-SHAPED CHANNEL. MAKE ELEVATION CHANGES GRADUALLY AND DIRECTIONAL CHANGES WITH SMOOTHED CURVES.
6. POURED-IN-PLACE BASE SHALL BE POURED FULL THICKNESS TO UNDISTURBED SIDES OF EXCAVATION OR SHALL BE FORMED. PRECAST BASES MAY BE USED ONLY WITH DIRECT APPROVAL OF THE DIRECTOR OF PUBLIC WORKS AND UTILITIES, AND SHALL BE PLACED ON 12" THICK 3/4" DRAIN ROCK SUB-BASE INSTALLED AGAINST UNDISTURBED EARTH.
7. CLASS "A" CONCRETE COLLAR SHALL BE 2" BELOW FINISHED GRADE.
8. THE GRADE RING, CONCENTRIC CONE, VERTICAL WALL SECTION, AND BASE SHALL HAVE MINIMUM WALL THICKNESS OF 5" AND SHALL BE PRECAST CONCRETE CONFORMING TO ASTM SPECIFICATION C478. THE BASE SHALL BE CAST IN PLACE IN LIEU OF PRECAST.
9. 48" I.D. MANHOLE TO BE USED FOR SEWER MAINS LESS THAN 18" ON CENTER AND LESS THAN 8- FEET DEEP FROM FINISHED GRADE.
10. MANHOLE REDUCER SLAB MAY BE USED WHERE PIPE IS TOO SHALLOW FOR TAPER SECTION.
11. MANHOLE TAPER SHALL BE IN DIRECTION OF FLOW.
12. WHEN DIMENSION FROM FINISHED GRADE TO THE SEWER FLOW LINE IS GREATER THAN 8'-0", THE BASE SHALL HAVE NO. 4 REINFORCING STEEL BARS @ 12" ON CENTER BOTH WAYS
13. APPLY TWO (2) COATS OF THORO-SEAL OR XYPEX COATING OR APPROVED EQUAL
14. SEE CITY OF PETALUMA SEWER SYSTEM DESIGN AND CONSTRUCTION GUIDELINES, PARAGRAPH B.2.a



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STANDARD DETAILS
60"Ø PRECAST
ECCENTRIC CONE
CONCRETE MANHOLE

DATE: DECEMBER 2020 SCALE: N.T.S.

APPROVED BY:


Kent R. Carothers, P.E. Operations Manager C60671

DRAWN BY: TM

NO. 501

PLEASE REFER TO CITY STANDARDS
219.1 - 219.3



CITY OF PETALUMA

PUBLIC WORKS & UTILITIES
UTILITIES DIVISION

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STANDARD TRENCH
DETAILS

DATE: JAN 3, 2019

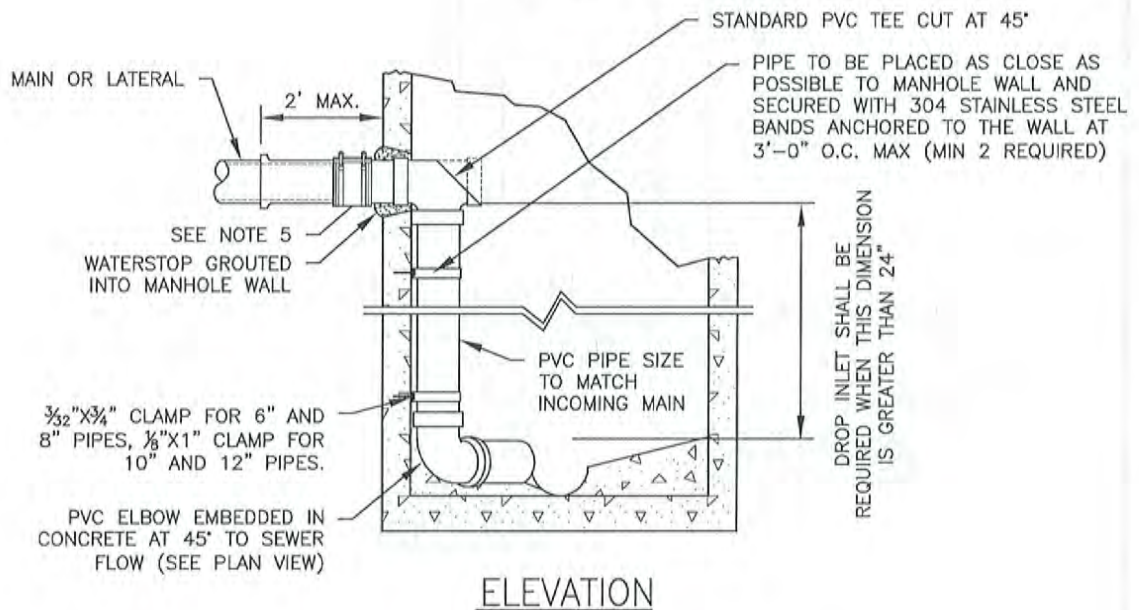
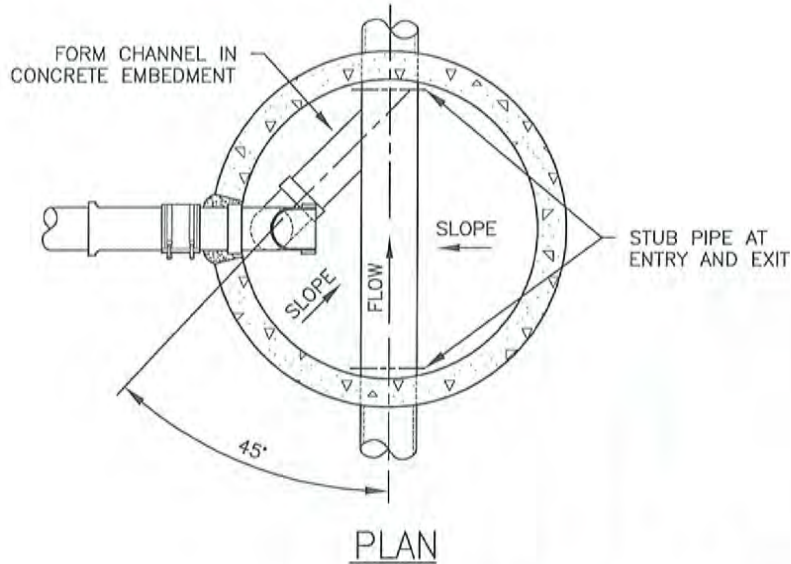
SCALE: N.T.S.

APPROVED BY:

Kent R. Carothers, P.E. Operations Manager C60671

DRAWN BY: TKM

NO. 502



NOTES:

1. INSTALL WATERSTOP IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS AS SHOWN.
2. NEW MANHOLES CONSTRUCTED USING THIS STANDARD SHALL BE 60 INCHES IN DIAMETER, AND INSTALLED IN CONFORMANCE WITH STANDARD 501.
3. SEE STANDARD 504 FOR STANDARD OUTSIDE DROP INSTALLATION.
4. ALL DROP PIPING AND FITTINGS TO BE PVC (SDR 26) REMOVE BELL.
5. FLEXIBLE RUBBER COUPLING WITH STAINLESS STEEL SHEAR BAND REQUIRED IF MAIN OR LATERAL IS NOT PVC MATERIAL.
6. INSTALL WATERSTOP IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS, AS SHOWN.



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STANDARD DETAILS
INSIDE DROP-IN
SANITARY SEWER
MANHOLE

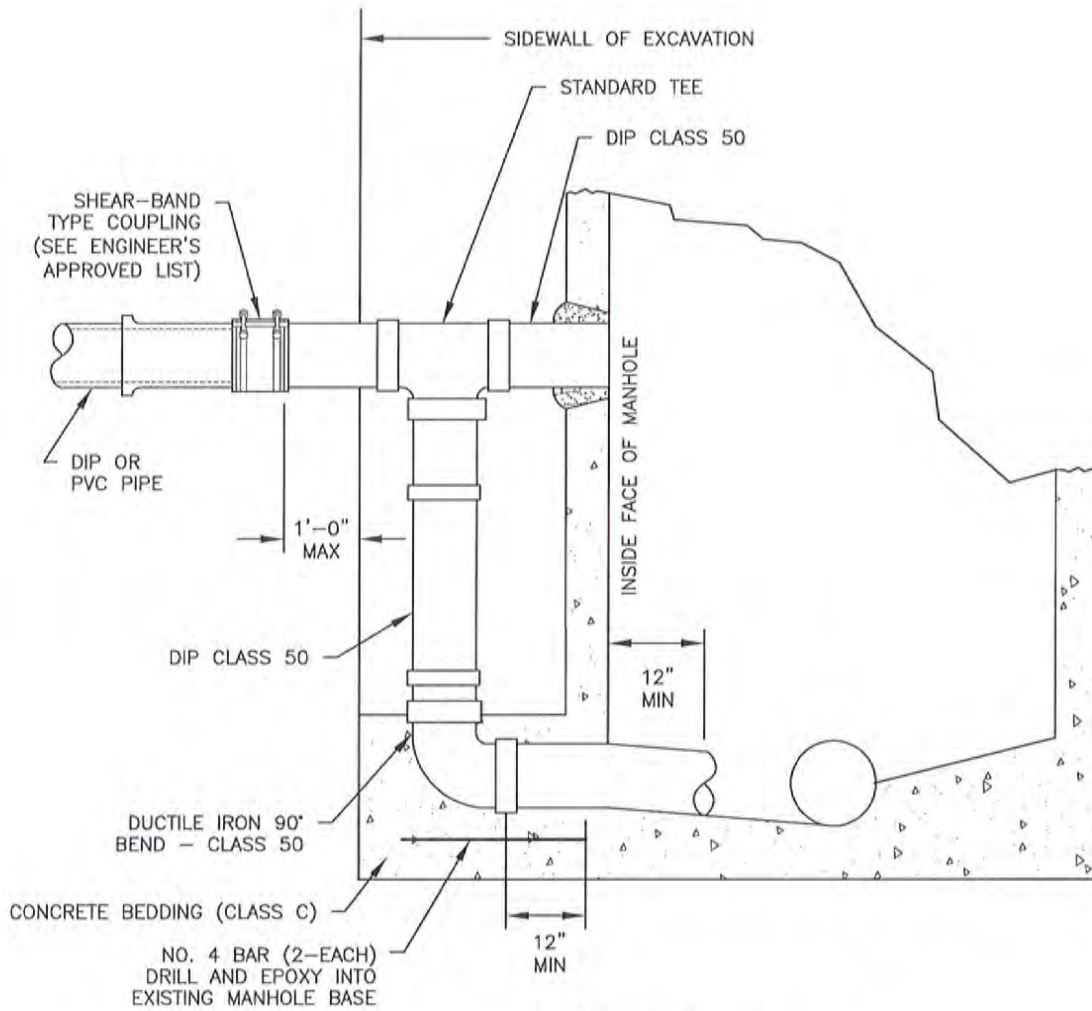
DATE: DECEMBER 2020 SCALE: N.T.S.

APPROVED BY:

Kent R. Carothers
Kent R. Carothers, P.E. Operations Manager C00671

DRAWN BY: TM

NO. 503



ELEVATION

NOTES:

1. DUCTILE IRON PIPE (DIP) AND FITTINGS SHALL BE CLASS 50 CONFORMING TO THE REQUIREMENTS OF ANSI A21.51
2. PIPE AND FITTINGS SHALL BE FURNISHED WITH BELL AND SPIGOT ENDS, "TYTON JOINT" OR MECHANICAL JOINT.
3. TO BE INSTALLED AT EXISTING 48" MANHOLES OR WHERE SPECIFICALLY APPROVE BY THE DIRECTOR OF PUBLIC WORKS AND UTILITIES.
4. DROP INLET PIPE AND FITTINGS SHALL BE THE SAME SIZE AS THE INCOMING SEWER MAIN,
5. SEE STANDARD 503 FOR STANDARD INSIDE DROP INSTALLATION.
6. INSTALL WATERSTOP IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS, AS SHOWN.



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STANDARD DETAILS
OUTSIDE DROP IN
SANITARY SEWER
MANHOLE

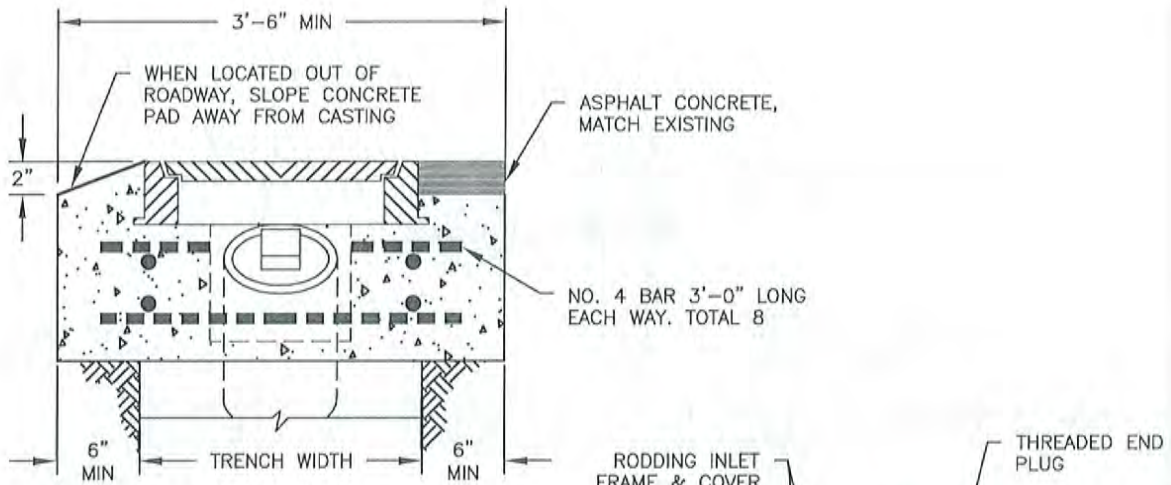
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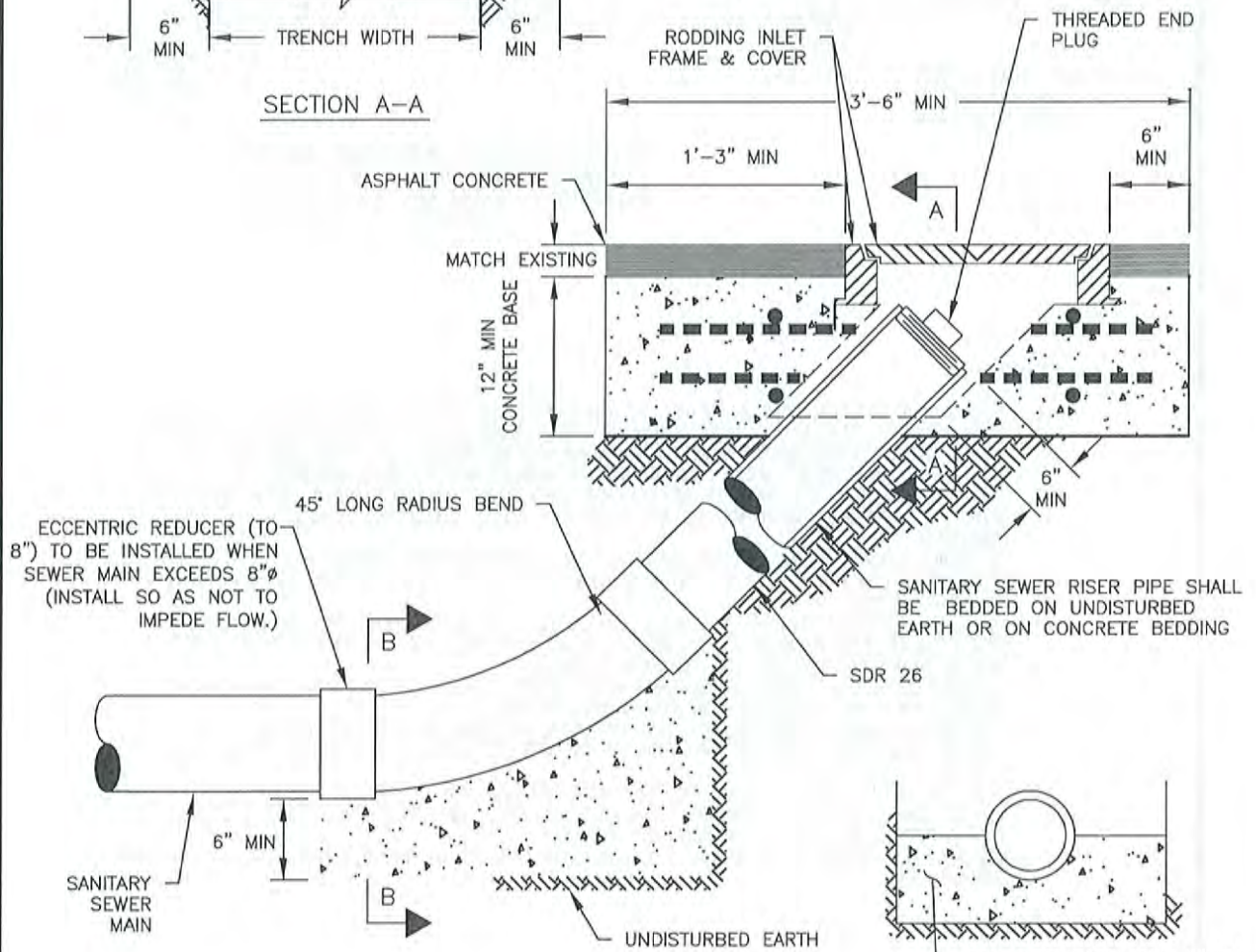
Kent R. Carolthers
Kent R. Carolthers, P.E. Operations Manager C60671

DRAWN BY: TM

NO. 504



SECTION A-A



SECTION B-B

NOTES:

1. TO BE USED ONLY WHEN SPECIFICALLY AUTHORIZED BY THE DIRECTOR OF PUBLIC WORKS AND UTILITIES



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STANDARD DETAILS
PERMANENT MAINLINE
CLEANOUT

DATE: DECEMBER 2020

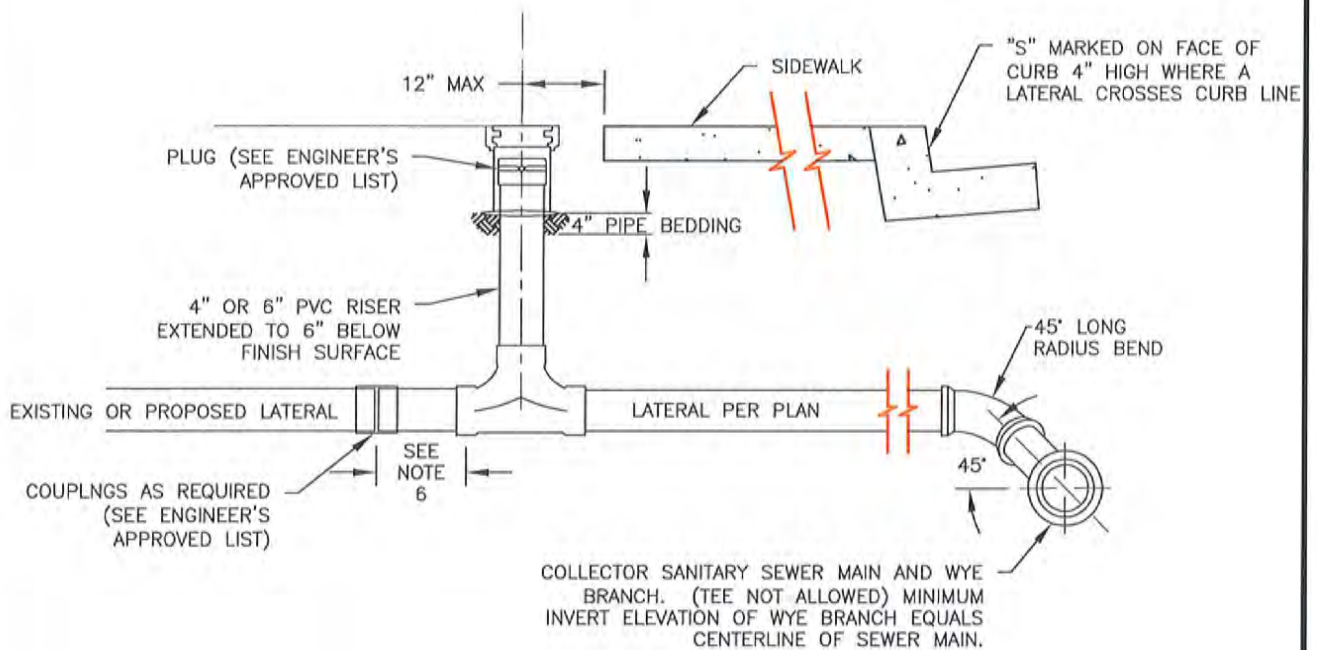
SCALE: N.T.S.

APPROVED BY:

Kent R. Carothers
Kent R. Carothers, P.E. Operations Manager C60671

DRAWN BY: TM

NO. 505



NOTES:

1. THE SEWER SERVICE LATERAL SHALL BE OF SUFFICIENT DEPTH TO ADEQUATELY SERVE THE BUILDING SITE, AND IN NO CASE SHALL BE LESS THAN 3 FT DEEP AT THE BACK OF THE P.U.E. UNLESS MATCHING EXISTING CONDITIONS ON REHABILITATION PROJECTS OR AS OTHERWISE AUTHORIZED BY THE DIRECTOR OF PUBLIC WORKS AND UTILITIES.
2. WHERE PROBLEMS ARE ANTICIPATED IN PROVIDING SEWER SERVICE TO A GIVEN BUILDING SITE, THE LATERAL INVERT AT THE BACK OF THE P.U.E. SHALL BE STAKED BY THE OWNER'S ENGINEER.
3. IN CASES WHERE THE CLEANOUT INSTALLATION CONFLICTS WITH EXISTING FACILITIES, THE CONTRACTOR SHALL VERIFY ANY ALTERNATE LOCATION WITH THE OPERATIONS MANAGER PRIOR TO INSTALLATION.
4. MINIMUM 2% SLOPE FOR 4" LATERALS AND A MIN. 1% SLOPE FOR 6" LATERALS ARE REQUIRED UNLESS A VARIANCE IS SPECIFICALLY APPROVED BY THE DIRECTOR OF PUBLIC WORKS AND UTILITIES AND THE BUILDING OFFICIAL.
5. A MINIMUM OF 12" WHEN CONNECTING TO EXISTING SEWER LATERAL OR EXTEND TO 1" BEHIND P.U.E. OR SIDEWALK FOR NEW CONSTRUCTION.
6. FOR NEW CONSTRUCTION, INSTALL CAP OR PLUG AT END OF SERVICE LATERAL.
7. LATERAL MATERIAL SHALL BE PVC SDR 26 OR DUCTILE IRON PIPE. RISER PIPE SHALL BE SDR 26.
8. CLEANOUT COMPONENTS SHALL BE THE SAME SIZE AS THE LATERAL.
9. TAP FITTINGS ON MAINS SMALLER THAN 12" MAY ONLY BE USED UNDER THE APPROVAL OF THE DIRECTOR OF PUBLIC WORKS AND UTILITIES.
10. INSTALL #12 TRACER WIRE OVER LATERALS THAT CANNOT BE INSTALLED PERPENDICULAR TO SEWER MAIN.



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STANDARD DETAILS
4" AND 6" SERVICE
LATERAL AND
CLEANOUT

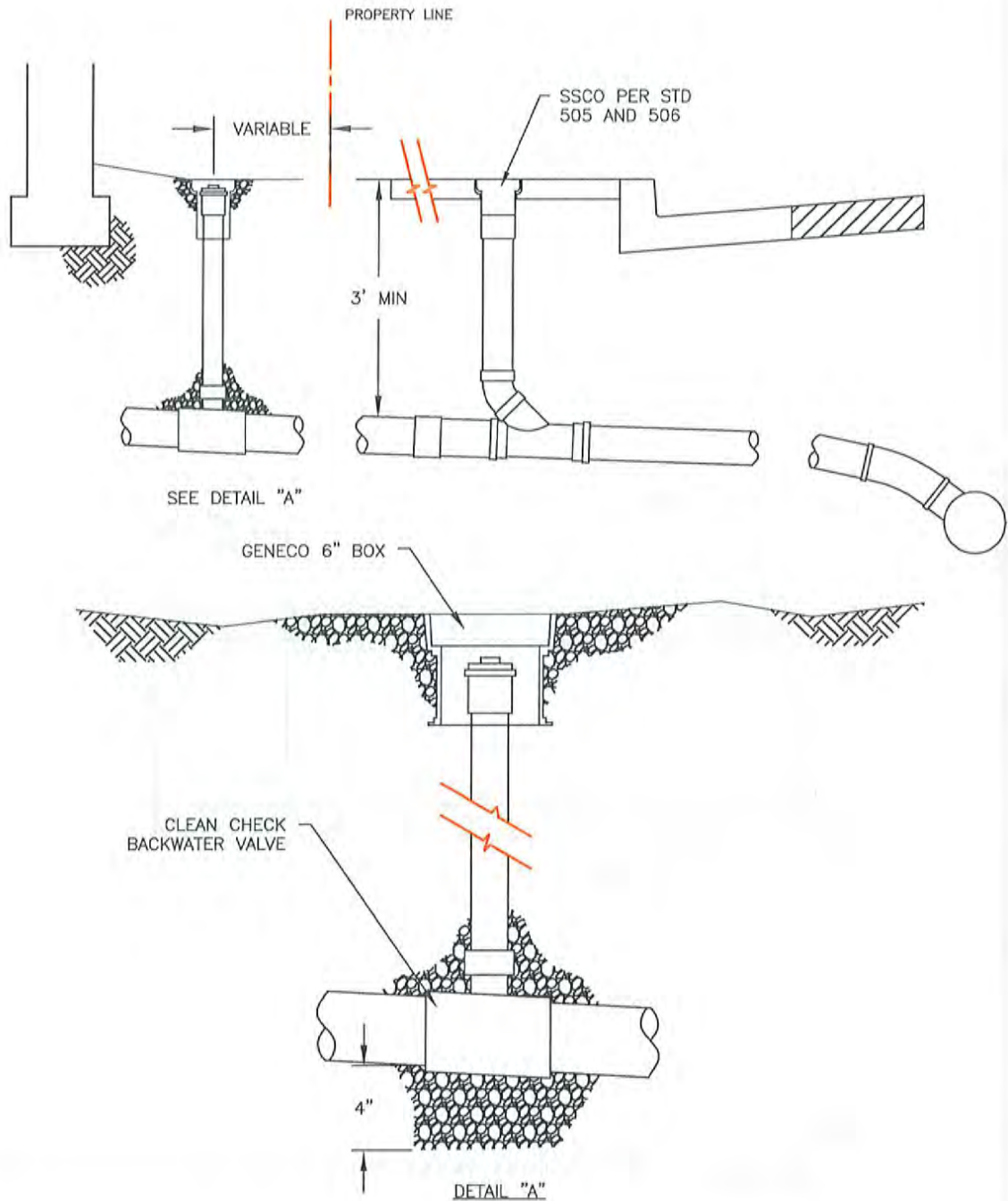
DATE: DECEMBER 2020 SCALE: N.T.S.

APPROVED BY:

Kent R. Carothers
Kent R. Carothers, P.E. Operations Manager C60671

DRAWN BY: TM

NO. 506



NOTES:

1. SEWAGE BACKWATER VALVE ASSEMBLY TO BE INSTALLED ON ALL LATERALS WHERE THE FINISH FLOOR ELEVATION IS LESS THAN ONE FOOT ABOVE THE FIRST UPSTREAM MANHOLE.
2. PROPERTY OWNER IS RESPONSIBLE FOR THE INSTALLATION AND MAINTENANCE OF THE SEWAGE BACKWATER VALVE ASSEMBLY
3. USE 4" EXTENDABLE BACKWATER VALVE IF DEPTH IS GREATER THAN 24".



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STANDARD DETAILS
SEWAGE BACKWATER
VALVE ASSEMBLY

DATE: JUNE 2016

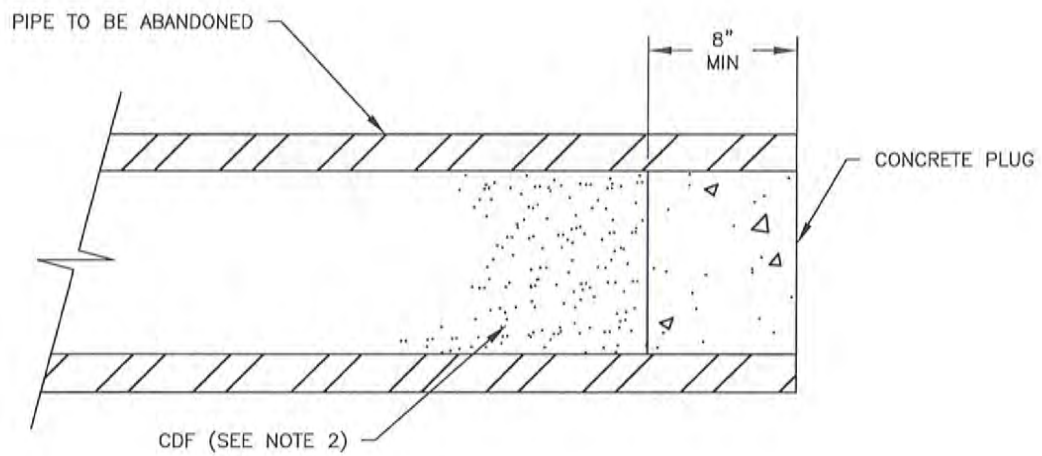
SCALE: N.T.S.

APPROVED BY:

Kent R. Carothers, P.E. Operations Manager C60671

DRAWN BY: TM

NO. 507



NOTES:

1. PIPE PLUGS SHALL BE INSTALLED TO THE SATISFACTION OF THE DIRECTOR OF PUBLIC WORKS AND UTILITIES.
2. ALL ABANDONED PIPES, 12" OR GREATER, SHALL BE BROKEN INTO EVERY 50'-0" AND SHALL BE FILLED COMPLETELY WITH CDF MIX NO. 1500 MANUFACTURED BY SHAMROCK MATERIALS INC.



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STANDARD DETAILS
ABANDONED
PIPE PLUG

DATE: JUNE 2016

SCALE: N.T.S.

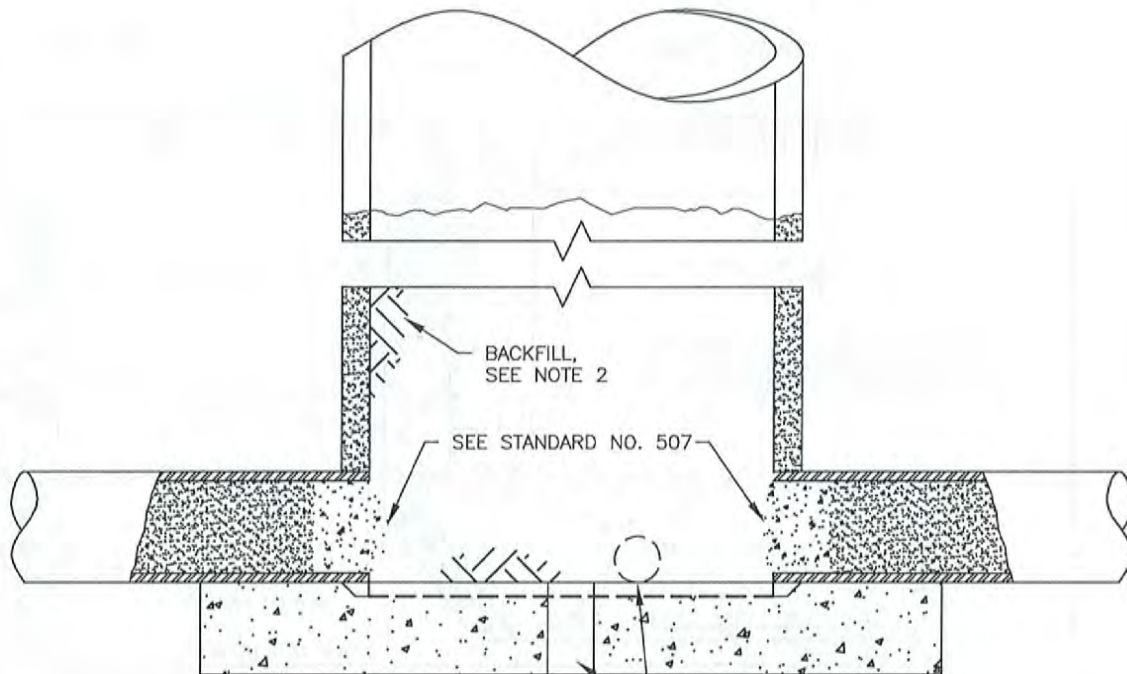
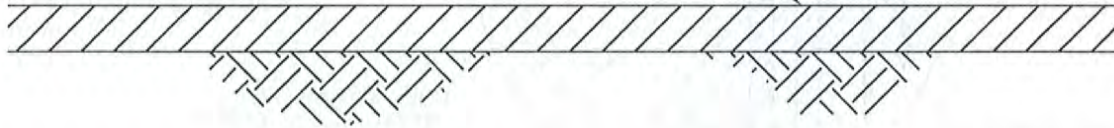
APPROVED BY:

Kent R. Carothers
Kent R. Carothers, P.E. Operations Manager C60671

DRAWN BY: TM

NO. 508

REPAIR OR REPLACE EXISTING GROUND OR PAVING, PER STANDARD DETAIL NO. 502



NOTES:

1. REMOVE FRAME, COVER, TAPER, AND BARREL SECTIONS.
2. AFTER PLUGGING ALL PIPES IN MANHOLE, THE REMAINING PORTION OF THE BARREL SECTION AND ALL VOIDS CREATED BY THE REMOVAL OF THE UPPER PORTIONS OF THE MANHOLE SHALL BE BACKFILLED AND COMPACTED TO 90% RELATIVE DENSITY. USE TRENCH BACKFILL OR PIPE BEDDING MATERIAL.



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STANDARD DETAILS
ABANDONED
MANHOLE

DATE: JUNE 2016

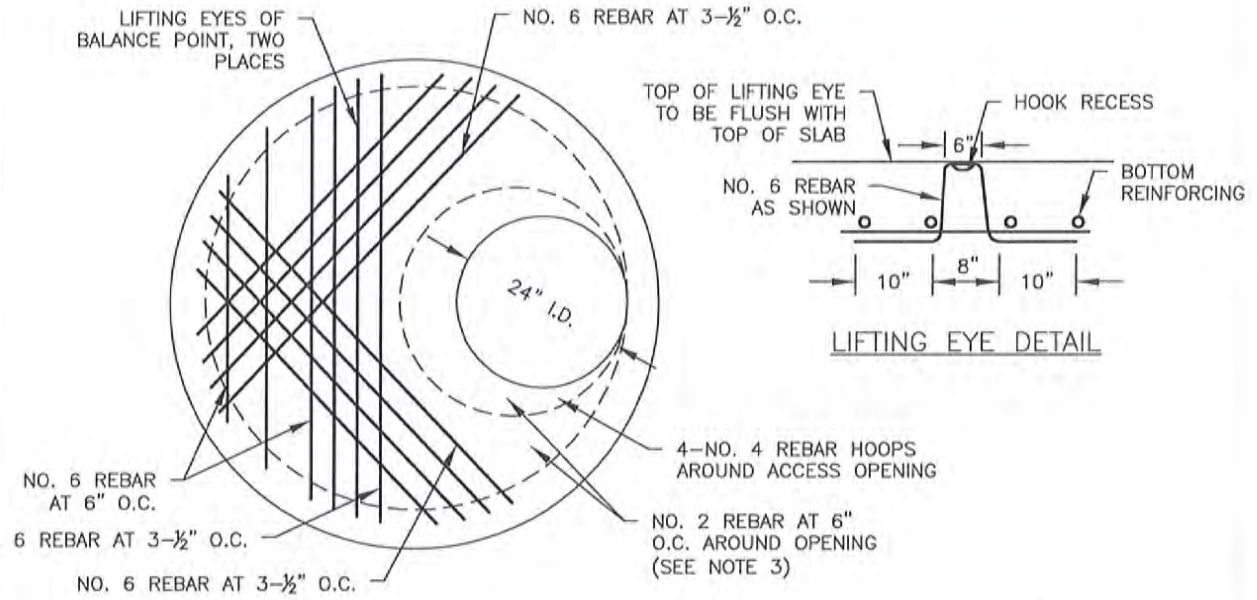
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APPROVED BY:

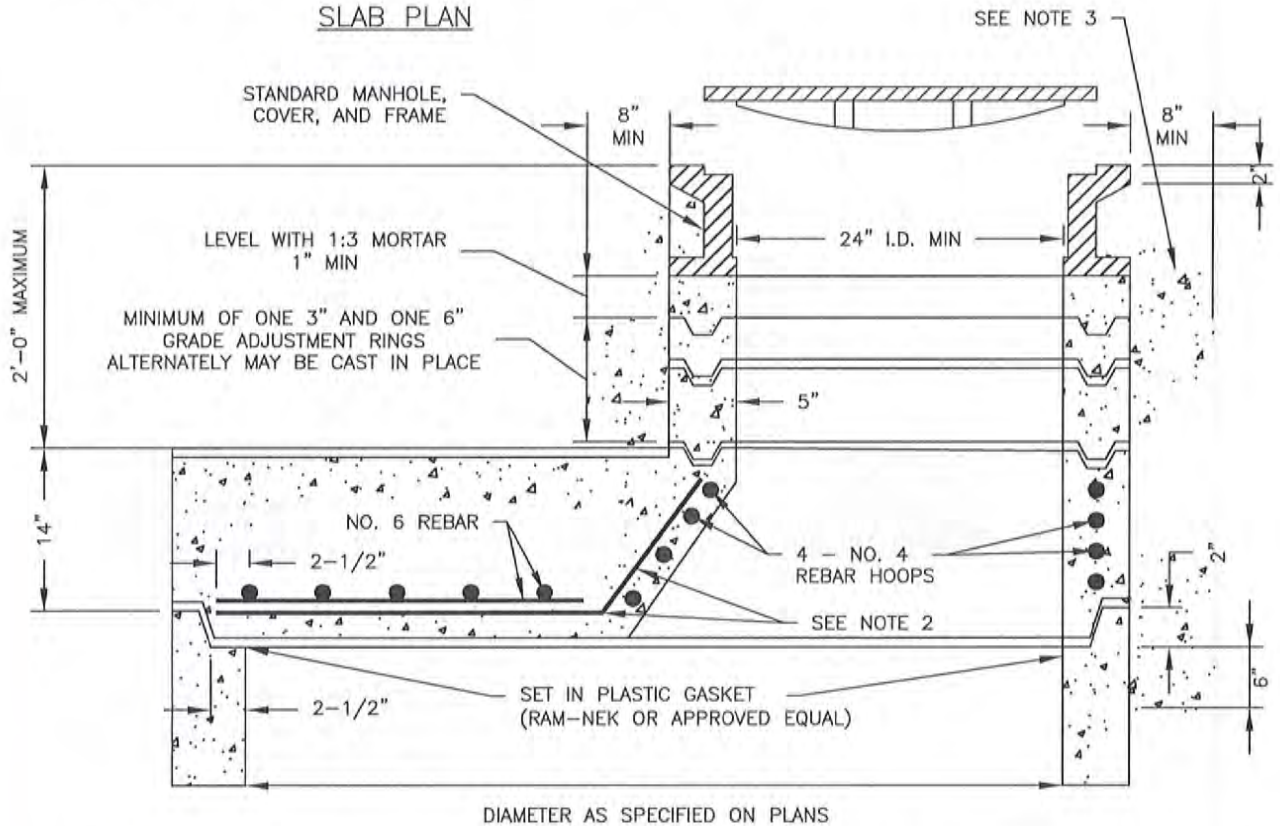
[Signature]
 Kent R. Carothers, P.E. Operations Manager C60571

DRAWN BY: TM

NO. 509



SLAB PLAN



NOTES:

1. FOR DETAILS AND SPECIFICATIONS OF BASE AND BARREL SECTIONS, SEE CITY OF PETALUMA STANDARD DETAIL NO. 500 AND 501,
2. NO. 2 REBARS BENT UP AND SPACED 6" ON CENTER AROUND 24" OPENING. HORIZONTAL LEGS TO FAN OUT EQUALLY SPACED, 2- $\frac{1}{2}$ " CLEAR AT EDGE OF SLAB.
3. CLASS "A" CONCRETE COLLAR TOP DOWN 2" FROM FINISHED GRADE. IN HIGH TRAFFIC AREAS - COLLAR 1" FROM FINISHED GRADE PER PUBLIC WORKS INSPECTOR.



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STANDARD DETAILS
PRECAST CONCRETE
MANHOLE
REDUCE SLAB

DATE: JUNE 2016

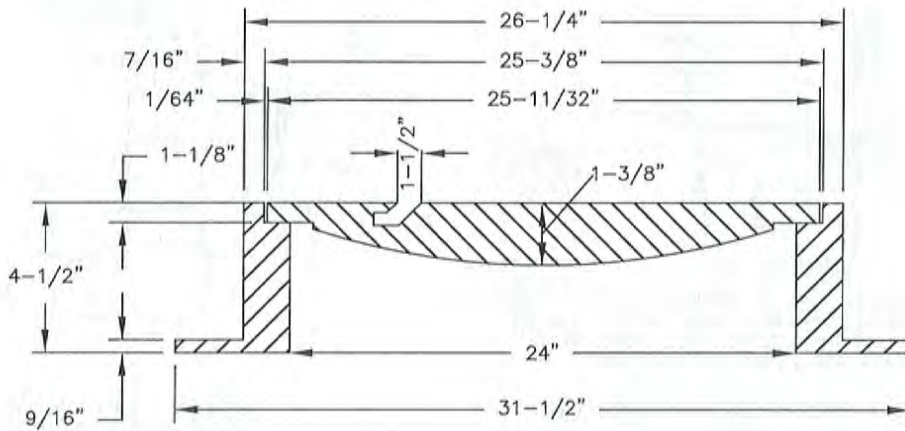
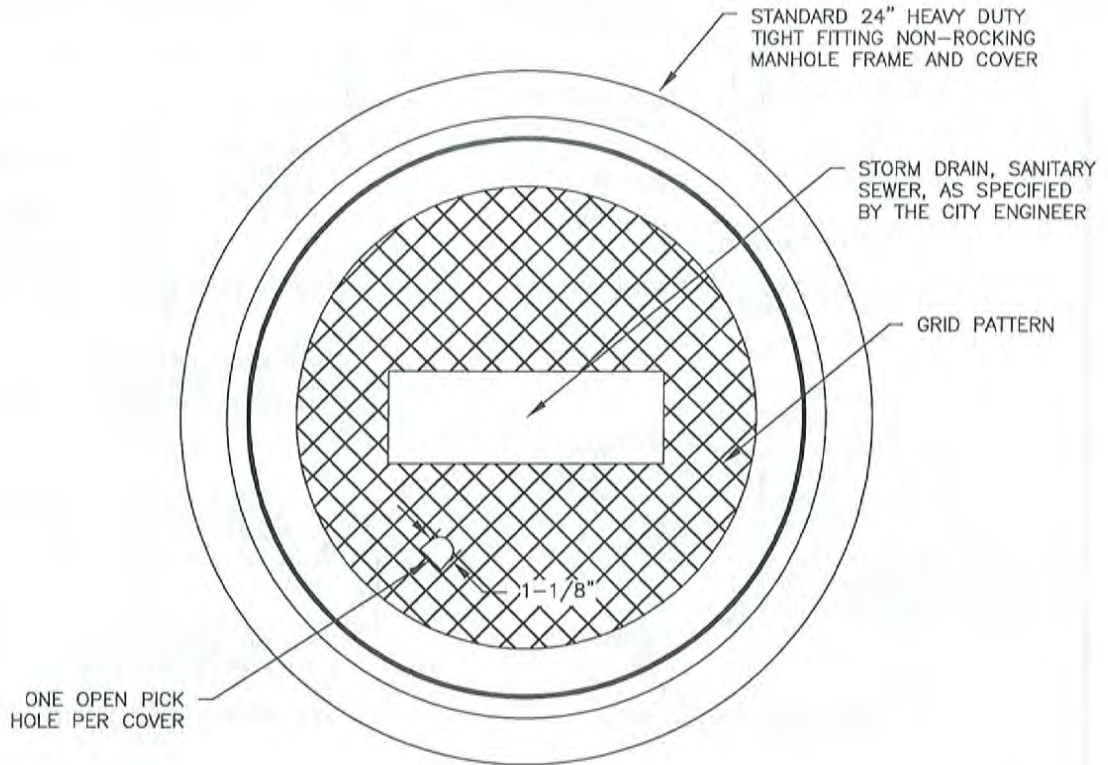
SCALE: N.T.S.

APPROVED BY:

Kent R. Carothers
Kent R. Carothers, P.E. Operations Manager CG0671

DRAWN BY: TM

NO. 510



NOTES:

1. SPECIFY SANITARY SEWER OR STORM DRAIN WHEN ORDERING. ALL CASTING SHALL BE DIPPED IN APPROVED ASPHALT PAINT
2. ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM IN A.S.T.M. DESIGNATION A-159-G3000, OR OF UNITED STATES GOVERNMENT SPECIFICATIONS QQ-652B.
3. MINIMUM WEIGHT COMPONENTS: COVER - 130 LBS.
FRAME - 135 LBS.

APPROVED MANHOLE FRAME & COVER
 PHOENIX IRON WORKS-CAT NO. P-1090CPH D&L SUPPLY-CAT NO. A-1024 CPH
 SOUTH BAY FOUNDRY-CAT NO. SBF-1900CPH PINKERTON FOUNDRY-CAT NO. A-640

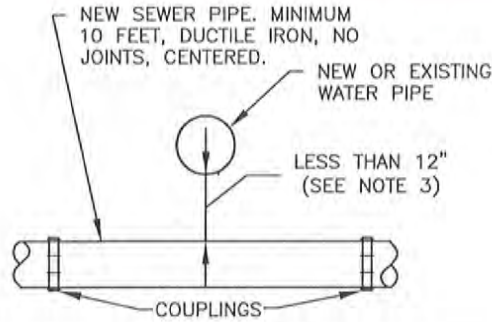


CITY OF PETALUMA
PUBLIC WORKS & UTILITIES
 UTILITIES DIVISION

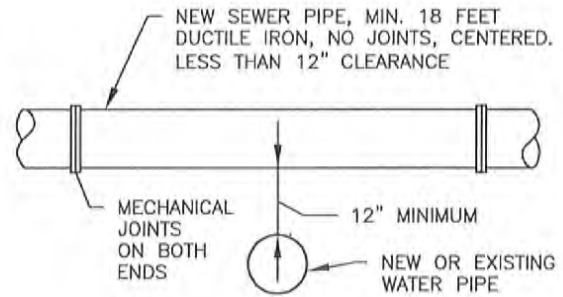
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STANDARD DETAILS
MANHOLE FRAME
AND COVER

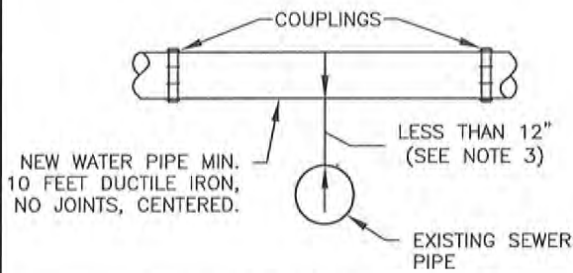
DATE: JUNE 2016	SCALE: N.T.S.
APPROVED BY: 	
Kent R. Carothers, P.E. Operations Manager C60871	
DRAWN BY: TM	NO. 511



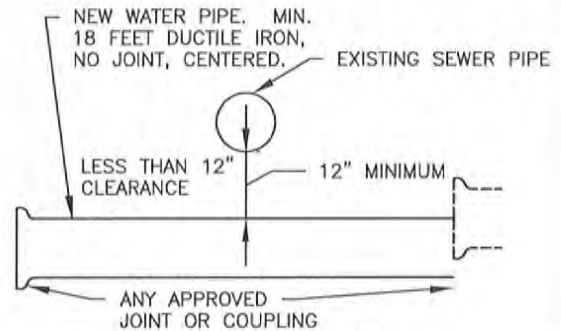
NEW SEWER UNDER NEW OR EXISTING WATER
CASE 1



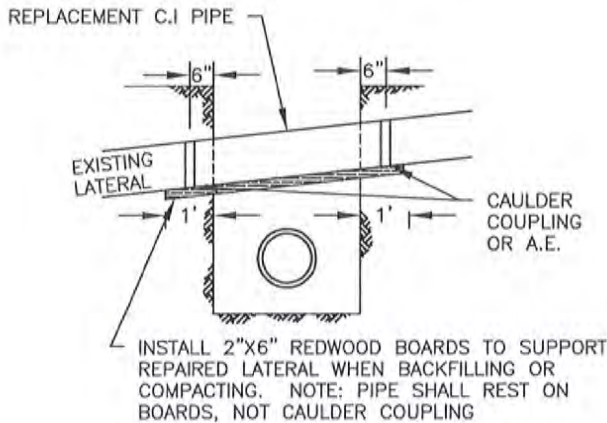
NEW SEWER OVER NEW OR EXISTING WATER
CASE 2



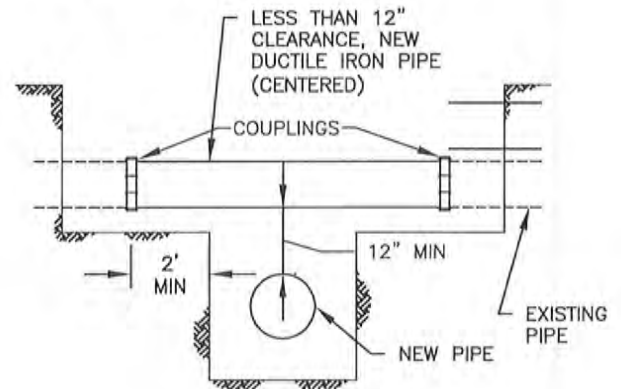
NEW WATER OVER EXISTING WATER
CASE 3



NEW WATER UNDER EXISTING SEWER
CASE 4



SEVERED SANITARY SEWER LATERAL DETAIL
CASE 6



NEW PIPE UNDER EXISTING
CASE 5 (SEE NOTE 4)

NOTES:

1. THIS STANDARD APPLIES TO PIPES UP TO AND INCLUDING 16" DIAMETER. ALL CROSSINGS OF LARGER DIAMETER SHALL BE APPROVED BY THE DIRECTOR OF PUBLIC WORKS AND UTILITIES
2. ALL NEW DUCTILE IRON SHALL BE WRAPPED IN POLYETHELENE PER CITY OF PETALUMA STANDARD DETAILS.
3. WHERE SEWER CROSSES ABOVE OR BELOW A WATER MAIN WITH 1'-0" OR MORE VERTICAL CLEARANCE, NO SPECIAL INSTALLATION IS REQUIRED. IF SEWER LATERAL IS 12" OR MORE ABOVE WATER MAIN, DI IS NOT REQUIRED.
4. "NEW PIPE" UNDER EXISTING (CASE 5) SHALL BE USED WHEN THE EXISTING PIPE HAS A JOINT OVER OR WITHIN 2'0" OF THE NEW TRENCH.
5. ANY PIPE-PIPE CROSSING WITH LESS THAN 6" VERTICAL CLEARANCE SHALL NOT BE INSTALLED WITHOUT APPROVAL OF THE DIRECTOR OF PUBLIC WORKS AND UTILITIES.
6. FOR WATER MAIN LOWERING DETAIL, SEE CITY WATER MAIN STANDARDS.
7. ALL CROSSINGS SHALL REFER TO DEPARTMENT OF HEALTH SERVICES REGULATIONS.



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STANDARD DETAILS
PIPE-PIPE
CROSSING

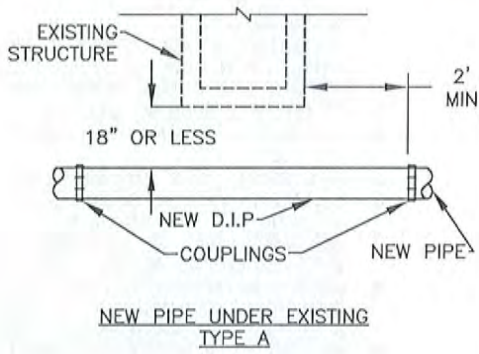
DATE: DECEMBER 2020 SCALE: N.T.S.

APPROVED BY:

Kent R. Carothers
Kent R. Carothers, P.E. Operations Manager CG0671

DRAWN BY: TM

NO. 512

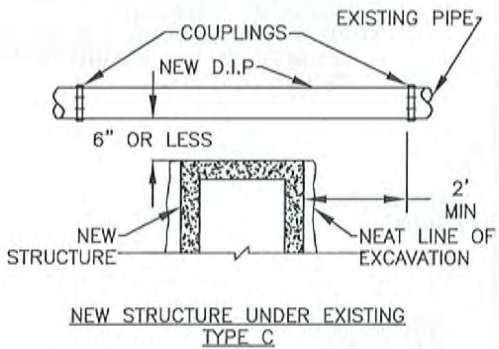
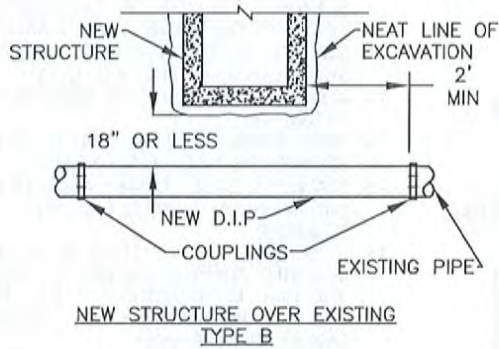


NOTES:

1. THIS STANDARD APPLIES TO PIPES UP TO AND INCLUDING 16" DIAMETER. ALL CROSSINGS INVOLVING PIPES OF LARGER DIAMETER SHALL BE AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS AND UTILITIES.
2. WHEN PIPES CROSS WITHIN THE DIMENSIONS SHOWN, A NEW DUCTILE IRON PIPE SECTION SHALL BE INSTALLED AS DETAILED.
3. ALL DUCTILE IRON PIPE SHALL BE ENCASED IN POLYETHYLENE FILM IN TUBE FORM.
4. ANY TYPE "A" INSTALLATION REQUIRING MORE THAN ONE LENGTH OF PIPE SHALL BE ENCASED PER CITY REQUIREMENTS.

APPROVED COUPLINGS:

SEE ENGINEER'S APPROVED LIST

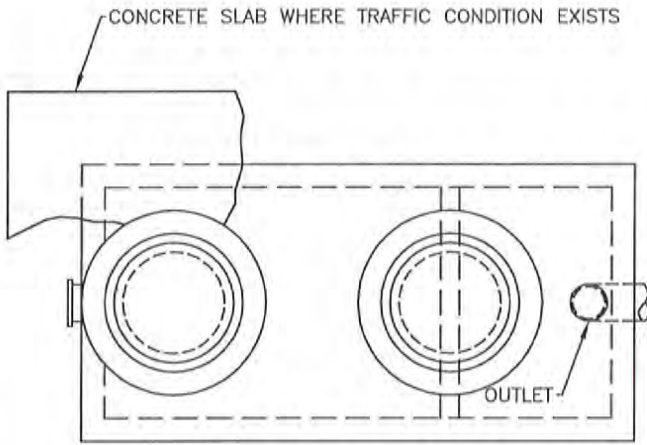


CITY OF PETALUMA
PUBLIC WORKS & UTILITIES
UTILITIES DIVISION

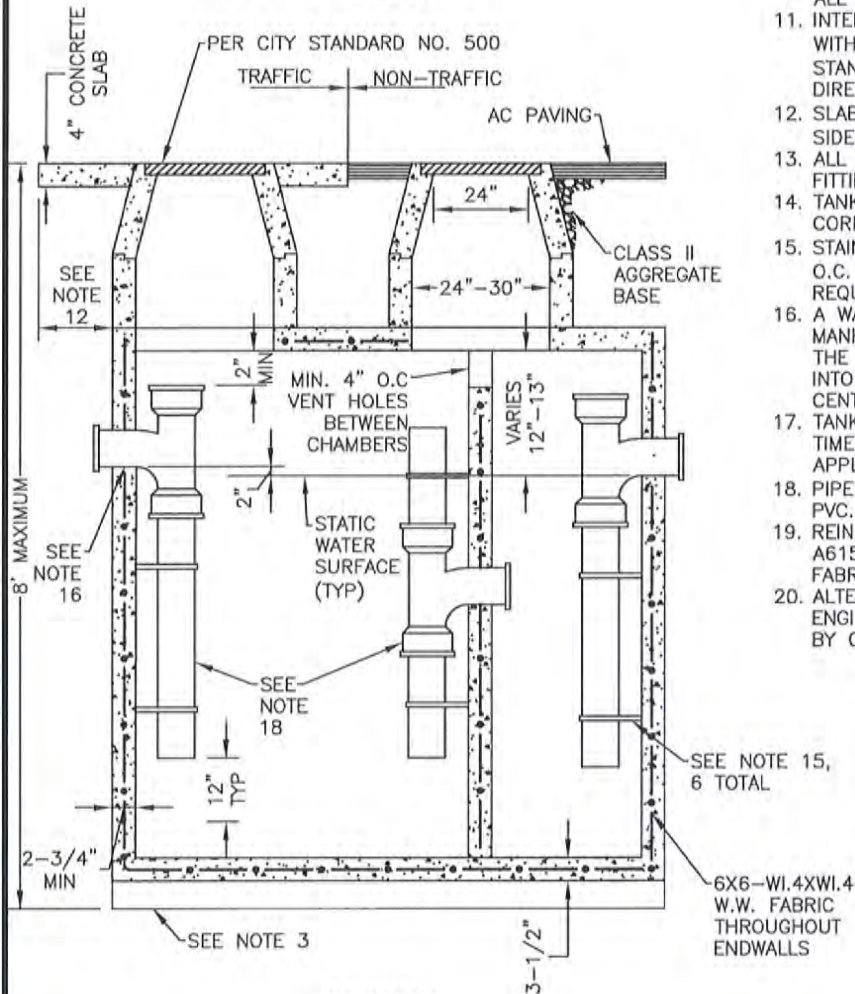
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STANDARD DETAILS
PIPE STRUCTURE
CROSSING

DATE: DECEMBER 2020	SCALE: N.T.S.
APPROVED BY: 	
Kent R. Carothers, P.E. Operations Manager C60671	
DRAWN BY: TM	NO. 513



PLAN



SECTION

NOTES:

1. TANK TO BE PRECAST AS PER ENGINEER'S APPROVED LIST.
2. POLYETHELENE ACCEPTABLE IN NON TRAFFIC AREAS UPON SPECIFIC APPROVAL OF THE DIRECTOR OF PUBLIC WORKS AND UTILITIES.
3. 3" MINIMUM BEDDING MATERIAL
4. ALL SURFACE WATER MUST DRAIN AWAY FROM MANHOLE.
5. PIPE SHALL BE 6" MAXIMUM O.C. PER U.P.C.
6. CONCRETE MINIMUM COMPRESSIVE STRENGTH OF 3000 P.S.I. AT 28 DAYS
7. ALL WYES SHALL BE ONE-WAY CLEANOUT WYES EXCEPT AS NOTED. TYPE PER U.P.C.
8. GREASE INTERCEPTORS SHALL BE LOCATED OUTSIDE OF BUILDINGS IN A LOCATION ACCESSIBLE TO WASTEBAULER PUMPER.
9. ALL GREASE INTERCEPTORS SHALL BE LOCATED OUTSIDE PUBLIC RIGHT-OF-WAY EXCEPT WITH WRITTEN APPROVAL OF THE DIRECTOR OF PUBLIC WORKS AND UTILITIES.
10. EXCAVATIONS SHALL BE NEAT LINE TYPICALLY ALL SIDES.
11. INTERCEPTOR TO BE USED IN CONJUNCTION WITH "SAMPLING MANHOLE" PER CITY STANDARD NO. 516 OR "SAMPLING PORT" PER DIRECTOR OF PUBLIC WORKS AND UTILITIES.
12. SLAB TO EXTEND MINIMUM 24" BEYOND ALL SIDES OF TANK. (TRAFFIC AREA)
13. ALL WASTE MUST ENTER THROUGH INLET FITTING ONLY.
14. TANK TO BE STENCILED ON UPPER LEFT HAND CORNER OF INLET END IN WHITE.
15. STAINLESS STEEL CLAMP AND BOLTS 3'-0" O.C. MAXIMUM (TYPICAL) MINIMUM 2 REQUIRED.
16. A WATERSTOP CONSISTING OF A STANDARD MANHOLE ADAPTOR GASKET AS SUPPLIED BY THE PIPE MANUFACTURER SHALL BE GROUDED INTO THE INTERCEPTOR WALL NEAR THE CENTER OF THE WALL.
17. TANK CAPACITY TO BE DETERMINED AT THE TIME OF INDUSTRIAL WASTE PERMIT APPLICATION.
18. PIPE AND FITTINGS TO BE 4" CHEDULE 40 PVC.
19. REINFORCED BAR INTERMEDIATE GRADE ASTM A615-62T AND A305-56T REINFORCING WIRE FABRIC ASTM A185-61T
20. ALTERNATE DESIGN BY A REGISTERED ENGINEER MAY BE SUBSTITUTED FOR REVIEW BY CITY.

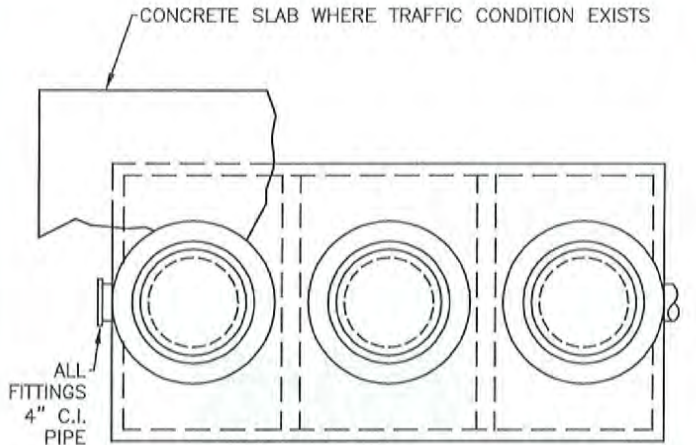


CITY OF PETALUMA
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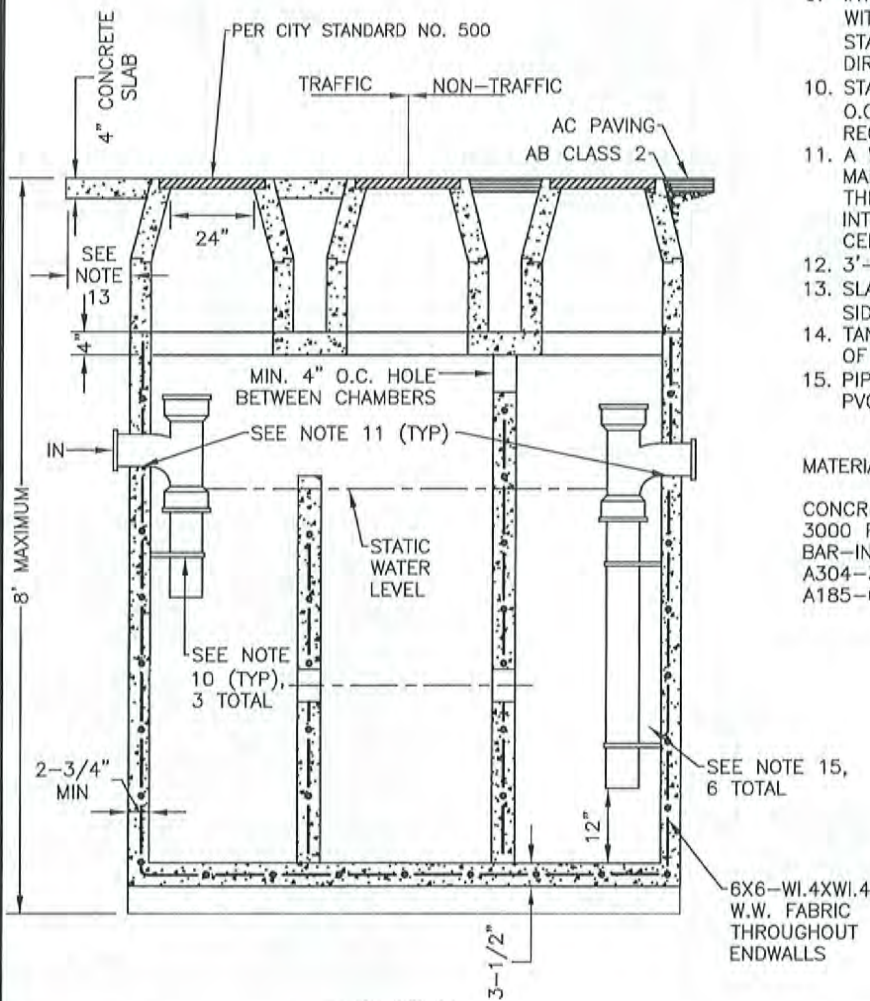
STANDARD DETAILS
PRECAST GREASE
INTERCEPTOR

DATE: JUNE 2016	SCALE: N.T.S.
APPROVED BY: 	
Kent R. Garothers, P.E. Operations Manager C60671	
DRAWN BY: TM	NO. 514



NOTE: ALL WASTE MUST ENTER THROUGH INLET FITTING ONLY.

PLAN



SECTION

NOTES:

1. TANK TO BE PRECAST AS PER ENGINEER'S APPROVED LIST.
2. ALL GREASE INTERCEPTORS SHALL BE LOCATED OUTSIDE PUBLIC RIGHT-OF-WAY EXCEPT WITH WRITTEN APPROVAL OF THE DIRECTOR OF PUBLIC WORKS AND UTILITIES.
3. GREASE INTERCEPTORS SHALL BE LOCATED OUTSIDE OF BUILDINGS IN A LOCATION ACCESSIBLE TO WASTEHAULER PUMPER. LOCATION SUBJECT TO APPROVAL OF DIRECTOR OF PUBLIC WORKS AND UTILITIES.
4. ALTERNATE DESIGN BY A REGISTERED ENGINEER MAY BE SUBSTITUTED FOR REVIEW BY THE CITY.
5. PIPE SHALL BE 6" MAXIMUM DIAMETER TYPE PER U.P.C.
6. EXCAVATION SHALL BE NEAT LINE TYPICALLY ALL SIDES.
7. HEIGHT OF TANK ABOVE FITTINGS VARIABLE ONE FEET SECTIONS MAY BE ADDED TO REQUIRED FINISH GRADE.
8. ALL WYES SHALL BE ONE-WAY CLEANOUT WYES EXCEPT AS NOTED. TYPE PER U.P.C.
9. INTERCEPTOR TO BE USED IN CONJUNCTION WITH "SAMPLING MANHOLE" PER CITY STANDARD NO. 516 OR "SAMPLING PORT" PER DIRECTOR OF PUBLIC WORKS AND UTILITIES.
10. STAINLESS STEEL CLAMP AND BOLTS 3'-0" O.C. MAXIMUM (TYPICAL) MINIMUM 2 REQUIRED.
11. A WATERSTOP CONSISTING OF A STANDARD MANHOLE ADAPTOR GASKET AS SUPPLIED BY THE PIPE MANUFACTURER SHALL BE GROUTED INTO THE INTERCEPTOR WALL NEAR THE CENTER OF THE WALL.
12. 3'-0" MINIMUM BEDDING MATERIAL.
13. SLAB TO EXTEND MINIMUM 24" BEYOND ALL SIDES OF TANK. (TRAFFIC AREA)
14. TANK CAPACITY TO BE DETERMINED AT TIME OF INDUSTRIAL WASTE PERMIT APPLICATION.
15. PIPE AND FITTINGS TO BE 4" SCHEDULE 40 PVC.

MATERIAL SPECIFICATIONS

CONCRETE MINIMUM: COMPRESSIVE STRENGTH OF 3000 PSI AT 28 DAYS. REINFORCING BAR-INTEREDATE GRADE ASTM A615-62T AND A304-36T REINFORCING WIRE FABRIC ASTM A185-61T.



CITY OF PETALUMA
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STANDARD DETAILS
SAND AND GREASE
INTERCEPTOR

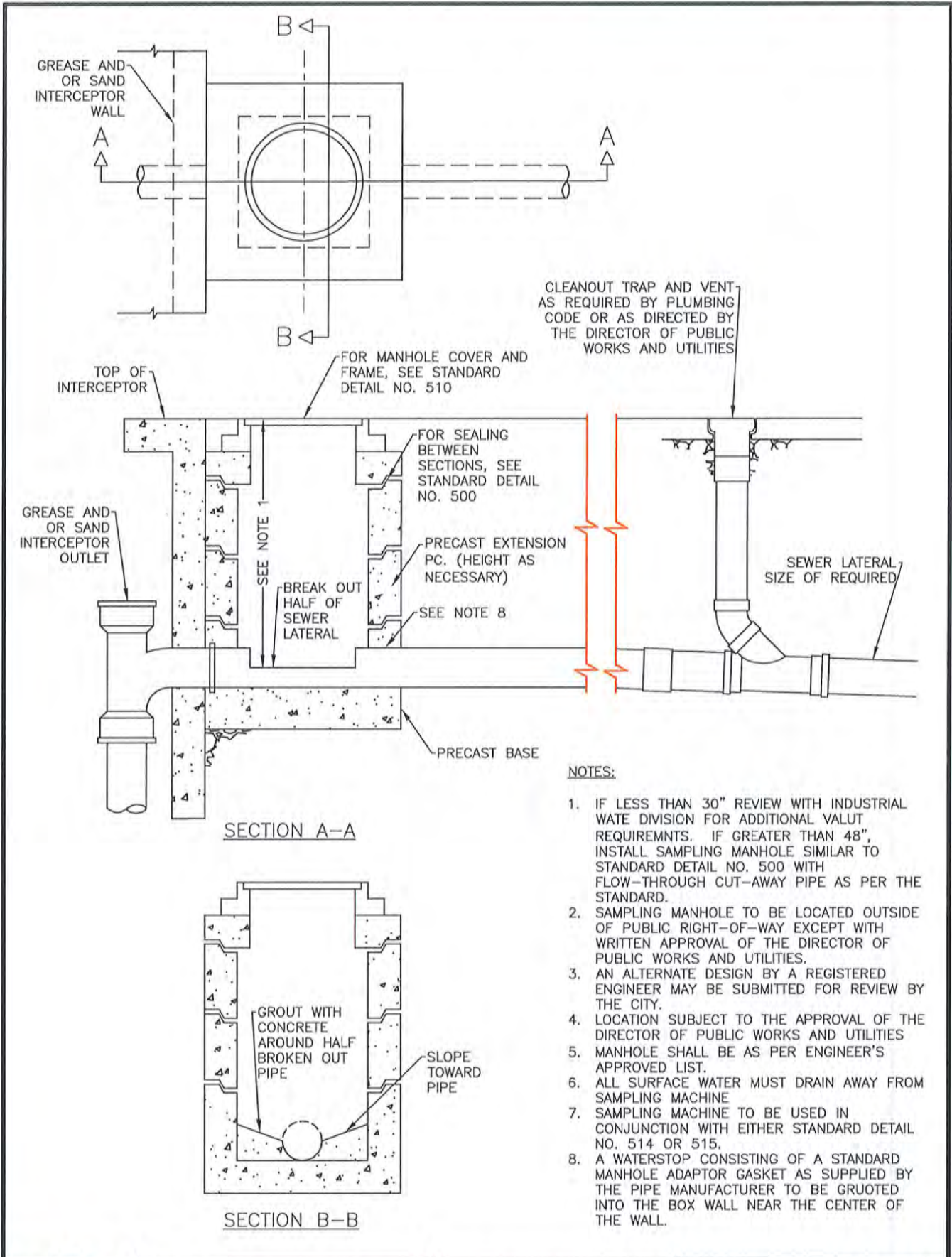
DATE: DECEMBER 2020 SCALE: N.T.S.

APPROVED BY:

[Signature]
Kenl R. Carothers, P.E. Operations Manager C60671

DRAWN BY: TM

NO. 515



CLEANOUT TRAP AND VENT AS REQUIRED BY PLUMBING CODE OR AS DIRECTED BY THE DIRECTOR OF PUBLIC WORKS AND UTILITIES

FOR MANHOLE COVER AND FRAME, SEE STANDARD DETAIL NO. 510

FOR SEALING BETWEEN SECTIONS, SEE STANDARD DETAIL NO. 500

PRECAST EXTENSION PC. (HEIGHT AS NECESSARY)

SEE NOTE 8

GREASE AND OR SAND INTERCEPTOR WALL

TOP OF INTERCEPTOR

GREASE AND OR SAND INTERCEPTOR OUTLET

SEE NOTE 1

BREAK OUT HALF OF SEWER LATERAL

PRECAST BASE

SEWER LATERAL SIZE OF REQUIRED

NOTES:

1. IF LESS THAN 30" REVIEW WITH INDUSTRIAL WATER DIVISION FOR ADDITIONAL VALUT REQUIREMNTS. IF GREATER THAN 48", INSTALL SAMPLING MANHOLE SIMILAR TO STANDARD DETAIL NO. 500 WITH FLOW-THROUGH CUT-AWAY PIPE AS PER THE STANDARD.
2. SAMPLING MANHOLE TO BE LOCATED OUTSIDE OF PUBLIC RIGHT-OF-WAY EXCEPT WITH WRITTEN APPROVAL OF THE DIRECTOR OF PUBLIC WORKS AND UTILITIES.
3. AN ALTERNATE DESIGN BY A REGISTERED ENGINEER MAY BE SUBMITTED FOR REVIEW BY THE CITY.
4. LOCATION SUBJECT TO THE APPROVAL OF THE DIRECTOR OF PUBLIC WORKS AND UTILITIES
5. MANHOLE SHALL BE AS PER ENGINEER'S APPROVED LIST.
6. ALL SURFACE WATER MUST DRAIN AWAY FROM SAMPLING MACHINE
7. SAMPLING MACHINE TO BE USED IN CONJUNCTION WITH EITHER STANDARD DETAIL NO. 514 OR 515.
8. A WATERSTOP CONSISTING OF A STANDARD MANHOLE ADAPTOR GASKET AS SUPPLIED BY THE PIPE MANUFACTURER TO BE GROUTED INTO THE BOX WALL NEAR THE CENTER OF THE WALL.

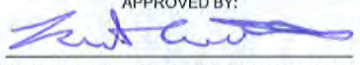


CITY OF PETALUMA
PUBLIC WORKS & UTILITIES
 UTILITIES DIVISION

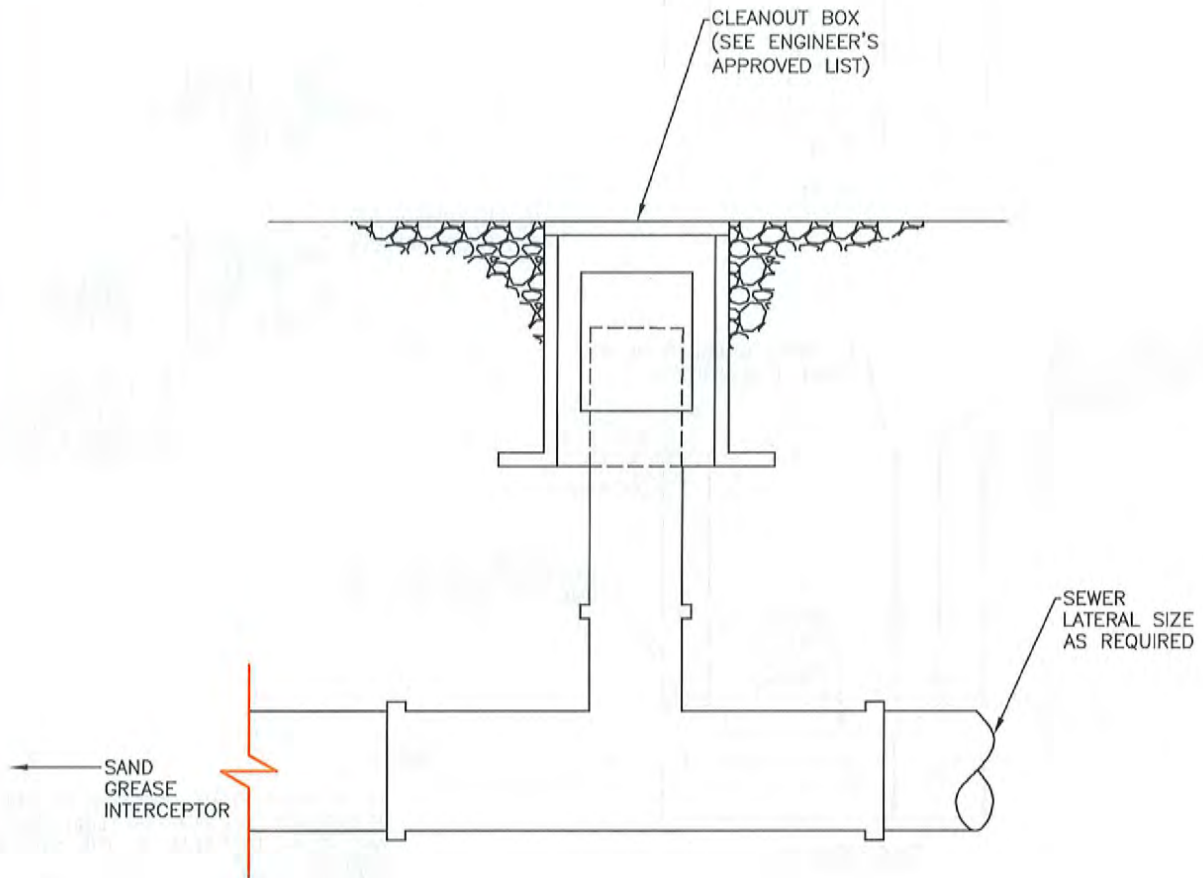
202 N. McDOWELL BLVD. TEL. 707-778-4546
 PETALUMA, CALIFORNIA 94954 FAX. 707-778-4508

STANDARD DETAILS
SAMPLING MANHOLE
(EXTERIOR USE)

DATE: DECEMBER 2020 SCALE: N.T.S.

APPROVED BY:

 Kent R. Carothers, P.E. Operations Manager G60671

DRAWN BY: TM NO. 516



NOTES:

1. ALTERNATE TO STANDARD DETAIL NO. 516 – AS DIRECTED BY THE DIRECTOR OF PUBLIC WORKS AND UTILITIES



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STANDARD DETAILS
SAMPLING
PORT

DATE: JUNE 2016

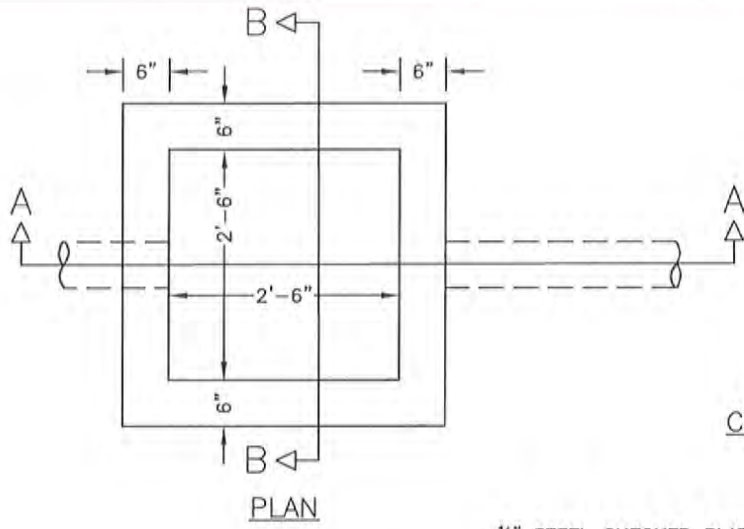
SCALE: N.T.S.

APPROVED BY:

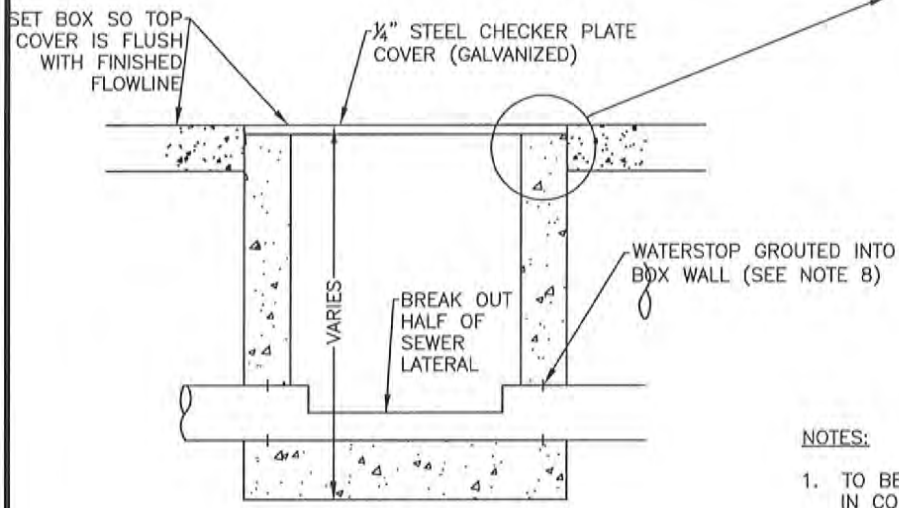
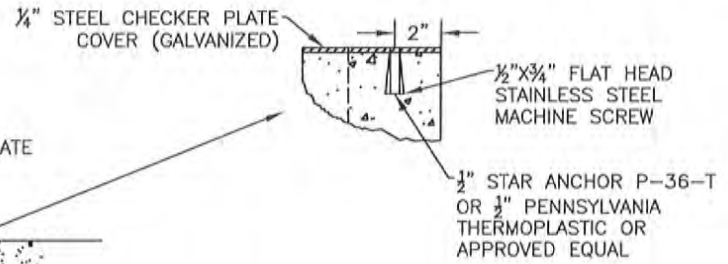
Kent R. Carothers, P.E. Operations Manager C60671

DRAWN BY: TM

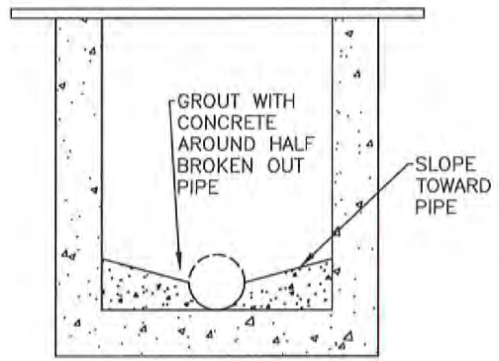
NO. 517



STEEL PLATE
COVER FASTENER
DETAIL



SECTION A-A



SECTION B-B

NOTES:

1. TO BE USED IN THE INTERIOR OF BUILDINGS IN CONJUNCTION WITH SAMPLING MANHOLE AND TO BE UPSTREAM OF THE SAMPLING MANHOLE.
2. LOCATION SUBJECT TO THE APPROVAL OF THE DIRECTOR OF PUBLIC WORKS AND UTILITIES
3. TO BE USED ONLY WITH THE APPROVAL OF THE DIRECTOR OF PUBLIC WORKS AND UTILITIES.
4. ALTERNATE DESIGN BY A REGISTERED ENGINEER MAY BE SUBMITTED FOR REVIEW BY THE CITY OF PETALUMA.
5. BOX SHALL BE AS PER ENGINEER'S APPROVED LIST
6. ALL SURFACE WATER MUST DRAIN AWAY FROM SAMPLING BOX.
7. SAMPLING BOX TO BE USED IN CONJUNCTION WITH STANDARD DETAIL NO. 514 OR 515.
8. A WATERSTOP CONSISTING OF A STANDARD MANHOLE ADAPTOR GASKET AS SUPPLIED BY THE PIPE MANUFACTURER TO BE GROUDED INTO THE BOX WALL NEAR THE CENTER OF THE WALL.



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STANDARD DETAILS
SAMPLING BOX
BUILDING INTERIOR

DATE: JUNE 2016 SCALE: N.T.S.
APPROVED BY:
[Signature]
Kent R. Carothers, P.E. Operations Manager C60671
DRAWN BY: TM NO. 518

CITY OF PETALUMA

ENGINEER'S LIST OF APPROVED ITEMS
FOR USE WITH SEWER SYSTEM CONSTRUCTION
STANDARDS APPROVED

STANDARD 504, 506, 512, 513

COUPLINGS

APAC
POWER SEAL
ROCKWELL
ROMAC

300 SERIES
3500 SERIES
441 SERIES
500 SERIES

STANDARD 505, 506

RIM AND COVER

SOUTH BAY FOUNDRY

SBF-1249

STANDARD 506

FLUSH MOUNT "T" CONE PLUG

ETCO

CO-402

STANDARD 512

MANHOLE FRAME AND COVER

PHOENIX IRON WORKS
D & L SUPPLY
SOUTH BAY FOUNDRY
PINKERTON FOUNDRY

P-1090CPH
A-1024CPH
SBF-1900CPH
A-640

STANDARD 514, 515

PRECAST TANK

M. C. NOTTINGHAM
PACIFIC CONCRETE PRODUCTS
SELVAGE CONCRETE PRODUCTS

STANDARD 516, 518

PRECAST INLET BOX

SANTA ROSA COST PRODUCTS

5K

STANDARD 516, 518

PRECAST MANHOLE TRANSITION

SANTA ROSA CAST PRODUCTS

5K W/5K X 24" TRANSITION SLAB

STANDARD 517

CLEANOUT BOX

GENECO

CC4 W/LID MARKED SEWER

RIM AND COVER

CHRISTY
BES

G5
M2



CITY OF PETALUMA

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ENGINEER'S
APPROVED
LIST

DATE: JUNE 2016

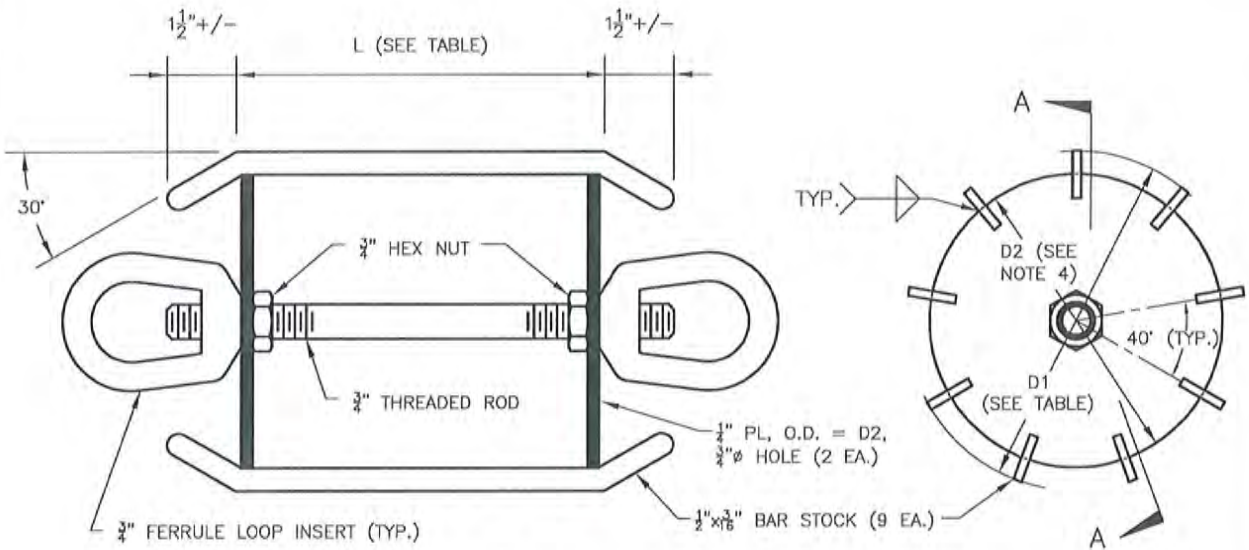
SCALE: N.T.S.

APPROVED BY:

Kent R. Carothers
Kent R. Carothers, P.E. Operations Manager C60671

DRAWN BY: TM

NO. 519



SECTION A-A

		MANDREL DIAMETER (D1) SEE NOTE 4	
		5% DEFLECTION	
NOM. PIPE DIA.	L	SDR 35	SDR 26
6	6"	5.619	5.503
8	8"	7.524	7.366
10	10"	9.405	9.207
12	12"	11.191	10.961
15	15"	13.849	13.559
>15	*	*	*

* REQUEST MANDREL DIMENSIONS FROM CITY.

NOTES:

1. MARK ALL MATERIALS WITH ASTM SPECIFICATION NUMBER, SDR NUMBER, AND DEFLECTION.
2. PLATE DIAMETER SHALL BE 1" LESS THAN THE MANDREL DIAMETER.
3. THE 1/2" BAR STOCK ON EDGE PROVIDES CLEARANCE TO PASS SMALL AMOUNTS OF SOIL WHICH MAY BE IN PIPE.
4. MANDREL DIAMETER HAS BEEN CALCULATED BASED ON SECTION 306-1.2.12 OF THE "GREENBOOK" STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION AND/OR DIMENSIONS GIVEN IN TABLE 1 OF ASTM STANDARD D3034.
5. ALTERNATIVE DESIGNS THAT MATCH THE DEFLECTION DIMENSIONS SHOWN MY BE SUBMITTED FOR REVIEW.



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DEFLECTION MANDREL FOR PVC SEWER PIPE

DATE: DECEMBER 2020 SCALE: N.T.S.
 APPROVED BY:

 Kent Carothers, P.E.
 DRAWN BY: ETL NO. 520

CITY OF PETALUMA



**STREET
LIGHT
DESIGN AND
CONSTRUCTION
STANDARDS**

600 SERIES

JUNE 1999

GENERAL NOTES

1. All wiring methods and equipment construction shall conform to the current edition of the National Electrical Code, California Standard Specifications and the Standard Plans.
2. All conduit to be used shall be a minimum of 2" diameter, except from each street light to the adjacent pull box which may be 1" diameter PVC or metal, and shall have the following cover from top of conduit.
 - A. Within sidewalk of parkway areas: 2" - 0" min. Schedule 40 PVC.
 - B. Within roadway areas: 3" - 0" min. Schedule 80 PVC.
3. All metal conduit and other metal parts shall be continuously bonded and grounded.
4. All bends and/or offsets shall be made with factory sections.
5. Unless otherwise approved by the City Engineer, a No. 5 pull box (State Standard ES-8) shall be used at all street light standards.
6. All pull boxes shall be installed per State Standard ES-8 and Standard Specification Section 86. The bottoms of pull boxes installed in the ground or in sidewalk areas, shall be bedded in 12" of clean drain rock.
7. Junction boxes to be not more than 200'-0" apart on long runs.
8. When pull boxes are subject to vehicular traffic, they shall be set on concrete footings and cast iron traffic covers shall be installed.
9. All splices to be aproved solderless waterproof connectors of proper size. (Example: split bolt plus tape plus coating).
10. All empty conduits shall have a 1/4" nylon pull rope provided inside.
11. All conduits shall be sealed with an approved duct seal. Conduits stubbed for future extensions shall be capped.
12. All street lighting projects are subject to approval by the City Traffic Engineer.
13. All pull box covers shall be secured with brass hold down bolts and inscribed, "Street Lighting".

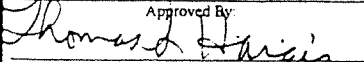

<p>CITY OF PETALUMA Department of Engineering 22 Bassett Street - Petaluma California 949 2 707 778 4304 - Fax 707 778 4437</p> <p>Approved By:  Thomas S. Hargis - R.C.E. 22366</p>	<p>Street Light Standards General Notes (1)</p>	<p>Drawn By Butch Smith</p> <p>Scale N. T. S.</p> <p>Date March 31st 1995</p> <p>File Number Std. Det. SLS0000.600</p>	 <p>Page: 600</p>
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TABLE OF CONTENTS STREET LIGHTS

600 SERIES

<u>Standard No.</u>	<u>Title</u>	<u>Date of Approval \ Revision</u>
600A	Table of Contents	June 16th 1999
600	General Notes (1)	March 31st 1995
601	General Notes (2)	March 26th 1996
602	Standard Street Light (Local Street)	June 16th 1999
603	Standard Street Light (Collector Street)	June 16th 1999
604	Standard Street Light (Arterial Street)	June 16th 1999
605	Standard Concrete Footing Detail	June 16th 1999
606	Standard I.E.S. Light Patterns	March 31st 1995
607	Standard Street Light Wiring	March 31st 1995
608	Standard Roadway Illumination	March 31st 1995
609	Historic Style Street Light with Acorn Fixture	June 16th 1999
610	Historic Style Mastarm Street Light	June 16th 1999
611	Historic Style Concrete Footing and Base Detail	June 16th 1999

CITY OF PETALUMA
Department of Engineering

22 Bassett Street - Petaluma California 94952
707-738-4304 - Fax 707-738-4438

Approved By

Thomas S. Hargis

Thomas S. Hargis - R.C.E. 22566

Standard
STREET
LIGHTS
Table of Contents

Drawn by

Butch Smith

Scale

N. T. S.

Date

June 16th 1999 (Rev.)

File Number

Std. Det. SLS0000.600A




Page

600A

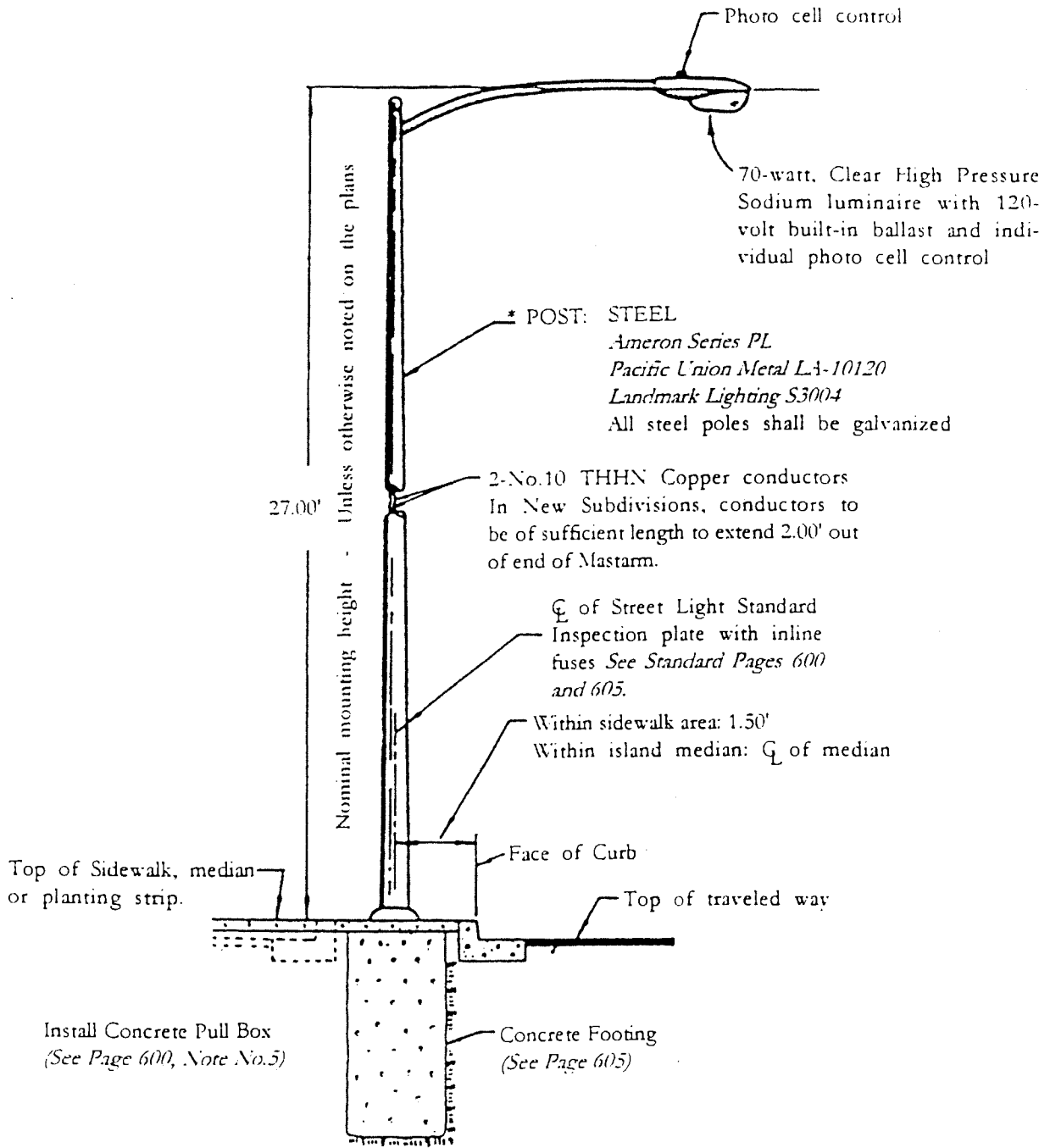
GENERAL NOTES (Continued)

14. Street light spacing shall be maintained per design criteria. Street light spacing shall be located at property lines when possible.
15. The minimum-average maintained foot-candles and uniformity ratio of all street lighting shall comply with design criteria.
16. All street lights equipped with a photocell control shall have the photocell oriented to the north.
17. All wire shall be THHN A.W.G. with the minimum size to be No.8 except within Street Lighting Standards, shall be No.10.
18. The developer/engineer shall make arrangements for service points with P.G.&E. The developer shall be responsible for all costs associated therewith which shall be paid directly to P.G.&E. The contractor shall verify the street light service point location(s) with P.G.&E. prior to installation.
19. New developments within an existing developed area shall install the entire lighting system, including luminaires.
20. All street light systems shall be designed for 120 volt service.
21. The current to be used to determine conductor sizes shall be determined as follows:

$$\text{Total Wattage of Fixtures Served} \times 3.5 \div \text{Service Voltage.}$$
22. Pole identification numbers shall be located on the street side of each luminaire. Minimum finished height 10'-0" from top of curb. Numbers for metal poles shall be a minimum of 4" x 2" reflective white on black with adhesive backs. Numbers for wood poles shall be a minimum of 3" x 2" stamped aluminum.
23. Project applicant shall provide as built to the City prior to the request for Street Light turn on. Street Light as built shall provide the following: Service connection points, conduit locations including distance from face of curb and depth.

<p>CITY OF PETALUMA Department of Engineering 22 Bassett Street - Petaluma California 949 2 707.778.4304 - Fax 707.778.4437</p>	<p style="text-align: center;">Street Light Standards General Notes (2)</p>	<p>Drawn by Butch Smith</p>	
<p>Approved By: <i>Thomas S. Hargis</i> Thomas S. Hargis - R.C.E. 22366</p>		<p>Scale: N. T. S.</p>	
		<p>Date: March 26th 1996</p>	<p>Page: 601</p>
		<p>File Number: Std. Det. SLS0000.601</p>	

Mastarm to extend 2.00' Minimum beyond curb face.



* Alternates to be specifically approved by the City Engineer

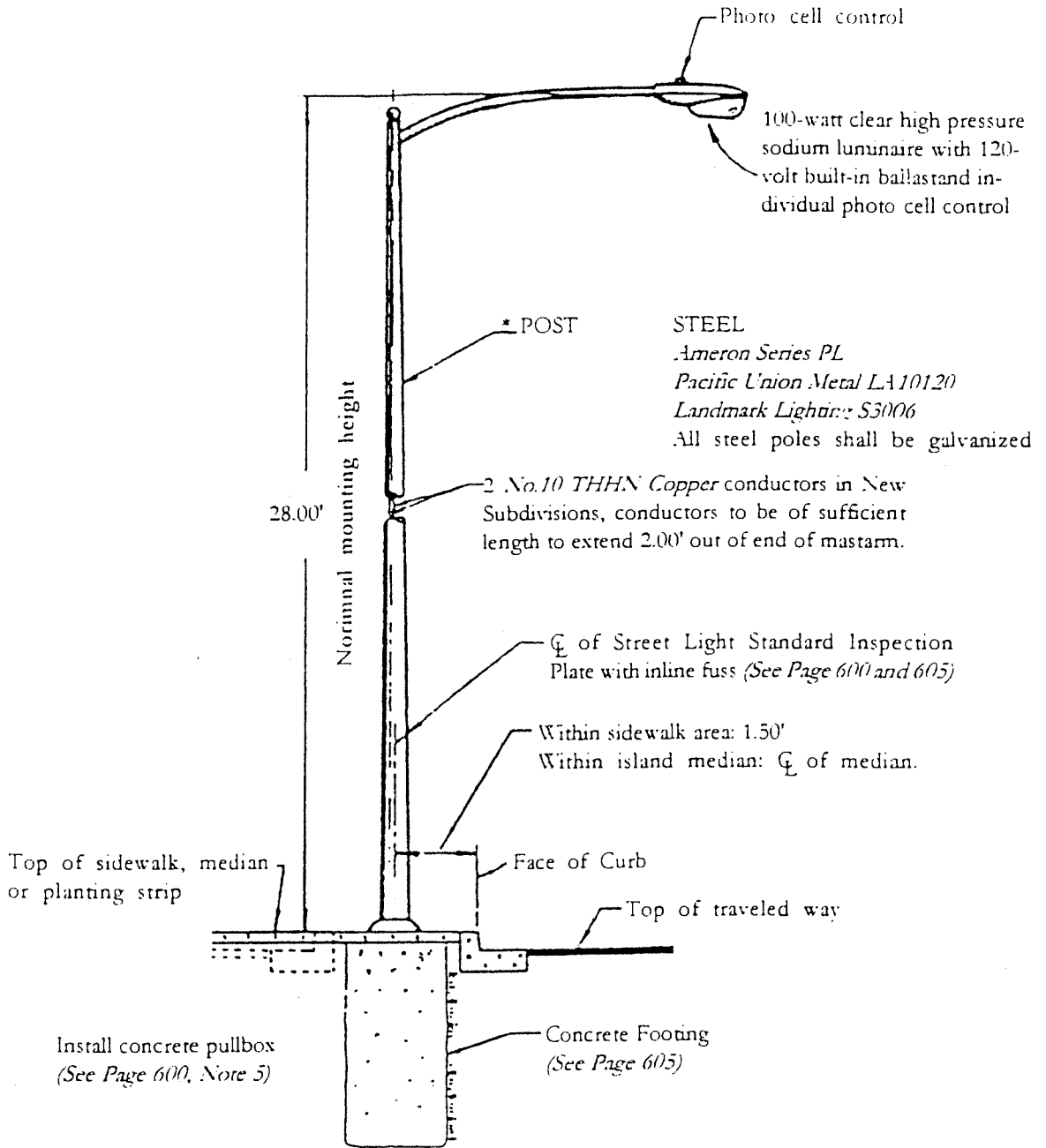
CITY OF PETALUMA
 Department of Engineering
 22 Bassen Street - Petaluma California 94952
 "0" "8 4304 - Fax "0" "8 443"
 Approved By
Thomas S. Hargis
 Thomas S. Hargis - R.C.E. 22366

Standards
 Street Light
 Local Street


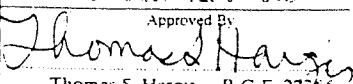
Drawn By
 Butch Smith
 Scale
 N. T. S.
 Date
 June 16th 1999 (Rev.)
 File Number
 Std. Det. SLS0000.602



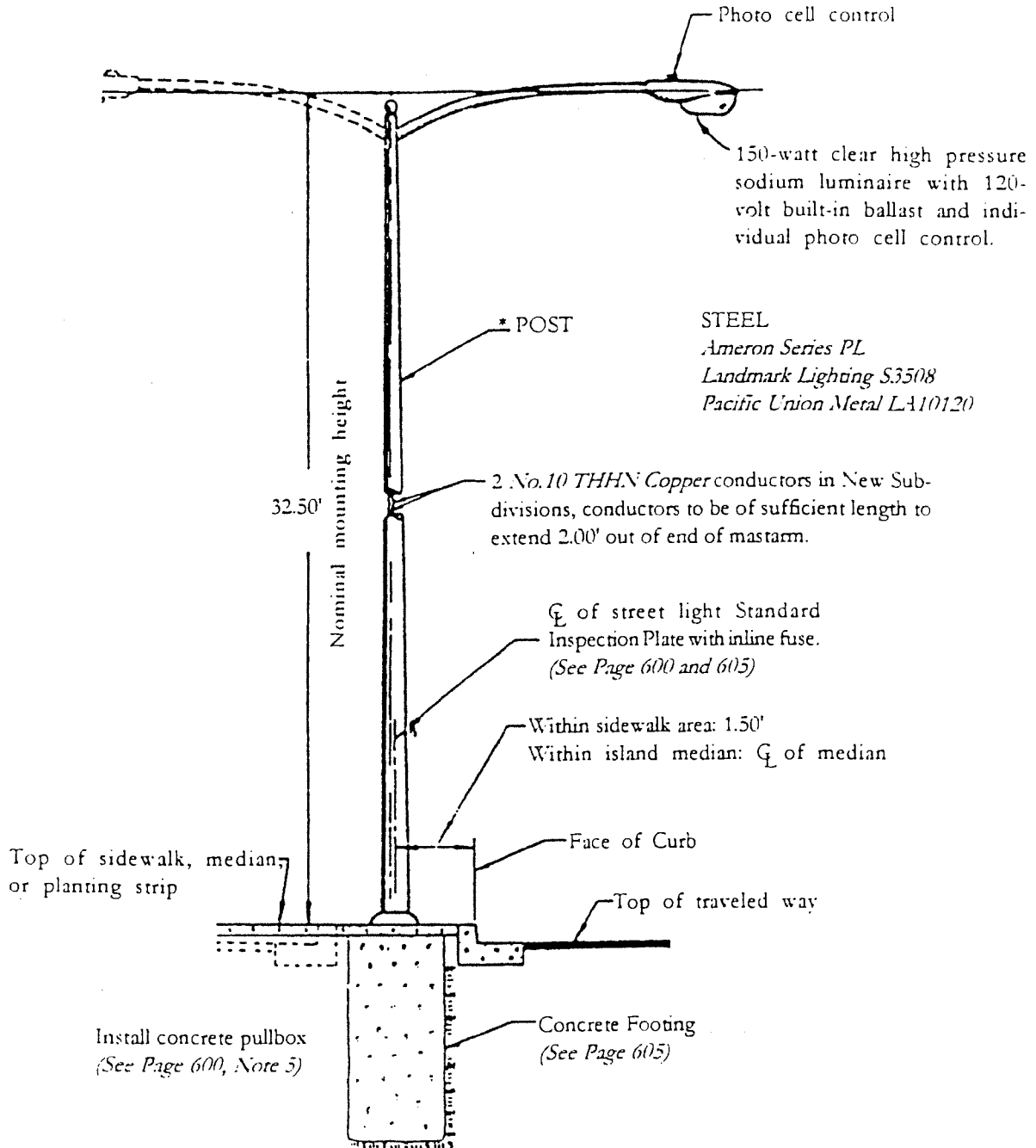
Mastarm to extend 4.50' Minimum beyond curb face.



* Alternates to be specifically approved by the City Engineer

<p>CITY OF PETALUMA Department of Engineering 22 Bassett Street - Petaluma California 94952 707-784-3041 - Fax 707-784-4137</p>	<p>Standard Street Light Collector Street</p>	<p>Drawn by Butch Smith</p>	
<p>Approved By  Thomas S Hargis - R.C.E. 22366</p>		<p>Scale N. T. S. Date June 16th 1999 (Rev.) File Number Std. Det. SLS0000.603</p>	

Mastarm to extend 6.50' minimum beyond curb face.




* Alternates to be specifically approved by the City Engineer.

CITY OF PETALUMA
 Department of Engineering
 22 Bassett Street - Petaluma California 94952
 707-768-4504 - Fax 707-768-4437

Approved By
Thomas S Hargis
 Thomas S Hargis - R.C.E. 22366

Standard
 Street Light
 Arterial Street

Drawn by
 Butch Smith
 Scale
 N. T. S.
 Date
 June 16th 1999 (Rev.)
 File Number
 Std. Det. SLS0900.604

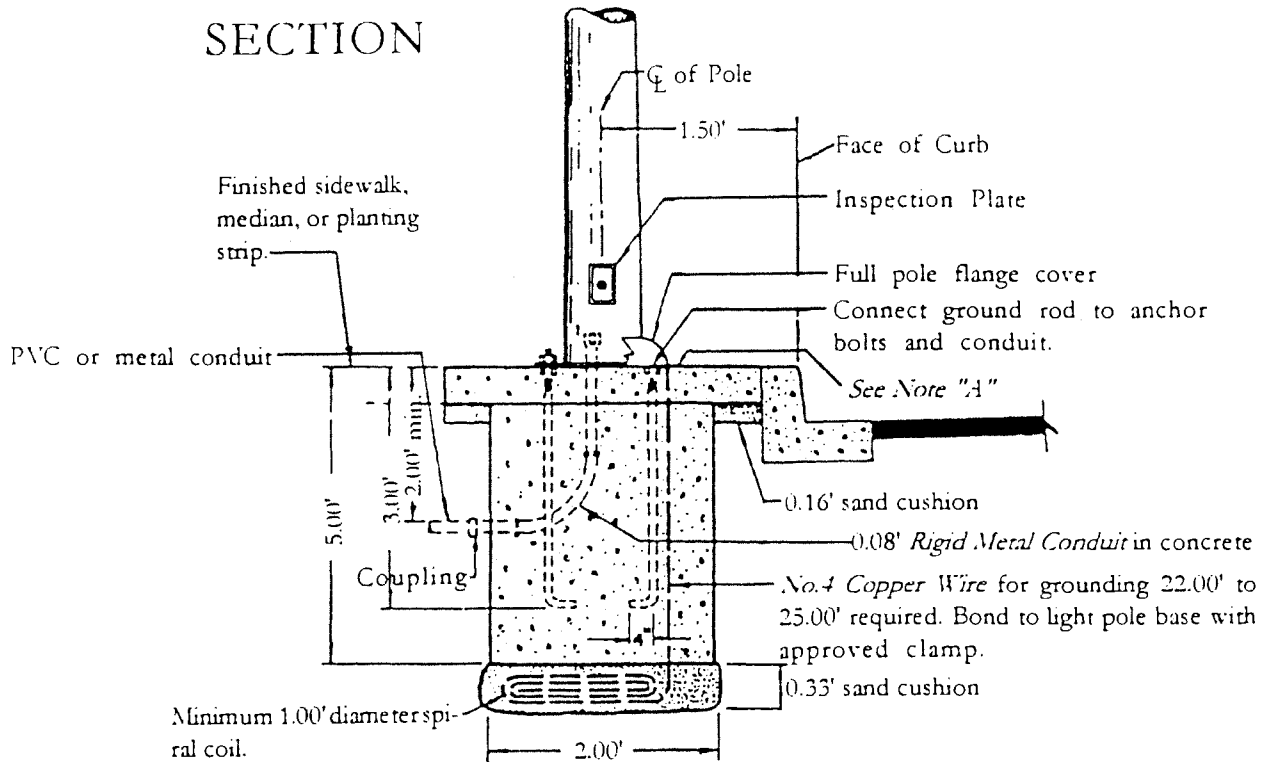

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 604

ALTERNATES:

Quickset Model No. L.F.-54

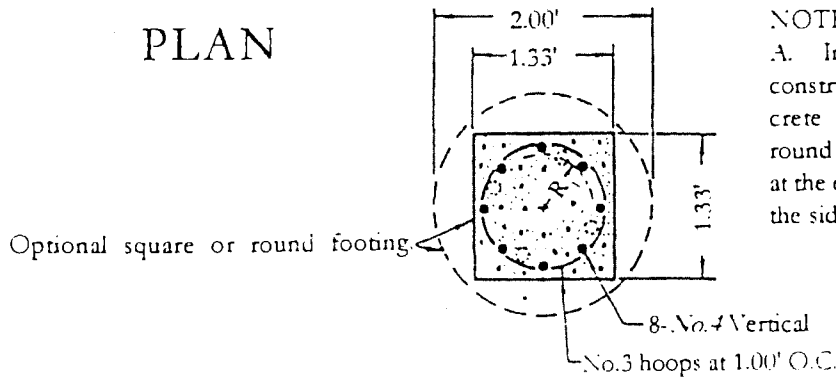
Brooks Products Inc. Model No. 85C-109

SECTION



Concrete shall be Class "A" P.C.C. poured against undisturbed soil.

PLAN



NOTES:

A. In undeveloped areas, construct a 2.00' x 2.00' concrete pad (0.33' thick). If round footing is poured, stop at the elevation of bottom of the sidewalk.

R = Anchor bolt diameter dimension radius and bolt pattern to suit pole base furnished.

CITY OF PETALUMA
Department of Engineering

22 Bassett Street - Petaluma California 94952
Phone 708 4304 - Fax 708 4437

Approved By:
Thomas S Hargis
Thomas S Hargis - R.C.E. 2266

Standard
Concrete Footing
Detail

Drawn by
Butch Smith

Scale

N. T. S.

Date

June 16th 1999 (Rev.)

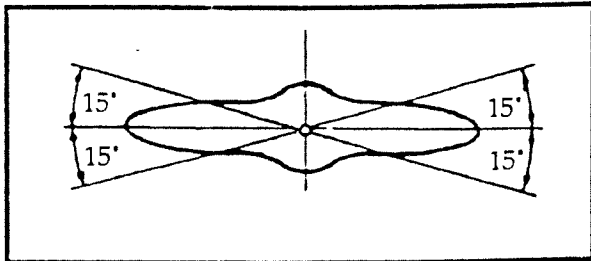
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Std. Det. SLS0000.605

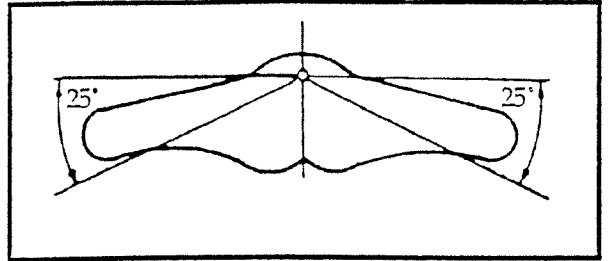


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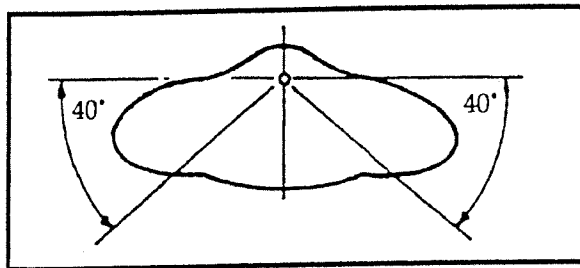
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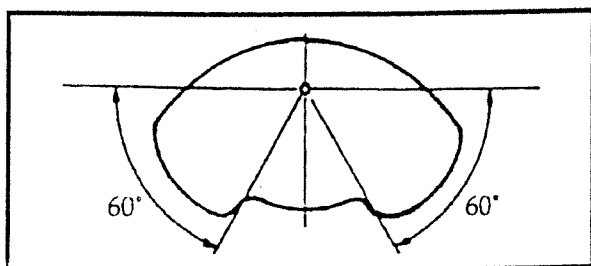
TYPE 1
CENTER OF STREET



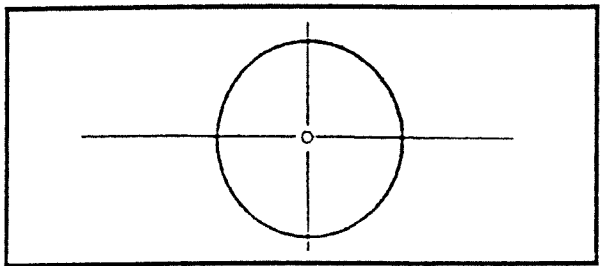
TYPE 2
SIDE MOUNTING
Standard for Local Street
unless noted otherwise



TYPE 3
SIDE MOUNTING
Standard for Collector and Arterial Streets
unless noted otherwise



TYPE 4
SIDE MOUNTING



TYPE 5

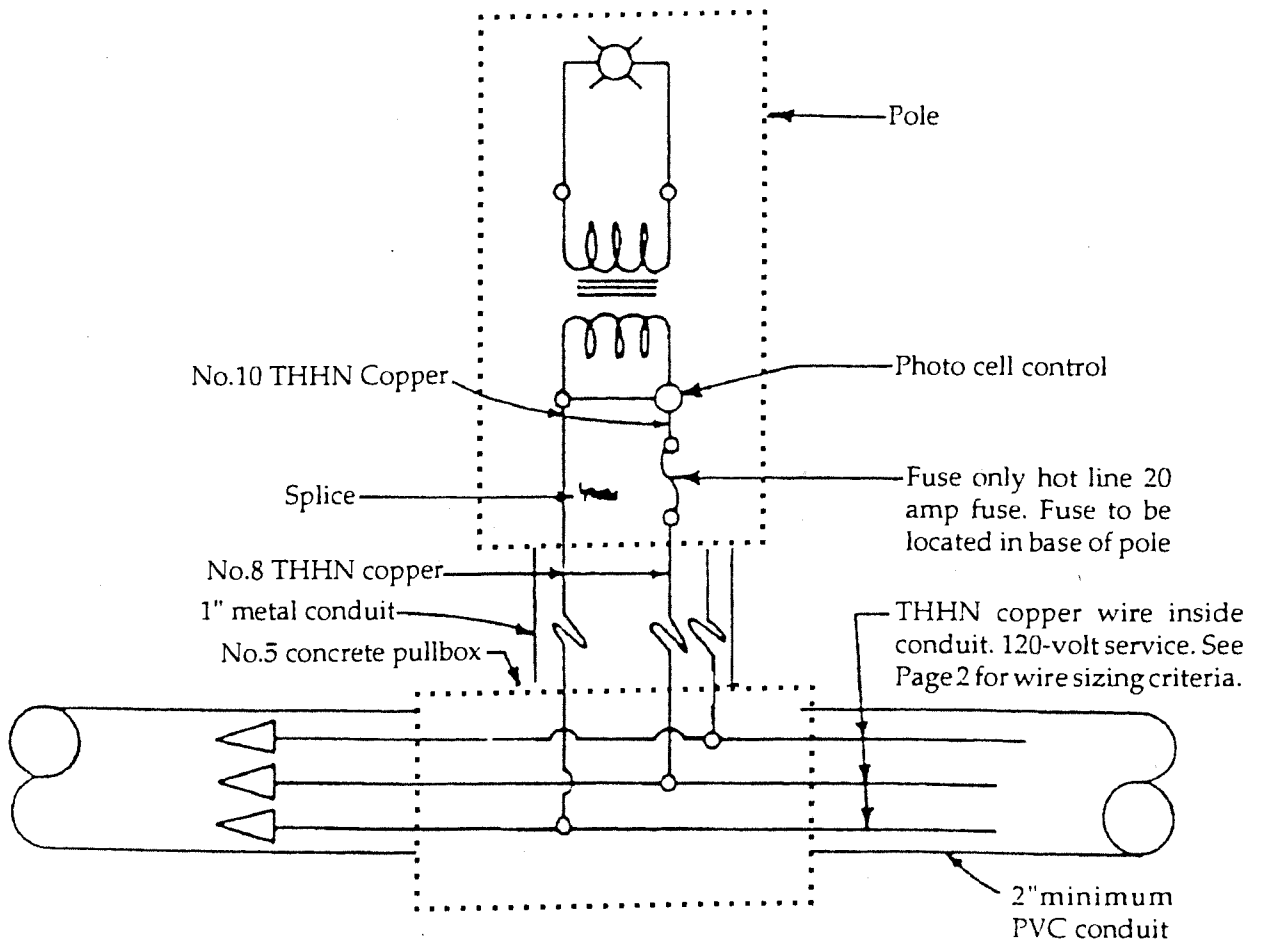
CITY OF PETALUMA
Department of Engineering
22 Bassett Street - Petaluma California 94952
707.778.4304 - Fax 707.778.4437

Approved By:
Thomas S. Hargis
Thomas S. Hargis - R.C.E. 22366


Standard
I. E. S.
Light Patterns

Drawn By:
Butch Smith
Scale:
N. T. S.
Date:
March 31st 1995
File Number:
Std. Det. SLS0000.606





**SCHEMATIC STREET LIGHT
WIRING DIAGRAM**

<p>CITY OF PETALUMA Department of Engineering 22 Bassett Street - Petaluma California 94952 707.778.4304 - Fax 707.778.4437</p> <p>Approved By: <i>Thomas S. Hargis</i> Thomas S. Hargis - R.C.E. 22366</p>	<p>Standard STREET LIGHT WIRING Light Patterns</p>	<p>Drawn by Butch Smith</p> <p>Scale N. T. S.</p> <p>Date: March 31st 1995</p> <p>File Number Std. Det. SLS0000.607</p>	 <p>Page: 607</p>
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AREA CLASS	ROADWAY CLASS	MIN. AVG. MAINTAINED F.C.	UNIFORMITY RATIO AVG.F.C. MIN.F.C.
RESIDENTIAL	LOCAL	0.2	4 : 1
	COLLECTOR	0.3	5 : 1
	ARTERIAL	0.75	3 : 1
URBAN	LOCAL	0.2	4 : 1
	COLLECTOR	0.3	5 : 1
	ARTERIAL	0.75	3 : 1
COMMERCIAL	COLLECTOR	0.3	5 : 1
	ARTERIAL	0.75	3 : 1

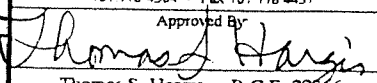
AVERAGE MAINTAINED F.C. IS: $F.C. = \frac{(LL) (MF) (CU)}{(W) (S)}$

- FC = Illumination in footcandles
 LL = Rated initial lamp lumens
 MF = Maintenance factor
 CU = Coefficient of utilization
 W = Street width (curb to curb)
 S = Spacing of luminaires

- MINIMUM F.C. IS: $FC = (fc) (LF) (MF) (CF)$
 FC = Minimum point footcandles
 fc = Raw total footcandles (at darkest point)
 LF = Lamp factor
 MF = Maintenance factor
 CF = Mounting height correction factor

UNIFORMITY RATIO = $\frac{\text{AVERAGE FOOTCANDLES}}{\text{MINIMUM FOOTCANDLES}}$

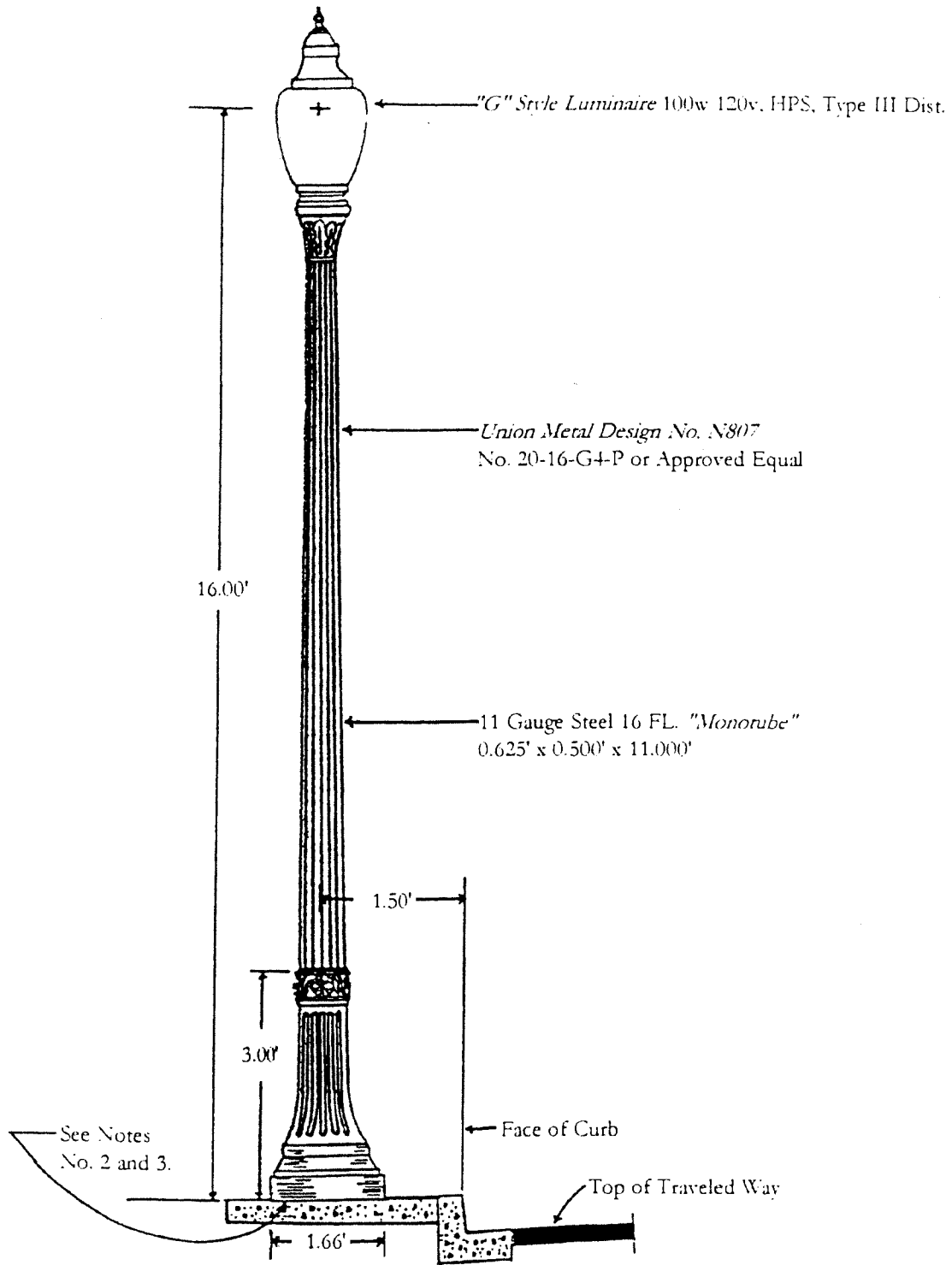
CITY OF PETALUMA
 Department of Engineering
 22 Bassett Street - Petaluma California 94952
 707 778 4304 - Fax 707 778 4437

Approved By:

 Thomas S. Hargis - R.C.E. 22566

**Standard
 Roadway
 Illumination**

Drawn by:
 Butch Smith
 Scale:
 N. T. S.
 Date:
 March 31st 1995
 File Number:
 Std.Det. SLS0000.608





NOTES:

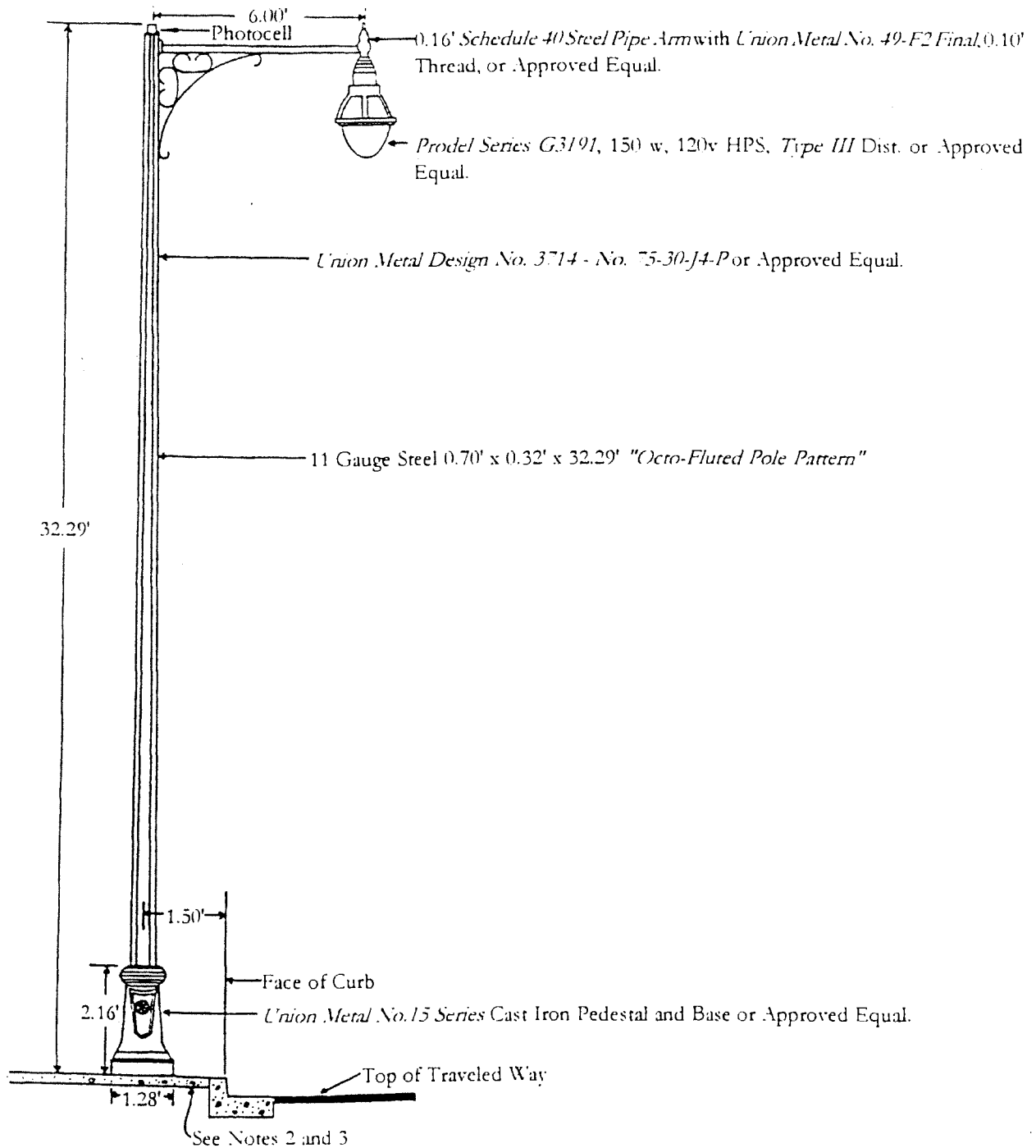
1. Design shall conform to these requirements except as otherwise approved by the City Engineer by variance.
2. Ground surface at base must be level
3. (4) 0.08' x 2.50' Anchor Bolts shall be used on the 1.00' base coupling.

CITY OF PETALUMA
 Department of Engineering
 22 Bassett Street - Petaluma California 94952
 "0" "8 4304 - Fax "0" "8 443"
 Approved By
Thomas S Hargis
 Thomas S Hargis - R.C.E. 22366

**Historic Style
 Street Light
 With Acorn
 Fixture**

Drawn by
Butch Smith
 Scale
N. T. S.
 Date
June 28th 1999 (Rev.)
 File Number:
Std. Det. SLS0000.609

Page
609



NOTES:

1. Design shall conform to these requirements except as otherwise approved by the City Engineer by variance.
2. Ground surface at base must be level.
3. (4) 0.06' x 2.50' Large Anchor Bolts (0.33' Proj.) with (2) Hex Nuts shall be used on the 0.83' Base Coupling.

CITY OF PETALUMA
Department of Engineering

22 Bassett Street - Petaluma California 94952
"0" "8 4304 - Fax "0" "8 443"

Approved By

Thomas S. Hargis
Thomas S. Hargis - R.C.E. 22366

Historic Style
Mastarm
Street Light

Drawn by
Butch Smith

Scale
N. T. S.

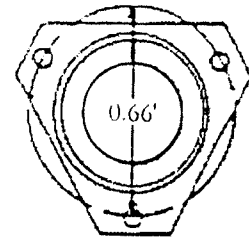
Date
June 28th 1999 (Rev.)

File Number
Std. Det. SLS0000.610



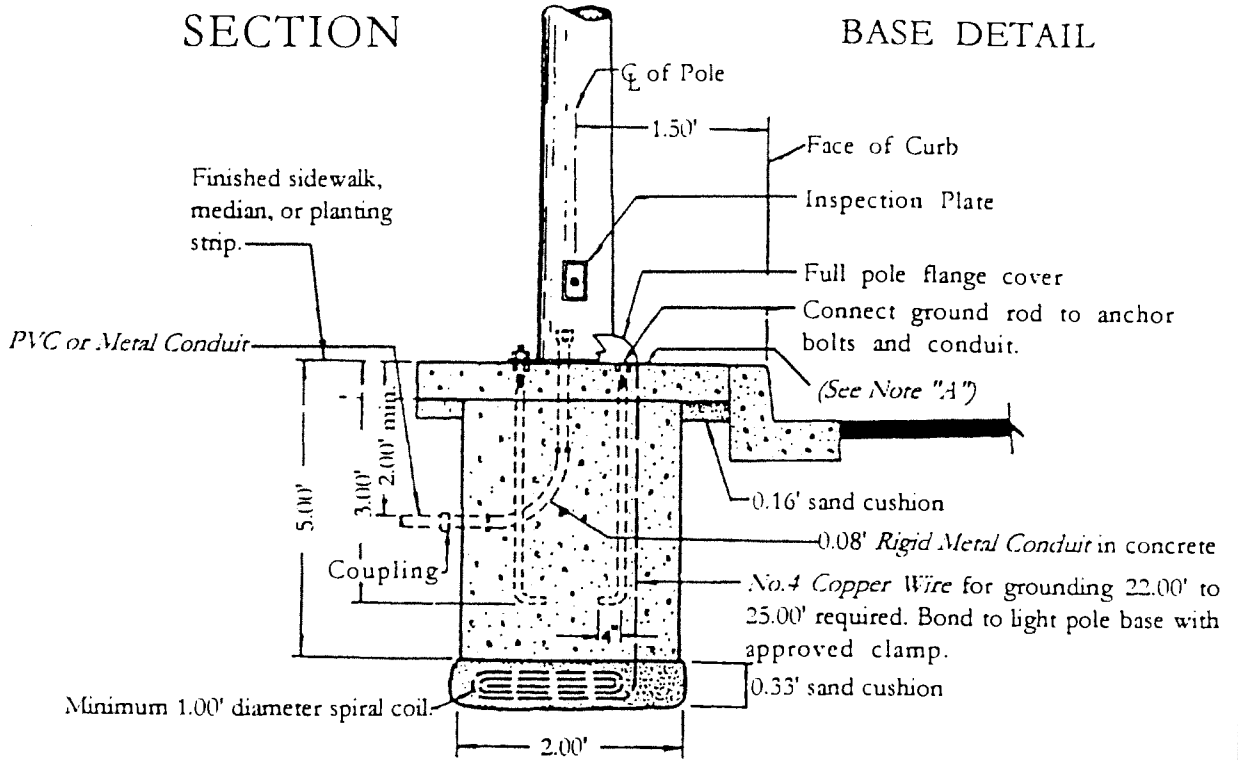
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ALTERNATES:
 Quikser Model No. L.F.-54
 Brooks Products Inc. Model No. 85C-109



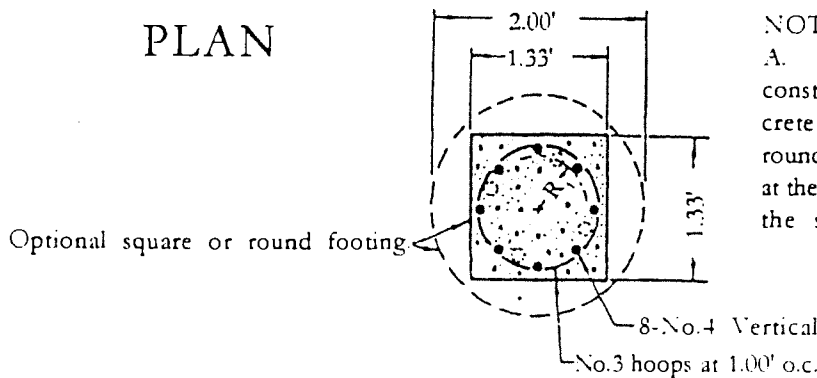
SECTION

BASE DETAIL



Concrete shall be Class "A" P.C.C. poured against undisturbed soil.

PLAN



NOTES:


A. In undeveloped areas, construct a 2.00' x 2.00' Concrete Pad (0.33' thick). If round footing is poured, stop at the elevation of bottom of the sidewalk.

R₁ = Anchor bolt diameter dimension radius and bolt pattern to suit pole base furnished.

CITY OF PETALUMA
 Department of Engineering
 12 Bassett Street - Petaluma California 94952
 "07" 78 4304 - Fax "07" 78 443"
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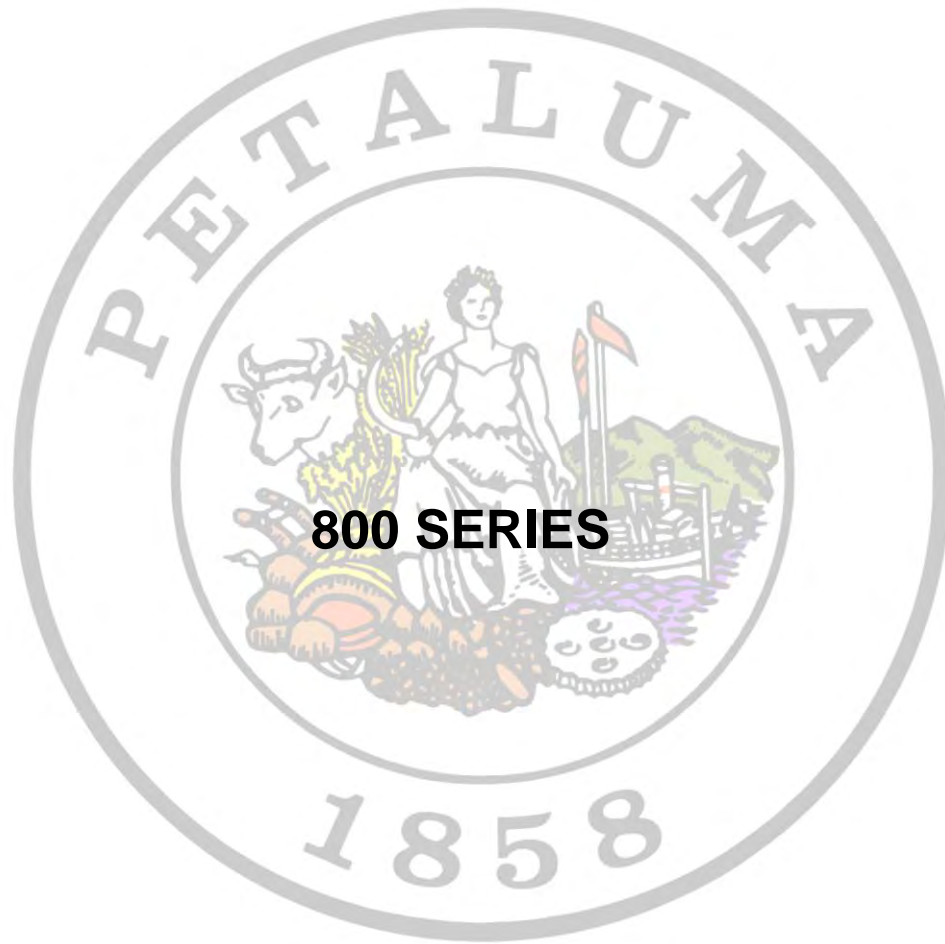
Historic Style
 Concrete Footing
 and Base Detail

Drawn by
 Butch Smith
 Scale
 N. T. S.
 Date
 June 16th 1999 (Rev.)
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Water System

- Design Guidelines
- Construction Standards
- Approved Materials List
- Installation Specification No. 11



City of Petaluma - Sonoma County - California

Public Works & Utilities

202 North McDowell Boulevard

Petaluma, CA 94954

APPROVED BY:

Jeff Stutsman, City Engineer

1/3/2022

Date

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Construction Standards

Approved Materials List

Installation Specifications

Water System Design Guidelines

A. PURPOSE

To provide guidelines for the design and construction of water utility projects and thereby reduce the time required for processing the plans. These guidelines do not include, but may reference, additional conditions, which may be promulgated by all other pertinent ordinances, codes, and official policy set forth by other departments of the City of Petaluma or other government agencies. These guidelines are intended to impose minimum acceptable design criteria. More stringent requirements may be imposed at the discretion of Public Works & Utilities Department based on specific project conditions. It is the responsibility of the design engineer to initiate written requests for approval of any design concepts contrary to these criteria, to verify additional requirements imposed, perform any necessary calculations or studies, and resolve specific design problems with the appropriate department or division.

B. WATER SYSTEM

1. Water Main Materials

- a. 8-inch thru 12-inch water mains shall be Polyvinyl Chloride (PVC) C900, Class 200, minimum, or cement lined ductile iron pipe, C151, Class 50, minimum.
- b. Polyvinyl chloride (PVC) pipe shall be new pipe, minimum Class 200, or as shown on the plans and conforming to the requirements of AWWA C900 "Standard for Polyvinyl Chloride Pressure Pipe, 8-inch through 12-inch for Water" and shall be furnished with either bell ends or couplings designed to effect an elastomeric pressure seal.
- c. Ductile iron pipe shall be cement lined, new pipe conforming to the most recent issue of A.N.S.I. A 21.51 1976 or most recent issue, if any, as sponsored by the American Water Works Association for thickness Class 50 Ductile Iron Pipe. The pipe shall be furnished with bell and spigot end, "Tyton Joints" or Mechanical Joints except where otherwise specified on the plans.
- d. Ductile iron pipe must be polyethylene encased (8 mil. minimum) in accordance with ANSI/ AWWA C105.
- e. 16-inch or 18-inch diameter water mains shall be cement lined ductile iron pipe or PVC C905, 235 psi or as shown on plans and specifications.
- f. 20-inch and larger water mains shall be constructed as directed by the Public Works & Utilities Department
- g. Asbestos cement pipe shall not be installed under any circumstances.
- h. All cutting, handling, and disposal of asbestos cement pipe shall be done in compliance with the Contractor's State Licensing Law and all applicable laws and regulations.
- i. Mains outside the paved roadway or crossing a delineated fault zone must be ductile iron pipe.

2. Water Main Alignment

- a. Alignment shall be in accordance with the provisions of City Standards.
- b. Public water mains outside the public street are not allowed without special permission from the Public Works & Utilities Department and shall be installed to City Standards located in an exclusive, dedicated minimum 10-foot-wide paved easement per City Resolution 91-17 N.C.S., "Water mains including fire hydrants and service laterals to the meters or detector check valves shall be publicly maintained." For ease of maintenance, public water systems shall always be in asphalt, concrete, or turf block surfaced area with a buffer area from buildings, carports, and landscaping whenever feasible. This will provide for all weather surfaces to allow the Public Works & Utilities Department to be able to make repairs at any time and allow sufficient operating room for equipment normally used in water line maintenance. Private utilities shall not be allowed to share the easements set aside for water mains on private property. Overhangs of buildings shall not be allowed to project over a utility easement. Trash enclosures, transformer pads, retaining walls, carports, or other structures shall not be located closer than ten (10) feet from a water utility easement. The location of trees in relationship to utilities shall be coordinated with the Public Works & Utilities Department.
- c. Minimum allowable radius for 8-inch-diameter water mains is 250-feet, for a 12-inch diameter water main is 350 feet, or per the pipe manufacturer's recommendations. Whenever possible, new mains shall be roped to avoid obstacles rather than using angle fitting.
- d. New mains must match the grade and centerline offset of existing water mains where possible. Start excavation by exposing end of existing main to determine its line and grade. Start new main 8-10 feet from and on same line and grade as existing main. Pipe lying shall then be adjusted so depth of new main conforms to Section B-4 Water Main Cover.
- e. Maintain a constant distance from centerline of street wherever possible, center easement over water main alignment where applicable.
- f. Conform to the State of California Department of Health Services "criteria for the vertical and horizontal separation of water main and sanitary sewers" and City Standard 855.03.
- g. The minimum vertical clearances shown in City Standard between a main and pipes or structures must be maintained unless special permission allowing a low head crossing is obtained from the Public Works & Utilities Department. A low head crossing over or under a structure when allowed by the Public Works & Utilities Department will require the installation of a 1-inch thick felt or rubber expansion cushion between pipes. The Public Works & Utilities Department may require concrete encasement. Ductile iron pipe Class 52 minimum shall be used for low head crossings and shall extend a minimum of 36 inches beyond the plumb line of the pipe or structure crossed.
- h. When the structure or pipe to be crossed is less than 6 inches in size (such as a telephone conduit) at the Public Works & Utilities Department's discretion, low head-clearance requirements may be waived.
- i. Minimum separation from existing gas, electrical, and telephone lines shall be 36 inches between pipes in any direction from the outside of pipe.

- j. Metallic pipe fitting shall not be installed within ten (10) feet of any pipeline that is protected by induced current unless approved by the Public Works & Utilities Department
- k. Minimum clear horizontal separation from a storm drain shall be 5 (five) feet measured from the outside of pipe.
- l. New water main crossing utility trench lines shall be made at angles between 90° and 45° whenever possible.
- m. Number 12 THHN insulated copper wire shall be secured to the top of and along the entire length of all mains and service laterals, and shall be extended to the surface at all valve locations, blow-offs, and meter boxes sufficiently for locator equipment to be attached, as noted on City Standard. All wire connections shall be made with copper crimps wrapped with electrical tape. Ductile iron fire-hydrant laterals or services are exempted.

3. Water Main Sizing

- a. Water mains must be sized to meet minimum California Fire Code requirements.
- b. For residential/commercial installations, public and private mains shall be an 8-inch minimum unless otherwise allowed by the Public Works & Utilities Department.
- c. For industrial installations, water main sizing in a looped system shall have a minimum pipe diameter of 8 inches; a dead-end system requires a minimum of 12-inch diameter pipe.
- d. The Public Works & Utilities Department may modify specification size requirements to provide the pipe size for overall system benefit.

4. Water Main Cover

- a. Definition: Cover is the distance from the top of the pipe to finished grade.
- b. Minimum depth of cover from finished grade shall be: 32 inches for 6-inch mains, 36 inches for 8-inch mains, 42 inches for 12-inch mains, and 48 inches for mains larger than 12-inches.
- c. Where cover is less than the standard cover, Class 52 ductile iron pipe and special permission from the Public Works & Utilities Department is required. Concrete encasement or a cap may also be required by the Public Works & Utilities Department to protect the water pipe.
- d. Where cover exceeds 8 (eight) feet, special permission from the Public Works & Utilities Department is required.

5. Water Main Connection to an Existing Main

- a. In most major streets, or in new streets, the new water main must be bored and jacked into place. Conditions should be verified to be consistent with the City of Petaluma's "Street Cut Policy."

- b. For connecting 2-inch-diameter pipes and smaller, the contractor will be responsible for making the hot taps unless arrangements are made with the Public Works & Utilities Department for the service.
- c. For connections of pipes 4–12 inches in diameter, a hot tap or a cut-in tee may be used as determined by the Public Works & Utilities Department in conformance with the provisions of the Water System Guidelines, Section 10.m. These hot taps shall be made by the Public Works & Utilities Department at the contractor's expense. 24-Hour advance notice is required.
- d. A cut-in tee must be used if additional valves are required on the existing main. If the new lateral is larger than the existing main, the tee shall be the size of the new lateral and reduced to the size of the existing main.
- e. Any tapping sleeve or service saddle used must be on the Approved Materials List.
- f. Mechanical joint continuous-sleeve type couplings shall be used for all spigot-to-spigot pipe connections. Mechanical Joint (MJ) sleeves shall comply with AWWA C110 Table 10.10 or C153 Table 53.5. The pressure class shall be 350 psi. In cases of differing pipe ODs, a ductile iron or cast iron MJ transition sleeve or coupling shall be used. For transition couplings larger than 12-inch diameter, submit manufacturer's specification data for approval. Steel couplings shall not be permitted.

6. Water Main Flanged Coupling and Adapters

- a. Flange Coupling Adapters (FCA) - Short body ductile iron or cast-iron FCA's are permitted in manhole or vault type installations where minimal laying length dimensions are required. Acceptable FCA's are listed in the Approved Materials List.

7. Water Main Fittings

- a. All fittings shall be new ductile iron fittings conforming to ANSI/AWWA C110 thru C153 or of latest revision and shall have the proper type of ends to match the type of pipe used.
- b. Gaskets for flange fittings shall conform to AWWA STD. C115.
- c. Ductile iron fittings shall be cement mortar lined or fusion-bonded epoxy coated in accordance with AWWA C104 of latest revision and shall have petroleum asphalt outside coating conforming to AWWA C110. Ductile iron fittings shall have a minimum pressure rating of 250 psi and shall otherwise meet or exceed the pressure rating of the pipe to be installed and shall have a minimum Class 53 thickness rating.

8. Valves

a. General

1. Valves at intersections shall be in accordance with the provisions of City Standard 871. Main line valves within two hundred and fifty (250) feet of an intersection may be considered as part of the intersection. Valves shall be located so that no more than eight hundred (800) feet of water main would be out of service in the event of a shut down.
2. All hydrants must be on separate valve sections of the public main. No service connections are allowed between any hydrant and its isolation valve.
3. After a street has been overlaid, all water-valve boxes will be marked in white paint before the close of that workday. Within forty-eight (48) hours of paving, all water-valve boxes shall be brought to grade, cleaned out, and inspected by the contractor.
4. All bolts, nuts, and washers shall be stainless steel.
5. Where the vertical distance from the top of the operating nut exceeds four (4) feet from the finished grade, the Contractor shall install a valve stem extension per City Standard.
6. All valves shall be wrapped with 10-mil minimum polyethylene.
7. 4-inch thru 12-inch main line valves shall be resilient seat gate valves. 16-inch and larger mainline valves shall be butterfly valves.
8. Contractors are prohibited from operating valves or hydrants on the City system. Fines may be levied for violation per *City Resolution No. 94-317 NCS*. Only Public Works & Utilities Department authorized personnel shall operate valves on water mains or water services.

b. Gate Valves

Gate valves shall be AWWA-approved resilient seat gate valves with non-rising stem opening counter-clockwise conforming to the latest AWWA C509 standard. Valves shall be manufactured by Clow, American Flow Control, American AVK, or approved equal. All internal and external surfaces of the valve body and bonnet shall have a fusion-bonded epoxy coating complying with ANSI/AWWA C550, applied electro-statically prior to assembly. All bolts, nuts, and washers shall be stainless steel. Valves shall be wrapped with 10-mil minimum polyethylene.

c. Butterfly valves

Butterfly valves shall have a ductile iron body, stainless steel shaft and discs with stainless steel seating edge. Valve seats shall be vulcanized, bonded, mechanically secured, or clamped to the body. Valves shall be the stub or through shaft design type. Wafer type valves shall not be permitted. Valves shall be the traveling nut type and open with a counter-clockwise rotation. Valve discs shall rotate 90 degrees from the full open position to the tight shut position. The valve seat shall provide a seal at a pressure differential of 150 psi upstream and 0 psi downstream in either direction. Valves shall have a fully lined rubber inner body or have corrosion resistant fusion-bonded epoxy coating internally and externally. Butterfly valves shall be manufactured and tested in accordance with AWWA Standard C504 for Class 150B.

9. Service Laterals and Water Meters

- a. All Public Works & Utilities Department water meters, blow offs, valves, hydrants, or other facilities shall be located in a utility easement or right-of-way. See *Section B. 2. b.*
- b. As part of the plan approval process, two sets of detailed plans showing all meter sizes and calculations used by the Design engineer to determine the meter(s) size(s) proposed shall be submitted to Public Works & Utilities Department for approval for any water meter that will serve irrigation or domestic use other than for a single family dwelling. Public Works & Utilities Department shall determine water meter size.
- c. Service laterals other than those shown or noted on approved plans shall not be installed prior to obtaining the Public Works & Utilities Department approval.
- d. New or remodeled single-family residential construction shall be:
 1. Minimum of 1½-inch lateral service from the main to the meter.
 2. Minimum of 1-inch water meter flange, bushing, and meter coupling shall be supplied by contractor
 3. Approved double check backflow shall be as close to the meter as possible
 4. Minimum 1½-inch or larger service from the meter to the dwelling, depending on calculated flow for fire sprinkler system. The Fire Marshal will verify the size of this pipe based on fire flow requirements.
 5. Provide a single check valve device on the fire sprinkler system; installed on or near the sprinkler riser.
 6. All water connection fees as established by the Public Works & Utilities Department for the appropriate-sized meter will be charged, as required.
 7. Service laterals and meters under 1" will be upgraded to 1 ½ lateral and 1" meter for fire sprinkler system. The Fire Plans Examiner will coordinate with the building owner and/or contractor to determine the best solution to provide the fire sprinklers, i.e., pump and tank assembly, or upsize lateral to 1 1/2" and 1" meter. If upsizing the water meter or the laterals is necessary, the plans examiner will obtain concurrence from both the Public Works & Utilities Department, Fire Plan Examiner and Community Development before requiring them.
 8. Any new residential fire sprinkler application requiring a meter larger than 1 inch will be required to provide a separate lateral and meter from the domestic supply.
 9. An approved double check backflow will be installed where fire sprinklers are required, as close to the meter as possible.
- e. Unless otherwise shown on the approved plans, 2-inch water service laterals shall be installed in commercial developments.
- f. Water and sewer service laterals shall be separated horizontally by a minimum of 5 (five) feet or greater and as otherwise required by health codes.
- g. At the location of each water service lateral, the letter "W" shall be inscribed into the face of the curb. The letter "W" shall be 4 inches high and completely legible.
- h. Water service laterals 2" or less in diameter shall be polyethylene plastic tubing Class 200, PE 3408, CTS, and shall conform to AWWA STD C901. All connections are to be compression type with plastic inserts used. Tubing shall be installed per manufacturer's recommendation. All water or fire service laterals or stub-outs larger than 2 inches in size must be constructed of ductile iron pipe.

- i. All meter boxes, vaults, and pits shall be bedded on 3-inch minimum thick $\frac{3}{4}$ -inch drain-rock and bedded against compacted or undisturbed base. Additional bedding material may be required to stabilize moisture saturated base. Aggregate Base (AB) shall not be used as bedding or to stabilize moisture saturated base. Bedding shall extend to a 4-inch minimum distance beyond all sides of the meter box. Box shall be set flush with top of curb, sidewalk, or ground, whichever is applicable. Lot numbers must be noted on topside of meter box with a permanent-marking pen. If the meter is located in such a way that water will pond over it, a drain line that will keep the water meter level below the meter shall be installed to the Public Works & Utilities Department's satisfaction.
- j. Where a fire hydrant is not required by the Fire Department, any water service stub-in larger than 2 inches must have a blow off at the end of the stub-in set in a meter boxes in the public right-of-way per City Standard.
- k. Meter boxes shall be located out of traffic loading areas whenever possible. Meter boxes and vaults shall be set so that the reading lids are aligned over the meter registers as closely as possible.
- l. Unless otherwise approved by Public Works & Utilities Department, the on-site water service shall be at a minimum the same size as the water meter or 1 $\frac{1}{2}$ ", unless fire sprinklers are required.
- m. New service laterals must be installed and aligned generally perpendicular to the water main and property frontage. Horizontal offsets greater than 24 inches from the service alignment shall require prior approval of the Public Works & Utilities Department.
- n. All meter manifolds must be detailed and approved by the Public Works & Utilities Department. In general, manifolds where all fittings are 2 inches or less, shall be constructed from threaded brass pipe and fittings from the end of the service lateral to the meter connection. No soldered copper, PVC, plastic, or galvanized pipe shall be used in constructing manifolds of any size. Polyethylene plastic tubing Class 200, PE3408 C.T.S. may be used for straight sections of the manifold longer than 12 inches. On water service manifolds having water meters larger than 2 inches, the service manifold must be constructed of flanged ductile iron pipe and in accordance with the City's Standard Details. No more than six (6) meters may be on a manifold off of a single water service lateral without prior approval of the Public Works & Utilities Department. Main shutoff valve for manifold shall be installed in a valve box separate from the meter boxes.
- o. Residential (single-family unit)
 - 1. One (1) meter per lot unless approved by the Public Works & Utilities Department. Approved double check valve devices are required.
 - 2. Where fire sprinklers are required or in low pressure area, install individual 1 $\frac{1}{2}$ -inch service(s) and 1-inch meter(s). Single check valve shall be required to separate the systems on the site.
 - 3. Approved double check shall be installed as close to the meter as possible.
- p. Accessory Dwelling Units (ADU)
- q. Apartments (2-6 units) must be individually metered.
- r. Apartments (7 or more units) and mobile home parks (under common control)
 - 1. May be master metered or individually metered with the size based on the total demand.

2. Separate irrigation meters are required.
 3. This may require a combination water service.
 4. Apartment or mobile-home park owners may sub-meter to the tenants at their own expense but must first obtain City authorization per City Ordinance 15.12.050.
 5. All meters 3" and larger will have a bypass installed per Standards 866.01-868.02
- s. Condominiums
1. Must be individually metered.
 2. Individual meters must be clustered and located within the public right-of-way.
 3. A maximum of six (6) meters is allowed per manifold.
 4. Separate irrigation meters for common areas are required.
 5. Combination water services may be required.
- t. Commercial
1. Size of the meter and service are based on calculations by the design engineer and approved by the Public Works & Utilities Department
 2. A separate irrigation meter is required.
 3. Unless otherwise approved by the Public Works & Utilities Department, a minimum 2-inch service shall be required for any commercial lot.
 4. A minimum 8-inch service shall be required for industrial lots and shopping centers on lots of one acre or larger.
 5. All commercial installations shall be required to meet backflow prevention requirements per City Ordinance 15.09.
 6. All meters 3" and larger will have a bypass installed per Standards 866.01-868.02
- u. Combination services
1. 8-inch laterals are the minimum required for most installations.
 2. Combination services are required in commercial subdivisions per City Standard.
- v. Irrigation
1. Separate irrigation meters must be provided for all commercial users, master metered condominiums, Planned Unit Developments, apartment complexes (7 or more units), and mobile-home parks.
 2. All irrigation services in industrial areas or new City facilities must have reduced pressure backflow devices unless otherwise determined by the Public Works & Utilities Department.
 3. Irrigation water demands shall be determined by the maximum flow required at any one control valve or combination of valves operated the same time.
 4. Sizing of irrigation meters shall be coordinated with and approved by the Public Works & Utilities Department. At the design engineer's option, the irrigation demand may be disconnected from the domestic demand when connected to a common service lateral.
 5. Backflow devices specified on the irrigation plan must conform to City Standard and must be on the current USC University of Southern California and the state of California Department of Health Services Approved List of Devices.
- w. Private fire systems
1. Before combustible materials may be stored or constructed on site, the Fire Department must approve fire flow and access per City Code Section 17.20 and California Fire Code, and all hydrants serving the construction site shall

be operable. Before a fire hydrant may be placed in service, a high velocity flush of the fire hydrant shall be witnessed and approved by the Fire Inspector or Public Works and Utilities Department in conformance with the provisions of City Standard 850 Section J15 and conform to National Fire Protection Association (NFPA) standards.

2. Lateral size must be the same or larger than the size required for the sprinkler system or the private hydrant system.
 3. Additional services will require upsizing of common laterals (combination service).
 4. All private fire systems require detector check assemblies in accordance with City Standard.
 5. At a minimum double detector check backflow assemblies shall be required in accordance with City Standard if the fire system contains:
 - (1) Chemicals, or
 - (2) An auxiliary water supply (well) exists on site, or
 - (3) A health hazard exists on the site, or
 - (4) More than one feed from the City water supply to the property, or
 - (5) A building of 3 or more stories
 - (6) Public Works & Utilities Department to make final determination on degree of hazard and level of protection.
 6. On residential fire systems, install a 1½-inch service lateral from water main and a 1-inch meter unless otherwise determined by the Public Works & Utilities Department. Unless specifically approved by the Public Works & Utilities Department, meters larger than 1 inch will not be installed for single-family residential use. Meters that are larger than the lateral are prohibited. An approved double check assembly must be installed as close as possible to the meter. See detail City Standards 874-875
 7. Fire Department connection location must be approved by the Fire Department and conform to NFPA standards.
 8. The maximum length of a fire hydrant lateral from a private main to the hydrant buried is (forty) 40 feet.
 - (1) Where the intended use of the water services requires an uninterrupted supply, the design engineer shall submit a meter bypass detail to Public Works & Utilities Department for approval. The bypass design will allow the meter to be taken out of service for repairs and testing. See Standards 866-868
- x. Where multiple taps are made for 1½-inch services, the taps must be made a minimum of 18 inches apart and a minimum of 18 inches from any joint or fitting.

10. Fire Hydrants

- a. Minimum fire flow required at all fire hydrants
 1. Residential buildings-1,500 gallons per minute with a 20-psi residual.
 2. Industrial and commercial buildings-2,500 gallons per minute with a 20-psi residual.
 3. Lower fire flows may be permitted with approval of the City Fire Marshal when a built-in fire suppression system is provided in the building.
- b. Fire hydrants shall conform to the Approved Materials List.
- c. Location of fire hydrants must be approved by the Fire Department.
- d. Each hydrant must be on a separate valved main line section. The fire hydrant lateral will be 6" pipe, typical.

- e. Whenever possible, locate hydrants at street intersections. If it is not possible to locate at an intersection, locate the hydrant near a property line or where it will minimize interference with property use.
- f. All public hydrants shall be painted in accordance with the specifications; DTM ALKYD based enamel paint, gloss safety yellow, shown on City Standard. Private hydrants shall be painted chrome yellow.
- g. Locate hydrants a minimum of (ten) 10 feet from roll down of driveways unless prior approval of the Public Works & Utilities Department is obtained.
- h. Single Family Residential areas
 - 1. Space fire hydrants every (three hundred) 300 feet or as approved by the City Fire Marshal.
 - 2. Evenly distribute hydrants throughout the project.
 - 3. No building may be more than (one hundred and fifty) 150 feet from the nearest hydrant.
 - 4. Approximately (one) 1 fire hydrant is needed for every (two) 2 acres in a single family residential development.
 - 5. Whenever possible, locate a fire hydrant at the end of water mains in cul-de-sacs or other non-looped systems.
 - 6. Residential fire hydrants will have two 2½-inch outlet and one 4½-inch outlet.
- i. Multi-family, Commercial and industrial areas
 - 1. General hydrant spacing shall be every (three hundred) 300 feet.
 - 2. Evenly distribute hydrants throughout the project.
 - 3. No building may be more than (one hundred and fifty) 150 feet from the nearest hydrant.
 - 4. Commercial fire hydrants will have one 2½-inch outlet and two 4½-inch outlets.
 - 5. Hydrant shall be within (fifty) 50 feet of the Fire Department connection.
- j. Hydrants located within shopping centers and adjacent to parking areas shall be protected by 6-inch diameter concrete-filled galvanized steel bollards anchored 36 inches deep in concrete and to the City's satisfaction. Steel bollards shall be installed per California Fire Code.
- k. Before combustible materials may be stored or constructed on site, the Fire Department must approve fire flow, hydrant operability, and access, per City Code Section 17.20 and California Fire Code.
- l. No bends will be allowed in fire hydrant laterals without approval of the Public Works & Utilities Department.
- m. When a connection is required to an existing water main, the contractor shall provide all excavation, shoring, backfill, and trench resurfacing, per City Standard. Where the connection is to be a "hot tap" larger than 2 inches, the contractor shall provide and install a flanged by mechanical joint tapping valve and sleeve, and any other hardware required, and City staff will make the tap with 24-hour advance notice at the contractor's expense. No hot tap shall be made within 24 inches of a fitting (measured edge of fitting to edge of fitting). In cases where the tapping sleeve cannot be moved, the joint shall be removed and the proposed hot tap shall be replaced with a "cut-in" tee. When a "cut-in" tee and valve(s) assembly is required on the plans, the contractor shall provide and install the entire assembly (including valves) and any other hardware necessary

under inspection, and shall provide all other work and materials necessary to complete the installation to City Standards.

- n. Each fire hydrant shall be covered until it is accepted and activated following permanent connection of mainline piping to the existing system. The contractor shall protect fire hydrants whenever the engineer determines that the situation or placement warrants such protection.
- o. Before a fire hydrant may be placed in service, a high velocity flushing of the hydrant lateral shall be witnessed and approved by the City Fire Marshal and the Public Works and Utilities Department. High velocity flushing shall consist of flushing through the 4½-inch outlet of the fire hydrant. The contractor shall provide a suitable elbow and diffuser. Under the City Fire Marshal supervision, the hydrant lateral is flushed until the Public Works & Utilities Inspector is satisfied that the lines are clean of debris. Prior to activation of private on-site water main(s) by the Public Works & Utilities Department, an approved double check valve assembly certified by the Public Works & Utilities Department must be installed per City Standard.
- p. Blue reflective markers, anchored with epoxy, shall be required to be placed 6 inches from the centerline on the hydrant side of the street. When the street is without centerline marking hydrant marker shall be located beside the centerline on the hydrant side of the street per City Standard.

11. Backflow Devices

- a. Backflow devices are required to be installed by State of California Title 17 and City of Petaluma Ordinance 15.09.
- b. All backflow devices that are installed must be on the latest State of California Department of Health Services Approved List.
- c. Backflow assemblies must be installed as near as practical to the water meter, as shown on City Standards 874, 876 and (875 RESIDENTIAL ONLY)
- d. Where residential fire sprinklers are installed, approved double check backflow preventers are required to be installed, as close as possible to the water meter per City standard 875-876. The backflow preventer must be accessible for testing and maintenance.
- e. Properties with private sewer lift stations must have, at a minimum, an approved reduced pressure backflow assemblies installed on their water systems.
- f. All irrigation services require approved reduced pressure backflow assemblies unless otherwise approved by Public Works & Utilities Department
- g. Parcels with two (2) or more water service laterals must have at a minimum double check valves installed on each service. This shall include private fire systems.
- h. A thermal expansion tank shall be sized and installed per manufacturer's recommendation on the cold water supply line to the water heater.

12. Pressure

- a. Maximum allowable main line pressure is 120 psi measured at a fire hydrant.

- b. Maximum allowable service pressure measured at a faucet is 80 psi.
- c. Minimum service pressure measured at a faucet is 40 psi.
 - 1. If the service pressure delivered to the customer exceeds 80 psi, an individual pressure regulator will be required on the service line beyond the City water meter. If the delivery pressure does not meet a minimum of 40 psi, an individual pressure booster station will be required on the service line as shown in City Standard 873.01.
- d. Fire flows must be calculated in all areas of low pressure.
 - 1. For calculating maximum pressures in pumped zones, calculate the maximum pressure using the elevation of the supply reservoir full.
 - 2. For calculating design pressure in pumped zones, calculate the available pressure using the base elevation of the supply reservoir.
 - 3. Pressure modeling in Zone I shall be calculated using the low setting of pressure reducers at the nearest aqueduct turnout supply. Contact Public Works & Utilities Department for this information.

13. Specialty Items

- a. Air relief valve
 - 1. Air relief valves are required at locations in the system that are one pipe diameter or higher than the remainder of the system.
 - 2. Air relief valves are not required in residential areas if a service or fire hydrant is installed at or near the crown within one pipe diameter vertically of the high point.
- b. Pressure reducing valves may be required to be installed to maintain overall system pressure balance.
- c. Surge or pressure relief valves are required and are to be installed where pressure could potentially reach above the maximum allowable as determined by the Public Works & Utilities Department. A long dead end main with large demands and/or fire systems/hydrant on it would require this installation.

14. Special Conditions

- a. Abandon water mains and services
 - 1. All steel and iron saddles $\frac{3}{4}$ to 2" or any defective or leaking fitting must be removed and replaced with full circle, all stainless-steel clamps at contractor's expense. Unused service laterals shall be abandoned at the water main by removing the saddle and installing a full circle clamp. For brass saddles, turn off corporation stop, disconnect lateral and cap the corporation stop. For lines that are 1½ inches or larger, remove the valve from the tee and plug the main. Coordinate with the Public Works & Utilities Department 24 hours in advance.
 - 2. Valve boxes for abandoned valves must be removed and the street repaired.
 - 3. Abandoned mains, valves, and risers located within the street structural section must be removed.
 - 4. All water mains 12 inches and larger, within the public right-of-way, must be broken every fifty (50) feet and filled with sand/concrete slurry.
 - 5. Unused water mains must be cut and plugged to the Public Works & Utilities Inspector's satisfaction. A closed gate valve is not acceptable as a permanent cap or plug on a live main or service.

- b. Private water mains vs. Public water mains
 - 1. Public water mains may not be constructed outside the street right-of-way without specific approval by the Public Works & Utilities Department and in accordance with Water System Guidelines, Section B. 2. b.
 - 2. Fire hydrants required on site to serve one lot will be private systems unless otherwise determined by the Public Works & Utilities Department.
 - 3. Fire hydrants required on site to serve two or more lots, or properties will be public systems unless otherwise determined by the Public Works & Utilities Department
 - 4. Normally where the water mains are publicly maintained, the sewer mains should also be publicly maintained.
- c. Water mains installed at a slope of 15% or greater shall be constructed with restrained joints, and trench dams shall be installed every fifty (50) feet.
- d. Water mains installed outside of the paved roadway must be ductile iron pipe.
- e. PVC water mains and/or polyethylene tubing shall not be used in areas where soils are contaminated with petroleum based products or where the intended use of the site may contaminate the soil.
- f. Restrained joints shall be subject to the prior approval of the Public Works & Utilities Department. Restrained joints shall not be used in lieu of thrust blocking or tiebacks except as allowed by City Standard.

15. Hardware

- a. All bolts, nuts, washers, and tie rods installed below grade shall be stainless steel. To reduce galling, the use of Teflon anti-seize compound should always be used on bolt or tie-rod threads.

16. Water System Component Reporting

- a. Accompanying or preceding each load of pipe delivered, a certificate shall be furnished upon request to the Public Works & Utilities Department certifying that the pipe which is (to be) delivered has been tested and meets the requirements of the American Water Works Association Standard Specifications. The certificate shall identify the pipe by manufacturer's name, lot number, and date tested by a State certified materials testing laboratory.
- b. The pipe shall be tested in accordance with the most recent American Water Works Standard Specifications and Amendments. The testing shall be performed in a State licensed materials testing laboratory where the testing standards meet or exceed State of California Testing Standards.
- c. Each and every length of pipe and coupling shall be marked with the manufacturer's name, lot number, and date the pipe was tested.

17. Laying and Handling Pipe Materials

- a. Whenever it is necessary to use a short length of pipe at a fitting or valve, the minimum length shall be three (3) feet unless otherwise approved by the Public Works & Utilities Department
- b. Cutting pipe by means of oxyacetylene torch shall not be allowed.

- c. Proper implements, tools, and facilities satisfactory to the Public Works & Utilities Department shall be provided and used by the contractor for safe, convenient, and workmanlike performance of the work. All pipe fittings and valves shall be carefully lowered into the trench in such a manner as to prevent damage to pipe coatings. Under no circumstances shall pipe or accessories be dropped or dumped into the trench. Before lowering and while suspended, the pipe shall be inspected for defects and the cast iron pipe rung with a light hammer to detect cracks. Any defective, damaged, or unsound pipe shall be rejected and sound material furnished. Cutting of pipe for inserting valves, fittings, or closure pieces shall be done in a neat and workmanlike manner without damage to pipe or coating.
- d. Whenever it is necessary either in vertical or horizontal plane to avoid obstructions or when long radius curves are permitted, the amount of deflection shall not exceed the maximum recommended by the pipe manufacturer or that required for satisfactory jointing.
- e. Each length of pipe shall be free of any visible evidence of contamination, dirt, and foreign material before it is lowered into its position in the trench, and it shall be kept clean by approved means during and after lying. At times when pipe lying is not in progress, the open ends of any pipe, which has been laid, shall be closed by approved means to prevent the entrance of small animals or foreign material. Trench water shall not be permitted to enter the pipe.
- f. Individual pieces of pipe, valves, and fittings shall be joined in accordance with the manufacturer's recommendations. The joint sealing rings shall be checked to be sure they are in the proper position once in place. Care shall be taken to insure proper seating of the rings, and adapters shall be utilized for connections as required by the manufacturer.
- g. Necessary cutting or breaking of asbestos concrete pipe shall be done in strict accordance with applicable health and safety regulations.

18. Excavation and Backfill

- a. All excavation, backfill, and resurfacing required for installation of water system facilities shall be as shown on City Standard Trench Details.
- b. Excess material from excavation shall become the property of the contractor and shall be disposed of to the satisfaction of the Public Works & Utilities Department and in accordance with all applicable waste-disposal regulations.
- c. Prior to disposal of any materials or operation of any equipment on sites provided by the contractor for disposal of excess trench excavation owned by him, the contractor shall submit to the Public Works & Utilities Department written authorization for such disposal of materials, entry permission signed by the owners of the disposal site, and the required permits.
- d. The contractor shall not excavate within 6 (six) feet of any City valve, tie-down, thrust block, or fire hydrant without prior approval of the Public Works & Utilities Department.

19. Construction Water

- a. There shall be no un-metered connections to the water system, including connections bypassing meter for testing on-site plumbing or for obtaining

construction water. When a subdivision water main has been accepted and tied-in the individual curb stops may be locked off with cable ties. Cutting off or tampering with the cable ties will constitute a straight tie-in connection. Such connections will be severed by the Public Works & Utilities Department and will result in penalties, including payment of fines and estimated water usage fees.

- b. Upon application, a contractor may install a temporary construction meter and approved backflow preventer under the direction of the Public Works & Utilities Department on the end of the existing main, service, or fire hydrant for construction water (see City Standard drawings).
- c. Unauthorized acquisition of water through appropriation at un-metered fire hydrants or other facilities is a violation of City ordinance and State law and subject to a fine per City of Petaluma resolution. *City Resolution No. 2007-022 N.C.S.*
- d. City of Petaluma must approve use of construction water from sources other than the City water system.
- e. Construction water shall be obtained from the City water system only at the point(s) designated by the Public Works & Utilities Department.
- f. The contractor must possess a valid load account agreement issued by the Public Works & Utilities Department for each metered construction water connection.
- g. A deposit for each meter will be required, which is refundable upon return of the meter by the contractor, less charges for equipment damage, daily use, and water consumed, per current City Resolution.

20. Thrust Blocking

- a. All tees, bends, and plugs shall be provided with thrust blocking and/or harness when necessary as shown on the plans or in accordance with City of Petaluma Standard Details
- b. All Portland cement concrete used shall be Class "B", five (5)-sack mix, 1½-inch maximum aggregate, and 4-inch maximum slump.

21. Hydrostatic Test

- a. Pressure testing against gate valves will not be allowed unless directed otherwise by the Public Works & Utilities Department.
- b. The test shall be performed after the line has been laid and all backfill compacted as specified elsewhere in these specifications. The contractor, at his option, may test the line at any time during construction; however, the final test for acceptance shall be made only after all backfill is in place. Each valved section of pipe, or combined sections as approved by the Public Works & Utilities Department, shall be subjected to a hydrostatic pressure of not less than fifty (50) PSI above working pressure and not less than one hundred and fifty (150) psi at any point on the main. The duration of each pressure test shall be two (2) hours. No more than one thousand (1000) feet of pipe shall be included in any test unless authorized by Public Works & Utilities Department. Only the Public Works & Utilities Department authorized personnel shall operate valves on existing mains in service required to be operated in connection with any project. Each

section of pipe shall be slowly filled with water and the specified test pressure shall be applied by means of a pump connected to the pipe in a satisfactory manner. The contractor shall furnish the pump, pipe connection, and all necessary apparatus except gage and measuring devices. The contractor shall make the taps into the pipe and shall furnish all necessary assistance for conducting the tests. Before applying the test pressure, all air shall be expelled from the pipe. To accomplish this, taps shall be made, if necessary, at the points of the highest elevation, and afterwards tightly plugged to the City's satisfaction. The Public Works & Utilities Department inspector shall designate the time and location number at which the test shall be made.

- c. The contractor shall provide suitable means to the Public Works & Utilities Department for determining the quantity of water leakage under the test pressure. No pipe installation will be accepted if the pressure drops more than one (1) PSI during the duration of the pressure test. Should any test of combined sections of pipe laid disclose leakage greater than specified limit, the contractor shall, at his own expense, locate the cause and repair the defect until the leakage is within the specified allowance.
 1. Leakage is defined as the quantity of water to be supplied into the newly laid pipe, or any valves section of it, necessary to maintain the specified leakage test pressure after the pipe has been filled with water and the air expelled. The Public Works & Utilities Department shall designate the time and location number at which the test shall be made.
 2. The contractor shall repair any obvious leaks even though the hydrostatic test results are within the prescribed limits above.
 3. The hydrostatic test shall be performed after placement of the final aggregate base section. This test shall be at the pressure required by City specifications and shall be witnessed by the Public Works & Utilities Department authorized representative.
 4. Chlorination of the pipeline may be done in conjunction with the hydrostatic test.
 5. 24-hour notice is required for all inspections.

22. Chlorination of Pipeline

- a. Chlorine may be applied by any of the AWWA standard methods, subject to the approval of the Public Works & Utilities Department. The point of application of the chlorination agent shall be at the beginning of the pipe extension, or any valved section of it, and through a corporation stop inserted in the newly laid pipe.
- b. Water from the existing distribution system shall be controlled so that it flows slowly in the newly laid pipe during the application of chlorine. Only authorized Public Works & Utilities Department personnel shall operate valves on water mains or water services. The rate of chlorine feed shall be in such proportion to the rate of water entering the pipe that the chlorine dose applied to the water entering the newly laid pipe shall be at least 100 PPM. Precautions shall be taken to prevent backpressure causing a reversal of flow in the treated pipe. A bridge meter and backflow must be added (see City standard 881)
- c. Treated water shall be retained in the pipe for a period of 24 hours. After the chlorine treated water has been retained for the required time, the chlorine residual at the pipe extremities and at representative points shall be at least five (5) parts per million. In the process of chlorinating, all valves and other appurtenances on the newly laid main shall be operated.

- d. Following chlorination, all treated water shall be thoroughly flushed and discarded appropriately until residual is less than 1.5-parts per million from the new pipeline. Under no circumstance shall any chlorinated water enter the public storm drain system. The water throughout its length shall be chemically and bacteriologically proven equal to the water quality served the public from the existing water supply system. The necessary samples and tests shall be taken by the Public Works & Utilities Department at the contractor's expense. Should the initial treatment, in the opinion of the Public Works & Utilities Department, prove ineffective, the chlorination procedure shall be repeated at the contractor's expense until samples confirm that the water from the newly laid pipeline conforms to the above requirements.
- e. There shall be a minimum 24-hour waiting period after flushing of the main prior to taking bacteria samples, unless otherwise authorized by the Public Works & Utilities Department. The initial bacteria tests shall be 24 or 48-hour duration, depending on the method used by laboratory. If the initial bacteria test fails, two consecutive repeat samples must be taken with results negative for coliform bacteria prior to making the tie-in. The first of these two subsequent tests result shall be of the 24-hour duration type, and the second shall be of the 48-hour duration. Bacteria test results are valid for only 30 days. If there is more than a 30-day lapse between a passing bacteria test and the applicable tie-in, the bacteria test must be repeated prior to water main tie-in.
- f. Water main or service extensions sized three (3) inches or larger that have a total length greater than ten (10) feet, or at the discretion of the Public Works & Utilities Department, shall be chlorinated and tested through a blow-off and meter connection per City Standard. Shorter extensions may be disinfected by swabbing with Public Works & Utilities Department's approval.
- g. 24-hour advance notice is required for all inspections.
- h. Bacteriological tests shall be scheduled by the Public Works & Utilities Department, with the number and location of the tests to be determined by the Public Works & Utilities Inspector. The contractor will be responsible for the costs of all tests. See AWWA C651-14 for requirements.

23. Water Main Tie-Ins

- a. The contractor shall contact the Public Works & Utilities Department for approval 48 hours prior to individual mainline shutdowns required to facilitate these tie-in operations. The contractor shall schedule tie-in work with the Public Works & Utilities Department. Tie-ins will not be scheduled until the Public Works & Utilities Department has received a written passing bacteria test. Only authorized Public Works & Utilities Department personnel shall perform all shutdowns and valve turning operations. No tie-ins shall be performed without prior authorization and presence of the Public Works & Utilities Inspector.
- b. Pipe and fittings furnished for tie-ins shall be no smaller than the existing water main to which each tie-in is made.
- c. Contractors or parties who fail to keep field appointments may be billed for the scheduled Public Works & Utilities Department water crew standby time and the contractor may bear the costs incurred. The City shall not be responsible for the contractor's standby time under any circumstances.

- d. As a general rule, a customer's service shall not be terminated or interrupted on Mondays. Interruption of service to customers shall, as much as practical, be coordinated with the customer's needs. The contractor will contact the customers, consider the customer's interests, and inform the Public Works & Utilities Department accordingly. For interruption of service, the City may require the contractor to do the notification under the Public Works & Utilities Department's direction. A temporary bypass pipeline, satisfactory to the Public Works & Utilities Department, may be required to be installed by the contractor at his expense. In no event shall any shutdown be allowed that will deprive consumers of water in excess of six (6) hours during any one day or commences less than 24 hours after all affected customers have been notified of the planned service interruption.
- e. After hour, holiday, or weekend work is to be avoided whenever possible, and any overtime costs shall be borne by the contractor. Normal working hours are: 8:00 A.M. to 4:00 P.M.
- f. Contractors or parties requesting work of any kind by the Public Works & Utilities Department shall request such services a minimum of 48 hours in advance of the time such services are desired. Work requests, which will involve the Public Works & Utilities Department for more than eight (8) hours or an extensive number of Public Works & Utilities Department supplied parts, shall be requested a minimum of seven (7) calendar days in advance.
- g. During the work, the contractor shall prevent the entrance of trench water or any other foreign material into the water main and shall conduct all operations in accordance with AWWA guidelines.

24. Records

- a. Provide a set of 24 x 36-inch record reproducible Mylar drawings, two sets of paper prints, and an electronic copy (.tiff format) within 90 days of completion of project. The contractor shall maintain a set of current red-lined "record" drawings on the job-site at all times. Record drawings shall be signed by the Public Works & Utilities Inspector prior to acceptance of project.
- b. Plans shall show the profile of all existing and proposed water mains as well as any other existing or proposed underground facilities or utilities that would affect the design or construction of the improvement.

25. Requirements for Pump Tank Assembly

The purpose of this standard is to define the proper installation of a pump for fire sprinkler systems tank assembly as described. This installation will have a direct effect on the performance of the required fire sprinkler system and domestic water pressure to the residence it serves. This system is usually found in low-pressure area as determined by the Public Works & Utilities Department.

- a. Plan review
 1. Provide a minimum of four (4) copies of the following to the City Fire Marshal's office and the Public Works & Utilities Department for plan review and approval prior to installation.
 2. The same information shall be provided to the installing sprinkler contractor.
 3. Pump installing contractor shall coordinate with the sprinkler contractor prior to pump install.

- b. Tank

The tank will be sized to meet the requirements of the design curve density of the sprinkler system requirements with a minimum storage capacity of ten (10) minutes of water storage. (See air gap detail City code 873.01)
- c. Pump
 1. Shall provide the required water flow and pressure to meet the requirements of the sprinkler-system design curve density above that of the domestic demand.
 2. Domestic demand shall be determined and included in the pump calculations.
 3. Provide model of pump(s).
 4. Provide model number of motor and rpm.
 5. Provide pump curve data sheet.
- d. Pipe size
 1. Pipe size shall not restrict the water flow to the fire sprinkler system.
 2. Shut off valve shall turn off both fire service and domestic water.
- e. Wiring
 1. Voltage: 220V
 2. Wire shall be the gage required for length of run and for horsepower of pump.
 3. Wire color code shall be WHITE, BLACK, and GREEN.
 4. Minimum horsepower for pump shall not less than 1½ horsepower.
 5. Circuit breaker for pump shall be a separate circuit and breaker.
 6. Minimum circuit breaker shall be a Fuse-a-Tron or approved equal not more than a 150% of run load.

26. Installation of Automatic Fire Sprinklers in Pre-Existing Buildings in the Historic Downtown District (as it relates to fire sprinkler protection)

a. Geographic Boundary - Historic Downtown District

For the purposes of this section, the Historic Downtown Business District shall include all buildings located inside the geographic area generally formed by Kentucky Street to the west, Washington Street to the north, the Petaluma River to the east, and B Street to the south. Also included in this ordinance is 201 Washington Street (Phoenix Theater) and 132 Keller Street (formerly Tuttle Drug), as more particularly described in **Figure 1003.2.12**.



Figure 1003.2.12

b. Installation requirements

An automatic sprinkler system conforming to the *Standard for the Installation of Sprinkler Systems* (NFPA-13) shall be installed in all existing buildings in the Historic Downtown Business District in accordance with the following criteria:

1. Kentucky Street and Western Avenue

- (a) In any building wherein a change of use as defined by the Uniform Building Code occurs.
- (b) In any building or occupancy where the square footage of the building or occupancy is increased in area by greater than or equal to 25% of the building's or occupancy's existing square footage.
- (c) All buildings with basement or space below street grade used for storage, business, or public use shall have automatic fire sprinklers installed within the basements or the below street grade areas no later than December 31, 2010.
- (d) All buildings not meeting the criteria of "a" or "b" above shall have automatic fire sprinklers installed throughout the structure, including all public, private, storage, and/or concealed spaces, as defined by the

Standard for the *Installation of Sprinkler Systems* (NFPA –13), by no later than December 31, 2016.

2. Petaluma Boulevard North (See Separate Cover from Fire Department)
- c. Property owner's responsibility for system installation
 1. The Property owner shall be responsible for installation of the lateral service from the curb line into the building. This also includes isolation, check, or other valves or devices, as applicable.
 2. The property owner shall be responsible for the installation of the automatic fire sprinkler system according to the *Standard for the Installation of Sprinkler Systems* (NFPA-13).
 - d. Plans and specifications

Plans and calculations (NFPA-13, Chapter 8) for the service lateral and fire-sprinkler system shall be submitted to and approved by the Fire Prevention Bureau/ Fire Marshall's office and the Public Works & Utilities Department prior to installation of equipment and materials.

 1. For the Kentucky Street installations that are required on or before December 31, 2010, or December 31, 2016, all Plans and Calculations for service lateral and sprinkler systems shall be submitted no later than June 30, 2010, or June 30, 2016, respectively, with installation and approval of work to occur prior to December 31, 2010, or December 31, 2016, respectively.
 2. For Petaluma Boulevard North installations that occur in the last year of the six (6) or twelve (12) year deadline (when established) after the installation of the water main by the City of Petaluma, plans and calculations shall be submitted in that last year no later than June 30, with installation and approval of work to occur prior to December 31 of that last year.

City of Petaluma
Water System
Construction Standards
December 2021

Water System Construction Standards

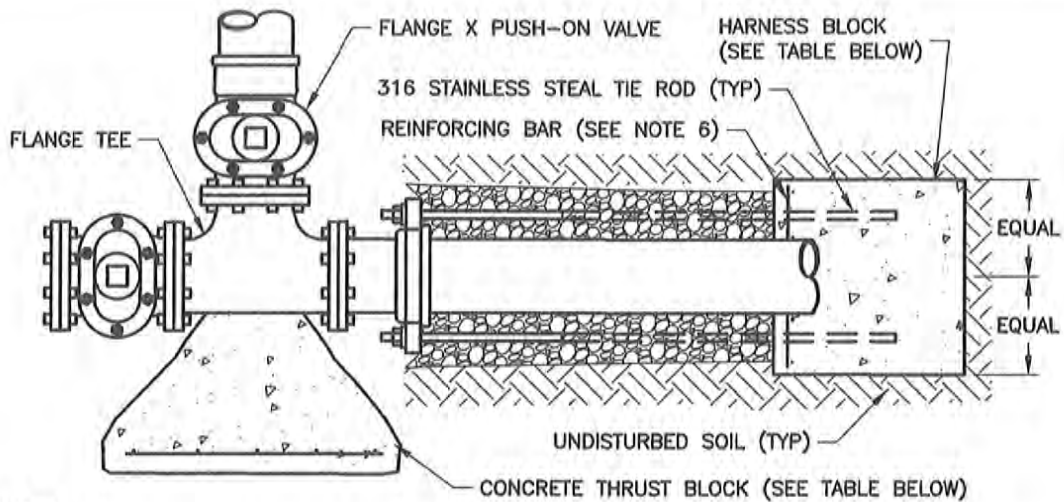
Standards List

<u>Std. No.</u>	<u>Title</u>	<u>Date Approved</u>
851	Concrete Block w/ Anchor Harness for Flanged Fittings	August 2019
852	Standard Trench Details	January 2019
853	Concrete Thrust Blocks for Vertical & Combination Bend Applications	August 2016
854.01	Concrete Thrust Blocks for Horizontal Applications	August 2016
854.02	Concrete Thrust Blocks for Horizontal Applications (Notes)	August 2016
855.01	Water Main Under Structure (Lowering).....	August 2016
855.02	Water Main Over Structure	August 2016
856.01	Pipe to Pipe Crossing Requirements.....	August 2016
856.02	Pipe to Pipe Crossing Requirements (Notes)	August 2016
857.01	Fire Hydrant Installation.....	March 2016
857.02	Fire Hydrant Location	March 2016
857.03	Fire Hydrant Marker Location	March 2016
858.01	6-inch Blow-off	March 2016
858.02	End of Line Details (6 inch Blow-off Application)	March 2016
859	1-inch Manual Air Release Valve Connection	March 2016
861	1 ½ -inch Water Service for Existing ¾-inch or 1-inch Meters	December 2021
862	1 ½-inch Water Service for 1-inch Meter (New Residential Service)	December 2021
863.01	Residential Fire Service Installation	August 2019
863.02	Residential Fire Sprinkler Loop System	August 2019
864	1 ½-inch Water Service for 1 1/2-inch Meter (Commercial)	August 2019
865	2-inch Water Service for 1½-inch or 2-inch Meter (Commercial)	August 2019
866.01	4-inch Water Service for 3-inch Meter	August 2019
866.02	4-inch Water Service for 3-inch Meter (Notes and Parts).....	March 2016
867.01	4-inch Water Service for 4-inch Meter	August 2019
867.02	4-inch Water Service for 4-inch Meter (Notes and Parts).....	March 2016
868.01	6-inch Water Service for 6-inch Meter (Turbine)	August 2019
868.02	6-inch Water Service for 6-inch Meter (Turbine) (Notes and Parts).....	March 2016
869	Combination Service Stub (Commercial & Multi-residential).....	August 2019
870.01	Combination Water Service (Commercial & Multi-residential)	August 2019
870.02	Combination Water Service (Commercial & Multi-residential) (Notes & Calcs)	August 2019
871	Water Mains and Mainline Valve Alignment.....	March 2017
872	Bore and Jack Casing, Spacer and End Seal	March 2017
873.01	Air Gap Tank System.....	March 2016
873.02	Special Standard Pressure Tank System.....	March 2016
874	Above Ground Double Check Valve Backflow Assembly.....	August 2019

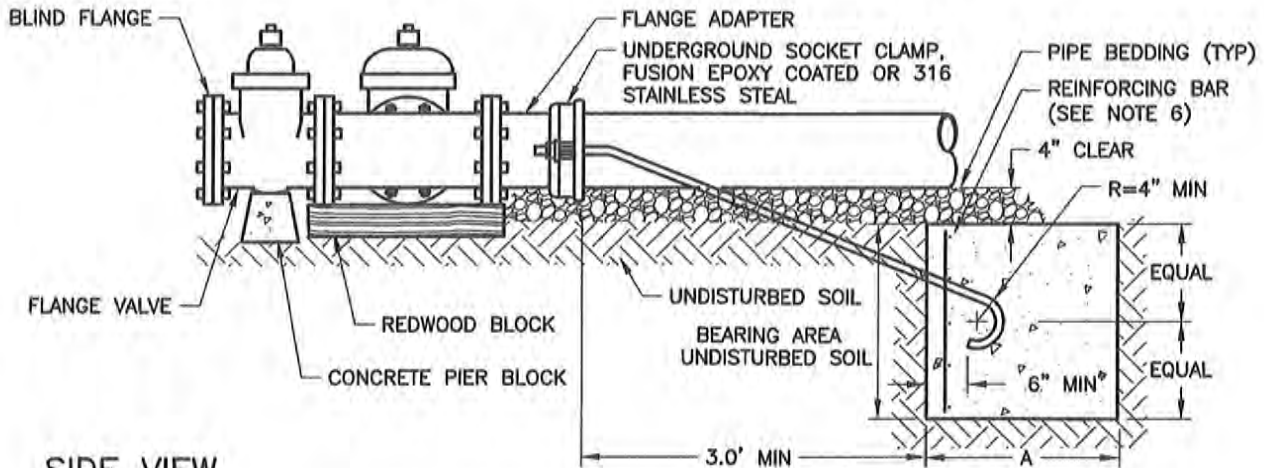
Water System Construction Standards

Standards List (continued)

<u>Std. No.</u>	<u>Title</u>	<u>Date Approved</u>
875	Special Installation Double Check Valve Backflow Assembly	August 2019
876	Above Ground Reduced Pressure Principle Backflow Assembly	April 2017
877.01	Gate Valve, Stem Extension and Box with Riser	August 2016
877.02	Valve Anchor	March 2016
877.03	Valve Stem Extension Assembly	March 2016
878	Tapping Valve and Pit.....	March 2016
879	Butterfly Valve Installation (Required for 16" and Larger Pipe).....	March 2016
880.01	4" Thru 10" Double Check Detector Fire Line Backflow Assembly	August 2019
880.02	4" Thru 10" Double Check Detector Fire Line Backflow Assembly (Parts and Notes)...	August 2019
881	Temporary Metered Connection Fire Flow Required	April 2017
884	Dry Fire Hydrant Main Sign	March 2017
885.01	2-inch Manifold Retro-fit Existing 2-inch Service	April 2017
885.02	2-inch Manifold Retro-fit Existing 2-inch Service	April 2017
887.01	Combination Fire and Domestic Service Master Meter Assembly	April 2017
887.02	Combination Fire and Domestic Service Master Meter Assembly (Notes)	April 2017
888.00	Clustered Water Meters.....	August 2019



TOP VIEW



SIDE VIEW

MINIMUM DIMENSION REQUIREMENTS				
*PIPE SIZE	TIE ROD	HARNESS BLOCK	DIMENSION A	THRUST BLOCK
6 INCH	5/8 INCH	4SQFT	2FT	4SQFT
8 INCH	3/4 INCH	7SQFT	3FT	7SQFT
12 INCH	1-1/8 INCH	15SQFT	4FT	15SQFT

* PIPE SIZE 12 INCH AND LARGER BY DESIGN ENGINEER.

NOTES

- SEE WATER SYSTEM DESIGN GUIDELINES.
- BOLTS, NUTS, WASHERS AND TIE ROD SHALL BE 316 STAINLESS STEEL.
- SAFE BEARING LOAD OF SOIL FOR HORIZONTAL THRUST SHALL NOT BE EXCEEDED.
- DUCTILE IRON FITTINGS SHALL BE ENCASED WITH 8-MIL. POLYETHYLENE TUBING AND SECURED WITH 10-MIL TAPE AS DEFINE IN AWWA C105 PRIOR TO POURING THRUST BLOCK.
- CAST CONCRETE THRUST AND HARNESS BLOCK AGAINST UNDISTURBED SOIL.
- REINFORCING BAR MAT SHALL BE INCLUDED IN ALL THRUST BLOCK APPLICATIONS. REINFORCING BAR SPACING SHALL BE 12 INCHES EACH WAY.
-
- THRUST AND HARNESS BLOCKS ARE TO BE CLASS B CONCRETE, CAST IN PLACE AND EXTEND FROM BELLS OF FITTINGS TO UNDISTURBED SOIL. ENTIRE BEARING AREA SHALL BE AGAINST UNDISTURBED SOIL.



CITY OF PETALUMA
PUBLIC WORKS & UTILITIES
 UTILITIES DIVISION
 202 N. McDOWELL BLVD. TEL. 707-778-4546
 PETALUMA, CALIFORNIA 94954 FAX. 707-778-4508

SPECIAL STANDARD
**CONCRETE BLOCK w/
 ANCHOR HARNESS**
FOR FLANGE FITTINGS
HORIZONTAL APPLICATIONS

DATE: AUGUST 2019 SCALE: N.T.S.
 APPROVED BY:

 Kent R. Carothers, P.E. Operations Manager C80871
 DRAWN BY: JDL NO. 851

PLEASE REFER TO CITY STANDARDS
219.1 - 219.3



CITY OF PETALUMA

PUBLIC WORKS & UTILITIES
UTILITIES DIVISION

202 N. McDOWELL BLVD. TEL. 707-778-4546
PETALUMA, CALIFORNIA 94954 FAX. 707-778-4506

STANDARD TRENCH
DETAILS

DATE: JAN 3, 2019

SCALE: N.T.S.

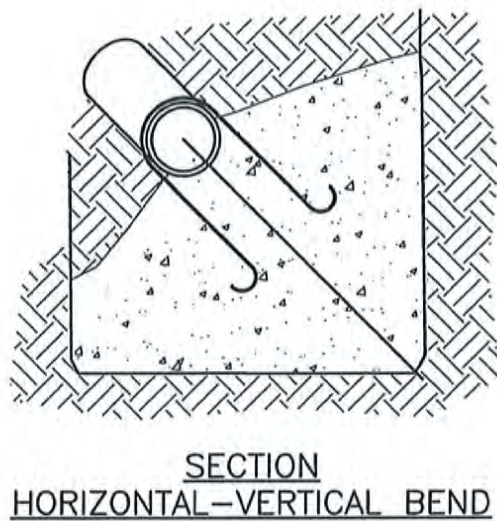
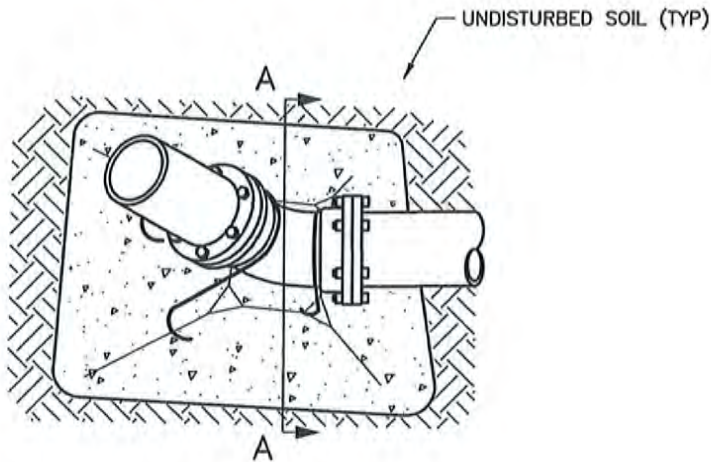
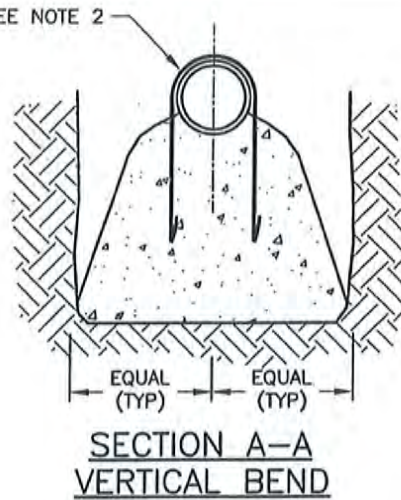
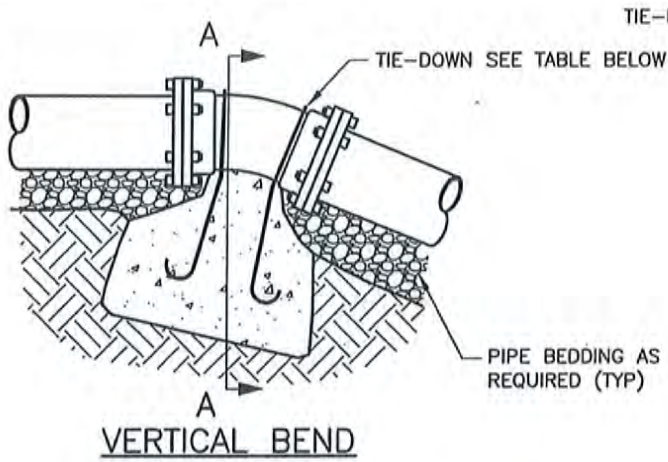
APPROVED BY:


Kent R. Carothers, P.E. Operations Manager C60871

DRAWN BY: TKM

NO. 852

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TIE-DOWN SIZING TABLE	
PIPE SIZE	BAR DIAMETER
4-6 INCHES	5/8" #5
8-10 INCHES	3/4" #6
12 INCHES	1 1/8" #9

NOTES:

1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. ALL EXPOSED TIE DOWN REINFORCING BAR SHALL BE COATED WITH MORTAR OR PETROLEUM ASPHALT PER AWWA C110.
3. DUCTILE IRON FITTINGS SHALL BE ENCASED WITH 8-MIL. POLYETHYLENE TUBING AND SECURED WITH 10-MIL TAPE PER AWWA C105 PRIOR TO POURING THRUST BLOCK.
4. POUR/PLACE CONCRETE FOR ANCHOR BLOCK AGAINST UNDISTURBED SOIL.
5. ANCHOR/THRUST BLOCKS SHALL BE CLASS B CONCRETE, POURED IN PLACE AND EXTEND FROM BELLS OF FITTINGS TO UNDISTURBED SOIL. FOR PIPE GREATER THAN 12" IN SIZE, DESIGN ENGINEER MUST SUBMIT CALCULATIONS TO SIZE CONCRETE THRUST BLOCKS.

• FOR SOIL BEARING AREA SEE 854.02



CITY OF PETALUMA

PUBLIC WORKS & UTILITIES
UTILITIES DIVISION

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PETALUMA, CALIFORNIA 94954 FAX. 707-778-4508

**CONCRETE THRUST
BLOCKS
VERTICAL AND COMBINATION
BEND APPLICATIONS**

DATE: AUGUST 2016

SCALE: N.T.S.

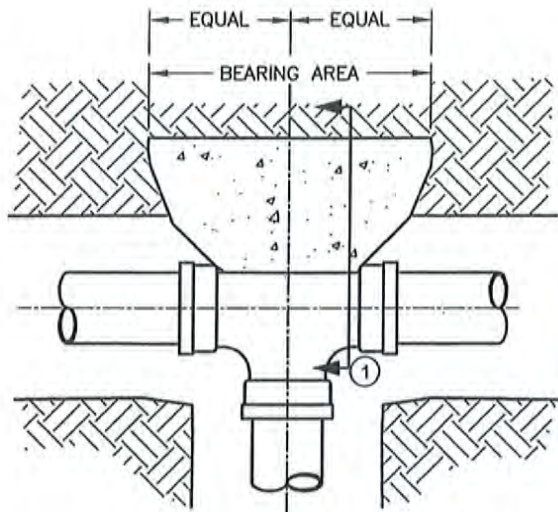
APPROVED BY:

[Signature]
Kent R. Carothers, P.E. Operations Manager C60671

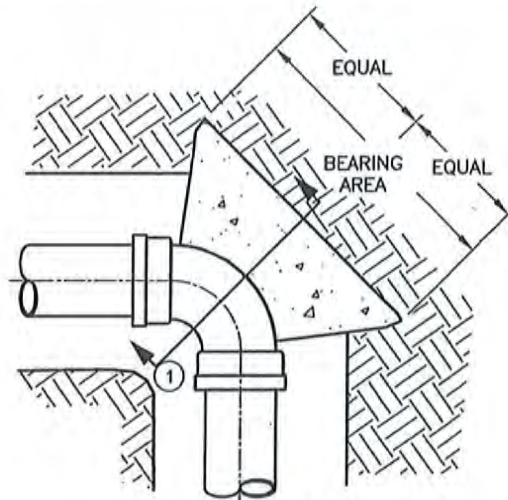
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NO. 853

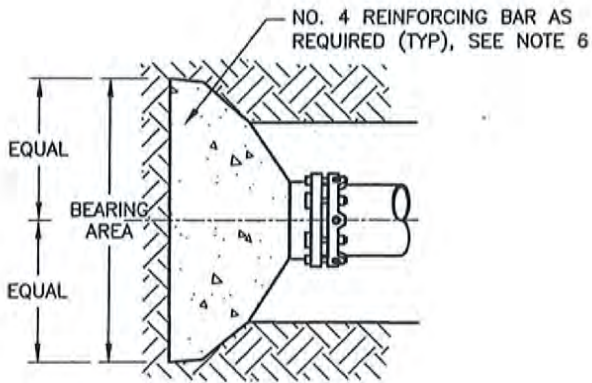
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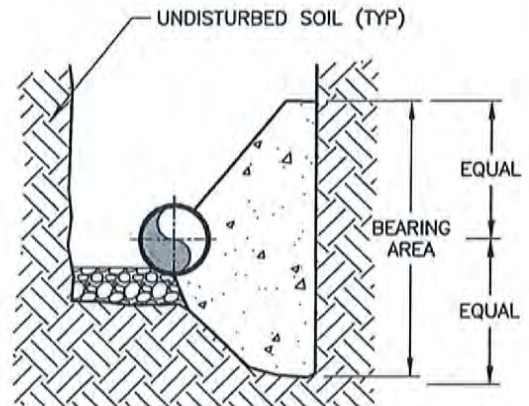
TEE
PLAN VIEW



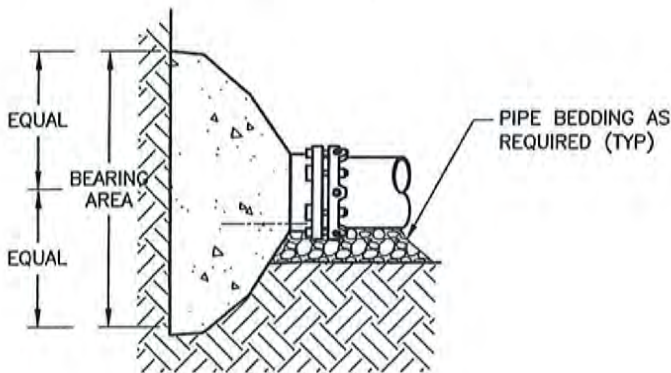
TYPICAL BEND
PLAN VIEW



DEAD END OR PLUG
TOP VIEW



TYPICAL BEND OR TEE
SECTION VIEW



DEAD END OR PLUG
SIDE VIEW

• FOR SOIL BEARING AREA SEE 854.02



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**CONCRETE THRUST
BLOCKS**
HORIZONTAL APPLICATIONS

DATE: AUGUST 2016

SCALE: N.T.S.

APPROVED BY:

Kent R. Carothers

Kent R. Carothers, P.E. Operations Manager C80871

DRAWN BY: JDL

NO. 854.01

THRUST BLOCK TABLE: MINIMUM REQUIRED BEARING AREA IN SQUARE FEET PER REQUIRED PSI TEST PRESSURE (FOR TEST PRESSURE SEE HYDROSTATIC TEST IN WATER SYSTEM DESIGN GUIDLINES)					
PIPE SIZE	SOIL BEARING CAPACITY PSF	TEE & DEAD END	90 DEG BEND	45 DEG BEND	22 1/2 DEG BEND
6 INCH	1000	4	6	3	2
	2000	2	3	2	1
8 INCH	1000	7	10	5	3
	2000	4	5	3	2
12 INCH	1000	16	22	12	6
	2000	8	11	6	3

NOTES:

1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. IN USING THE THRUST BLOCK TABLE ABOVE, ASSUME 1000 PSF BEARING CAPACITY UNLESS OTHERWISE SHOWN ON THE PLANS. THE DESIGN ENGINEER SHALL SPECIFY THRUST BLOCKING REQUIREMENTS FOR ALL OTHER SOIL BEARING CONDITIONS.
3. SAFE BEARING LOAD OF SOIL FOR HORIZONTAL THRUST SHALL NOT BE EXCEEDED.
4. DUCTILE IRON FITTINGS SHALL BE ENCASED WITH 8-MIL. POLYETHYLENE TUBING AND SECURED WITH 10-MIL TAPE AS DEFINE IN AWWA C105 PRIOR TO POURING THRUST BLOCK.
5. CAST CONCRETE ANCHOR BLOCK AGAINST UNDISTURBED SOIL..
6. THRUST BLOCKS ARE TO BE CLASS B CONCRETE, CAST IN PLACE AND EXTEND FROM BELLS OF FITTINGS TO UNDISTURBED SOIL. ENTIRE BEARING AREA SHALL BE AGAINST UNDISTURBED SOIL.
7. FOR PIPE GREATER THAN 12" IN SIZE, DESIGN ENGINEER MUST SUBMIT CALCULATIONS TO SIZE CONCRETE THRUST BLOCKS.



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**CONCRETE THRUST
BLOCKS**
HORIZONTAL APPLICATIONS

NOTES

DATE: AUGUST 2016 SCALE: N.T.S.

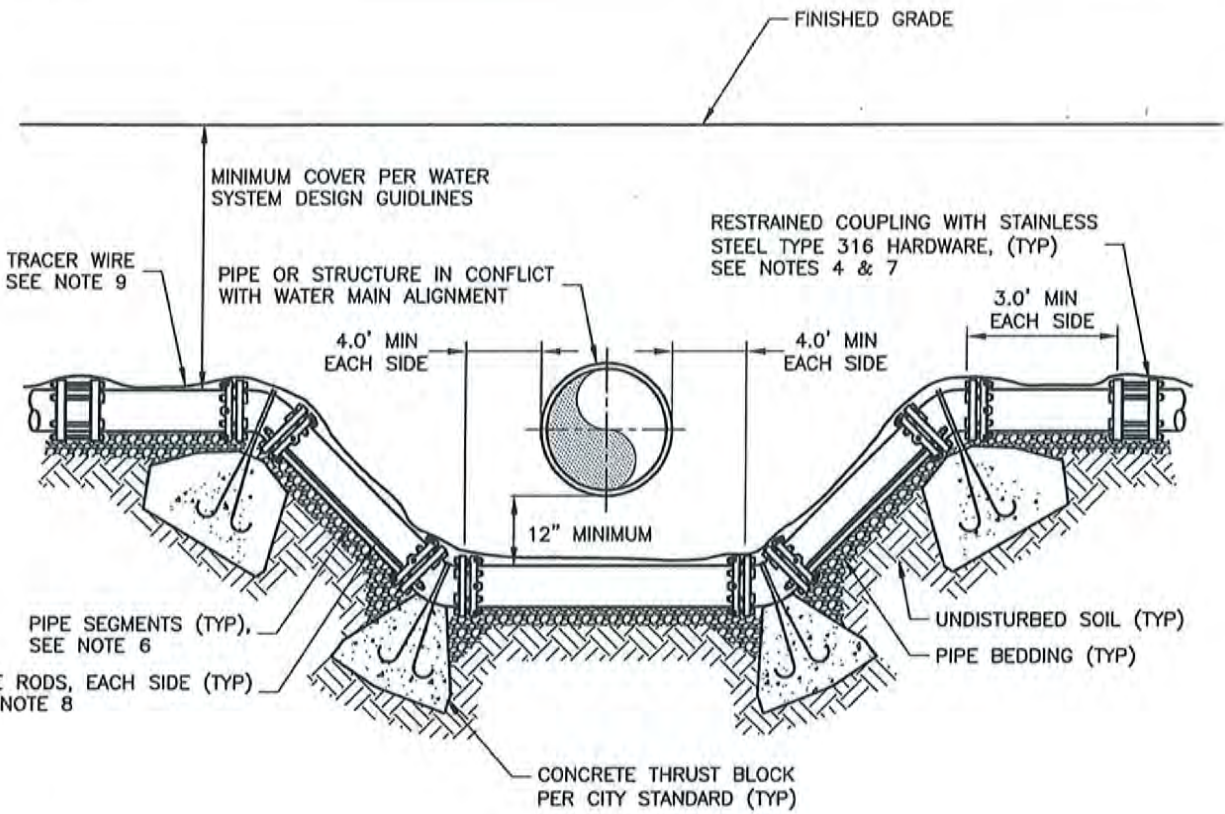
APPROVED BY:

Kent R. Carothers, P.E. Operations Manager C60071

DRAWN BY: JDL

NO. 854.02

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NOTES:

1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. ALL PIPE AND FITTINGS SHALL BE CEMENT LINED OR EPOXY FUSION BONDED DUCTILE IRON CLASS 53 MINIMUM AND SHALL BE WRAPPED IN POLYETHYLENE PER WATER SYSTEM DESIGN AND CONSTRUCTION GUIDELINES.
3. ONLY RESTRAINED FITTINGS, MECHANICAL JOINT, TIE RODS, MEGALUG (OR EQUAL), FLANGED MAY BE USED. ALL BENDS MUST BE RESTRAINED.
4. RETAINING GLANDS SHALL NOT BE USED ON THE TWO STRAIGHT END COUPLINGS.
5. ALL BENDS SHALL BE 45° DEG. OR 22 1-1/2° DEG. FITTINGS.
6. PIPE SEGMENT LENGTHS SHALL BE 3FT MINIMUM.
7. REDUCED CLEARANCE MAY BE APPROVED BY THE PUBLIC WORKS & UTILITIES DEPARTMENT.
8. 2 TYPE 316 TIE RODS ARE REQUIRED ON EACH SIDE. TIE ROD DIAMETER TO BE SAME AS BOLT SIZE AND SHALL BE RETAINED WITH DOUBLE NUT AT EACH END.
9. USE INSULATED NO. 12 THHN WIRE. ALL WIRE CONNECTIONS SHALL BE MADE WITH MECHANICAL WIRE CONNECTORS WRAPPED WITH ELECTRICAL TAPE.
10. DUCTILE IRON TRANSITION COUPLINGS MAY BE ALLOWED WHEN THE NOMINAL PIPE SIZE IS THE SAME AND THE O.D. IS DIFFERENT.
11. ALL HARDWARE IS TO BE TYPE 316 STAINLESS STEEL.
12. EXPOSED REINFORCING BARS SHALL BE COATED WITH EPOXY, MORTAR OR PETROLEUM ASPHALT PER AWWA C110.

• FOR SOIL BEARING AREA SEE 854.02



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**WATER MAIN
UNDER STRUCTURE
(LOWERING)**

DATE: AUGUST 2016

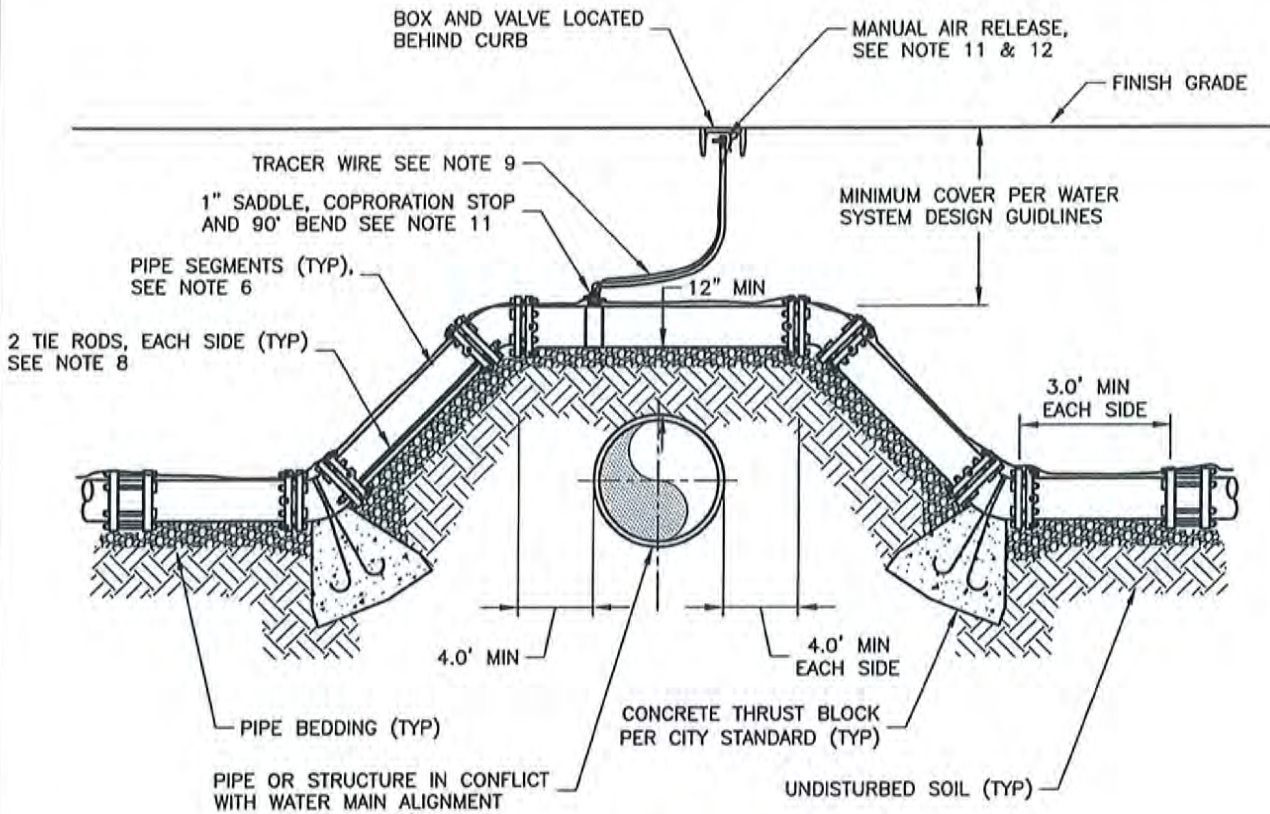
SCALE: N.T.S.

APPROVED BY:

Kent R. Carothers
Kent R. Carothers, P.E. Operations Manager C60071

DRAWN BY: JDL

NO. 855.01



NOTES:

1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. ALL PIPE AND FITTINGS SHALL BE CEMENT LINED OR EPOXY FUSION BONDED DUCTILE IRON CLASS 53 MINIMUM AND SHALL BE WRAPPED IN POLYETHYLENE PER WATER SYSTEM DESIGN GUIDELINES.
3. ONLY RESTRAINED FITTINGS, MECHANICAL JOINT, TIE RODS, MEGALUG (OR EQUAL), FLANGED MAY BE USED. ALL BENDS MUST BE RESTRAINED.
4. RETAINING GLANDS SHALL NOT BE USED ON THE TWO STRAIGHT END COUPLINGS.
5. ALL BENDS SHALL BE 45° DEG. OR 22 1-1/2° DEG. FITTINGS. 90° BEND ARE NOT ALLOWED.
6. PIPE SEGMENT LENGTHS SHALL BE 3FT MINIMUM.
7. REDUCED CLEARANCE MAY BE APPROVED BY THE PUBLIC WORKS & UTILITIES DEPARTMENT.
8. DUCTILE IRON TRANSITION COUPLINGS MAY BE ALLOWED WHEN THE NOMINAL PIPE SIZE IS THE SAME AND THE O.D. IS DIFFERENT.
9. USE INSULATED NO. 12 THHN WIRE.
 - ALL WIRE CONNECTIONS SHALL BE MADE WITH MECHANICAL WIRE CONNECTORS WRAPPED WITH ELECTRICAL TAPE.
 - END OF TRACER WIRE TO BE EXPOSED 6" MINIMUM INSIDE OF BOX
10. ALL HARDWARE IS TO BE TYPE 316 STAINLESS STEEL.
11. EXPOSED REINFORCING BARS SHALL BE COATED WITH EPOXY, MORTAR OR PETROLEUM ASPHALT PER AWWA C110.
12. PROVIDE A 1-INCH MANUAL AIR RELIEF. TAP TO BE ON TOP OF PIPE, 24-INCHES MIN FROM FITTING.
13. EXTEND TUBING AND PLACE MANUAL AIR RELIEF VALVE AND BOX AT BACK OF CURB. COUTION TO BE USED AS NOT TO KINK THE TUBING. FINAL PLACEMENT OF THE VALVE SHALL BE VERTICAL AND CENTERED IN THE BOX.

• FOR SOIL BEARING AREA SEE 854.02

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WATER MAIN
OVER STRUCTURE

DATE: AUGUST 2016

SCALE: N.T.S.

APPROVED BY:

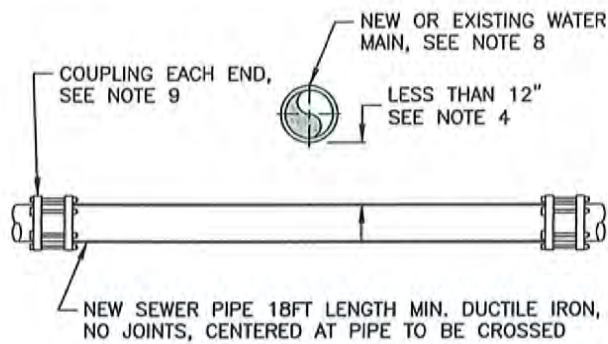
Kent R. Carothers

Kent R. Carothers, P.E. Operations Manager C60671

DRAWN BY: JDL

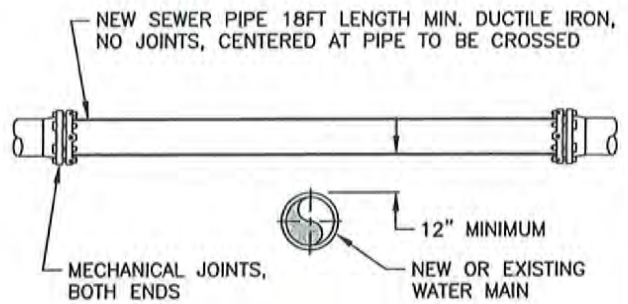
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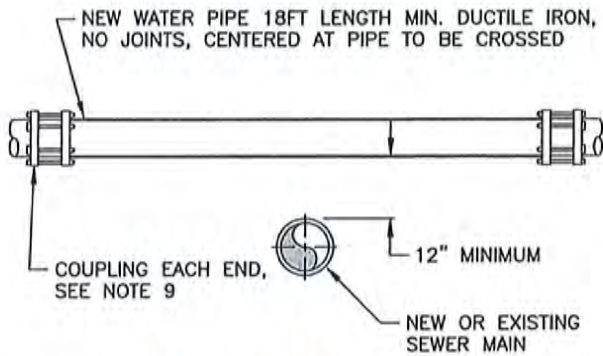
**NEW SEWER UNDER
NEW OR EXISTING WATER**

CASE 1



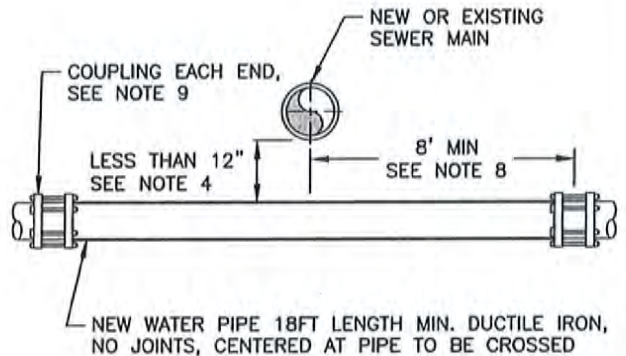
**NEW SEWER OVER
NEW OR EXISTING WATER**

CASE 2



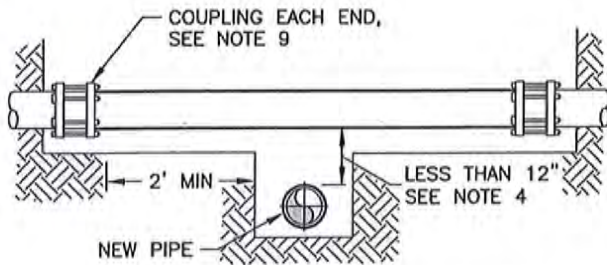
**NEW WATER OVER
NEW OR EXISTING SEWER**

CASE 3



**NEW WATER UNDER
NEW OR EXISTING WATER**

CASE 4



NEW PIPE UNDER EXISTING

CASE 5 (SEE NOTE 5)



CITY OF PETALUMA

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**PIPE TO PIPE CROSSING
REQUIREMENTS**

DATE: AUGUST 2016 SCALE: N.T.S.

APPROVED BY:

Kent R. Carothers

Kent R. Carothers, P.E. Operations Manager C60671

DRAWN BY: JDL

NO. 856.01

NOTES:

1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. THIS STANDARD APPLIES TO ALL PIPES UP TO AND INCLUDING 16 INCHES IN DIAMETER. LARGER DIAMETER PIPE CROSSING SHALL BE APPROVED BY THE DIRECTOR OF PUBLIC WORKS & UTILITIES.
3. ALL NEW DUCTILE IRON PIPE SHALL BE ENCASED IN POLYETHYLENE PER WATER SYSTEM DESIGN GUIDELINES.
4. WHERE SEWER CROSSES BELOW A WATER MAIN WITH MORE THAN 12 INCHES OF VERTICAL CLEARANCE, NO SPECIAL INSTALLATION IS REQUIRED.
5. NEW PIPE UNDER EXISTING PIPE, CASE 5, SHALL BE USED WHEN THE EXISTING PIPE HAS A JOINT WITHIN 2 FEET OF THE NEW TRENCH AND THE NEW PIPE IS NOT A WATER OR SEWER PIPE.
6. ANY PIPE TO PIPE CROSSING WITH LESS THAN 6 INCH VERTICAL CLEARANCE SHALL NOT BE INSTALLED WITHOUT THE APPROVAL OF THE PUBLIC WORKS & UTILITIES DEPARTMENT.
7. THE MINIMUM SEPARATION DISTANCES SHALL BE MEASURED FROM THE NEAREST EDGE OF EACH PIPE BARREL.
8. A NEW WATER MAIN SHALL BE CONSTRUCTED NO LESS THAN 45-DEGREES TO AND AT LEAST ONE FOOT ABOVE THAT PIPELINE. NO CONNECTION JOINTS SHALL BE MADE IN THE WATER MAIN WITHIN EIGHT (8') HORIZONTAL FEET OF THE PIPELINE.
9. FOR LOWERING A WATER MAIN SEE CITY STANDARD 855.01. FOR RAISING A WATER MAIN SEE CITY STANDARD 855.02
10. SEE CITY APPROVED MATERIALS LIST.



CITY OF PETALUMA

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PIPE TO PIPE CROSSING
REQUIREMENTS

NOTES

DATE: AUGUST 2016

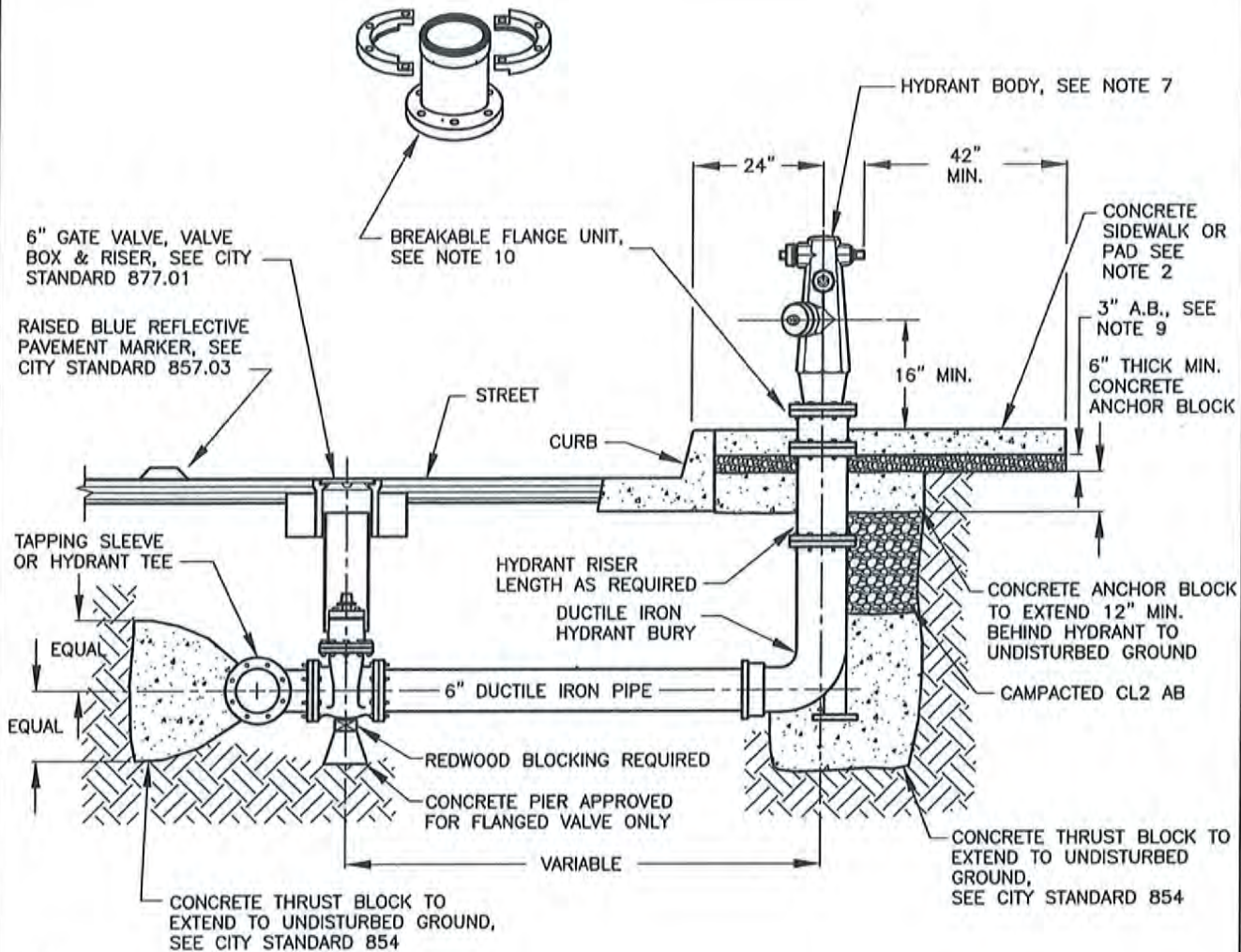
SCALE: N.T.S.

APPROVED BY:

Kent R. Carothers, P.E. Operations Manager C60671

DRAWN BY: JDL

NO. 856.02



NOTES:

1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. WHERE NO SIDEWALK EXISTS, OR WHERE HYDRANT IS INSTALLED IN PLANTER STRIP, A 6" THICK 4' X 4' CONCRETE PAD SHALL BE INSTALLED. SEE CITY STANDARD DETAIL 857.02.
3. RESIDENTIAL FIRE HYDRANTS SHALL HAVE TWO 2-1/2" & ONE 4-1/2" OUTLETS. COMMERCIAL FIRE HYDRANTS SHALL HAVE ONE 2-1/2" & TWO 4-1/2" OUTLETS. COMMERCIAL HYDRANTS: FACE 4-1/2" OUTLETS TO STREET.
4. VERIFY FIRE PROTECTION REQUIREMENTS WITH THE CITY FIRE MARSHAL'S OFFICE.
5. INSTALL FIRE HYDRANT A MINIMUM OF 10 FEET FROM DRIVEWAY.
6. FIRE HYDRANT SHALL BE PAINTED BY MANUFACTURER IN ACCORDANCE WITH AWWA STANDARD SPECIFICATION C503. THE FINISHED PAINT COLOR SHALL BE DTM ALKYD BASED ENAMEL PAINT, GLOSS SAFETY YELLOW. ALL DAMAGED PAINT SURFACES SHALL BE CORRECTED BY TOUCH UP PRIOR TO ACCEPTANCE.
7. FOR APPROVED HYDRANTS—SEE APPROVED MATERIALS LIST.
8. MAINTAIN A MINIMUM OF 36" OPERATIONAL CLEARANCE ALL AROUND.
9. MAINTAIN A 3" MINIMUM SPACE BETWEEN BOTTOM OF FLANGE OF HYDRANT RISER AND TOP OF CONCRETE ANCHOR BLOCK.
10. INSTALL 6" AMERICAN AVK BREAKABLE FLANGE UNIT OR APPROVED EQUAL. SET RISER BARREL CENTERED VERTICALLY AT FINISH GRADE.
11. SEE 857.02 (FIRE HYDRANT LOCATION) AND 857.03 (FIRE HYDRANT MARKER DETAIL)
12. NO BENDS WILL BE ALLOWED IN FIRE HYDRANT LATERALS WITHOUT APPROVAL OF PUBLIC WORKS AND UTILITIES.

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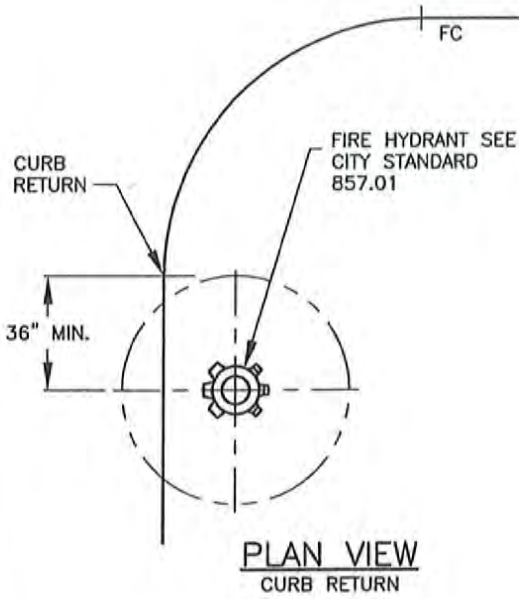


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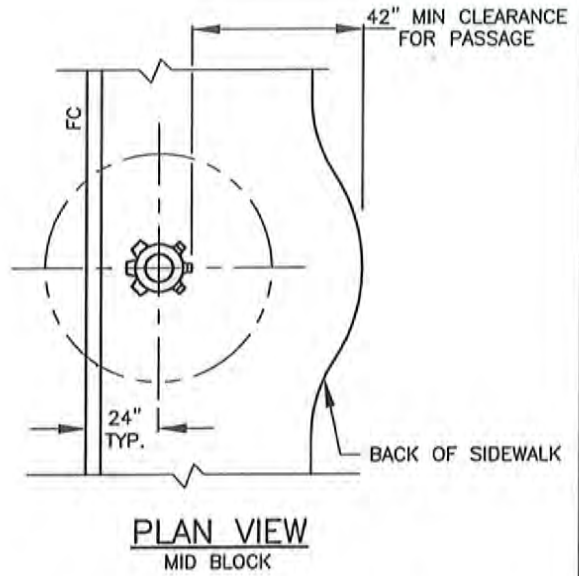
**FIRE HYDRANT
 INSTALLATION**

DATE: MARCH 2016	SCALE: N.T.S.
APPROVED BY: 	
Kent R. Carothers, P.E. Operations Manager C60671	
DRAWN BY: JDL	NO. 857.01

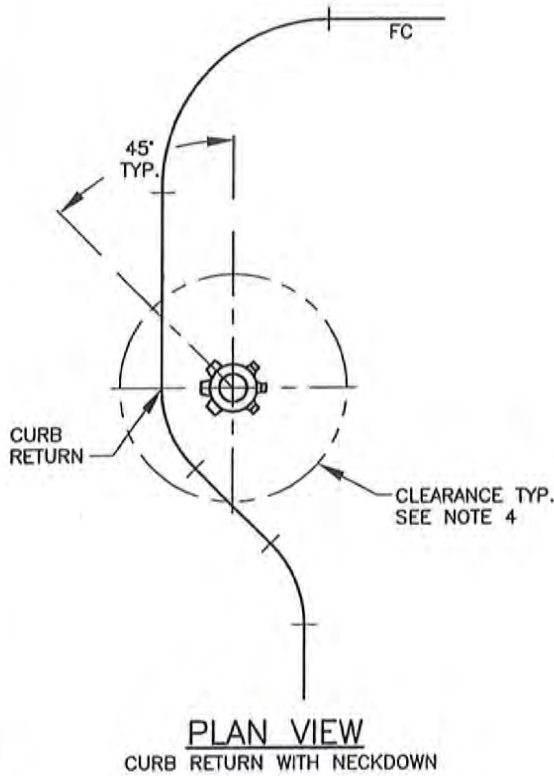
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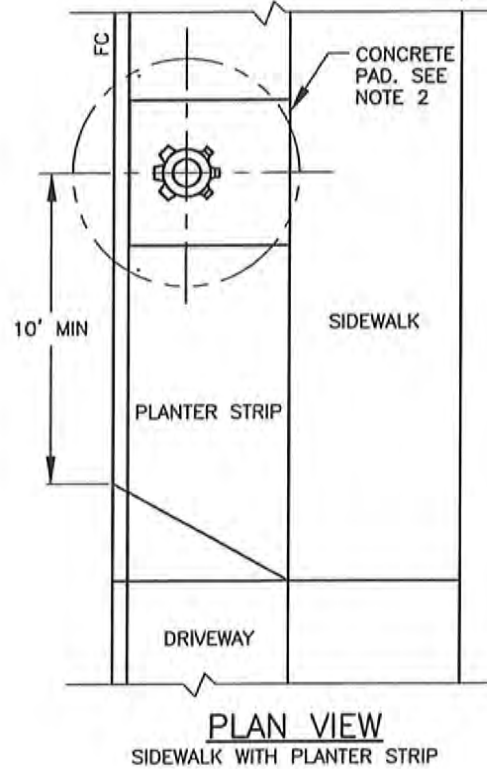
PLAN VIEW
CURB RETURN



PLAN VIEW
MID BLOCK



PLAN VIEW
CURB RETURN WITH NECKDOWN



PLAN VIEW
SIDEWALK WITH PLANTER STRIP

NOTES:

1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. WHERE NO SIDEWALK EXISTS, OR WHERE HYDRANT IS INSTALLED IN PLANTER STRIP, A 6" THICK 4' X 4' CONCRETE PAD SHALL BE INSTALLED.
3. RESIDENTIAL FIRE HYDRANTS HAVE TWO 2-1/2" & ONE 4-1/2" OUTLETS. COMMERCIAL FIRE HYDRANTS HAVE ONE 2-1/2" & TWO 4-1/2" OUTLETS. ON COMMERCIAL HYDRANTS: FACE 4 1/2" OUTLETS TO STREET.
4. MAINTAIN A MINIMUM OF 36" OPERATIONAL CLEARANCE ALL AROUND.
5. FOR DESIGNATED "NO PARKING" AREAS SEE STREET DESIGN AND CONSTRUCTION STANDARDS.



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**FIRE HYDRANT
LOCATION**

DATE: MARCH 2016

SCALE: N.T.S.

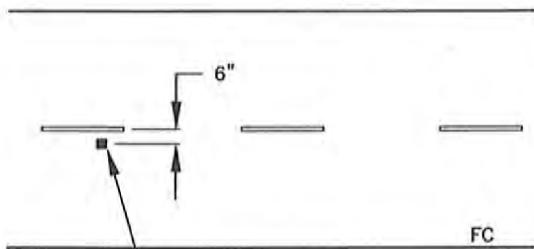
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Kent R. Carothers, P.E. Operations Manager C60671

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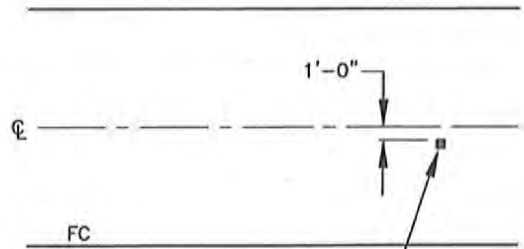
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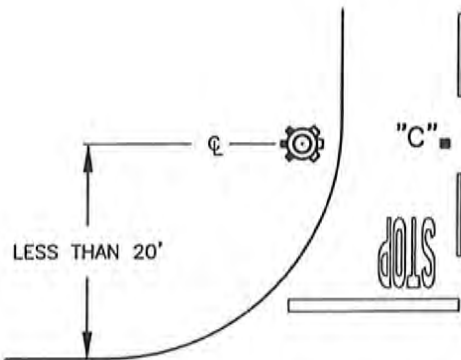


WHEN STREET HAS EXISTING CENTERLINE PAVEMENT MARKING, HYDRANT MARKER SHALL BE LOCATED BESIDE CENTERLINE TOWARD HYDRANT.

FIRE HYDRANT (TYP)

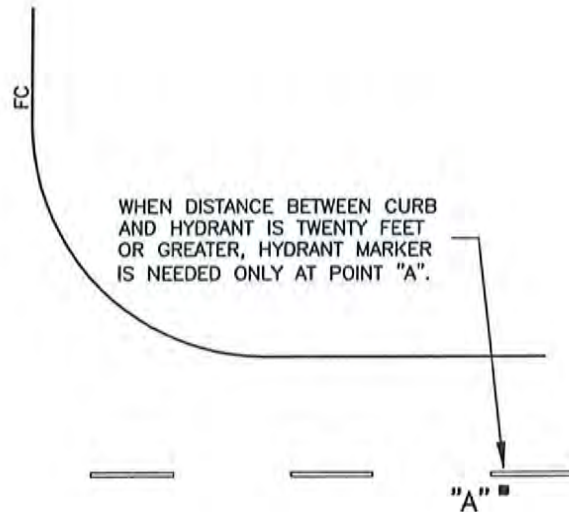


WHEN STREET IS WITHOUT CENTERLINE PAVEMENT MARKING, HYDRANT MARKER SHALL BE LOCATED ONE FOOT OFF CENTERLINE TOWARDS HYDRANT.

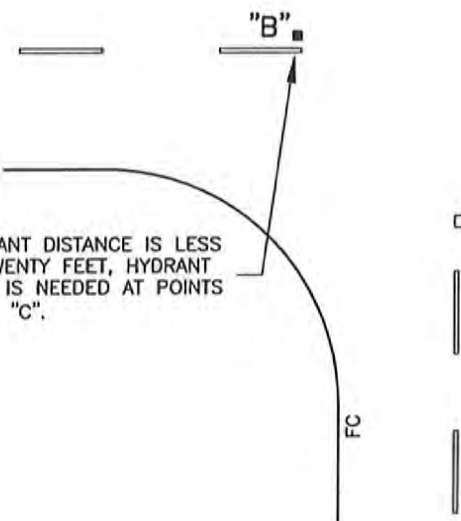


LESS THAN 20'

IF HYDRANT DISTANCE IS LESS THAN TWENTY FEET, HYDRANT MARKER IS NEEDED AT POINTS "B" AND "C".



WHEN DISTANCE BETWEEN CURB AND HYDRANT IS TWENTY FEET OR GREATER, HYDRANT MARKER IS NEEDED ONLY AT POINT "A".



GREATER THAN 20'

FIRE HYDRANT (TYP)

NOTES:

1. SEE WATER SYSTEM DESIGN GUIDELINES.



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FIRE HYDRANT MARKER LOCATION

DATE: MARCH 2016

SCALE: N.T.S.

APPROVED BY:

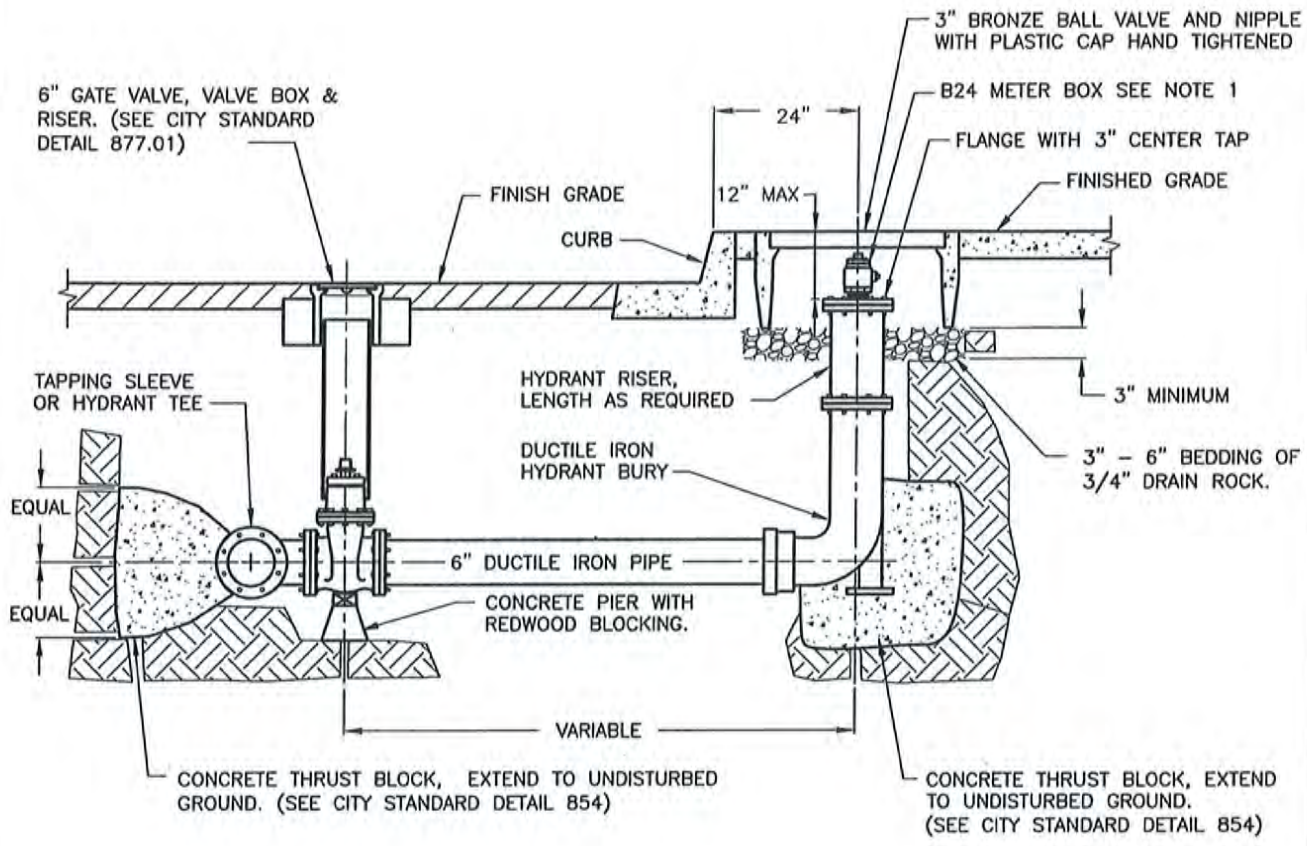
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Kent R. Carothers, P.E. Operations Manager C60671

DRAWN BY: JDL

NO. 857.03

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NOTES:

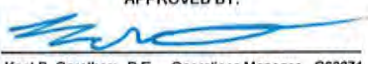
1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. METER BOXES SHALL BE LOCATED OUT OF TRAFFIC LOADING AREAS WHERE POSSIBLE. THE LID SHALL BE SET FLUSH WITH FINISHED GRADE.
3. FOR INSTALLATION ON A DEAD END OR THROUGH STREET, THE MINIMUM DISTANCE BETWEEN THE LINE VALVE OR BLIND FLANGE SHALL BE NO LESS THAN 6 FEET FROM THE BRANCH TEE.
4. BEDDING BACKFILL MATERIAL TO BE COMPACTED IN ACCORDANCE WITH CITY STANDARD DETAIL 852.01.
5. METER BOXES AND COVERS AND TAPPING SLEEVES—SEE ENGINEER'S APPROVED LIST.
6. NO SERVICE MAY BE TAPPED BETWEEN THE LINE VALVE AND BLOWOFF.

• SEE 858.02 FOR APPLICATION

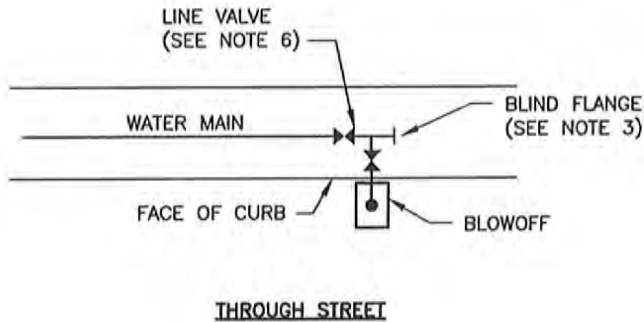
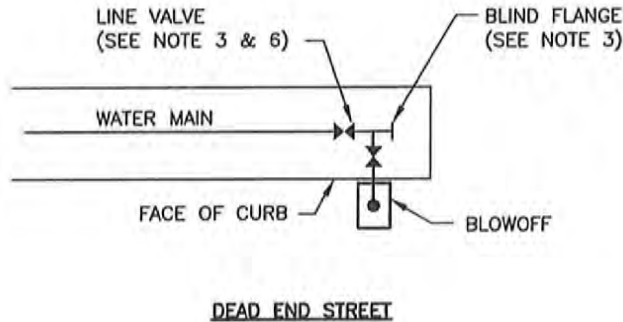
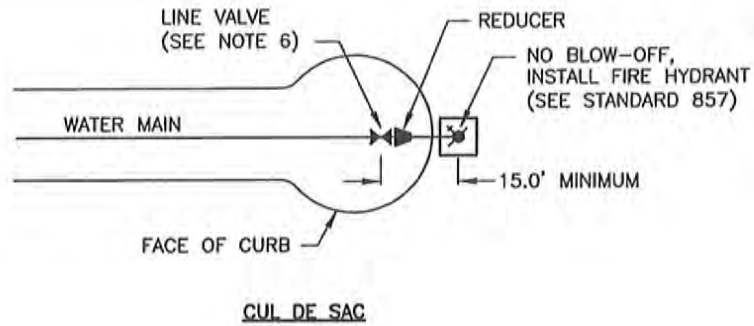


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6" BLOW-OFF

DATE: MARCH 2016	SCALE: N.T.S.
APPROVED BY: 	
Kent R. Carothers, P.E. Operations Manager C60971	
DRAWN BY: JDL	NO. 858.01

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NOTES:

1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. METER BOXES SHALL BE LOCATED OUT OF TRAFFIC LOADING AREAS WHERE POSSIBLE. THE LID SHALL BE SET FLUSH WITH FINISHED GRADE.
3. FOR INSTALLATION ON A DEAD END OR THROUGH STREET, THE MINIMUM DISTANCE BETWEEN THE LINE VALVE OR BLIND FLANGE SHALL BE NO LESS THAN 6 FEET FROM THE BRANCH TEE.
4. BEDDING BACKFILL MATERIAL TO BE COMPACTED IN ACCORDANCE WITH CITY STANDARD DETAIL 852.01.
5. METER BOX, COVER AND TAPPING SLEEVE—SEE APPROVED MATERIALS LIST.
6. NO SERVICE MAY BE TAPPED BETWEEN THE LINE VALVE AND BLOWOFF.



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**END OF LINE DETAIL
(6" BLOW-OFF
APPLICATION)**

DATE: MARCH 2016

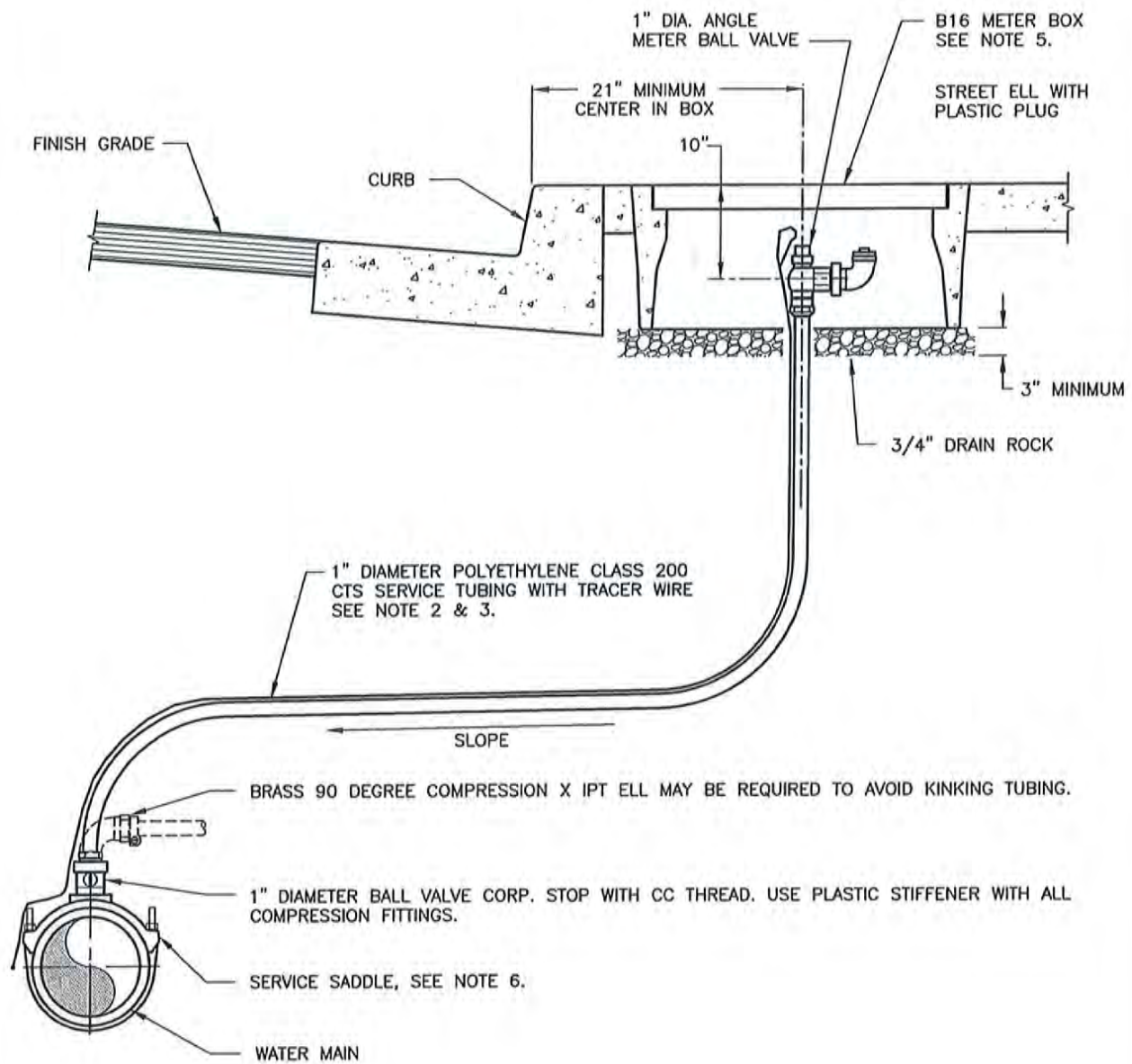
SCALE: N.T.S.

APPROVED BY:

Kent R. Carothers, P.E. Operations Manager C60071

DRAWN BY: JDL

NO. 858.02



NOTES:

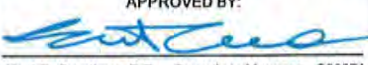
1. SEE WATER SYSTEM DESIGN AND CONSTRUCTION GUIDELINES.
2. SERVICE BEDDING MATERIAL TO BE COMPACTED IN ACCORDANCE WITH CITY STANDARD DETAIL 852.01.
3. CONTINUOUS TRACER WIRE TO BE EXPOSED 6" MINIMUM INSIDE OF METER BOX. USE INSULATED NO. 12 THHN WIRE. ALL WIRE CONNECTIONS SHALL BE MADE WITH MECHANICAL WIRE CONNECTORS WRAPPED WITH ELECTRICAL TAPE, SEE WATER SYSTEM DESIGN AND CONSTRUCTION GUIDELINES.
4. METER BOXES SHALL BE LOCATED OUT OF TRAFFIC LOADING AREAS WHERE POSSIBLE. TRAFFIC LOADING BOX & LID TO BE INSTALLED IN ALL LOCATIONS WHERE VEHICULAR TRAFFIC MAY OCCUR, THE STEEL LID SHALL BE SET FLUSH WITH FINISHED SURFACE.
5. METER BOX, COVER AND SERVICE SADDLE—SEE APPROVED MATERIALS LIST.

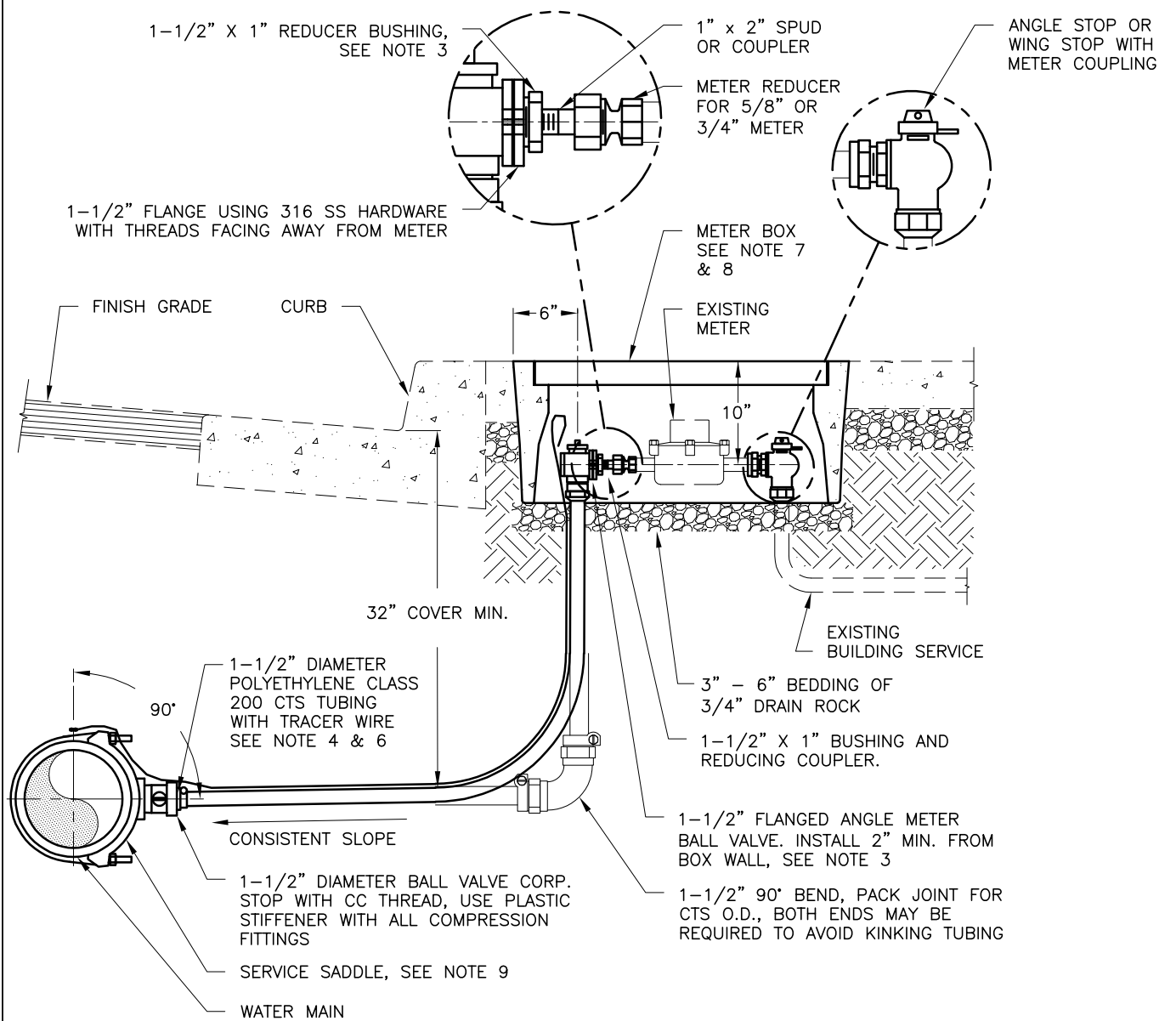
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**1" MANUAL AIR RELEASE
 VALVE CONNECTION**

DATE: MARCH 2016	SCALE: N.T.S.
APPROVED BY: 	
Kent R. Carolers, P.E. Operations Manager C60871	
DRAWN BY: JDL	NO. 859



NOTES:

1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. THE SERVICE SHALL NOT BE SIZED SMALLER THAN THE METER.
3. NEW 1-1/2" WATER SERVICE FOR EXISTING 5/8" OR 3/4" RESIDENTIAL METER, USE A BRASS REDUCING ADAPTER/BUSHING (SPUD) AND COUPLER TO CONNECT TO EXISTING METER.
4. USE INSULATED NO. 12 THHN WIRE.
 - ALL WIRE CONNECTIONS SHALL BE MADE WITH MECHANICAL WIRE CONNECTORS WRAPPED WITH ELECTRICAL TAPE.
 - END OF TRACER WIRE TO BE EXPOSED 6" MINIMUM INSIDE OF METER BOX.
5. METER BOXES SHALL BE LOCATED OUT OF TRAFFIC LOADING AREAS WHERE POSSIBLE. TRAFFIC LOADING BOX & LID TO BE INSTALLED IN ALL LOCATIONS WHERE VEHICULAR TRAFFIC MAY OCCUR, THE STEEL LID SHALL BE SET FLUSH WITH FINISHED SURFACE.
6. SERVICE BEDDING MATERIAL SHALL BE COMPACTED IN ACCORDANCE WITH CITY STANDARD DETAIL 852.01.
7. METER BOXES AND COVERS—SEE APPROVED MATERIALS LIST.
8. REPLACE EXISTING METER BOX WITH NEW B-30 METER BOX. REPLACE CONCRETE TO NEAREST SCORE LINE OR JOINT, ASPHALT TO 1.0' AROUND BOX OR LANDSCAPING IN-KIND.
9. TAPPING SERVICE SADDLES—SEE APPROVED MATERIALS LIST.



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**1-1/2" WATER SERVICE
 FOR EXISTING 3/4" OR
 1" METER**

DATE: DECEMBER 2021 SCALE: N.T.S.

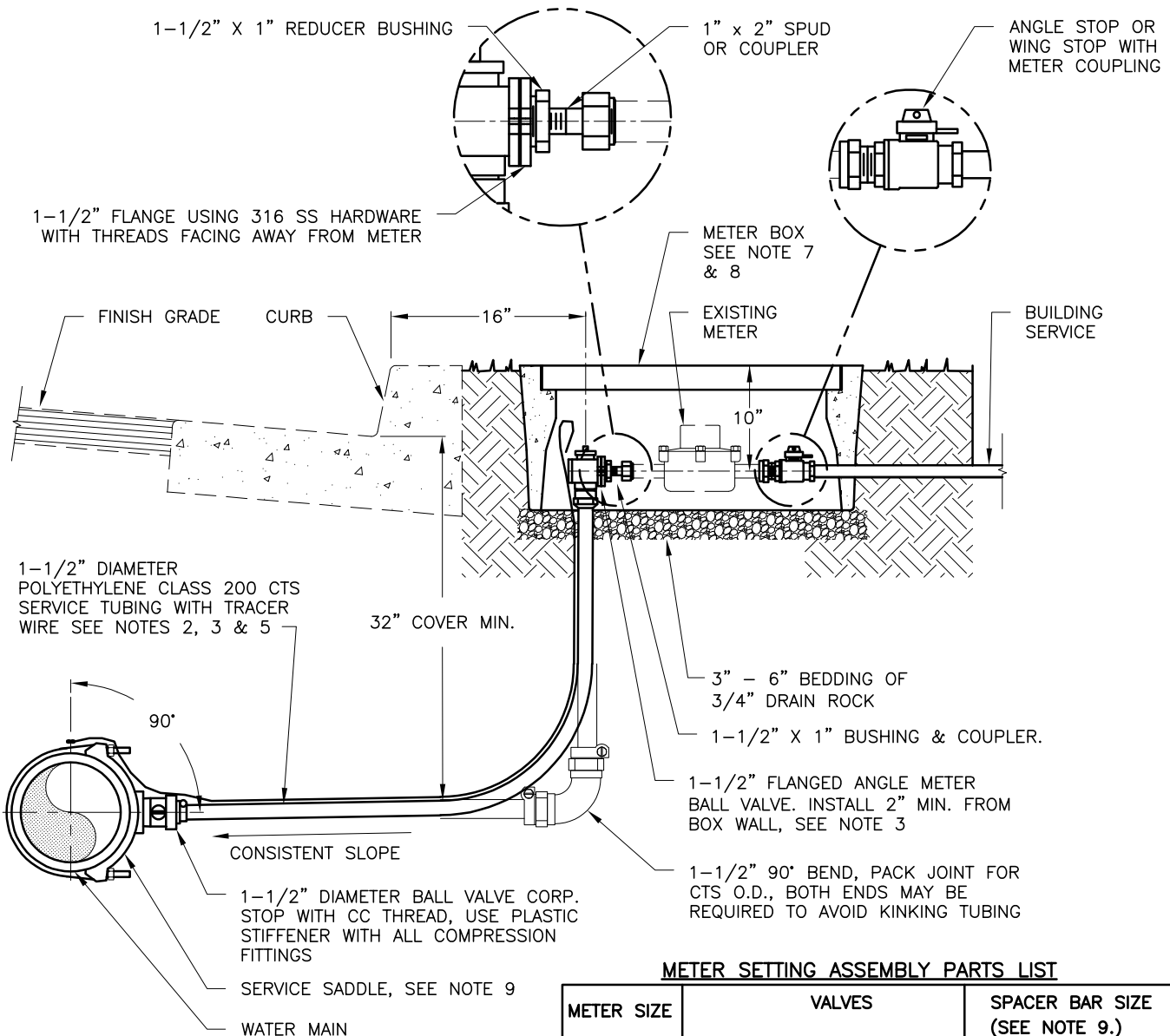
APPROVED BY:

Jeff Stutsman

Jeffrey A. Stutsman, P.E. City Engineer C79843

REV'D BY: ETL

NO. 861



METER SETTING ASSEMBLY PARTS LIST

METER SIZE	VALVES	SPACER BAR SIZE (SEE NOTE 9.)
1"	SEE APPROVED MATERIALS LIST	1" DIA X 11" LONG SCH. 80 PVC PIPE

NOTES:

- SEE WATER SYSTEM DESIGN GUIDELINES.
- THE SERVICE SHALL NOT BE SIZED SMALLER THAN THE METER. IF FIRE SPRINKLERS ARE REQUIRED SEE CITY STANDARD DETAIL 863.
- USE INSULATED NO. 12 THHN WIRE.
 - ALL WIRE CONNECTIONS SHALL BE MADE WITH MECHANICAL WIRE CONNECTORS WRAPPED WITH ELECTRICAL TAPE.
 - END OF TRACER WIRE TO BE EXPOSED 6" MINIMUM INSIDE OF METER BOX.
- METER BOXES SHALL BE LOCATED OUT OF TRAFFIC LOADING AREAS WHERE POSSIBLE. TRAFFIC LOADING BOX & LID TO BE INSTALLED IN ALL LOCATIONS WHERE VEHICULAR TRAFFIC MAY OCCUR, THE STEEL LID SHALL BE SET FLUSH WITH FINISHED SURFACE. BOX PIPE KNOCKOUTS TO BE GROUTED TO PREVENT DIRT INTRUSION WHERE REQUIRED.
- TRENCH BACKFILL REQUIREMENTS – SEE CITY STANDARD DETAIL 852.01.
- METER BOX AND COVER SHALL BE B-30 –SEE APPROVED MATERIALS LIST.
- TAPPING SERVICE SADDLES – SEE APPROVED MATERIALS LIST.
- FOR NEW SERVICES CONTRACTOR SHALL INSTALL SCHEDULE 80 PVC SPACER PIPE WITH 1/2" DIAMETER HOLES DRILLED THRU PIPE AT 2" ON CENTER. THREAD BOTH ENDS. CITY PUBLIC WORKS AND UTILITIES PERSONNEL TO REMOVE SPACER PIPE AND INSTALL METER. SEE METER SETTING ASSEMBLY PARTS LIST.



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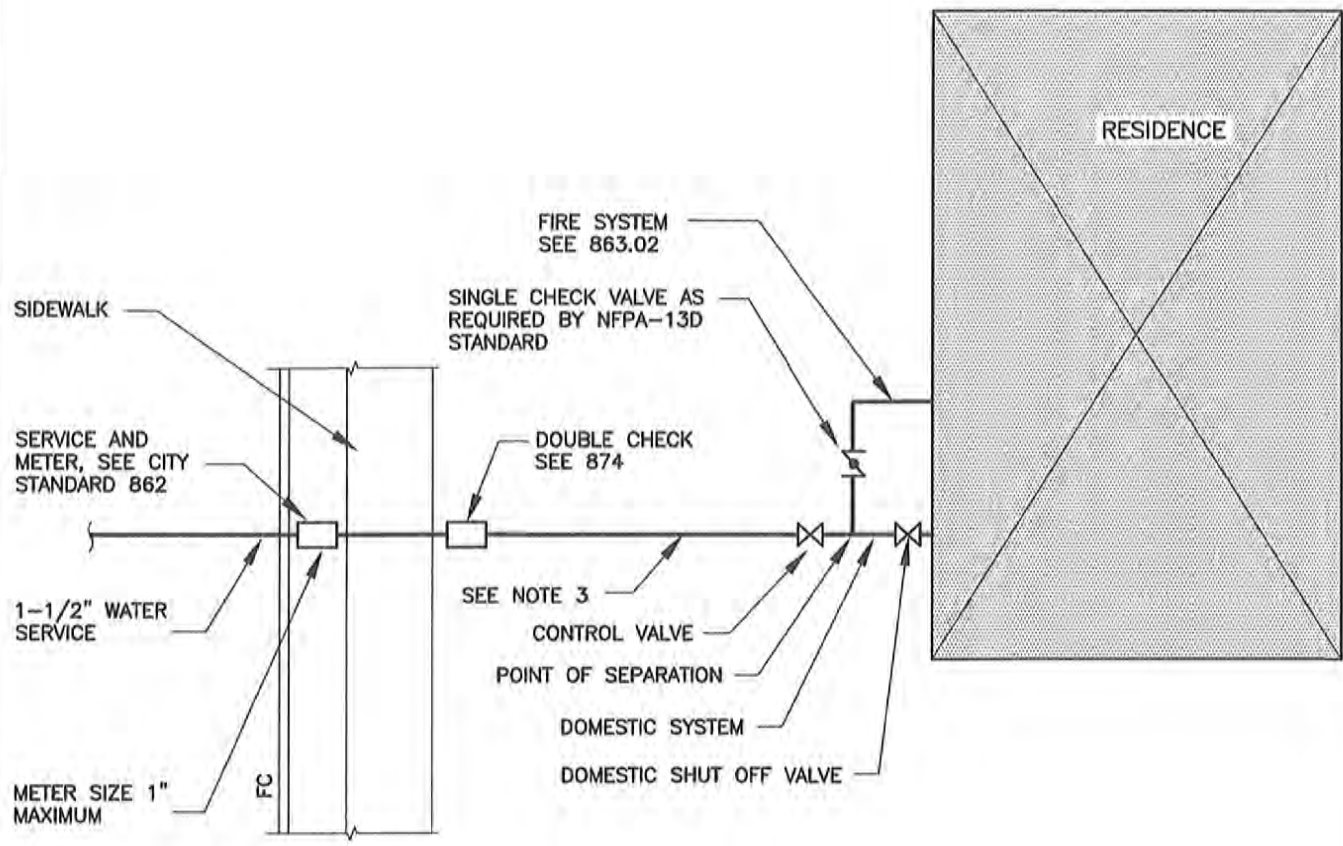
**1-1/2" WATER SERVICE
 FOR 1" METER
 (NEW RESIDENTIAL SVC)**

DATE: DECEMBER 2021 SCALE: N.T.S.

APPROVED BY:

 Jeffrey A. Stutsman, P.E. City Engineer C79843

REV'D BY: ETL NO. 862



PLAN VIEW

NOTES:

1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. LOCATE CHECK VALVE AND SEPARATION POINT AT HOUSE OR IN GARAGE.
3. SERVICE SIZE FROM METER TO DWELLING MUST BE 1-1/2" MINIMUM. FOR SERVICES WITH LONG RUNS OR SIGNIFICANT CHANGES IN GRADE FROM THE METER TO THE DWELLING, LARGER PIPE MAY BE REQUIRED. CONTACT THE FIRE MARSHAL FOR REQUIREMENTS.
4. INSTALL DOUBLE CHECK PER STD. # 874 & 875.



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**RESIDENTIAL FIRE
 SYSTEM SERVICE**

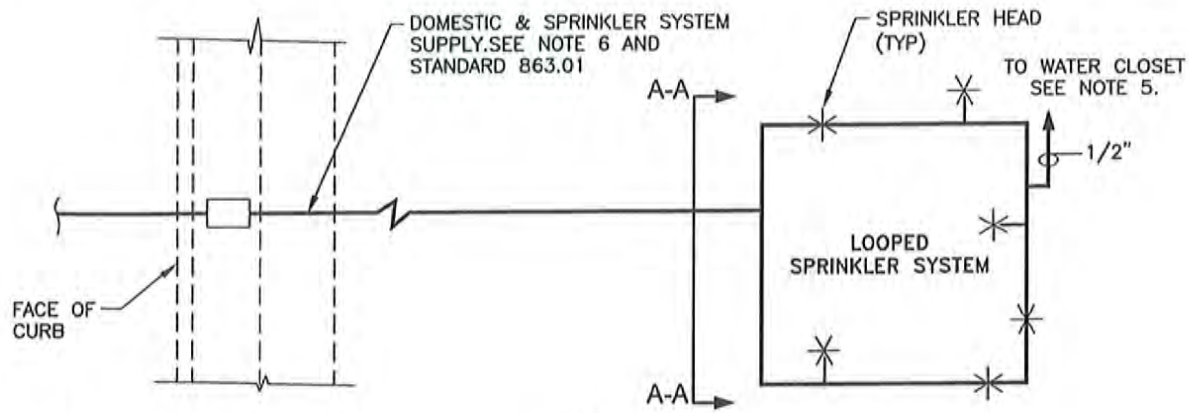
DATE: AUGUST 2019 SCALE: N.T.S.

APPROVED BY:

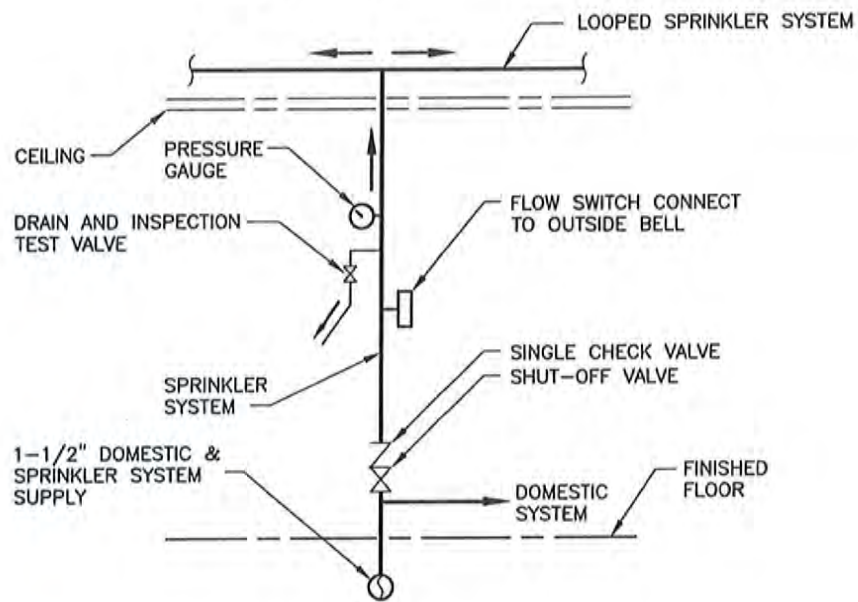
Kent R. Carothers
 Kent R. Carothers, P.E. Operations Manager C60871

DRAWN BY: JDL

NO. 863.01



PLAN VIEW



A-A RISER DETAIL

NOTES:

1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. SPRINKLER SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH NFPA 13D AS APPROVED BY THE FIRE MARSHAL.
3. THE SPRINKLER SYSTEM MUST BE A LOOPED SYSTEM.
4. BACK FLOW DEVICES WILL NOT BE REQUIRED FOR A LOOPED SYSTEM CONNECTED TO A WATER CLOSET (TOILET).
5. THE CONNECTION FOR THE WATER CLOSET MUST BE LOCATED AT THE MOST REMOTE FIXTURE (FARTHEST FROM THE SPRINKLER SYSTEM RISER). FOR SYSTEMS WHERE THE AVAILABLE PRESSURE IS GREATER THAN 70 PSI, A PRESSURE REDUCING VALVE (PRV) WILL BE REQUIRED TO BE INSTALLED BETWEEN THE TEE CONNECTION FROM THE SPRINKLER SYSTEM AND THE WATER CLOSET CONNECTION.
6. MINIMUM 1-1/2" DIA. SINGLE SERVICE-MAY REQUIRE LARGER SERVICE BASED ON FIRE SPRINKLER DESIGN CONSULT FIRE SPRINKLER CONTRACTOR FOR APPROPRIATE SIZING OF SERVICE.
7. FOR SPRINKLER SYSTEMS THAT CANNOT BE LOOPED, A SINGLE CHECK VALVE APPROVED IN ACCORDANCE WITH NFPA 13D AND OR OTHER NATIONALLY RECOGNIZED STANDARDS SHALL BE INSTALLED ON THE SPRINKLER RISER. SYSTEMS REQUIRING A CHECK VALVE SHALL NOT BE REQUIRED TO BE CONNECTED TO THE WATER CLOSET.
8. THE FIRE SPRINKLER FLOW SWITCH SHALL BE SET TO ITS HIGHEST SETTING TO AVOID ACTUATION OF THE AUDIBLE FIRE ALARM.



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RESIDENTIAL
FIRE SPRINKLER
LOOP SYSTEM

DATE: MARCH 2016

SCALE: N.T.S.

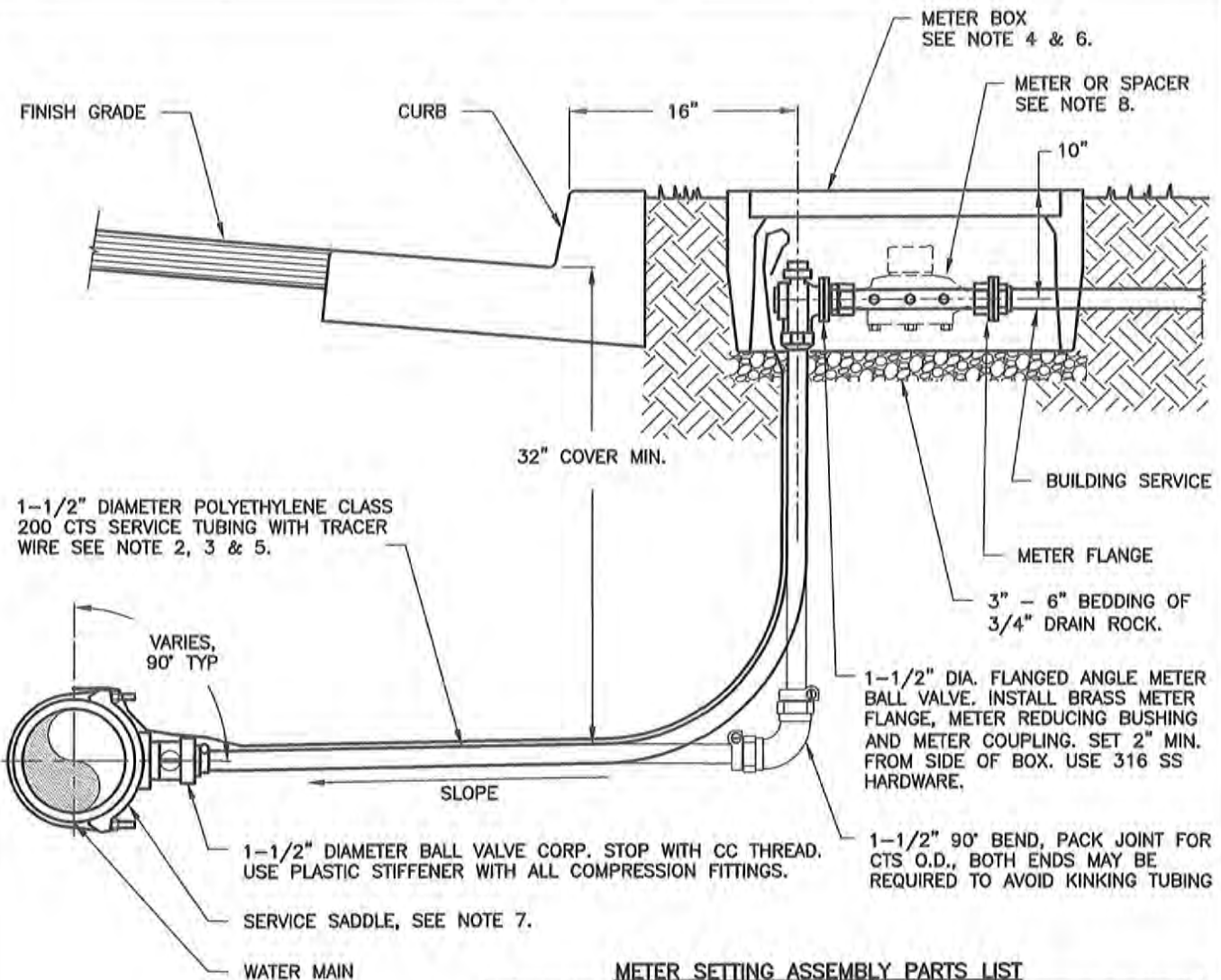
APPROVED BY:

[Signature]

Kent R. Carothers, P.E. Operations Manager C60871

DRAWN BY: JDL

NO. 863.02



METER SETTING ASSEMBLY PARTS LIST

METER SIZE	VALVES	SPACER BAR SIZE (SEE NOTE 9.)
1-1/2"	SEE APPROVED MATERIALS LIST	1-1/2" DIA X 13-1/4" L SCH. 80 PVC PIPE

NOTES:

- SEE WATER SYSTEM DESIGN GUIDELINES.
- THE SERVICE SHALL NOT BE SIZED SMALLER THAN THE METER. IF FIRE SPRINKLERS ARE REQUIRED SEE CITY STANDARD DETAIL 863.01 & 863.02.
- USE INSULATED NO. 12 THHN WIRE.
 - ALL WIRE CONNECTIONS SHALL BE MADE WITH MECHANICAL WIRE CONNECTORS WRAPPED WITH ELECTRICAL TAPE.
 - END OF TRACER WIRE TO BE EXPOSED 6" MINIMUM INSIDE OF METER BOX.
- METER BOXES SHALL BE LOCATED OUT OF TRAFFIC LOADING AREAS WHERE POSSIBLE. TRAFFIC LOADING BOX & LID TO BE INSTALLED IN ALL LOCATIONS WHERE VEHICULAR TRAFFIC MAY OCCUR, THE STEEL LID SHALL BE SET FLUSH WITH FINISHED SURFACE. BOX PIPE KNOCKOUTS TO BE GROUTED TO PREVENT DIRT INTRUSION WHERE REQUIRED.
- TRENCH BACKFILL REQUIREMENTS - SEE CITY STANDARD DETAIL 852.01.
- METER BOX AND COVER SHALL BE B-36 - SEE APPROVED MATERIALS LIST.
- TAPPING SERVICE SADDLES - SEE APPROVED MATERIALS LIST.
- FOR NEW SERVICES CONTRACTOR SHALL INSTALL SCHEDULE 80 PVC SPACER PIPE WITH 1/2" DIAMETER HOLES DRILLED THRU PIPE AT 2" ON CENTER, THREAD BOTH ENDS. CITY PUBLIC WORKS AND UTILITIES PERSONNEL TO REMOVE SPACER PIPE AND INSTALL METER. SEE METER SETTING ASSEMBLY PARTS LIST.
- ALL FLANGE BOLTS FOR METERS TO HAVE THREADS FACING AWAY FROM METER. INCLUDES 1 1/2" AND 2" METERS.



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1-1/2" WATER SERVICE
FOR 1-1/2" METER
(COMMERCIAL)

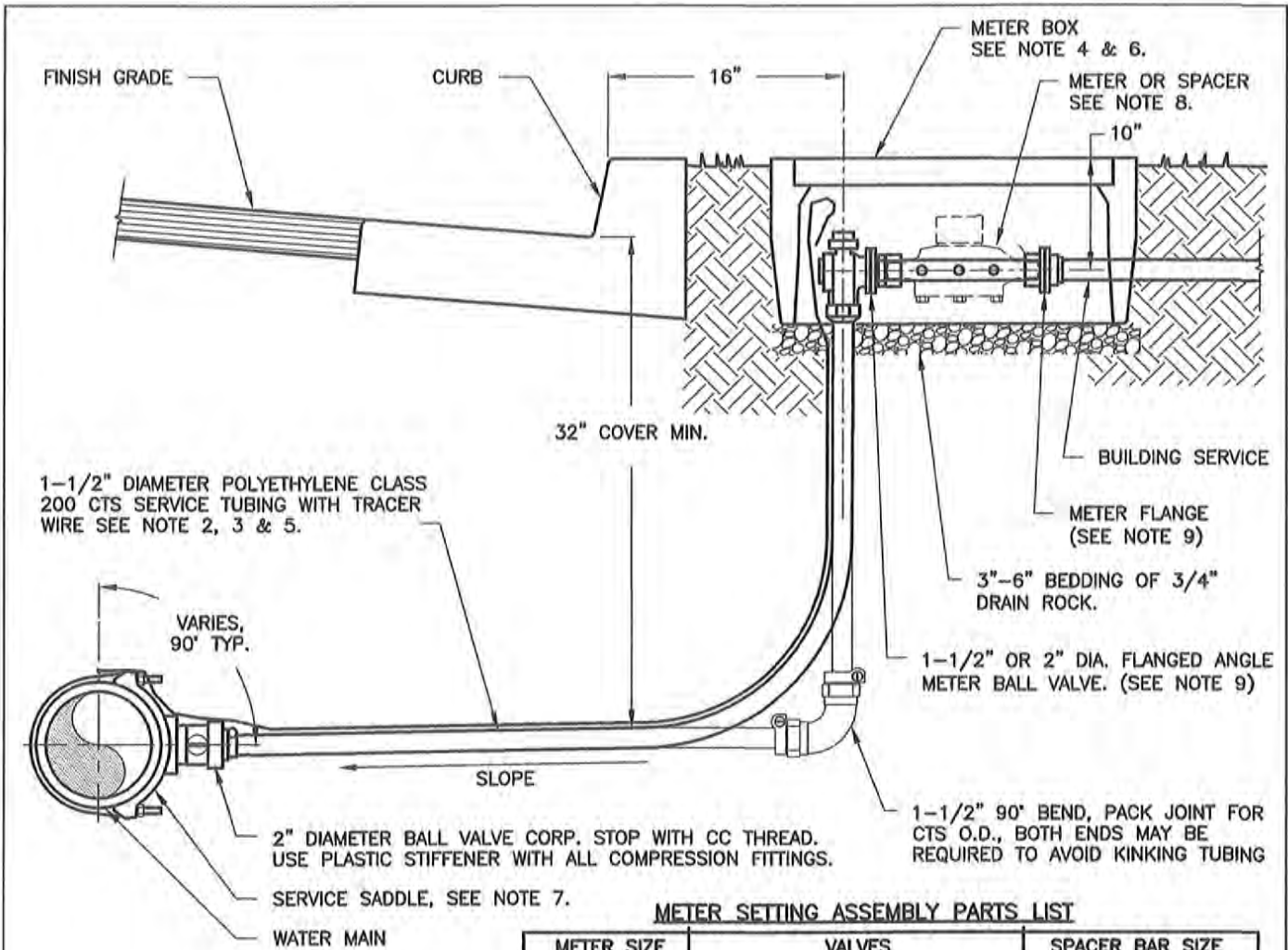
DATE: AUGUST 2019 SCALE: N.T.S.

APPROVED BY:

Kent R. Carothers
Kent R. Carothers, P.E. Operations Manager C60671

DRAWN BY: JDL

NO. 864



METER SETTING ASSEMBLY PARTS LIST

METER SIZE	VALVES	SPACER BAR SIZE (SEE NOTE 9.)
1-1/2"	SEE APPROVED MATERIALS LIST	1-1/2" DIA X 13-1/4" L SCH. 80 PVC PIPE
2"	SEE APPROVED MATERIALS LIST	2" DIA X 17-1/4" LONG SCH. 80 PVC PIPE

NOTES:

- SEE WATER SYSTEM DESIGN GUIDELINES.
- THE SERVICE SHALL NOT BE SIZED SMALLER THAN THE METER. IF FIRE SPRINKLERS ARE REQUIRED SEE CITY STANDARD DETAIL 863.01 & 863.02.
- USE INSULATED NO. 12 THHN WIRE.
 - ALL WIRE CONNECTIONS SHALL BE MADE WITH MECHANICAL WIRE CONNECTORS WRAPPED WITH ELECTRICAL TAPE.
 - END OF TRACER WIRE TO BE EXPOSED 6" MINIMUM INSIDE OF METER BOX.
- METER BOXES SHALL BE LOCATED OUT OF TRAFFIC LOADING AREAS WHERE POSSIBLE. TRAFFIC LOADING BOX & LID TO BE INSTALLED IN ALL LOCATIONS WHERE VEHICULAR TRAFFIC MAY OCCUR, THE STEEL LID SHALL BE SET FLUSH WITH FINISHED SURFACE. BOX PIPE KNOCKOUTS TO BE GROUTED TO PREVENT DIRT INTRUSION WHERE REQUIRED.
- TRENCH BACKFILL REQUIREMENTS - SEE CITY STANDARD DETAIL 852.01.
- METER BOX AND COVER SHALL BE B-36 - SEE APPROVED MATERIALS LIST.
- TAPPING SERVICE SADDLES - SEE APPROVED MATERIALS LIST.
- FOR NEW SERVICES CONTRACTOR SHALL INSTALL SCHEDULE 80 PVC SPACER PIPE WITH 1/2" DIAMETER HOLES DRILLED THRU PIPE AT 2" ON CENTER, THREAD BOTH ENDS. CITY PUBLIC WORKS AND UTILITIES PERSONNEL TO REMOVE SPACER PIPE AND INSTALL METER. SEE METER SETTING ASSEMBLY PARTS LIST.
- INSTALL BRASS METER FLANGE (WITH OBLONG BOLT HOLES AND BUSHING TO FIT 1-1/2" METERS). SET 2" MIN. FROM SIDE OF BOX. USE 316 SS HARDWARE.
- ALL FLANGE BOLTS FOR METERS TO HAVE THREADS FACING AWAY FROM METER. INCLUDES 1 1/2" AND 2" METERS.

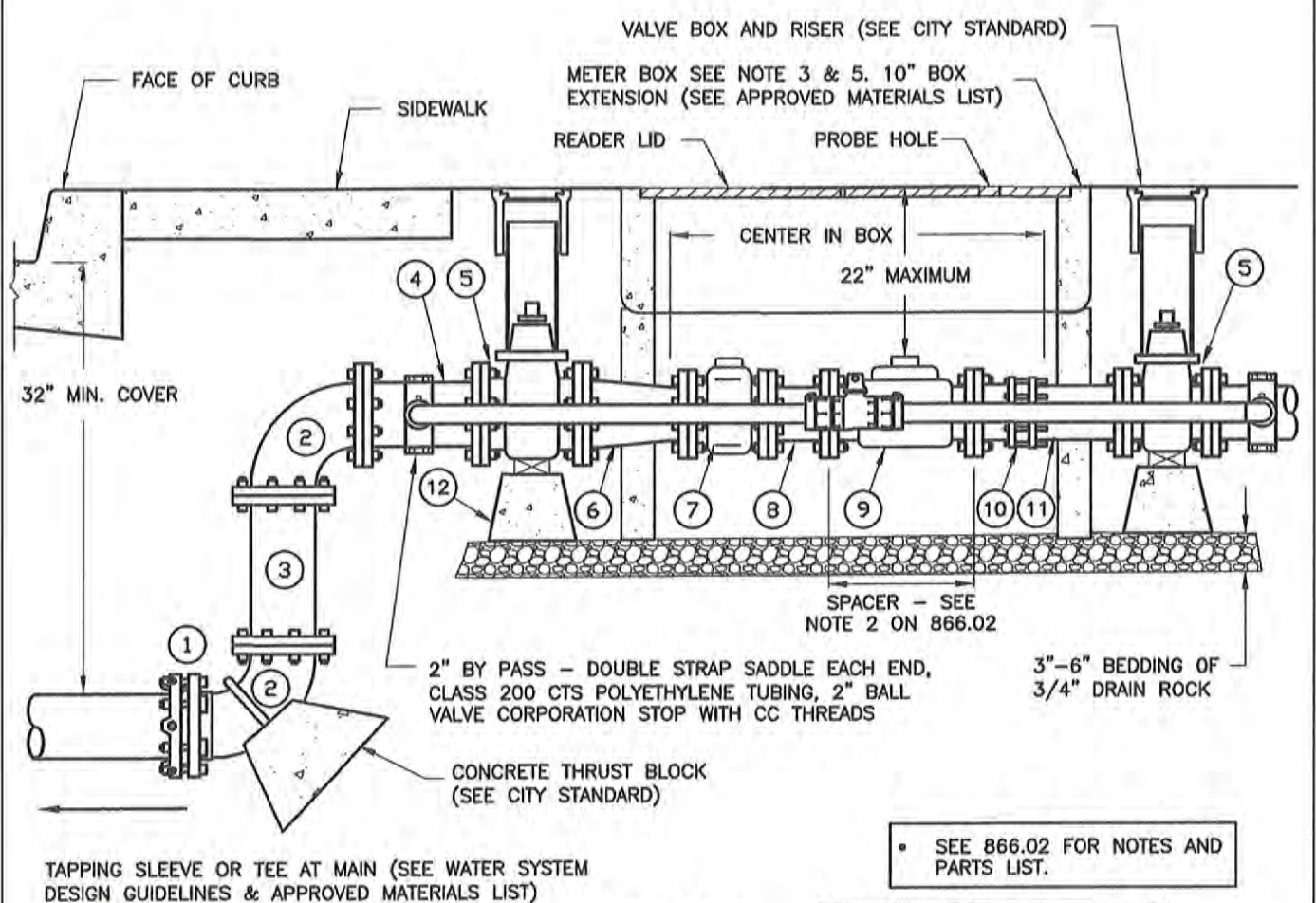
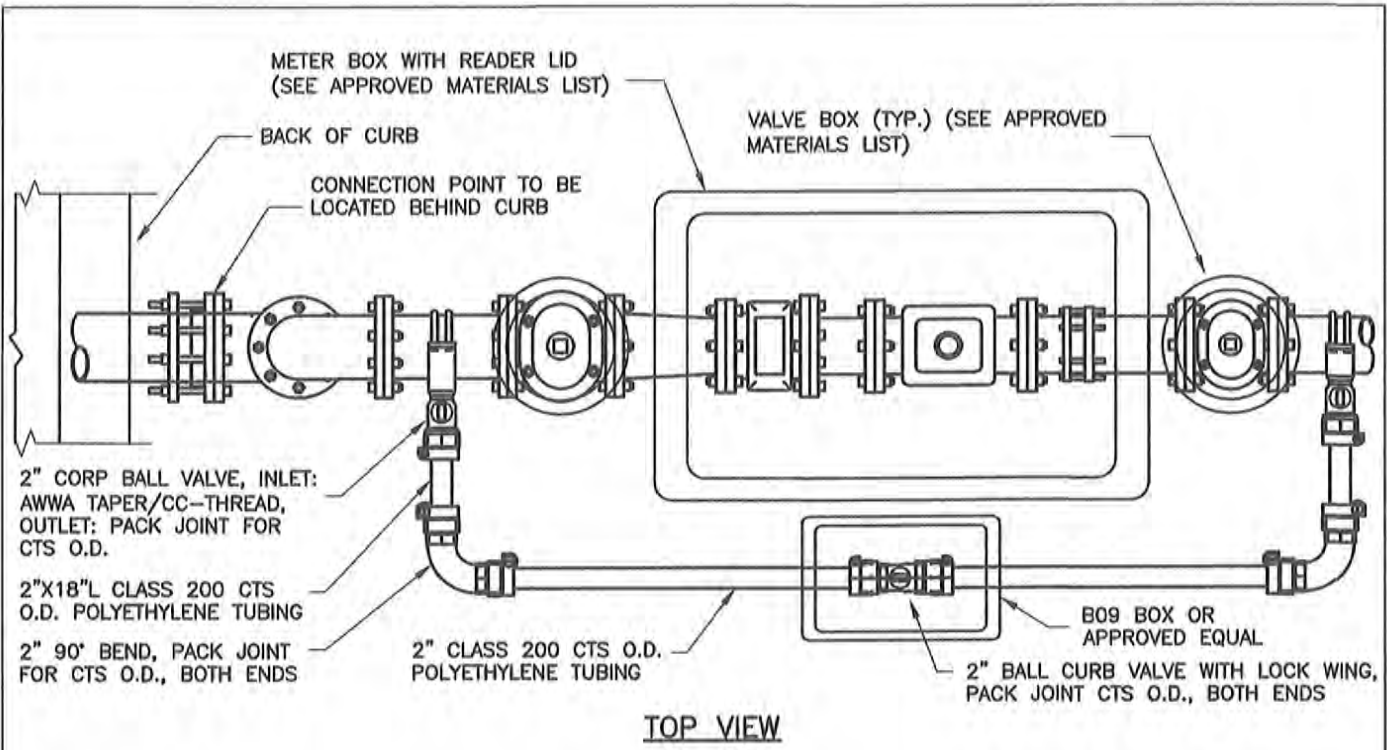


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2" WATER SERVICE
FOR 1-1/2" OR 2" METER
 (COMMERCIAL)

DATE: AUGUST 2019 SCALE: N.T.S.
 APPROVED BY:

 Kent R. Carothers, P.E. Operations Manager C60871
 DRAWN BY: JDL NO. 865



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**4" WATER SERVICE
 FOR 3" METER**

DATE: AUGUST 2019 SCALE: N.T.S.
 APPROVED BY:
Kent R. Carothers
 Kent R. Carothers, P.E. Operations Manager C60871
 DRAWN BY: JDL NO. 866.01

NOTES:

1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. CONTRACTOR SHALL INSTALL SCHEDULE 80 P.V.C. PIPE SPACER WITH 1/2" DIAMETER HOLES DRILLED THROUGH VERTICALLY AT 2" SPACING. CITY TO REMOVE SPACER BAR AT TIME OF METER INSTALLATION. LENGTH IS FOR A 3" DOMESTIC COMPOUND TYPE WATER METER. IF THE USE IS FOR IRRIGATION OR FIRE FLOW THIS LENGTH MAY VARY. CONTRACTOR TO VERIFY WITH UTILITY DIVISION PRIOR TO INSTALLATION.
3. METER BOX MUST BE SET SO THE STEEL COVER IS FLUSH WITH FINISHED SURFACE.
4. PRIOR TO METER SET, ADDRESS SHALL BE CLEARLY MARKED ON TOP OF METER BOX WITH PERMANENT MARKER.
5. METER BOX PIPE KNOCKOUTS SHALL BE NEATLY CUT AND GROUTED SUFFICIENTLY TO PREVENT INTRUSION OF DIRT.
6. ALL FITTINGS AND PIPE ARE SHALL BE DUCTILE IRON UNLESS OTHERWISE SPECIFIED.
7. SPOOL LENGTH SHALL BE A MINIMUM OF FIVE (5) TIMES THE PIPE DIAMETER.
8. THE SERVICE LATERAL SHALL NOT BE SIZED SMALLER THAN THE METER.
9. IN THE CASE OF A MONOLITHIC CURB AND SIDEWALK THE VALVE FLANGE LOCATION SHALL BE 17" BEHIND SIDEWALK.

4" SERVICE ASSEMBLY FOR A 3" METER PARTS LIST	
NO.	DESCRIPTION
①	MEGALUG MECHANICAL JOINT RESTRAINT OR APPROVED EQUAL
②	4" FLANGED 90° BEND
③	4" FLANGED SPOOL - LENGTH AS REQUIRED
④	4" FLG X FLG 18" LONG D.I.P. SPOOL
⑤	4" FLG X FLG RESILIENT WEDGE GATE VALVE
⑥	4" X 3" FLG X FLG REDUCER
⑦	STRAINER FURNISHED INSTALLED BY CITY AT DEVELOPERS EXPENSE
⑧	3" X 15" DIP SPOOL (SEE NOTE 7)
⑨	3" COMPOUND METER AND STRAINER INSTALLED BY CITY AT DEVELOPERS EXPENSE (SEE NOTE 2)
⑩	3" FLANGED COUPLING ADAPTER
⑪	3" PE X FLG D.I.P. SPOOL - LENGTH AS REQUIRED
⑫	CONCRETE PIER BLOCK WITH REDWOOD BLOCKING (2) REQUIRED



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**4" WATER SERVICE
FOR 3" METER**
(NOTES AND PARTS LIST)

DATE: MARCH 2016

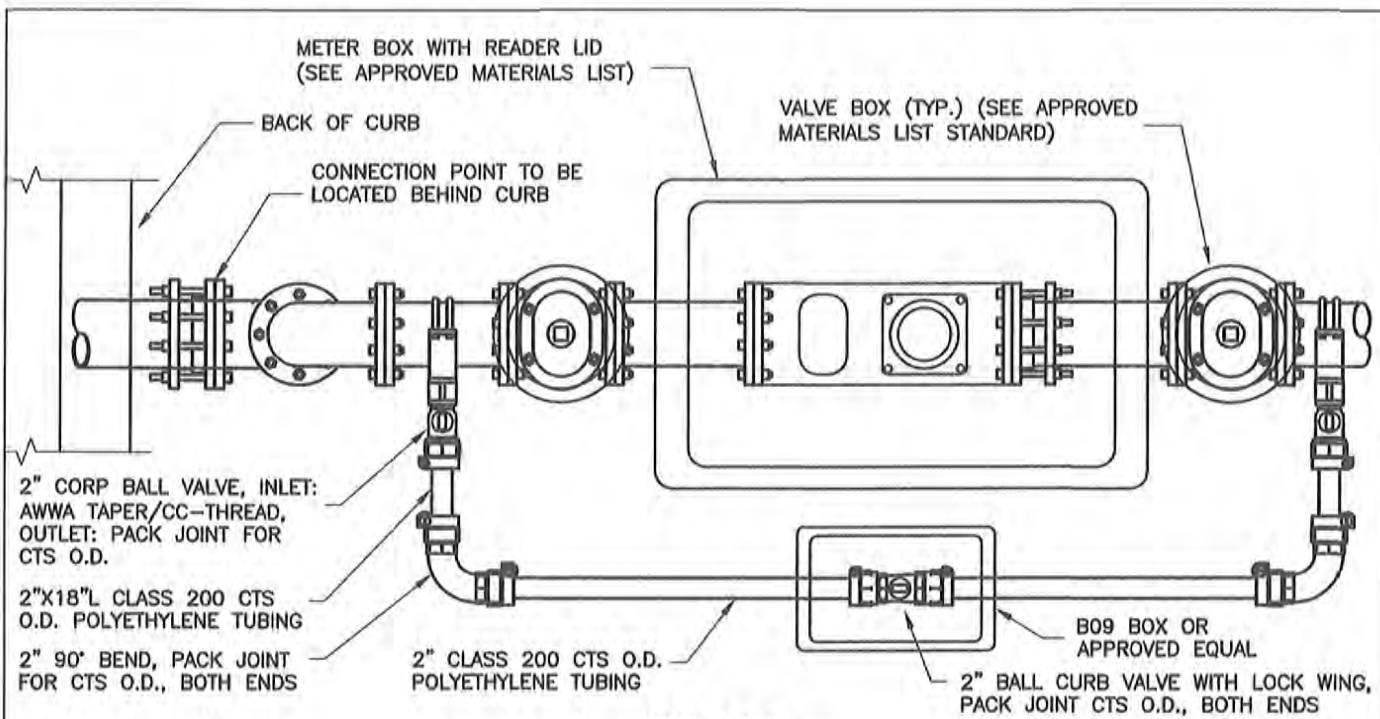
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APPROVED BY:

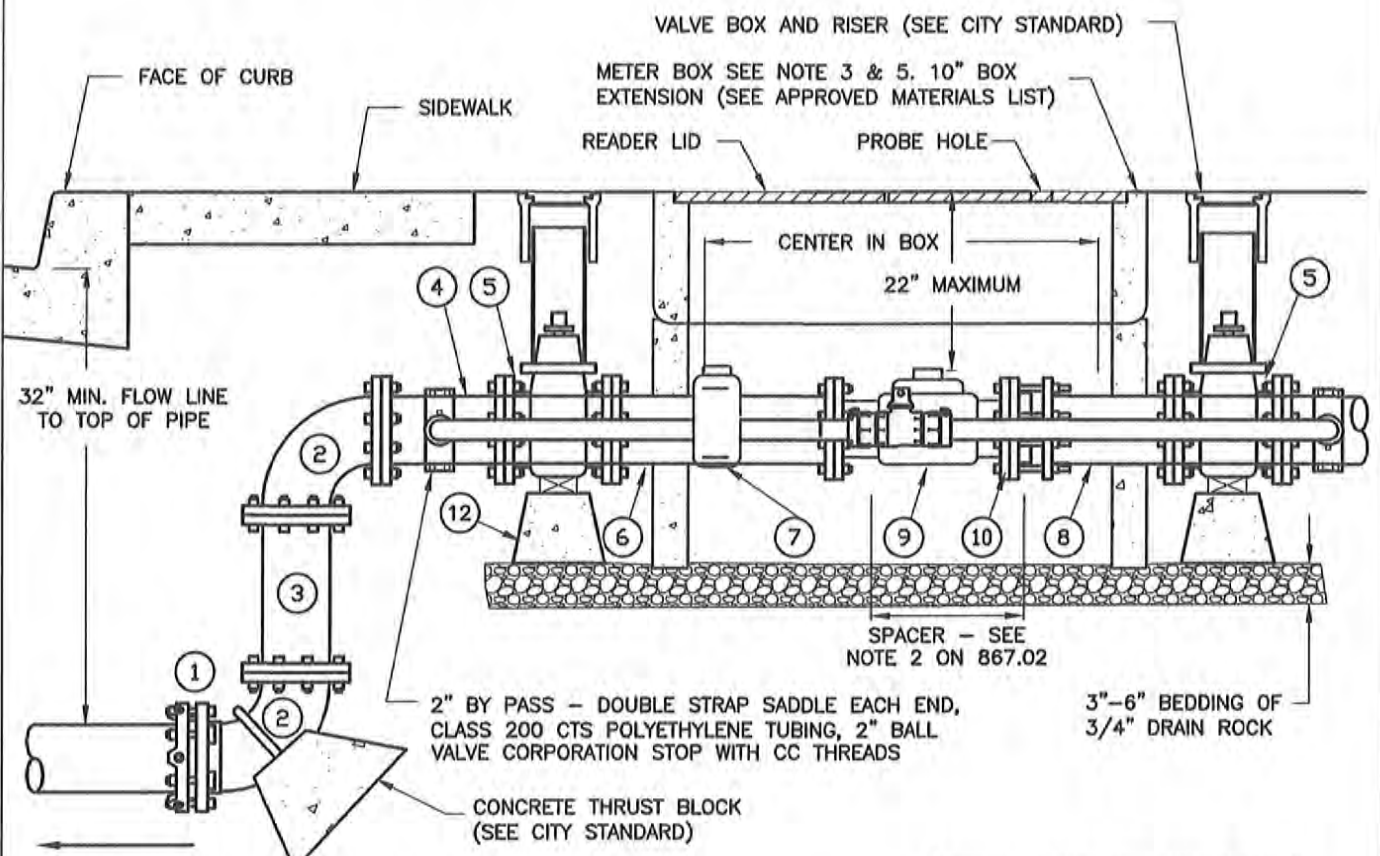
Kent R. Carothers, P.E. Operations Manager C60671

DRAWN BY: JDL

NO. 866.02



TOP VIEW



SIDE VIEW

• SEE 867.02 NOTES FOR AND PARTS LIST

• FULL SUBMITTAL REQUIRED BY CONTRACTOR FOR INSTALL.



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**4" WATER SERVICE
 FOR 4" METER**

DATE: AUGUST 2019 SCALE: N.T.S.
 APPROVED BY:

 Kent R. Carothers, P.E. Operations Manager C80671
 DRAWN BY: JDL NO. 867.01

NOTES:

1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. CONTRACTOR SHALL INSTALL SCHEDULE 80 P.V.C. PIPE SPACER WITH 1/2" DIAMETER HOLES DRILLED THROUGH VERTICALLY AT 2" SPACING. CITY TO REMOVE SPACER BAR AT TIME OF METER INSTALLATION. LENGTH IS FOR A 6" DOMESTIC TYPE WATER METER. IF THE USE IS FOR IRRIGATION OR FIRE FLOW THIS LENGTH MAY VARY. CONTRACTOR TO VERIFY WITH UTILITY DIVISION PRIOR TO INSTALLATION.
3. METER BOX MUST BE SET SO THE STEEL COVER IS FLUSH WITH FINISHED SURFACE.
4. PRIOR TO METER SET, ADDRESS SHALL BE CLEARLY MARKED ON TOP OF METER BOX WITH PERMANENT MARKER.
5. METER BOX PIPE KNOCKOUTS SHALL NEATLY CUT AND GROUTED SUFFICIENTLY TO PREVENT INTRUSION OF DIRT.
6. ALL FITTINGS AND PIPE ARE SHALL DUCTILE IRON UNLESS OTHERWISE SPECIFIED.
7. SPOOL LENGTH TO BE A MINIMUM OF FIVE (5) TIMES THE PIPE DIAMETER.
8. THE SERVICE LATERAL SHALL NOT BE SIZED SMALLER THAN THE METER.
9. IN THE CASE OF A MONOLITHIC CURB AND SIDEWALK THE VALVE FLANGE LOCATION SHALL BE 17" BEHIND SIDEWALK.

4" SERVICE ASSEMBLY FOR A 4" METER PARTS LIST	
NO.	DESCRIPTION
①	MEGALUG MECHANICAL JOINT RESTRAINT OR APPROVED EQUAL
②	4" FLANGED 90° BEND
③	4" FLANGED SPOOL - LENGTH AS REQUIRED
④	4" FLG X FLG 18" LONG D.I.P. SPOOL
⑤	4" FLG X FLG RESILIENT WEDGE GATE VALVE
⑥	4" X 20" DIP SPOOL (SEE NOTE 7)
⑦	STRAINER FURNISHED INSTALLED BY CITY AT DEVELOPERS EXPENSE
⑧	4" METER AS REQUIRED INSTALLED BY CITY AT DEVELOPERS EXPENSE (SEE NOTE 2)
⑨	4" FLANGED COUPLING ADAPTER
⑩	4" PE X FLG D.I.P. SPOOL - LENGTH AS REQUIRED
⑪	CONCRETE PIER BLOCK WITH REDWOOD BLOCKING (2) REQUIRED

4" METER SPACER TABLE	
METER TYPE	SPACER LENGTH
COMPOUND METER WITH STRAINER	29 1/2"
TURBINE METER WITH STRAINER (SHOWN)	23 1/2"



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**4" WATER SERVICE
FOR 4" METER
(NOTES AND PARTS)**

DATE: MARCH 2016

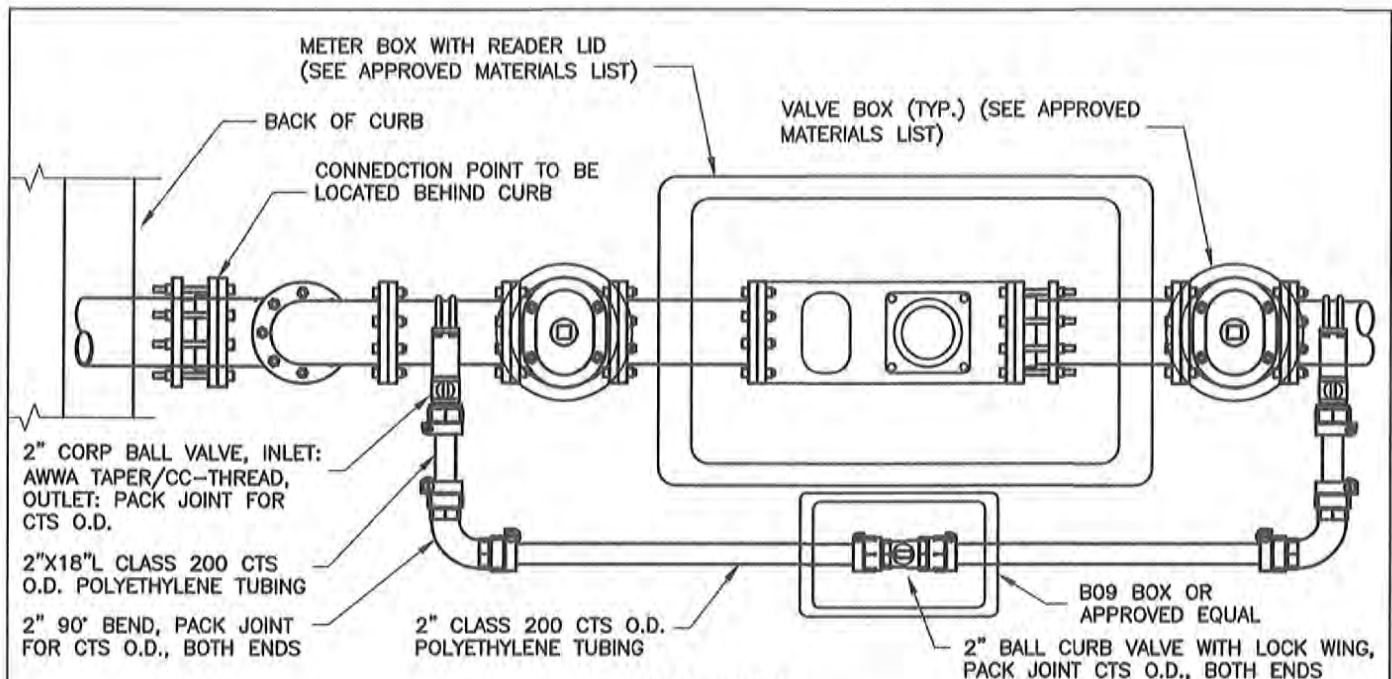
SCALE: N.T.S.

APPROVED BY:

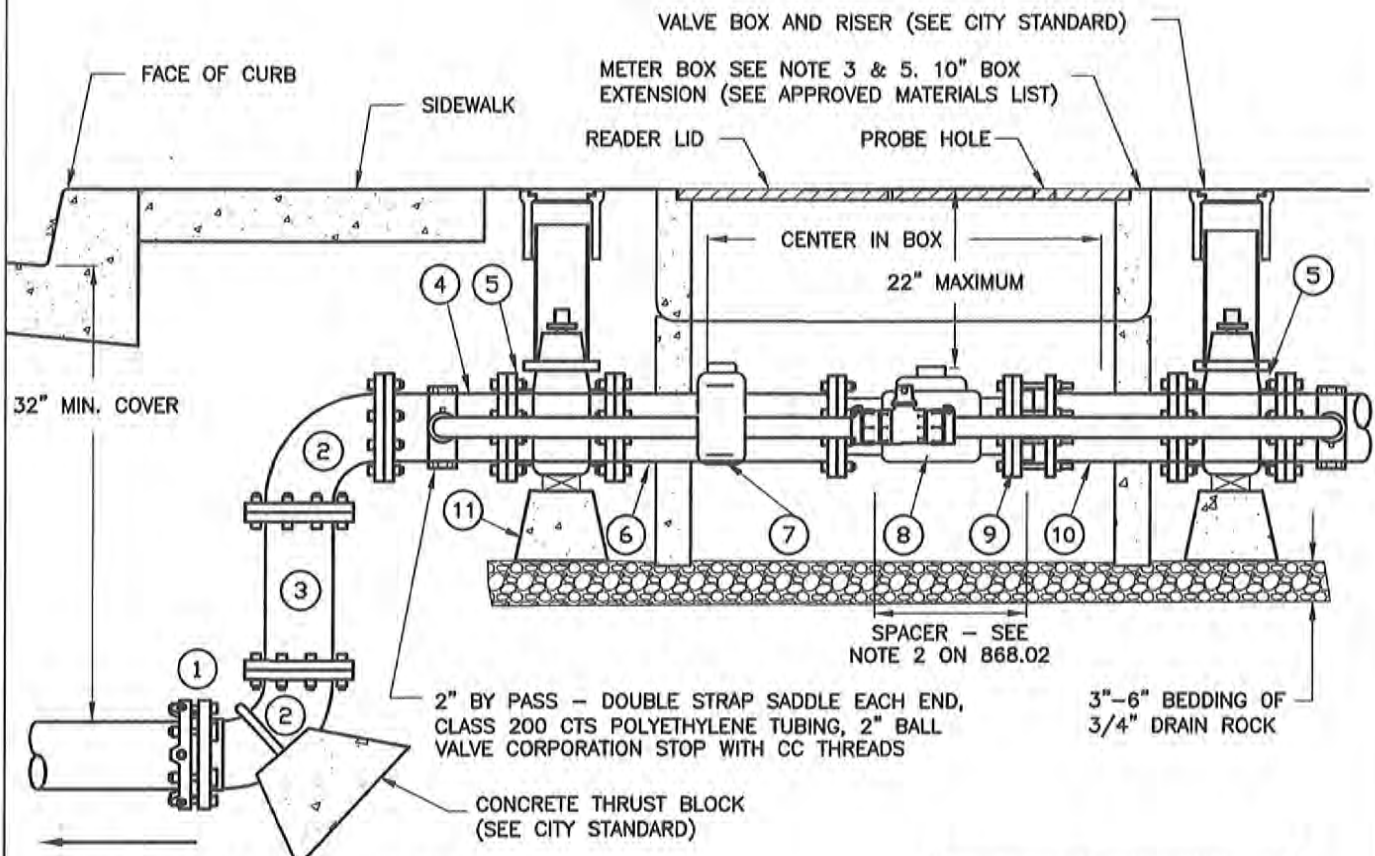
Kent R. Carolers, P.E. Operations Manager C60071

DRAWN BY: JDL

NO. 867.02



TOP VIEW



SIDE VIEW

• SEE 868.02 FOR NOTES AND PARTS LIST

• FULL SUBMITTAL REQUIRED BY CONTRACTOR FOR INSTALL.



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6" WATER SERVICE FOR 6" METER (TURBINE)

DATE: AUGUST 2019 SCALE: N.T.S.
 APPROVED BY:

 Kent R. Carothers, P.E. Operations Manager C80871
 DRAWN BY: JDL NO. 868.01

NOTES:

1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. CONTRACTOR SHALL INSTALL SCHEDULE 80 P.V.C. PIPE SPACER WITH 1/2" DIAMETER HOLES DRILLED THROUGH VERTICALLY AT 2" SPACING. CITY TO REMOVE SPACER BAR AT TIME OF METER INSTALLATION. LENGTH IS FOR A 6" DOMESTIC TYPE WATER METER. IF THE USE IS FOR IRRIGATION OR FIRE FLOW THIS LENGTH MAY VARY. CONTRACTOR TO VERIFY WITH UTILITY DIVISION PRIOR TO INSTALLATION.
3. METER BOX MUST BE SET SO THE STEEL COVER IS FLUSH WITH FINISHED SURFACE.
4. PRIOR TO METER SET, ADDRESS SHALL BE CLEARLY MARKED ON TOP OF METER BOX WITH PERMANENT MARKER.
5. METER BOX PIPE KNOCKOUTS SHALL BE NEATLY CUT AND GROUTED SUFFICIENTLY TO PREVENT INTRUSION OF DIRT.
6. ALL FITTINGS AND PIPE ARE SHALL BE DUCTILE IRON UNLESS OTHERWISE SPECIFIED.
7. SPOOL LENGTH SHALL BE A MINIMUM OF FIVE (5) TIMES THE PIPE DIAMETER.
8. THE SERVICE LATERAL SHALL NOT BE SIZED SMALLER THAN THE METER.
9. IN THE CASE OF A MONOLITHIC CURB AND SIDEWALK THE VALVE FLANGE LOCATION SHALL BE 17" BEHIND SIDEWALK.

6" SERVICE ASSEMBLY FOR A 6" METER PARTS LIST	
NO.	DESCRIPTION
①	MEGALUG MECHANICAL JOINT RESTRAINT OR APPROVED EQUAL
②	6" FLANGED 90° BEND
③	6" FLANGED SPOOL – LENGTH AS REQUIRED
④	6" FLG X FLG 18" LONG D.I.P. SPOOL
⑤	6" FLG X FLG RESILIENT WEDGE GATE VALVE
⑥	6" X 30" DIP SPOOL (SEE NOTE 7)
⑦	STRAINER FURNISHED INSTALLED BY CITY AT DEVELOPERS EXPENSE
⑧	6" METER AS REQUIRED INSTALLED BY CITY AT DEVELOPERS EXPENSE (SEE NOTE 2)
⑨	6" FLANGED COUPLING ADAPTER
⑩	6" PE X FLG D.I.P. SPOOL – LENGTH AS REQUIRED
⑪	CONCRETE PIER BLOCK WITH REDWOOD BLOCKING (2) REQUIRED

6" METER SPACER TABLE	
METER TYPE	SPACER LENGTH
COMPOUND METER WITH STRAINER	33"
TURBINE METER WITH STRAINER (SHOWN)	27"

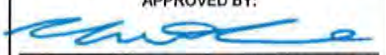


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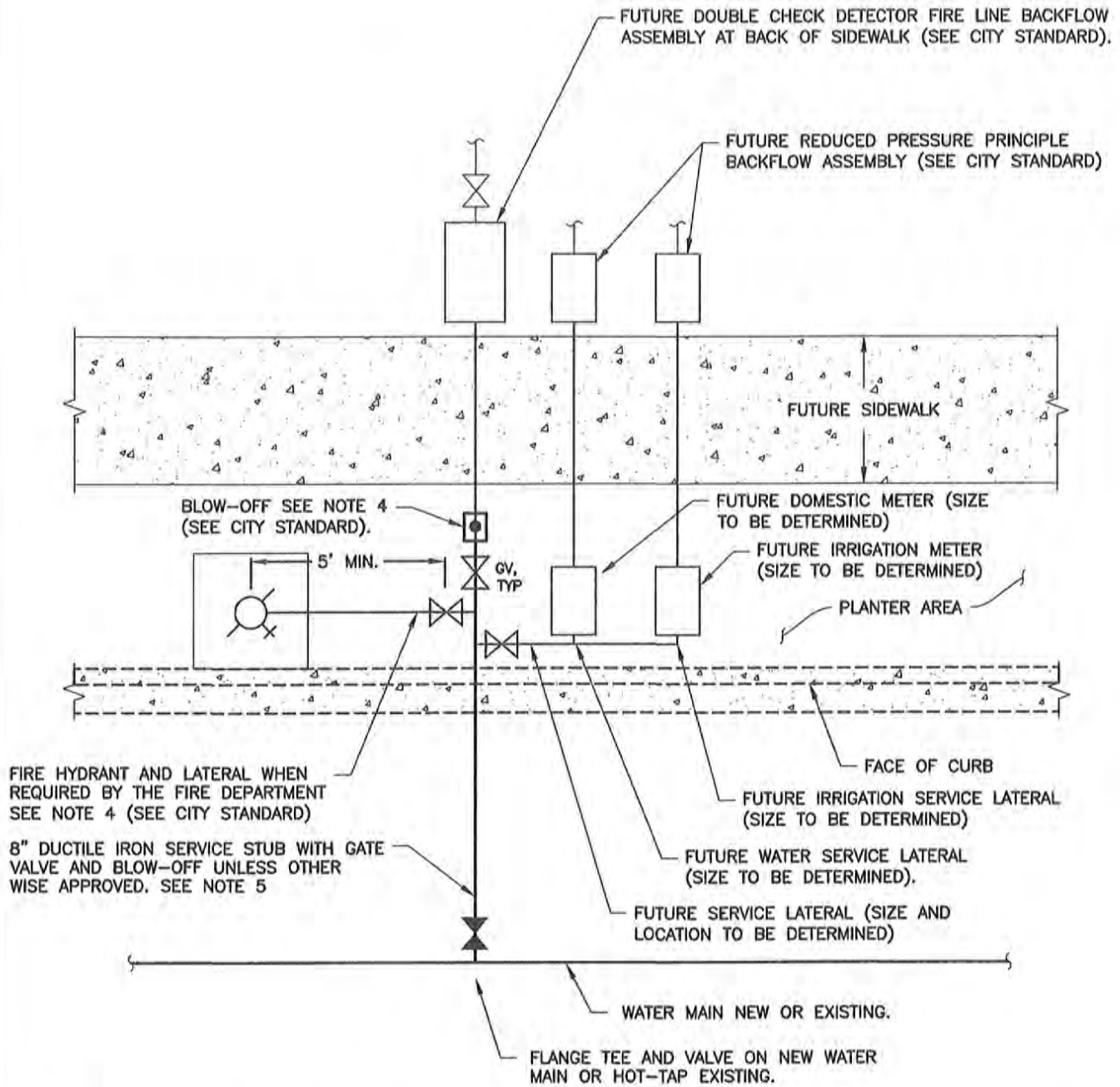
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**6" WATER SERVICE FOR
 6" METER
 (TURBINE)**
 (NOTES AND PARTS)

DATE: MARCH 2016 SCALE: N.T.S.

APPROVED BY:

 Kent R. Carothers, P.E. Operations Manager C60371

DRAWN BY: JDL NO. 868.02



- NOTES:**
1. SEE WATER SYSTEM DESIGN GUIDELINES.
 2. THIS STANDARD APPLIES TO COMMERCIAL AND MULTI-RESIDENTIAL DEVELOPMENTS WHEN DOMESTIC, IRRIGATION AND FIRE PROTECTION REQUIREMENTS ARE NOT ESTABLISHED AT TIME OF APPLICATION.
 3. DESIGN APPROVAL MUST BE OBTAINED FROM PUBLIC WORKS & UTILITIES.
 4. WHEN A FIRE HYDRANT IS REQUIRED THE BLOW-OFF SHALL BE DELETED, AND A TEE, FIRE HYDRANT AND BLIND FLANGE WITH A 3FT MINIMUM FLANGE SPOOL SHALL BE INSTALLED.
 5. ADEQUATE SPACING SHALL BE PROVIDED FOR FUTURE SERVICE LATERAL, BETWEEN THE BACK OF CURB AND TEE.
 6. APPROPRIATE THRUST BLOCKING IS REQUIRED PER CITY STANDARD.
 7. LABELED BRASS DISKS WITH ADDRESSES SHALL BE INSTALLED IN EACH METER BOX.



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COMBINATION SERVICE STUB
 COMMERCIAL & MULTI-RESIDENTIAL

DATE: AUGUST 2019	SCALE: N.T.S.
APPROVED BY: <i>[Signature]</i>	
Kent R. Carothers, P.E. Operations Manager C60671	
DRAWN BY: JDL	NO. 869

FIRE DEPARTMENT CONNECTION
LOCATION DETERMINED BY
FIRE DEPARTMENT

POST INDICATOR VALVE

FUTURE DOUBLE CHECK DETECTOR FIRE LINE BACKFLOW
ASSEMBLY AT BACK OF SIDEWALK (SEE CITY STANDARD).

FUTURE REDUCED PRESSURE PRINCIPLE BACKFLOW
ASSEMBLY, TYPICAL. (SEE CITY STANDARD).

EXISTING OR NEW SIDEWALK.

FUTURE DOMESTIC SERVICE AND
METER, SIZE TO BE DETERMINED

GATE VALVE REQUIRED
(SEE CITY STANDARD).
5' MIN.

FUTURE IRRIGATION SERVICE AND
METER, SIZE TO BE DETERMINED

PLANTER
AREA

FIRE HYDRANT AND LATERAL WHEN
REQUIRED BY THE FIRE DEPARTMENT
(SEE CITY STANDARD).

FACE OF CURB

BLIND FLANGE (SEE NOTE 12)

8" DUCTILE IRON SERVICE STUB WITH
GATE VALVE UNLESS OTHERWISE
APPROVED (SEE NOTE 11)

SERVICE LATERAL BRANCH MANIFOLD TO BE 4 OR
6 INCH FLANGED DUCTILE IRON PIPE SPOOLS,
SIZE TO BE DETERMINED (SEE NOTE 13)

FLANGE X FLANGE SERVICE ISOLATION VALVE
(SEE NOTE 10)

WATER MAIN CONNECTION
(SEE NOTE 8)

WATER MAIN NEW OR EXISTING

• FOR NOTES & CALCULATIONS SEE 870.02



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**COMBINATION
WATER SERVICE**
COMMERCIAL & MULTI-RESIDENTIAL

DATE: AUGUST 2019 SCALE: N.T.S.

APPROVED BY:

Kent R. Carothers, P.E. Operations Manager C60871

DRAWN BY: JDL

NO. 870.01

NOTES:

1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. THIS STANDARD APPLIES TO COMMERCIAL AND MULTI-RESIDENTIAL DEVELOPMENTS WHERE DOMESTIC, IRRIGATION AND FIRE PROTECTION REQUIREMENTS ARE NOT ESTABLISHED AT THE TIME OF APPLICATION.
3. DESIGN APPROVAL FROM PUBLIC WORKS & UTILITIES MUST BE OBTAINED PRIOR TO INSTALLATION.
5. WHEN THE PLANTER AREA IS WIDER THAN 8 FEET THE DOUBLE CHECK DETECTOR FIRE LINE BACKFLOW ASSEMBLY, METER(S) AND BACKFLOW PREVENTER SHALL BE LOCATED IN PLANTER AREA.
6. NO MANIFOLD VALVES OR FITTINGS EXCEPT SERVICE ISOLATION VALVE ARE TO BE BELOW 36" FROM FINISHED GRADE.
7. NO MORE THAN 6 SERVICES MAY BE INSTALLED ON A MANIFOLD WITHOUT THE APPROVAL FROM PUBLIC WORKS & UTILITIES. SEE CITY STANDARD FOR MANIFOLD DEMAND REQUIREMENTS UNDER 100 GALLONS PER MINUTE.
8. REFER TO CITY WATER SYSTEM DESIGN AND CONSTRUCTION GUIDELINES FOR WATER MAIN CONNECTION REQUIREMENTS.
9. FOR METER SIZES 1" THRU 2" SEPARATE SERVICES MAY BE INSTALLED ON THE SERVICE LATERAL MANIFOLD BRANCH PER CITY STANDARD.
10. THE SERVICE ISOLATION VALVE TO BE A CITY APPROVED GATE VALVE
11. SERVICE TO BE 2" LARGER DIAMETER THAN FIRE LINE OR MINIMUM 8", WHICHEVER IS GREATER.
12. INSTALL BLIND FLANGE 9" FROM END OF LAST SERVICE.
13. SERVICE LATERAL BRANCH MAY BE LOCATED IN THE STREET UPON APPROVAL FROM PUBLIC WORKS & UTILITIES.
14. LABELED BRASS TAGS WITH PROPERTY ADDRESSES TO BE INSTALLED IN EACH METER BOX.

MANIFOLD SIZE CALCULATIONS:

1. USE TABLE TO ASSIGN FLOW RATE PER METER.

METER SIZE	G.P.M. FLOW ALLOWED
1" SEE NOTE 7 & 9	25
1 1/2" SEE NOTE 7 & 9	50
2" SEE NOTE 7 & 9	80
3"	160
4"	250
6"	500

2. CALCULATE TOTAL MAXIMUM FLOW ALLOWED THROUGH MANIFOLD BY ADDING INDIVIDUAL METER FLOWS TOGETHER.

3.

METER SIZE	G.P.M. FLOW ALLOWED
4"	101 - 420
6"	421 - 950

MAXIMUM FLOW ALLOWED TO BE SUPPLIED BY A 2" MANIFOLD FED BY ONE (1) 2" SERVICE IS 100 GPM WITH PUBLIC WORKS & UTILITIES DEPT. APPROVAL. THE DESIGN ENGINEER MAY COUNT FLOWS FOR IRRIGATION METER(S) SEPARATELY IF THE MANIFOLD SERVES ONLY ONE (1) PROPERTY AND THE PROPERTY IS UNDER COMMON CONTROL.



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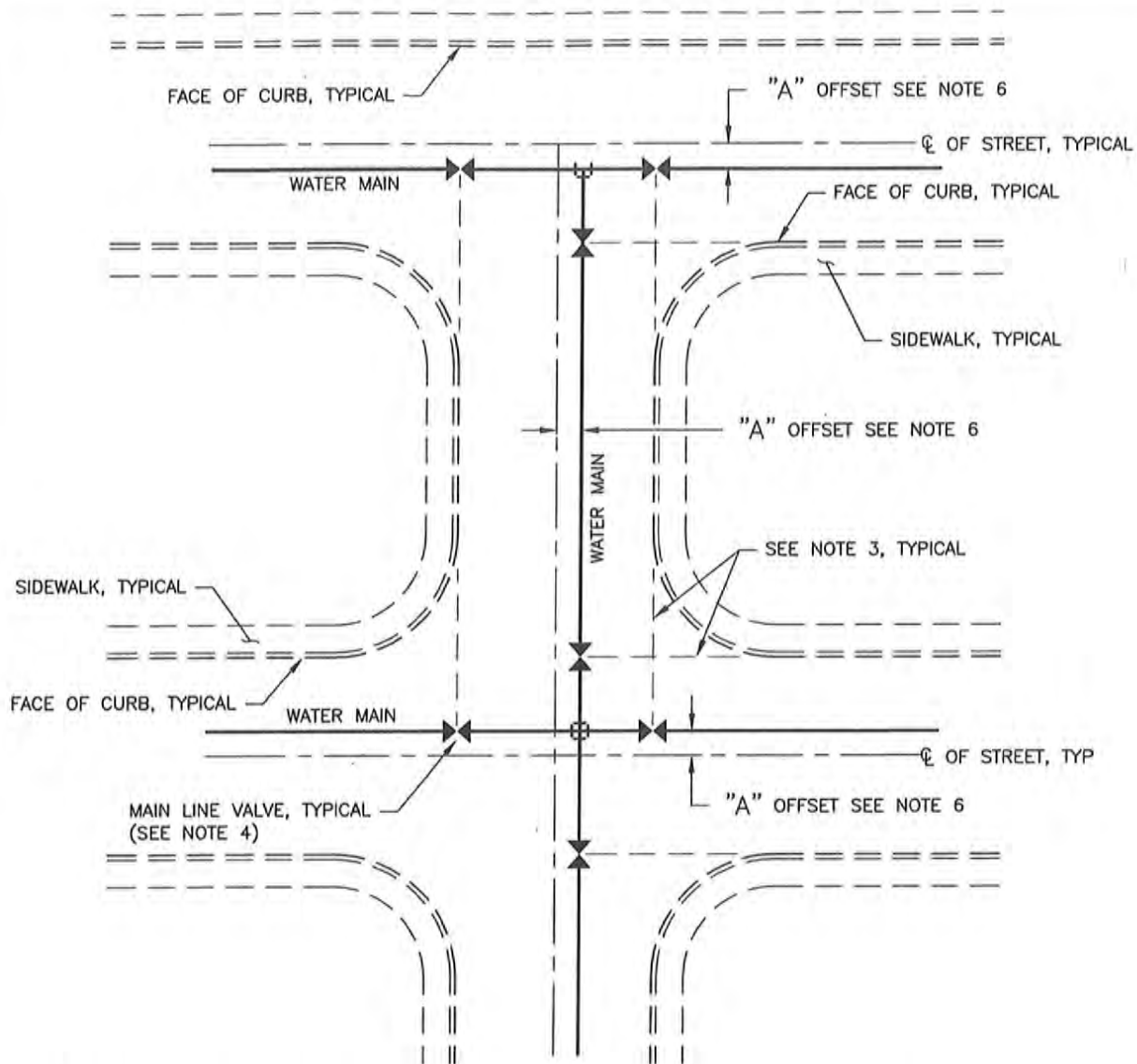
**COMBINATION
 WATER SERVICE**
 COMMERCIAL & MULTI-RESIDENTIAL
 NOTES & CALCULATIONS

DATE: AUGUST 2019 SCALE: N.T.S.

APPROVED BY:

 Kent R. Carothers, P.E. Operations Manager C60671

DRAWN BY: JDL NO. 870.02



NOTES

1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. WATER MAINS SHALL BE LOCATED PARALLEL TO STREET CENTERLINES AT THE OFFSET SHOWN ABOVE UNLESS CONFLICTS WITH OTHER UNDERGROUND FACILITIES CANNOT BE AVOIDED. NONSTANDARD ALIGNMENTS SHALL BE APPROVED BY THE PUBLIC WORKS & UTILITIES DEPARTMENT.
3. MAIN LINE VALVES, EXCEPT HYDRANT VALVES AND TAPPING VALVES SHALL BE LOCATED ON THE FACE OF CURB-LINE EXTENSION WHERE POSSIBLE.
4. A MINIMUM OF (3) THREE MAINLINE VALVES ARE REQUIRED FOR "T" INTERSECTIONS AND (4) FOUR VALVES ARE REQUIRED FOR CROSS INTERSECTIONS UNLESS OTHERWISE APPROVED BY THE PUBLIC WORKS & UTILITIES DEPARTMENT.
5. MAIN LINE VALVES SHALL BE REQUIRED TO ISOLATE BOTH PUBLIC AND PRIVATE FIRE HYDRANTS INTO SEPARATELY VALVED MAIN LINE SECTIONS. MAIN LINE VALVES SHALL HAVE A MAXIMUM SPACING OF 500 FEET.
6. DISTANCE "A";
 - MINIMUM OF 5 FEET FROM CENTERLINE OF STREET TO OUTSIDE OF PIPE WHERE POSSIBLE.
 - REFERENCE CA DEPARTMENT OF HEALTH SERVICES – GUIDANCE CRITERIA FOR THE SEPARATION OF WATER MAINS AND NON-POTABLE PIPELINES.
 - INSTALL WATER MAINS WITH CONSISTENT ALIGNMENT WHERE POSSIBLE.



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**WATER MAINS AND
MAIN LINE VALVE
ALIGNMENT**

DATE: MARCH 2017

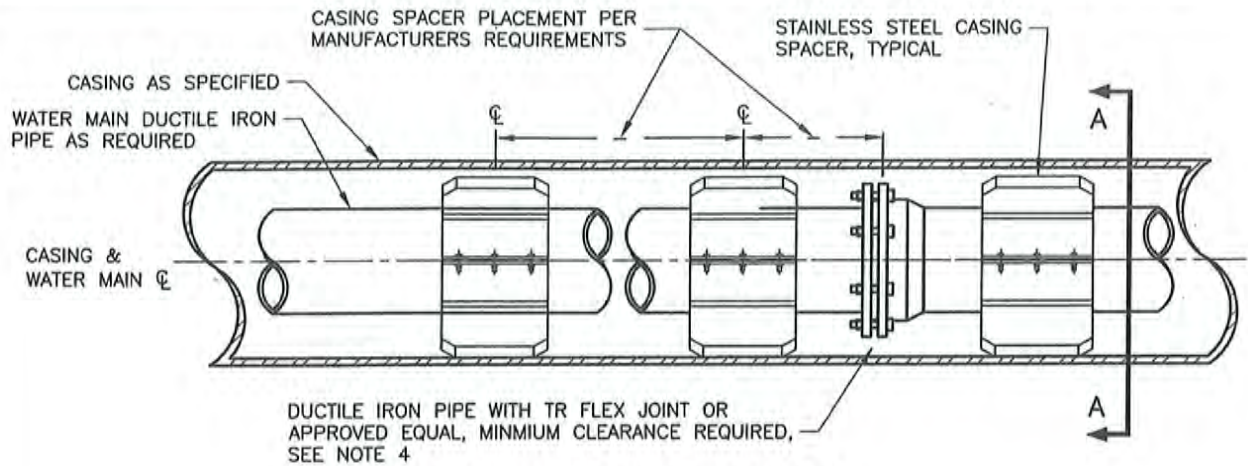
SCALE: N.T.S.

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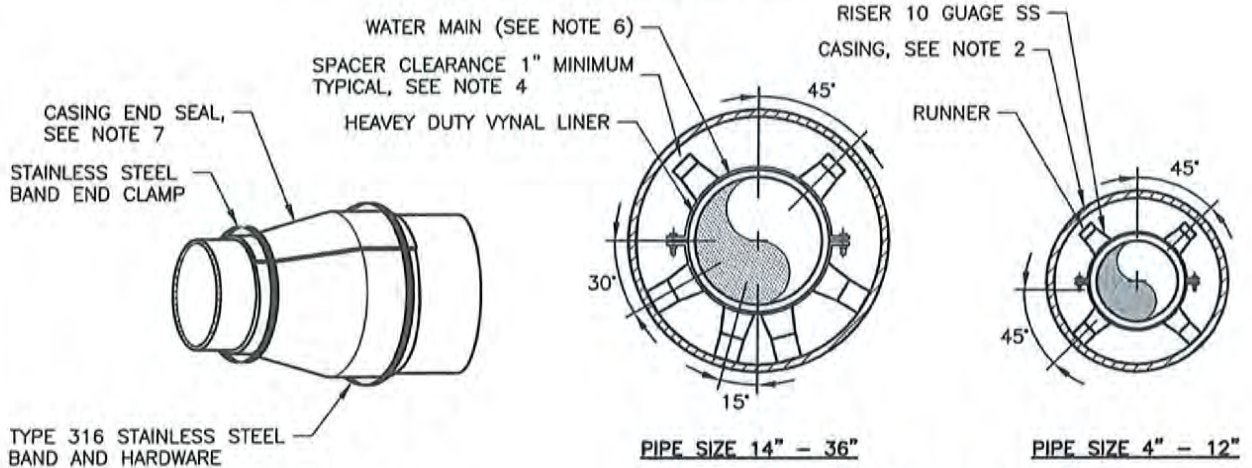
Kent R. Carothers, P.E. Operations Manager C60671

DRAWN BY: JDL

NO. 871



PIPE JOINT AND SPACER



CASING END SEAL

**(A) CASING SPACER CONFIGURATION
— CENTERED NON-RESTRAINED**

CASING TABLE — MINIMUM REQUIRED SIZE

PIPE SIZE	6"	8"	12"	14"	16"
CASING SIZE (INSIDE DIA.)	16"	16"	20"	24"	30"
CASING WALL THICKNESS	.375	.375	.375	.375	.500

NOTES

1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. CASING WALL THICKNESS AS INDICATED IN THE CASING TABLE IS A MINIMUM REQUIREMENT. HEAVIER WALL THICKNESS MAY BE REQUIRE BY JACKING OPERATION AND DESIGN BY A PROFESSIONAL ENGINEER REGISTER IN THE STATE OF CALIFORNIA, WHICH SHALL BE FURNISHED BY THE CONTRACTOR FOR APPROVAL.
3. CASING SPACER SHALL BE MODEL S12GN2 AS MANUFACTURED BY PIPELINE SEAL AND INSULATOR, INC., HOUSTON TX, OR APPROVED EQUAL. INSTALL SKIDS PER MANUFACTURERS SPECIFICATIONS.
4. CASING SPACER SHALL BE SIZED SO THAT PIPE JOINTS AND CASING HAVE A 1" MINIMUM CLEARANCE.
5. DUCTILE IRON PIPE AND FITTINGS SHALL BE CLASS 250 AND ENCASED IN 8MIL POLYETHYLENE TUBE PER AWWA C105.
6. CASING END SEAL SHALL BE MODEL W WRAP AROUND END SEAL AS MANUFACTURED BY PIPELINE SEAL AND INSULATOR, INC., HOUSTON TX, OR APPROVED EQUAL.
7. ALL STAINLESS STEEL SHALL MEET SS316 ASTM A240 SPECIFICATION.

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**BORE AND JACK
CASING, SPACER AND
END SEAL**

DATE: MARCH 2017

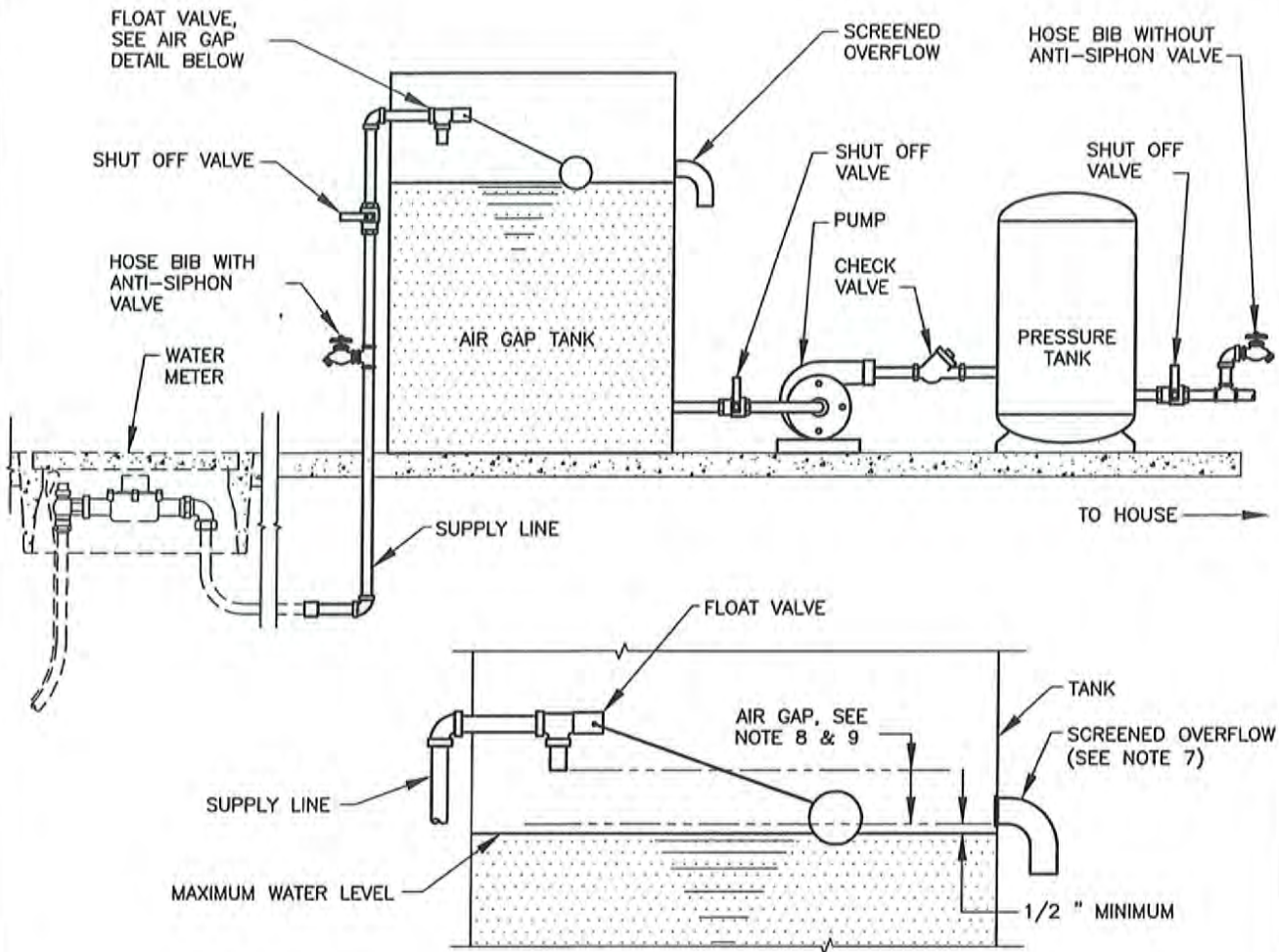
SCALE: N.T.S.

APPROVED BY:

Kent R. Carothers, P.E. Operations Manager C60571

DRAWN BY: JDL

NO. 872



AIR GAP DETAIL

NOTES:

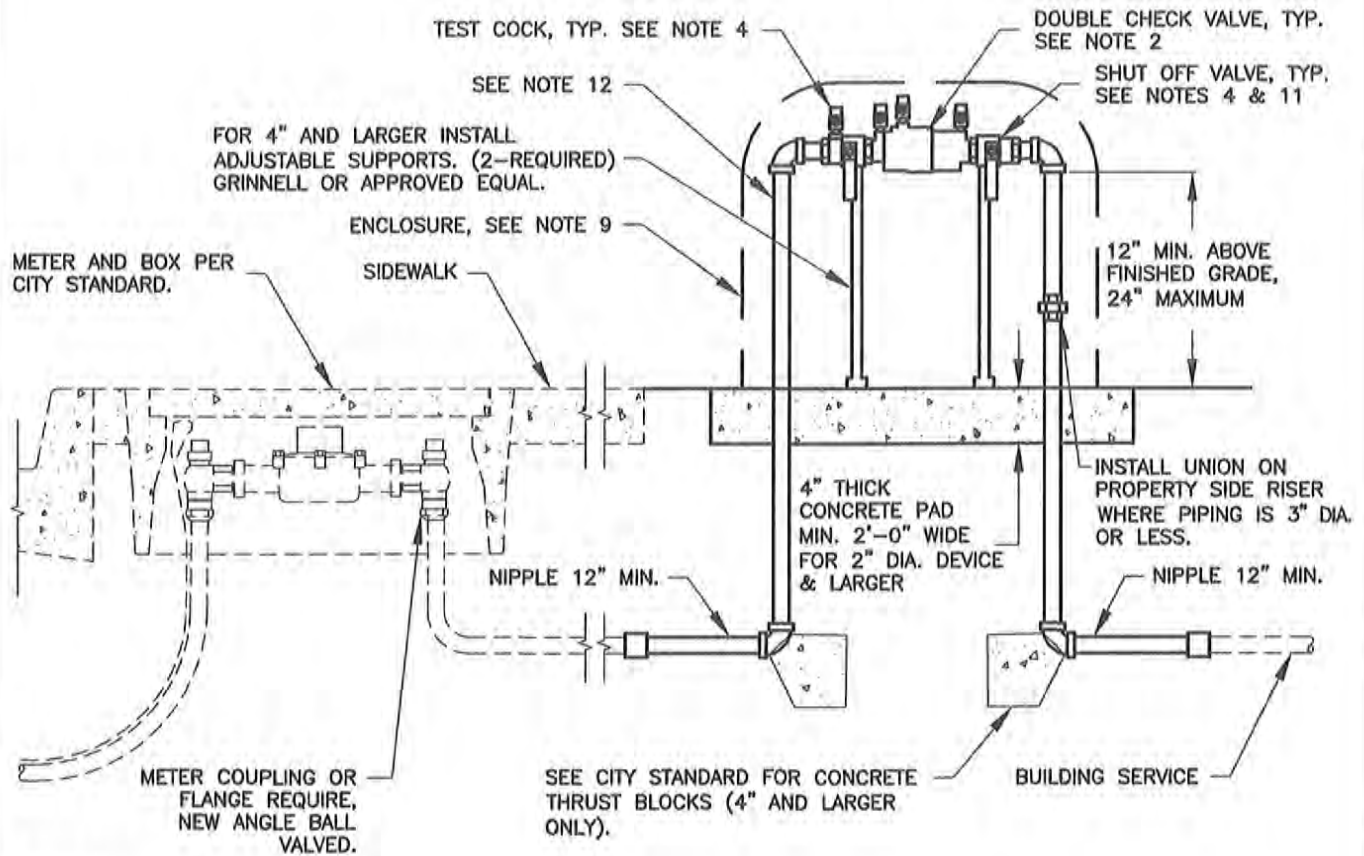
1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. THE SYSTEM DESIGN SHALL BE APPROVED BY THE FIRE MARSHALL AND PUBLIC WORKS AND UTILITIES PRIOR TO INSTALLATION. FOR TANK CAPACITY SEE WATER SYSTEM DESIGN GUIDELINES.
3. THE AIR GAP TANK SHALL BE INSTALLED AS CLOSE AS POSSIBLE TO THE WATER METER LOCATION. NO TEE OR BRANCH CONNECTIONS ARE ALLOWED BETWEEN THE WATER METER AND THE AIR GAP TANK.
4. NO PERMANENT BYPASS OF THE AIR GAP SYSTEM IS ALLOWED.
5. AN IN LINE SHUT OFF VALVE SHALL BE INSTALLED BETWEEN;
THE SUPPLY PIPE AND THE AIR GAP TANK
THE AIR GAP TANK AND THE PUMP
THE PRESSURE TANK AND THE HOUSE
6. THE AIR GAP TANK SHALL HAVE AN OVERFLOW OPENING LOCATED AT LEAST 1/2 INCH ABOVE THE MAXIMUM WATER LEVEL.
7. THE OVERFLOW OPENING SHALL BE AT LEAST 4 SQUARE INCHES AND COVERED BY A BUG PROOF WIRE MESH SCREEN.
8. THE AIR GAP IS MEASURED FROM THE LOWEST OPENING SUPPLYING WATER TO THE TANK, TO THE LOWEST OPENING OF THE OVERFLOW VENT PIPING. (SEE DETAIL)
9. THE AIR GAP SHALL BE AT LEAST 2 TIMES THE DIAMETER OF THE SUPPLY PIPE BUT IN NO CASE LESS THAN 1 INCH.
10. AN INLINE CHECK VALVE SHALL BE INSTALLED BETWEEN THE PUMP AND THE PRESSURE TANK.
11. A HOSE BIB SHALL BE INSTALLED ON THE SUPPLY PIPE BEFORE THE AIR GAP TANK, AND SHALL BE EQUIPPED WITH A APPROVED ANTI-SIPHON VALVE. A SECOND HOSE BIB SHALL BE INSTALLED DOWNSTREAM OF THE PRESSURE TANK AND SHALL NOT HAVE A ANTI-SIPHON VALVE.



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AIR GAP TANK SYSTEM

DATE: MARCH 2016	SCALE: N.T.S.
APPROVED BY: <i>[Signature]</i>	
Kent R. Carolers, P.E. Operations Manager C60671	
DRAWN BY: JDL	NO. 873.01



NOTES:

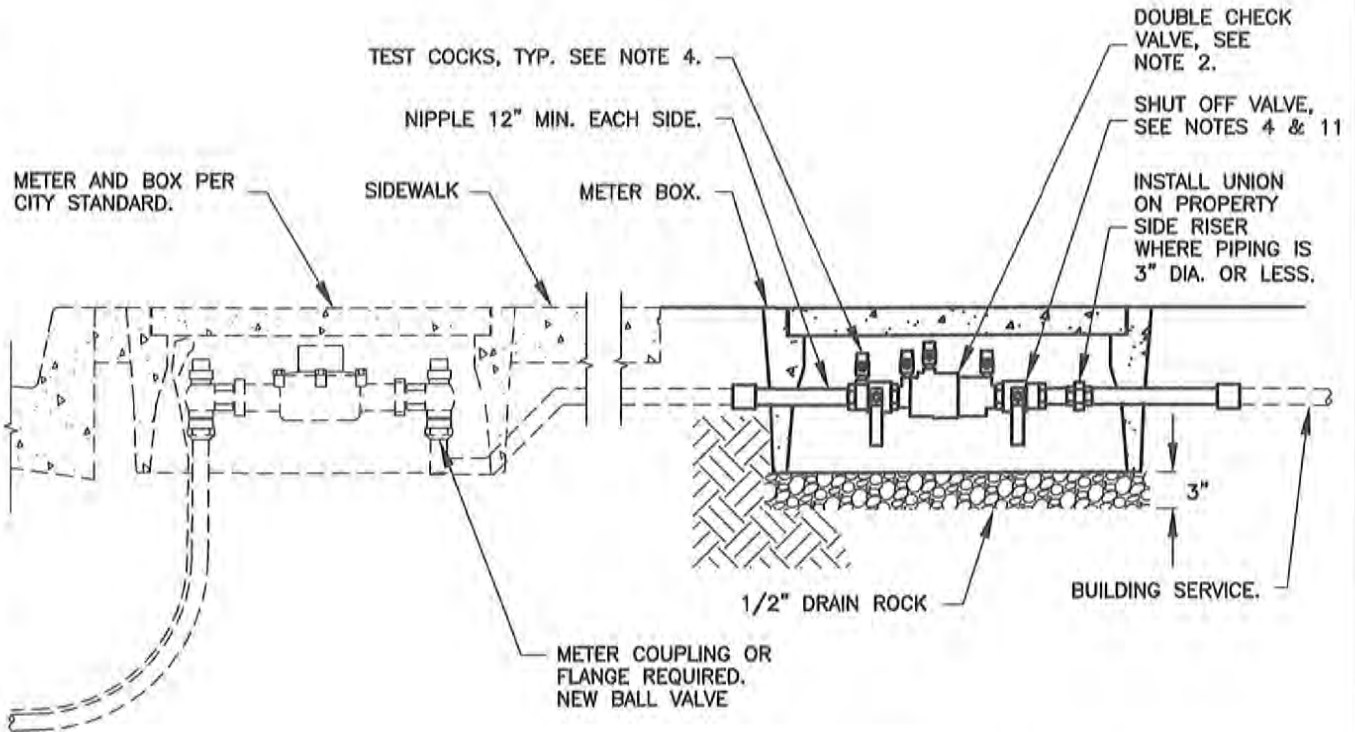
1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. DOUBLE CHECK VALVE ASSEMBLIES SHALL BE INSTALLED ADJACENT TO AND ON THE PROPERTY SIDE OF SIDEWALK WHERE APPLICABLE. WHERE NO SIDEWALK EXISTS, THE DOUBLE CHECK VALVE ASSEMBLIES SHALL BE INSTALLED AS CLOSE AS POSSIBLE TO THE WATER METER LOCATION. THERE SHALL BE NO TEE OR BRANCH LINES BETWEEN THE WATER METER AND ASSEMBLIES. ANY CONFLICTS SHALL BE RESOLVED BY PUBLIC WORKS AND UTILITIES.
3. APPROVED DOUBLE CHECK VALVES SHALL BE AS SHOWN ON "LIST OF APPROVED BACKFLOW PREVENTION ASSEMBLIES" (LATEST REVISION) BY THE STATE OF CALIFORNIA DEPARTMENT OF HEALTH SERVICES.
4. ALL DOUBLE CHECK VALVE ASSEMBLIES SHALL BE PROVIDED WITH A MINIMUM OF FOUR (4) TEST COCKS. AND (2) SHUT OFF VALVES.
5. THIS STANDARD APPLIES TO RESIDENTIAL CONNECTIONS WITH AUXILIARY WATER SUPPLIES ON SITE, FIRE SPRINKLERS OR WHERE A POTENTIAL HAZARD EXISTS, AS DETERMINED BY PUBLIC WORKS AND UTILITIES.
6. THE PIPING FROM THE METER TO THE DOUBLE CHECK VALVE ASSEMBLY AND THE REDUCED PRESSURE BACKFLOW ASSEMBLY ITSELF MUST BE THE SAME SIZE AS THE METER UNLESS OTHERWISE APPROVED BY PUBLIC WORKS AND UTILITIES.
7. NOT FOR USE ON INDUSTRIAL OR COMMERCIAL PROPERTY SERVICES.
8. IF ABOVE GROUND INSTALLATION IS NOT FEASIBLE OBTAIN APPROVAL FROM PUBLIC WORKS AND UTILITIES FOR SPECIAL INSTALLATION STANDARDS.
9. AN ENCLOSURE IS RECOMMENDED FOR PROTECTION FROM FREEZING AND VANDALISM.
10. A THERMAL EXPANSION TANK WHEN USED ON A DOMESTIC SERVICE SHALL BE SIZED AND INSTALLED PER MANUFACTURES RECOMMENDATION ON THE COLD WATER SUPPLY LINE TO THE WATER HEATER.
11. SHUT OFF VALVES:
 1. 2" AND LESS SHALL BE BALL VALVE
 2. 2 1/2" AND GREATER SHALL BE RESILIENT SEAT GATE VALVE.
12. ALL PIPING, VALVES, NIPPLES, ETC.:
 3. 2" AND LESS SHALL BE TYPE "L" HARD-TEMPER COPPER OR LEAD FREE BRASS.
 4. 2 1/2" AND GREATER SHALL BE FLANGED DUCTILE IRON.
13. PVC PIPE OR FITTINGS SHALL NOT BE USED.
14. IF PROPOSING TO INSTALL THIS DEVICE IN A FLOOD ZONE, CONTACT PUBLIC WORKS AND UTILITIES FOR APPROVAL.



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**ABOVE GROUND DOUBLE
 CHECK VALVE BACKFLOW
 ASSEMBLY**

DATE: AUGUST 2019	SCALE: N.T.S.
APPROVED BY: <i>Kent R. Carothers</i>	
Kent R. Carothers, P.E. Operations Manager C80871	
DRAWN BY: JDL	NO. 874



NOTES:

1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. DOUBLE CHECK VALVE ASSEMBLIES SHALL BE INSTALLED ADJACENT TO AND ON THE PROPERTY SIDE OF SIDEWALK WHERE APPLICABLE. WHERE NO SIDEWALK EXISTS, THE DOUBLE CHECK VALVE ASSEMBLIES SHALL BE INSTALLED AS CLOSE AS POSSIBLE TO THE WATER METER LOCATION. THERE SHALL BE NO TEE OR BRANCH LINES BETWEEN THE WATER METER AND ASSEMBLIES. ANY CONFLICTS SHALL BE RESOLVED BY PUBLIC WORKS AND UTILITIES.
3. APPROVED DOUBLE CHECK VALVES SHALL BE AS SHOWN ON "LIST OF APPROVED BACKFLOW PREVENTION ASSEMBLIES" (LATEST REVISION) BY THE STATE OF CALIFORNIA DEPARTMENT OF HEALTH SERVICES.
4. ALL DOUBLE CHECK VALVE ASSEMBLIES SHALL BE PROVIDED WITH A MINIMUM OF FOUR (4) TEST COCKS. AND (2) SHUT OFF VALVES.
5. THIS STANDARD APPLIES TO RESIDENTIAL CONNECTIONS WITH AUXILIARY WATER SUPPLIES ON SITE OR WHERE A POTENTIAL HAZARD EXISTS, FIRE SPRINKLERS, OR AS DETERMINED BY PUBLIC WORKS AND UTILITIES.
6. THE PIPING FROM THE METER TO THE DOUBLE CHECK VALVE ASSEMBLY AND THE DOUBLE CHECK VALVE ASSEMBLY ITSELF MUST BE THE SAME SIZE AS THE METER UNLESS OTHERWISE APPROVED BY PUBLIC WORKS AND UTILITIES.
7. NOT FOR USE ON INDUSTRIAL OR COMMERCIAL PROPERTY SERVICES.
8. THIS DETAIL CAN ONLY BE USED IF APPLICANT OBTAINS PRIOR WRITTEN APPROVAL FROM PUBLIC WORKS & UTILITIES DEPARTMENT.
9. (NOT USED)
10. A THERMAL EXPANSION TANK WHEN USED ON A DOMESTIC SERVICE SHALL BE SIZED AND INSTALLED PER MANUFACTURES RECOMMENDATION ON THE COLD WATER SUPPLY LINE TO THE WATER HEATER.
11. SHUT OFF VALVES:
 - 2" AND LESS SHALL BE BALL VALVE
 - 2 1/2" AND GREATER SHALL BE RESILIENT SEAT GATE VALVE.
12. ALL PIPING, VALVES, NIPPLES, ETC.:
 - 2" AND LESS SHALL BE TYPE "L" HARD-TEMPER COPPER OR LEAD FREE BRASS.
 - 2 1/2" AND GREATER SHALL BE FLANGED DUCTILE IRON.
13. PVC PIPE OR FITTINGS SHALL NOT BE USED.
14. APPLICATION FOR RESIDENTIAL DOUBLE CHECKS ONLY.



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**SPECIAL INSTALLATION
 DOUBLE CHECK VALVE
 BACK FLOW ASSEMBLY**

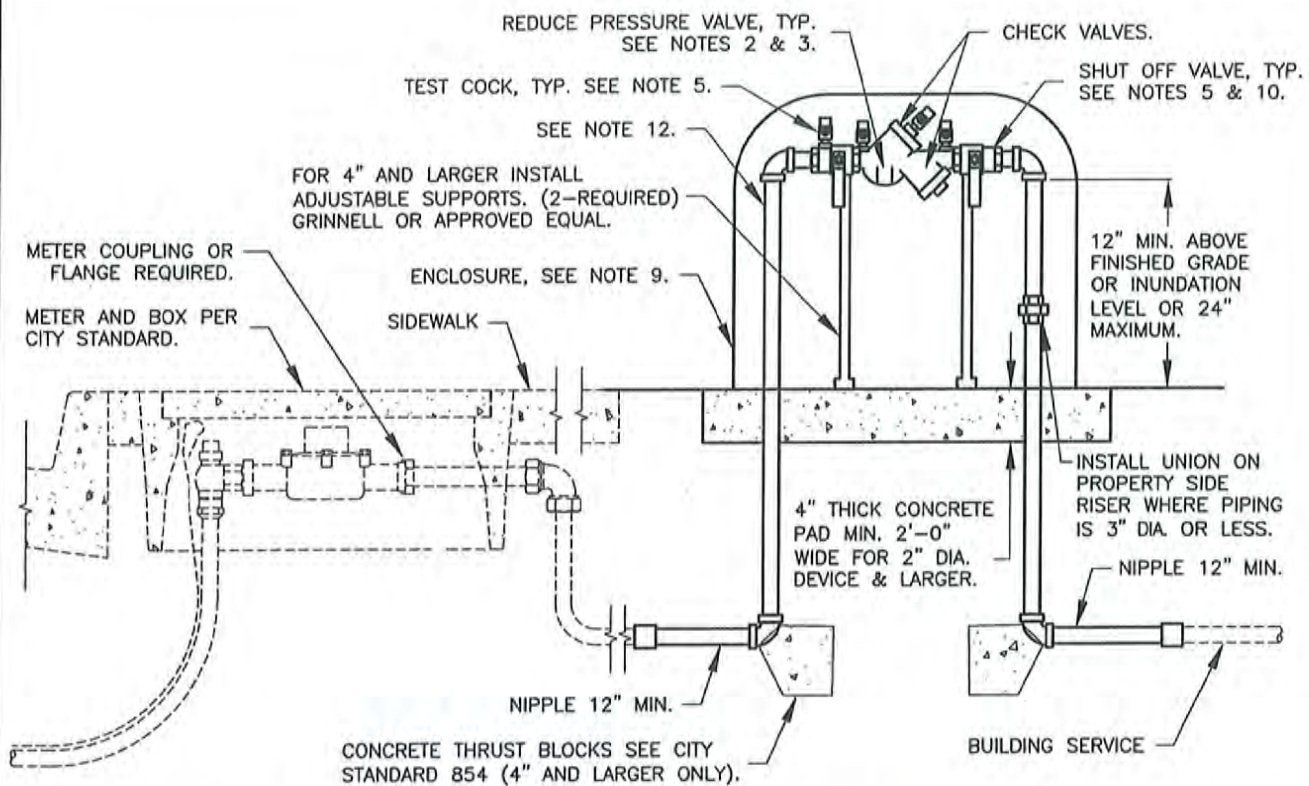
DATE: AUGUST 2019 SCALE: N.T.S.

APPROVED BY:

Kent R. Carothers
 Kent R. Carothers, P.E. Operations Manager C60871

DRAWN BY: JDL

NO. 875



NOTES:

1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. REDUCED PRESSURE BACKFLOW ASSEMBLIES SHALL BE REQUIRED FOR ANY USE WHERE TOXIC MATERIALS ARE USED OR WHERE POSITIVE PROTECTION OF THE PUBLIC WATER SUPPLY IS REQUIRED. TYPICAL APPLICATIONS INCLUDE, ALL INDUSTRIAL AND IRRIGATION SERVICES, PARKS, HOSPITALS, MEDICAL AND DENTAL LABORATORIES, MORTUARIES, INDUSTRIAL PLANTS AND DRY CLEANERS OR AS DETERMINED BY PUBLIC WORKS & UTILITIES.
3. REDUCED PRESSURE BACKFLOW ASSEMBLIES SHALL BE INSTALLED ADJACENT TO AND ON THE PROPERTY SIDE OF SIDEWALK WHERE APPLICABLE. WHERE NO SIDEWALK EXISTS, THE REDUCED PRESSURE BACKFLOW ASSEMBLY SHALL BE INSTALLED AS CLOSE AS POSSIBLE TO THE WATER METER LOCATION. THERE SHALL BE NO TEE OR BRANCH LINES BETWEEN THE WATER METER AND ASSEMBLY LOCATION. ANY CONFLICTS SHALL BE RESOLVED BY PUBLIC WORKS & UTILITIES.
4. APPROVED REDUCED PRESSURE BACKFLOW ASSEMBLIES SHALL BE AS SHOWN ON "LIST OF APPROVED BACKFLOW PREVENTION ASSEMBLIES" (LATEST REVISION) BY THE STATE OF CALIFORNIA WATER RESOURCE CONTROL BOARD, DIVISION OF DRINKING WATER, INFORMATION FOR PUBLIC DRINKING WATER SYSTEMS.
5. ALL REDUCED PRESSURE BACKFLOW ASSEMBLIES SHALL BE PROVIDED WITH A MINIMUM OF FOUR (4) TEST COCKS. AND TWO (2) SHUT OFF VALVES.
6. THE PIPING FROM THE METER TO THE REDUCED PRESSURE BACKFLOW ASSEMBLY AND THE REDUCED PRESSURE BACKFLOW ASSEMBLY ITSELF, MUST BE THE SAME SIZE AS THE METER UNLESS OTHERWISE APPROVED BY PUBLIC WORKS & UTILITIES.
7. FOR 2" PIPE DIAMETER OR LESS, A 12" LONG MINIMUM BRASS NIPPLE OR TYPE "L" HARD TEMPER COPPER PIPE IS REQUIRED AT BOTH UNDERGROUND ELBOWS.
8. A THERMAL EXPANSION TANK WHEN USED ON A DOMESTIC SERVICE SHALL BE SIZED AND INSTALLED PER MANUFACTURERS RECOMMENDATION ON THE COLD WATER SUPPLY LINE TO THE WATER HEATER.
9. AN ENCLOSURE IS RECOMMENDED FOR PROTECTION FROM FREEZING AND VANDALISM.
10. SHUT OFF VALVES:
 - 2" AND LESS SHALL BE BALL VALVE
 - 2 1/2" AND GREATER SHALL BE RESILIENT SEAT GATE VALVE.
11. ALL PIPING, VALVES, NIPPLES, ETC. SHALL BE THREADED BRASS.
 - 2" AND LESS SHALL BE TYPE "L" HARD-TEMPER COPPER.
 - 4" AND GREATER SHALL BE FLANGED DUCTILE IRON.
12. PVC PIPE OR FITTINGS SHALL NOT BE USED.
13. IF PROPOSING TO INSTALL THIS DEVICE IN A FLOOD ZONE, CONTACT PUBLIC WORKS & UTILITIES FOR APPROVAL.
14. PVC PIPE OR FITTINGS SHALL NOT BE USED.



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ABOVE GROUND
REDUCED PRESSURE
PRINCIPLE BACKFLOW
ASSEMBLY

DATE: APRIL 2017

SCALE: N.T.S.

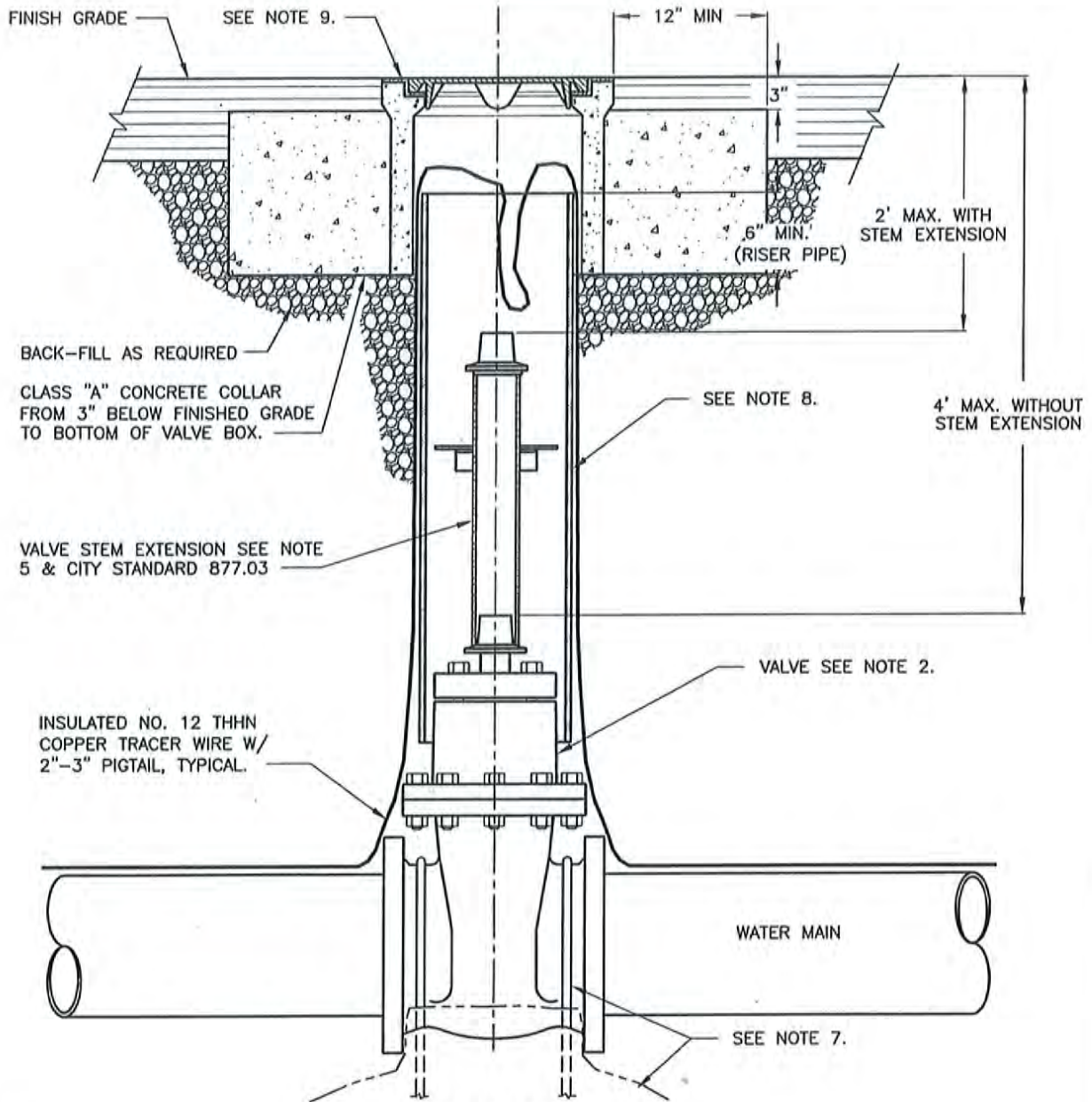
APPROVED BY:



Kent R. Carothers, P.E. Operations Manager C60671

DRAWN BY: LTV/JDL

NO. 876



SIDE VIEW

NOTES:

1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. VALVES 2" THROUGH 12" SHALL BE RESILIENT SEATED GATE VALVES AND VALVES 16" AND LARGER SHALL BE BUTTERFLY VALVES (SEE WATER SYSTEM DESIGN GUIDELINES) UNLESS OTHERWISE APPROVED BY PUBLIC WORKS AND UTILITIES.
3. GATE VALVES SHALL CONFORM TO THE CITY WATER SYSTEM DESIGN GUIDELINES.
4. ALL EXTERNAL BOLTS AND NUTS ON VALVES SHALL BE TYPE 316 STAINLESS STEEL.
5. IF VALVE IS INSTALLED SO THAT THE TOP OF THE OPERATING NUT IS MORE THAN 4' BELOW FINISHED GRADE, THE VALVE STEM RISER SHALL BE REQUIRED.
6. FOR INSTALLATION OF BUTTERFLY VALVE AND TAPPING VALVE, SEE STANDARD.
7. SEE CITY STANDARD DETAIL NO. 877.02 FOR VALVE TIE DOWN REQUIREMENTS.
8. 8" DIA. SDR 35 PVC SEWER PIPE CONFORMING TO ASTM3034. RISER PIPE TO BE PLUMB AND CENTERED OVER VALVE STEM AND SHALL BE CONSTRUCTED FROM A SINGLE LENGTH OF PIPE WITH NO JOINT. (IF VALVE RISER PIPE IS EXISTING AND VALVE BOX IS RAISED, A BELL JOINT EXTENSION IS ALLOWED). VALVE RISER PIPE MUST EXTEND INTO VALVE BOX.
9. SET VALVE BOX FLUSH WITH STREET SURFACE OR FINISHED GRADE WITH CAST IRON RING AND COVER MARKED "WATER". VALVE BOX TO BE CHRISTY G5 OR G8 OR APPROVED EQUAL WITH TRAFFIC LID.



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**GATE VALVE,
STEM EXTENSION
AND
BOX WITH RISER**

DATE: AUGUST 2016

SCALE: N.T.S.

APPROVED BY:

Kent R. Carolers, P.E. Operations Manager C00671

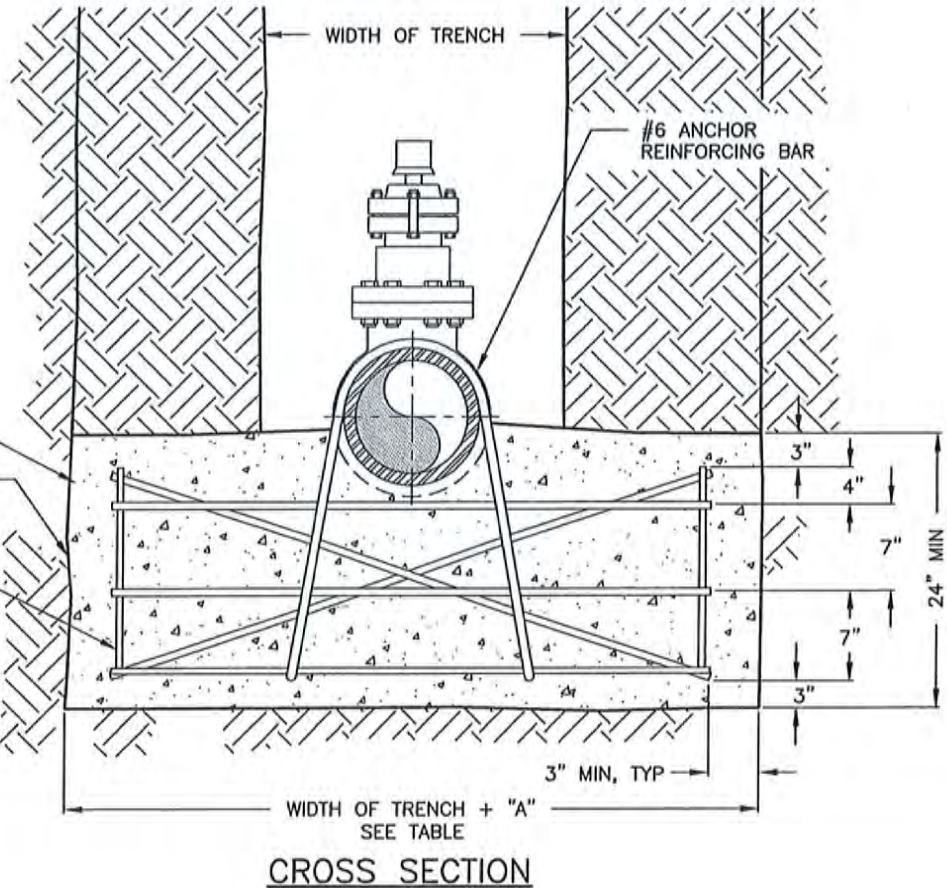
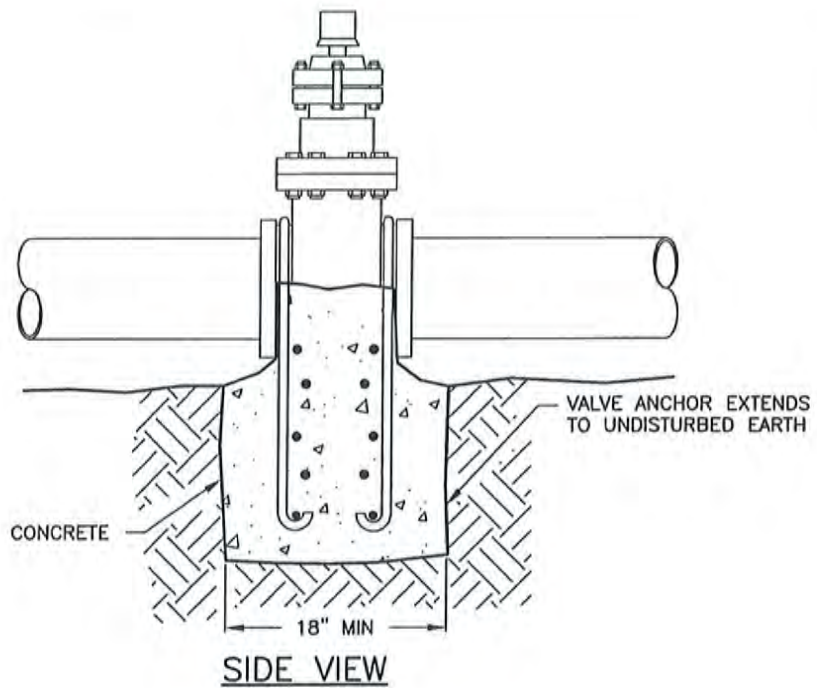
DRAWN BY: JDL

NO. 877.01

VALVE ANCHOR WIDTH

WIDTH OF TRENCH + "A"

VALVE SIZE	"A"
6 INCH	18 INCHES
8 INCH	30 INCHES
10 INCH	4 FEET
12 INCH	6 FEET
14 INCH	8 FEET
16 INCH	10 FEET



- NOTE**
1. SEE WATER SYSTEM DESIGN GUIDELINES.



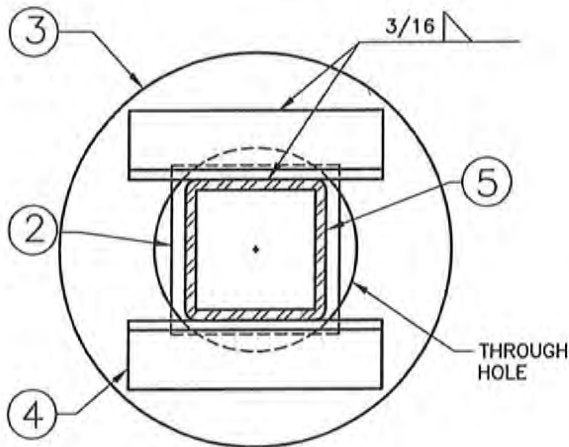
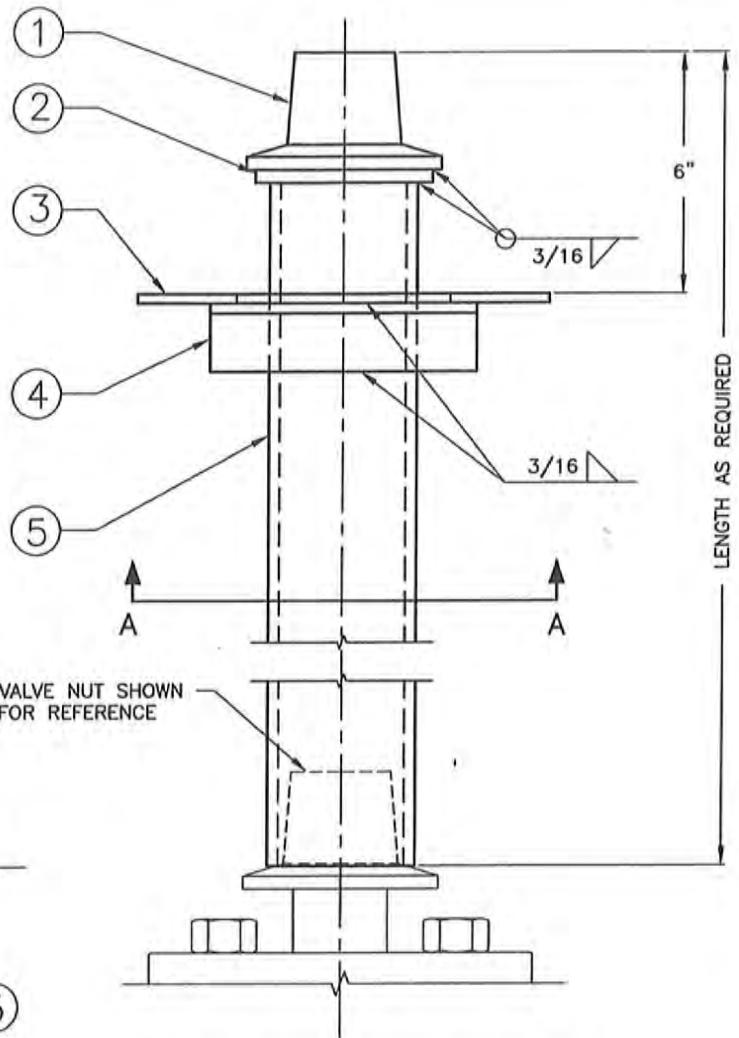
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VALVE ANCHOR

DATE: MARCH 2016 SCALE: N.T.S.
 APPROVED BY:

 Kent R. Carothers, P.E. Operations Manager C60671
 DRAWN BY: LTV/JDL NO. 877.02

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VIEW A-A

No. VALVE STEM EXTENSION PARTS LIST

①	VALVE OPERATING NUT OR 1-7/8" X 1-7/8" X 2" HIGH SOLID STEEL PIECE WELDED TO TOP PLATE.
②	3" X 3" X 1/4" STEEL TOP PLATE. WELD TO RISER SHAFT.
③	3/16" THK. X 7-1/2" DIA. GUIDE PLATE, WITH 3-5/8" DIA. HOLE IN CENTER.
④	TWO 3/16" X 1-1/2" X 1-1/2" X 5"L STEEL ANGLE WELDED TO TWO SIDES OF RISER SHAFT. (TO REINFORCE GUIDE PLATE.)
⑤	2-1/2" X 3/16"t SQUARE STEEL TUBING LENGTH AS REQUIRED.

NOTES:

1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. ALL WELDS TO EXTENSION SHAFT SHALL BE FILLET WELDS AS SHOWN.
3. ALL STEEL REQUIRED FOR EXTENSION FABRICATION SHALL BE STRUCTURAL STEEL PER ASTM A36.



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**VALVE STEM
EXTENSION ASSEMBLY**

DATE: MARCH 2016

SCALE: N.T.S.

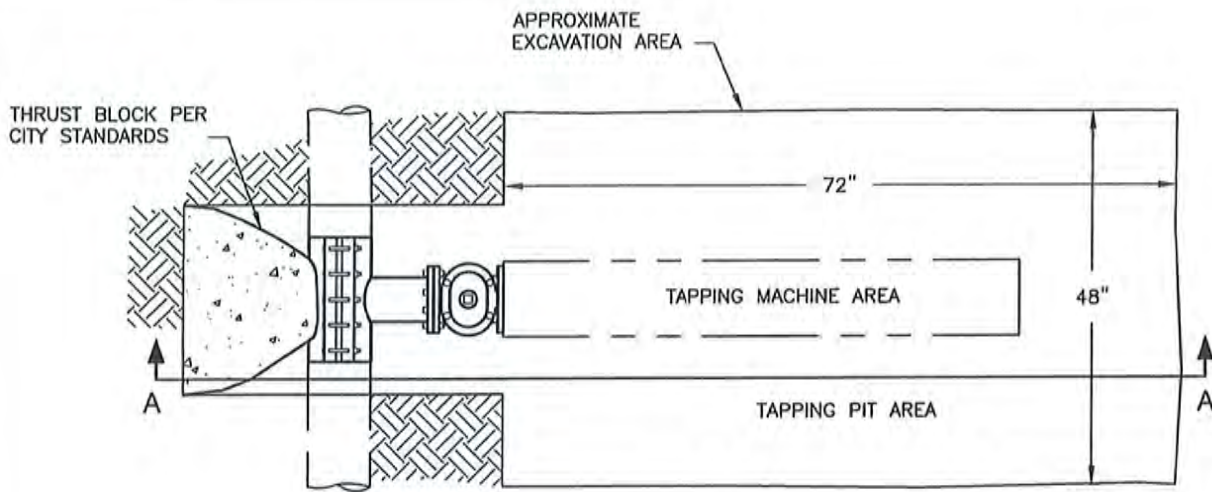
APPROVED BY:

Kent R. Carothers

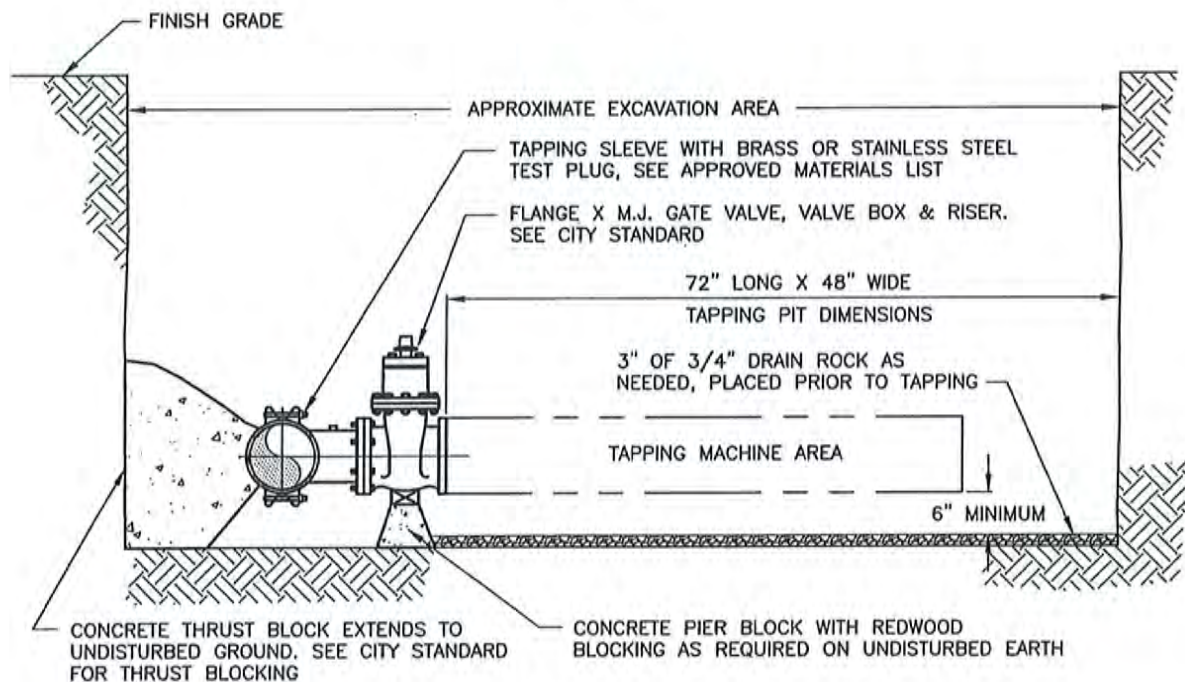
Kent R. Carothers, P.E. Operations Manager C60671

DRAWN BY: JDL

NO. 877.03



PLAN





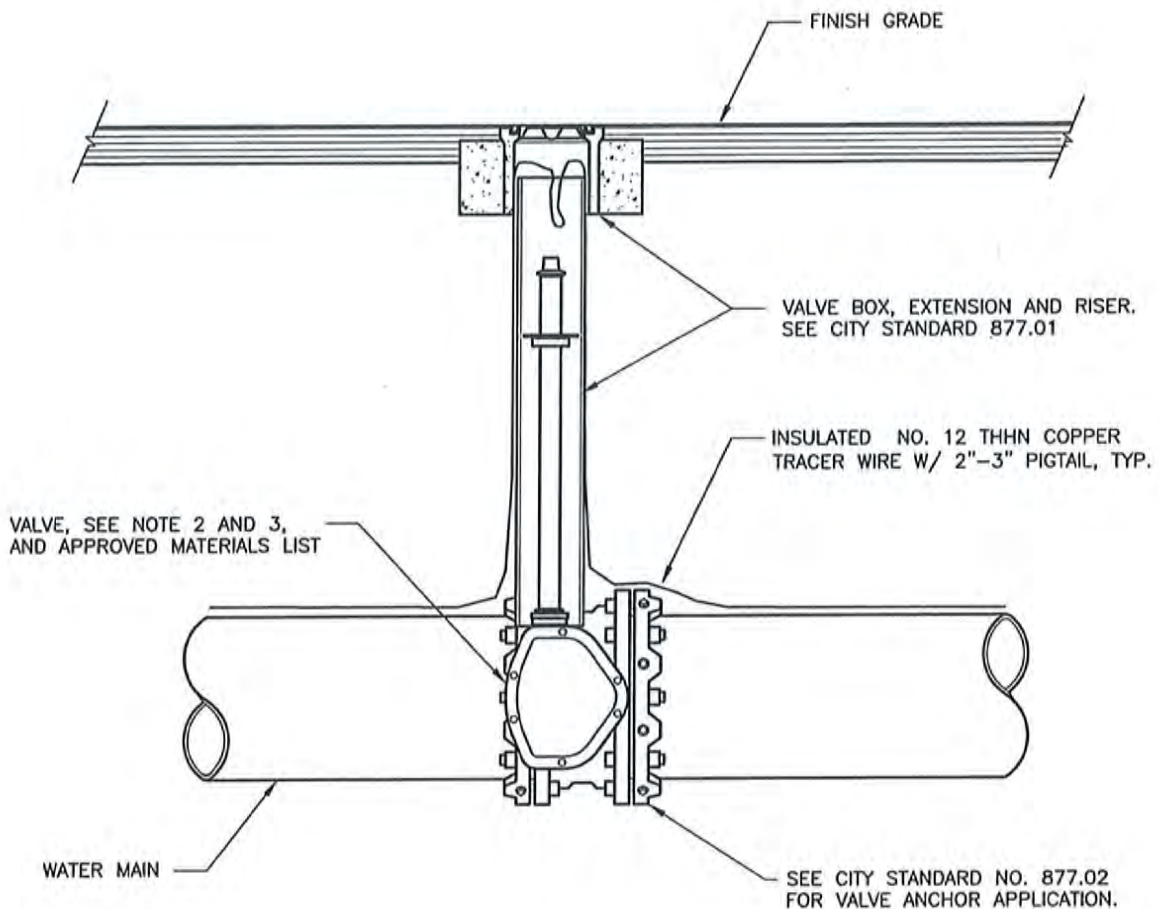
VIEW A-A

NOTES:

1. SEE WATER SYSTEM DESIGN GUIDELINES FOR TAPPING LOCATION REQUIREMENTS.
2. ALL EXTERNAL NUTS AND BOLTS ON VALVES SHALL BE TYPE 316 STAINLESS STEEL.
3. TAPS LARGER THAN 2 INCH SHALL BE MADE BY THE CITY PUBLIC WORKS & UTILITIES AT THE CONTRACTORS EXPENSE.
4. INSTALL SHORING PER OSHA REQUIREMENTS.

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 <p>CITY OF PETALUMA PUBLIC WORKS & UTILITIES UTILITIES DIVISION</p> <p>202 N. McDOWELL BLVD. TEL. 707-778-4546 PETALUMA, CALIFORNIA 94954 FAX. 707-778-4508</p>	<p>TAPPING VALVE AND PIT</p>	DATE: MARCH 2016	SCALE: N.T.S.
		APPROVED BY: 	
		Kent R. Carothers, P.E. Operations Manager C60671	
		DRAWN BY: JDL	NO. 878



ELEVATION

NOTES:

1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. ALL EXTERNAL NUTS AND BOLTS ON VALVES SHALL BE TYPE 316 STAINLESS STEEL.
3. BUTTERFLY VALVES;
 CLASS 200 PVC PIPE SHALL USE A FLANGED VALVE WITH MECHANICAL RESTRAINTS.
 CLASS 150 PVC OR DUCTILE IRON PIPE SHALL USE A VALVE WITH SUITABLE END CONNECTIONS.



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**BUTTERFLY VALVE
 INSTALLATION**
 (REQUIRED FOR 16" AND
 LARGER PIPE)

DATE: MARCH 2016

SCALE: N.T.S.

APPROVED BY:

Kent R. Carothers, P.E. Operations Manager C60571

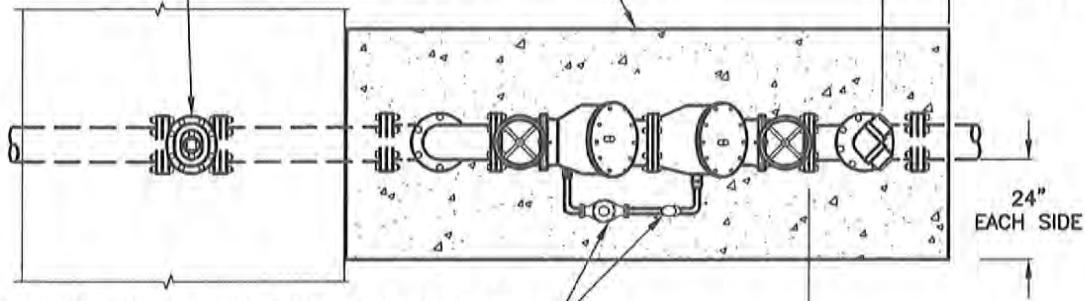
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NO. 879

ISOLATION VALVE REQUIRED ONLY WITH COMBINATION SERVICE

4" CONCRETE SLAB, SEE NOTE 7

18" EACH END MINIMUM

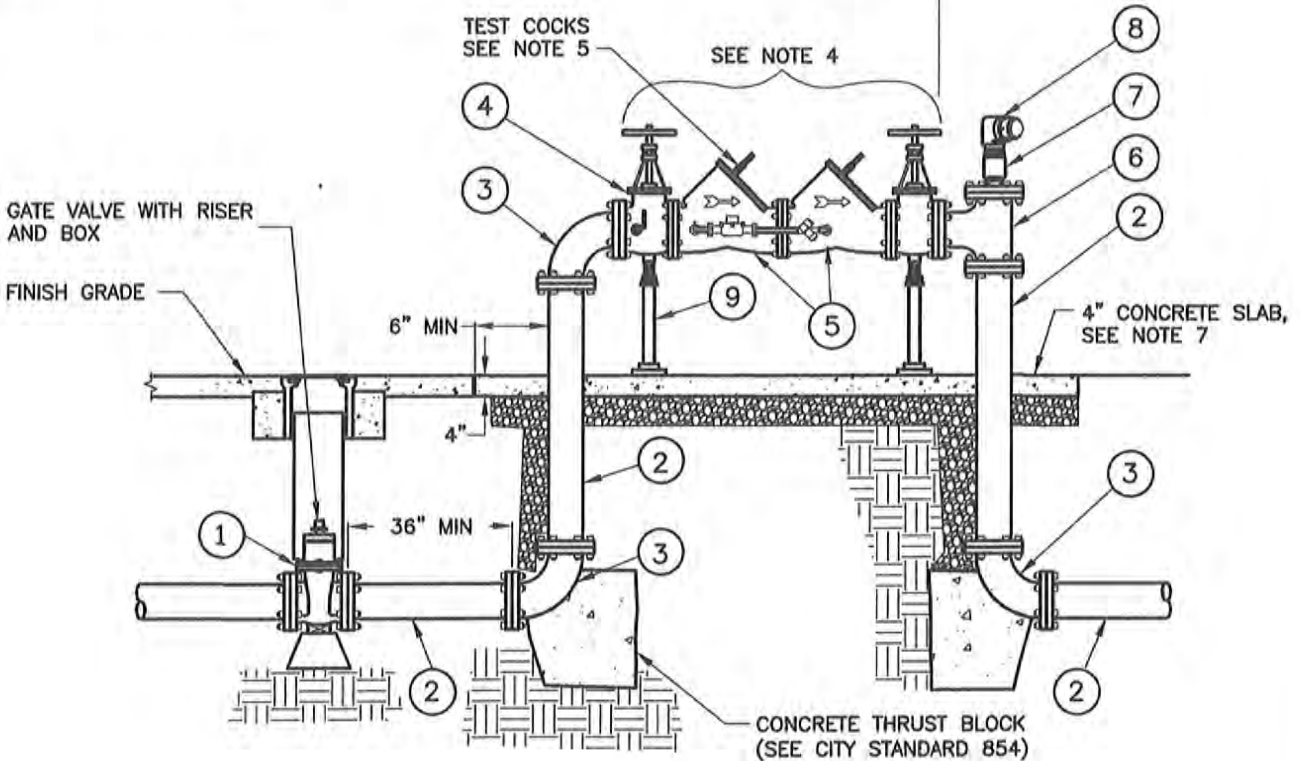


BYPASS METER WITH DOUBLE CHECK VALVE TO BE INSTALLED AT THE CONTRACTORS EXPENSE. THE METER SHALL REGISTER IN CUBIC FEET(SEE NOTE 11)

PLAN

PRIOR TO DOUBLE DETECTOR CHECK INSTALLATION, A BACTI TEST SHALL BE APPROVED BY OPERATIONS.

PUBLIC WORKS & UTILITIES INSPECTION ←
 FIRE DEPARTMENT INSPECTION →



ELEVATION

*SEE 880.02 FOR NOTES AND PARTS LIST
 *FOR TAPPING SLEEVE REQUIREMENTS SEE APPROVED MATERIALS LIST



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**4" THRU 10"
 DOUBLE CHECK DETECTOR
 FIRE LINE BACKFLOW
 ASSEMBLY**

DATE: AUGUST 2019	SCALE: N.T.S.
APPROVED BY: <i>[Signature]</i>	
Kent R. Carothers, P.E. Operations Manager C80871	
DRAWN BY: JDL	NO. 880.01

4" THRU 10" DOUBLE CHECK DETECTOR FIRE LINE BACKFLOW ASSEMBLY PARTS LIST	
NO.	DESCRIPTION
1	FLG X FLG RESILIENT WEDGE GATE VALVE, CONCRETE PIER BLOCK REQUIRED
2	FLG X FLG D.I.P. SPOOL - LENGTH AS REQUIRED (36" MINIMUM)
3	90° FLANGED D.I.P. ELBOW
4	SELF-RISING STEM SHUTOFF VALVES, 2 REQUIRED (SEE NOTE 4)
5	DOUBLE CHECK DETECTOR ASSEMBLY (SEE NOTE NO. 6 & 9)
6	TEE AND BLIND FLANGE WITH 4" TAP
7	CHECK VALVE AND NIPPLE
8	90-DEG. 4" X 2-1/2" X 2-1/2" FIRE DEPARTMENT CONNECTION AND NIPPLE
9	FOR 4 INCH AND LARGER INSTALL ADJUSTABLE SUPPORTS-GRINNEL OR APPROVED EQUAL

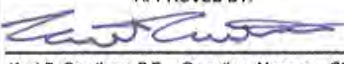
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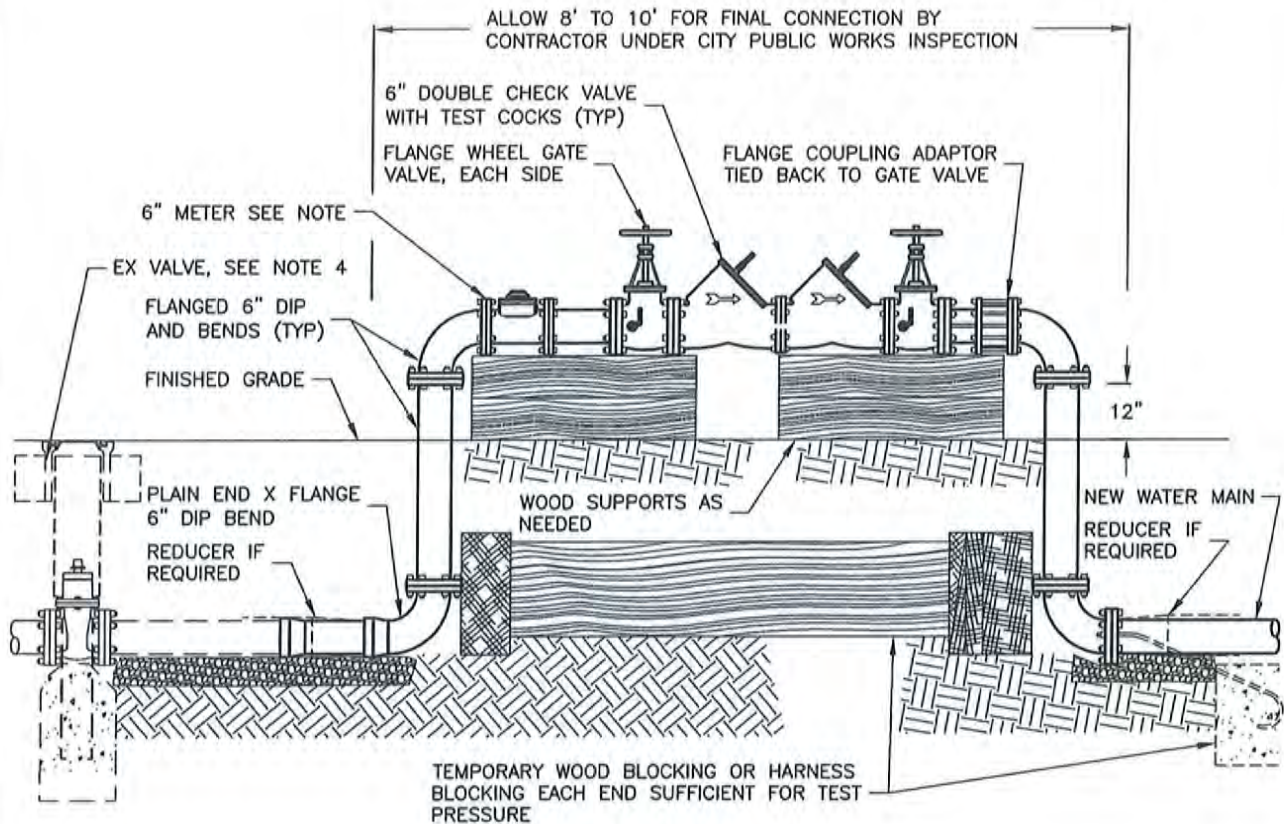
- SEE WATER SYSTEM DESIGN GUIDELINES.
 - DOUBLE CHECK DETECTOR VALVE BACKFLOW ASSEMBLIES SHALL BE REQUIRED ON ALL PROPERTIES WITH CLASS 3 OR 4 FIRE SPRINKLER SYSTEMS, AUXILIARY WATER SUPPLY ON SITE, WHERE THE CITY FIRE MARSHALL AND PUBLIC WORKS & UTILITIES DEPARTMENT DETERMINES EXTREME FIRE HAZARD EXISTS OR WHERE THERE IS MORE THAN ONE CONNECTION TO THE CITY WATER SUPPLY.
 - ALL APPROVED DOUBLE CHECK DETECTOR BACKFLOW ASSEMBLIES SHALL BE SHOWN ON THE LIST OF APPROVED BACKFLOW DEVICES OF THE LATEST REVISION BY THE STATE OF CALIFORNIA DEPARTMENT OF HEALTH SERVICES.
 - SHUT OFF VALVES SHALL BE RESILIENT WEDGE TYPE O.S. AND Y., AND MUST BE CHAINED AND PADLOCKED IN THE OPEN POSITION. FIRE DEPARTMENT REQUIRES ELECTRONIC MONITORING OF TAMPER SWITCHES.
 - 4 TEST VALVES ARE REQUIRED AND SHALL BE FITTED WITH APPROPRIATE SIZE FEMALE TEST COCKS.
- DOUBLE CHECK DETECTOR BACKFLOW ASSEMBLY SHALL BE LOCATED 24 INCHES ABOVE FINISHED GRADE (36 INCHES MAX) OR 12 INCHES ABOVE THE INUNDATION LEVEL, WHICHEVER IS GREATER AND AS CLOSE AS POSSIBLE TO THE SIDEWALK OR PUBLIC RIGHT OF WAY, WHERE NO SIDEWALK EXISTS INSTALL BEHIND RIGHT OF WAY OR AS APPROVED BY OPERATIONS.
- THE CONCRETE SLAB TO INCLUDE 6 X 6 WIRE MESH AND PLACED ON 6" OF CLASS 2 AGGREGATE BASE COMPACTED 95% RELATIVE COMPACTION.
 - ANY COVER OR SCREENING OF THIS ASSEMBLY MUST HAVE THE APPROVAL OF THE CITY FIRE MARSHALL AND THE PUBLIC WORKS & UTILITIES DEPARTMENT PRIOR TO INSTALLATION.
 - DOUBLE CHECK DETECTOR BACKFLOW ASSEMBLY SHALL BE THE SAME SIZE AS THE FIRE LINE EXCEPT WHERE A 12 INCH FIRE LINE IS REQUIRED. WHEN A 12 INCH FIRE LINE IS REQUIRED A 10 INCH DOUBLE CHECK DETECTOR BACKFLOW ASSEMBLY SHALL BE INSTALLED.
 - WHEN THE ASSEMBLY IS CONSTRUCTED WITHIN 3.0' OF A SLOPE GREATER THAN 3:1, A RETAINING WALL SHALL BE CONSTRUCTED WITH A 36" HORIZONTAL CLEARANCE AT FINISHED GRADE.
 - THE FIRE LINE WILL NOT BE ACTIVATED UNTIL THE CITY PUBLIC WORKS & UTILITIES DEPARTMENT HAS APPROVED THE INSTALLATION OF THE BYPASS METER AND THE ACCOUNT FOR THE SERVICE IS OPENED.
 - FOR TAPPING SLEEVE REQUIREMENTS SEE APPROVED MATERIALS LIST.
 - A DOUBLE DETECTOR CHECK IS REQUIRED ON ALL UPGRADES TO FIRE SYSTEM IF CURRENTLY HAVE SINGLE CHECK VALVE.
 - FDC LOCATION TO BE DETERMINED BY FIRE MARSHAL.



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4" THRU 10"
 DOUBLE CHECK DETECTOR
 FIRE LINE BACKFLOW
 ASSEMBLY
 (PARTS AND NOTES)

DATE: AUGUST 2019	SCALE: N.T.S.
APPROVED BY: 	
Kent R. Carothers, P.E. Operations Manager C80871	
DRAWN BY: JDL	NO. 880.02



ELEVATION

NOTES:

1. SEE WATER SYSTEM DESIGN GUIDELINES.
2. THIS ASSEMBLY SHALL BE INSTALLED PRIOR TO COMBUSTIBLE MATERIALS BEING STORED ON-SITE AND/OR CONSTRUCTION IS DONE PRIOR TO ACCEPTANCE OF THE ON-SITE WATER MAIN SYSTEM. FIRE FLOW AND ACCESS MUST BE SATISFACTORY TO THE CITY FIRE MARSHAL / FIRE DEPARTMENT.
3. THE CONTRACTOR SHALL FURNISH AN APPROVED 6" TURBINE METER AND DOUBLE CHECK VALVE ASSEMBLY. THE ENTIRE ASSEMBLY WILL BE TESTED AND CERTIFIED ON-SITE BY THE CITY PUBLIC WORKS & UTILITIES DEPARTMENT PRIOR TO SYSTEM ACTIVATION. A STANDARD FEE MAY BE CHARGED FOR THE TESTING AND CERTIFICATION. THE CONTRACTOR WILL BE RESPONSIBLE TO PAY THE CITY FOR ALL WATER DELIVERED THROUGH THIS CONNECTION. THE METER WILL BE READ AT TIME OF ACTIVATION AND A LOAD ACCOUNT STARTED.
4. IF AN ISOLATION VALVE DOES NOT EXIST WITH-IN 8' OF THE TIE-IN POINT, THE CONTRACTOR WILL BE REQUIRED TO INSTALL AN APPROVED GATE VALVE PER CURRENT CITY STANDARD UNLESS THE MAIN IS ON A SEPARATELY VALVED RUN WITH NO INTERVENING SERVICES AND AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS & UTILITIES.
5. THE CONTRACTOR WILL MAKE FINAL TIE-IN UNDER INSPECTION BY THE CITY PUBLIC WORKS & UTILITIES DEPARTMENT AT THE DEVELOPER'S EXPENSE. AFTER FINAL TIE-IN, THE METER WILL BE READ BY THE INSPECTOR AND THE LOAD ACCOUNT WILL BE CLOSED OUT.
6. GATE VALVES IN THE ASSEMBLY WILL BE RESILIENT WEDGE TYPE.
7. METER TO BE CUBIC FEET READING TYPE ONLY.
8. THE CONTRACTOR SHALL NOT EXCAVATE WITH-IN 6 FEET OF AN EXISTING GATE VALVE WITH OUT APPROVAL. GATE VALVES SHALL BE OPERATED BY CITY PERSONNEL ONLY.



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TEMPORARY
METERED CONNECTION
FIRE FLOW REQUIRED

DATE: APRIL 2017

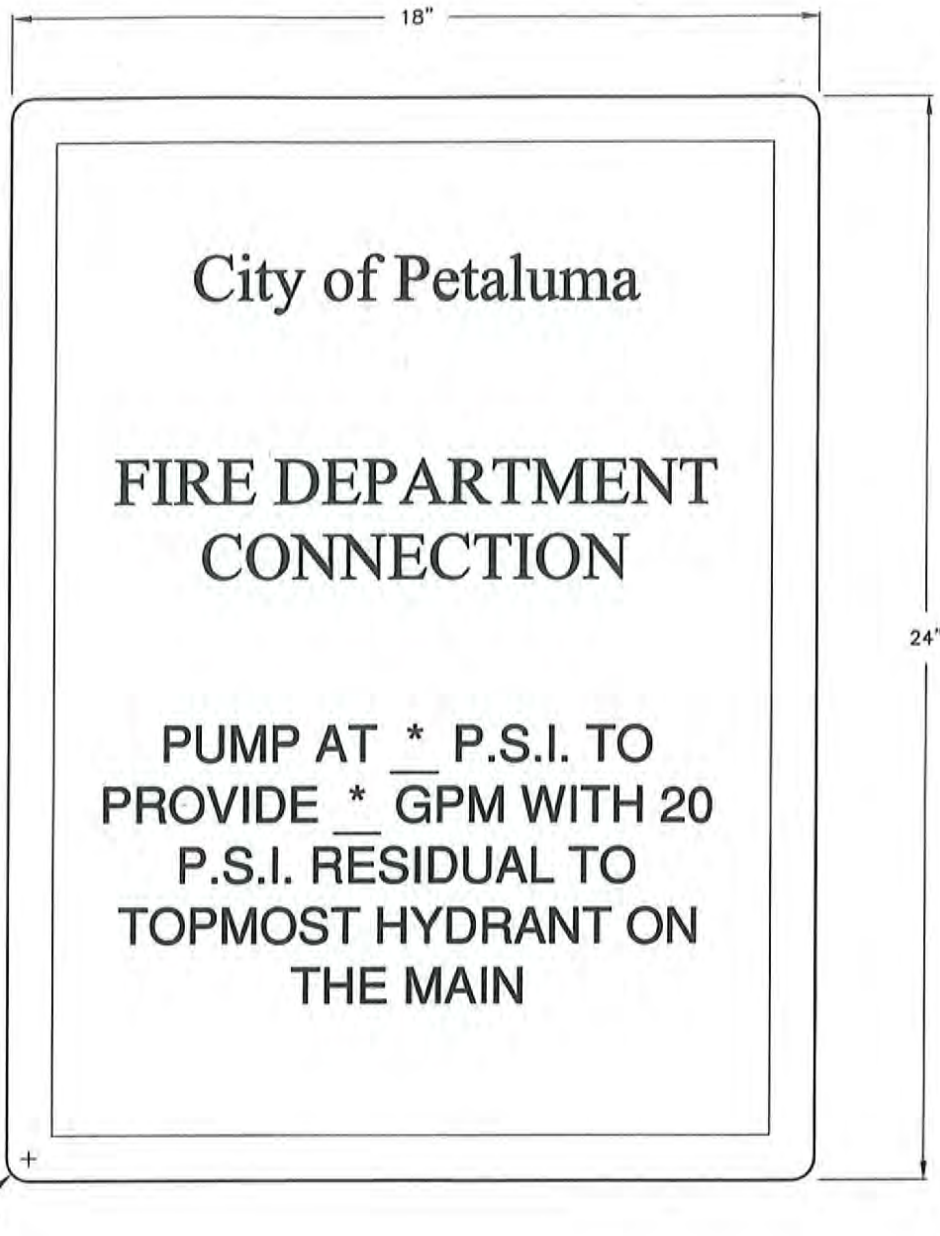
SCALE: N.T.S.

APPROVED BY:

Kent R. Carothers, P.E. Operations Manager C60871

DRAWN BY: JDL

NO. 881



NOTES:

NOTES:

1. PROVIDE A SIGN ADJACENT TO THE FIRE DEPARTMENT CONNECTION FACING THE STREET WITH THE PUMPING INSTRUCTIONS, THE SIGN SHALL BE SCOTCHLITE REFLECTIVE OR EQUAL MOUNTED ON ALUMINUM, MINIMUM THICKNESS = .080". THE SIGN SHALL BE WEATHER RESISTANT WITH WHITE REFLECTIVE LETTERS 1.5 INCHES HIGH, 3/8 STROKE ON GREEN BACKGROUND AND SHALL READ:

"FIRE DEPARTMENT CONNECTION DRY HYDRANT MAIN. PUMP AT * P.S.I. TO PROVIDE * GPM WITH 30 P.S.I. RESIDUAL TO TOPMOST HYDRANT ON THE MAIN"
(# P.S.I. & # GPM VALUES TO BE DETERMINED BY THE FIRE MARSHALL)
2. THE BASE, POST AND SIGN MOUNTING SHALL BE AS DESCRIBED IN CITY STANDARD 208 (2 OF 3) NOTES AND THE SIGN SHALL BE INSTALLED SO THAT THE BOTTOM OF THE SIGN IS 48" FROM FINISHED GRADE.



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DRY FIRE HYDRANT
MAIN SIGN

DATE: MARCH 2017

SCALE: N.T.S.

APPROVED BY:

Kent R. Carothers, P.E. Operations Manager C60871

DRAWN BY: JDL

NO. 884

METER BOX AND LID PER APPROVED MATERIALS LIST

2" RED BRASS NIPPLES CUT AND THREAD TO LENGTH. (TYP)

A

2" BRASS FLANGED ANGLE METER BALL VALVE WITH STAINLESS STEEL HARDWARE (TYP)

2" X 2" X 2" IPT BRASS TEE

2" X 2" X 1" IPT BRASS TEE FOR EACH METER (TYP)

2" X 1" IPT BRASS ELBOW (TYP)

2" MIN (TYP)

A
B

PLAN VIEW

EXISTING 2" FLANGED ANGLE METER BALL VALVE

RED BRASS NIPPLES CUT AND THREAD TO LENGTH (TYP)

2" X 2" X 1" IPT BRASS TEE FOR EACH METER (TYP)

EXISTING 2" SERVICE WITH TRACER WIRE, SEE NOTE 2

1" BALL ANGLE METER BALL VALVE FEMALE X FEMALE IPT WITH LOCKWING (TYP)

2" X 1" IPT BRASS ELBOW (TYP)

SECTION A-A

1" BRASS METER COUPLING

1" BALL STOP FEMALE X FEMALE IPT WITH LOCKWING



ALTERNATE SERVICE RUN

• FOR NOTES AND FLOW CALCULATIONS SEE 8XXX.02



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2" MANIFOLD RETRO-FIT
EXISTING 2" SERVICE

DATE: APRIL 2017

SCALE: N.T.S.

APPROVED BY:

Kent R. Carothers, P.E. Operations Manager C60671

DRAWN BY: JDL

NO. 885.01

USE THIS TABLE TO ASSIGN FLOW RATE PER METER TO
CALCULATE TOTAL MAXIMUM FLOW THROUGH A MANIFOLD SYSTEM

2" SERVICE MANIFOLD LOAD CALCULATIONS	
METER SIZE	G.P.M. FLOW ALLOWED
3/4" X 5/8"	20
1"	25
1 1/2"	50
2"	80

NOTES:

1. SEE CITY WATER SYSTEM DESIGN GUIDELINES.
2. ALL MANIFOLD LOAD CALCULATIONS AND DESIGN MUST HAVE PRIOR APPROVAL FROM PUBLIC WORKS & UTILITIES DEPARTMENT PRIOR INSTALLATION.
3. MAXIMUM OF SIX (6) 1" METERS PER MANIFOLD.
4. FOR MANIFOLD LOAD CALCULATION SEE CITY STANDARD 889.02.
5. FOR NEW 2" SERVICE SEE APPROPRIATE CITY STANDARD.
6. SEE APPROVED MATERIALS LIST FOR APPROVED FITTINGS



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**2" MANIFOLD RETRO-FIT
EXISTING 2" SERVICE**

DATE: APRIL 2017

SCALE: N.T.S.

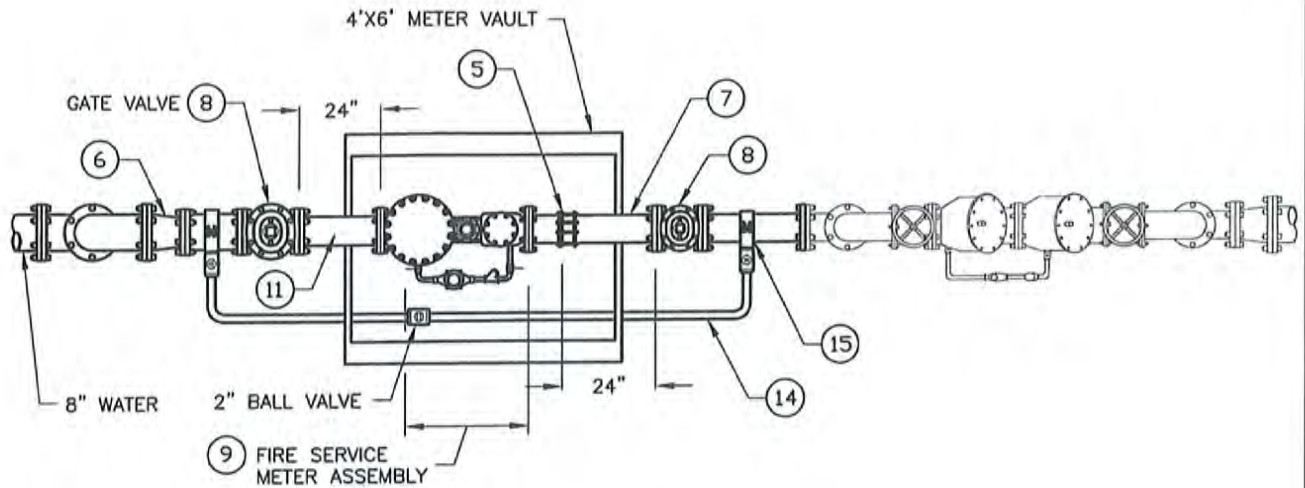
APPROVED BY:

Kent R. Carothers

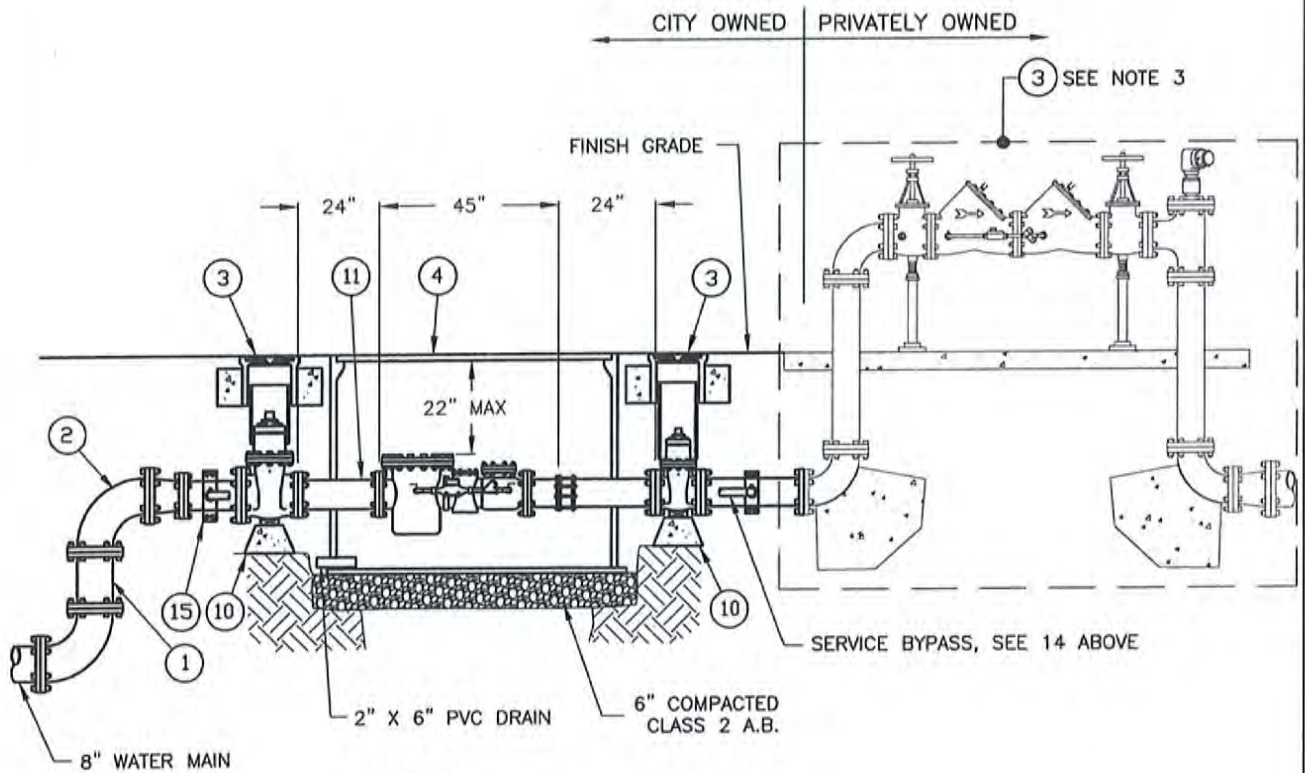
Kent R. Carothers, P.E. Operations Manager C80671

DRAWN BY: JDL

NO. 885.02



PLAN VIEW



ELEVATION

*SEE 887.02 FOR NOTES AND PARTS LIST
 *SEE APPROVED MATERIALS LIST



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COMBINATION FIRE & DOMESTIC
 SERVICE MASTER METER
 ASSEMBLY

DATE: APRIL 2017 SCALE: N.T.S.

APPROVED BY:

Kent Carothers
 Kent R. Carothers, P.E. Operations Manager C60671

DRAWN BY: JDL

NO. 887.01

SERVICE ASSEMBLY PARTS LIST	
NO.	DESCRIPTION
①	8" DUCTILE IRON FLANGE SPOOLS OR M.J. FITTINGS WITH RETAINER GLANDS.
②	8" X 90' FLANGED ELBOW
③	VALVE BOX AND RISER Christy G5 OR APPROVED EQUAL
④	VAULT AND COVER WITH 9"x12" METER LID COVER, CENTERED OVER METER REGISTERS OR APPROVED EQUAL.
⑤	6" FLANGE COUPLING ADAPTER
⑥	8" X 6" FLANGED REDUCER
⑦	6" PE X FLG PIPE- LENGTH AS NEEDED
⑧	6" FLG X FLG RESILIENT SEAT GATE VALVE, PER CITY STANDARD
⑨	6" NEPTUNE HP FIRE SERVICE METER TO BE PROVIDED BY THE CITY AT DEVELOPERS EXPENSE
⑩	CONCRETE PIER BLOCK REQUIRED (TYPICAL)
⑪	6" FLG X FLG D.I.P. SPOOL- LENGTH AS NEEDED (TYPICAL)
⑫	6" DOUBLE CHECK DETECTOR FIRE LINE ASSEMBLY PER CITY STANDARD
⑬	2" BALL VALVE BRASS
⑭	2" CLASS 200 C.T.S. POLYETHYLENE PIPE WITH TRACER WIRE
⑮	2" DOUBLE STRAP BRONZE SERVICE SADDLE W/ CC THREADS

NOTES:

1. SEE CITY WATER SYSTEM DESIGN GUIDELINES.
2. ALL PIPE AND FITTINGS ARE TO BE FLANGED DUCTILE IRON CEMENT MORTAR LINED OR FUSION-BONDED EPOXY COATED, EXCEPT AS NOTED OR UNLESS OTHERWISE SPECIFIED.
3. INSTALL DOUBLE CHECK DETECTOR FIRE LINE BACKFLOW ASSEMBLY PER CITY STANDARD.
4. SET METER VAULT SO THAT THE STEEL COVER IS FLUSH WITH FINISHED SURFACE.
5. METER VAULT KNOCKOUTS OR NEEDED PIPE OPENINGS ARE TO BE NEATLY CUT AND GROUTED SUFFICIENTLY TO PREVENT DIRT INTRUSION.
6. THIS ASSEMBLY TO BE INSTALLED ONLY WITH PRIOR APPROVAL OF THE PUBLIC WORKS & UTILITIES DEPARTMENT.



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COMBINATION FIRE & DOMESTIC
**SERVICE MASTER METER
 ASSEMBLY**
 NOTES

DATE: APRIL 2017

SCALE: N.T.S.

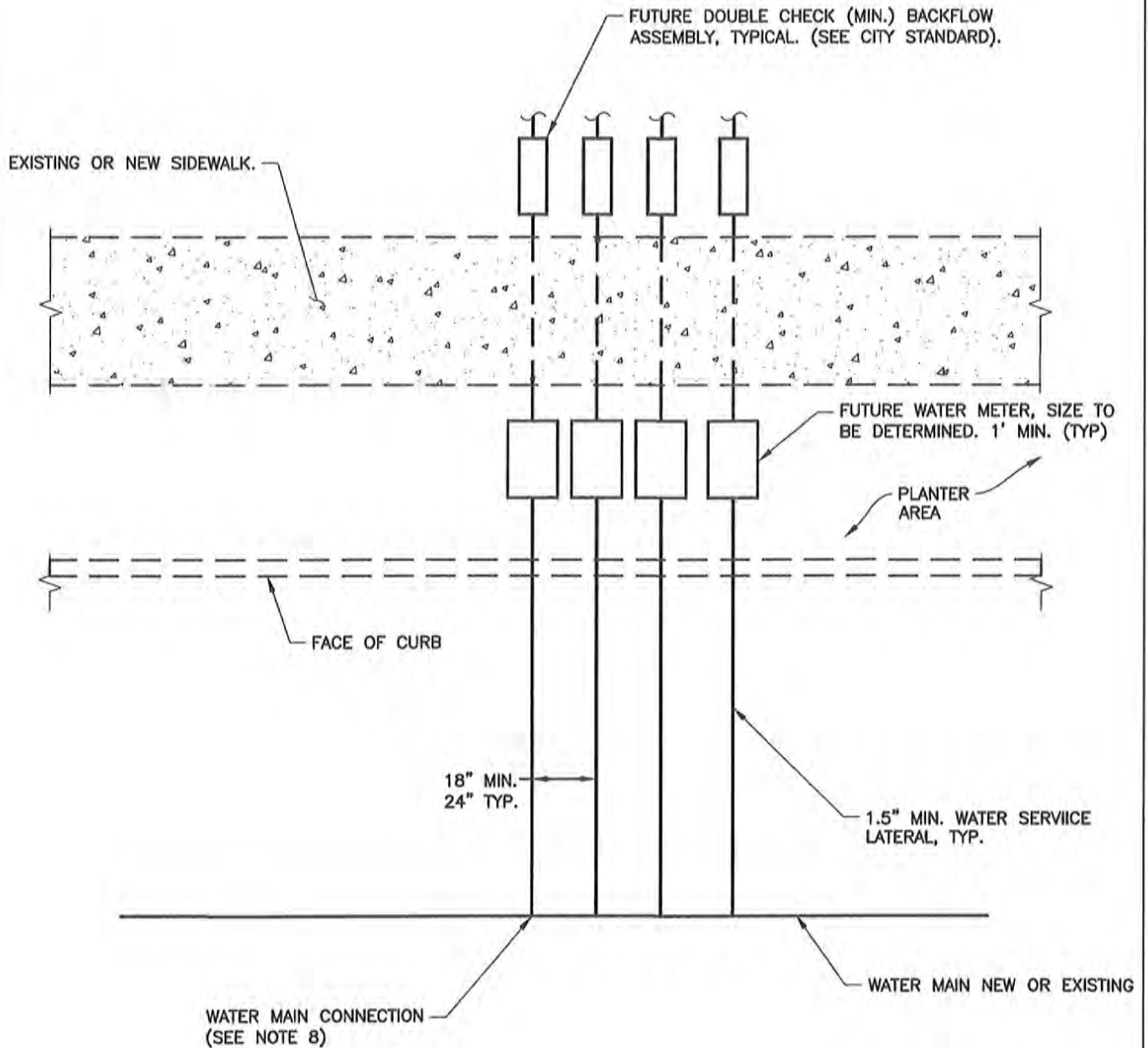
APPROVED BY:

Kent R. Carothers

Kent R. Carothers, P.E. Operations Manager C60671

DRAWN BY: JDL

NO. 887.02



• FOR NOTES & CALCULATIONS SEE 870.02



CITY OF PETALUMA
PUBLIC WORKS & UTILITIES
 UTILITIES DIVISION

202 N. McDOWELL BLVD. TEL. 707-778-4546
 PETALUMA, CALIFORNIA 94954 FAX. 707-778-4508

**CLUSTERED
 WATER SERVICES**
 RESIDENTIAL

DATE: AUGUST 2019 SCALE: N.T.S.

APPROVED BY:

Kent R. Carothers
 Kent R. Carothers, P.E. Operations Manager C60671

DRAWN BY: KRC

NO. 888.00

**Water System
Approved Materials List
August 2019**

**Water System
Approved Materials List**

CITY STANDARD DETAIL NO. 857.01

Hydrants

Residential

(All Two-2-1/2" and One-4-1/2" Outlet)
Clow 960
American AVK Series 2490

Commercial

(All One-2-1/2" and Two-4-1/2" Outlet)
Clow 865
American AVK Series 2420

Breakable Flange Unit

American AVK Co. 24-150-80
or Approved Equal

American AVK Co. 24-150-80
or Approved Equal

Paint: Safety Yellow, DTM (Direct to Metal) ALKYD based Enamel

CITY STANDARD DETAIL NO. 858

6" Blow-off

Ball Valve - Brass

3" Size

Watt B6000
Jomar T100

Meter Boxes and Covers

(Non-Traffic Loading Areas)

Box

Christy B40

Cover

Christy B40D

(Traffic Loading Area)

Box

Christy B40

Cover

Christy B40-61G

**CITY STANDARD DETAIL NO. 862
Angle Meter Valves, Pack Joint, Brass**

1-1/2" FL. x Compression

Ford BFA43-777W and BFA43-666W
Mueller P-24276-3

(Note: "Swivel Nut to Flange Style" flange type will not be accepted)

Corporation Stop Ball Valve - CC Threads

1-1/2" Size

Ford FB1000
Mueller P-25008

Service Saddle - Brass, CC Threads - C-900 PVC, AC and Ductile Iron Pipe

Ford S-90 and 202B
Mueller BR2B

Meter Boxes and Covers

1-1/2" (Non-Traffic Loading)

Box		Cover	
Christy	B30	Christy	B30

1-1/2" (Traffic Loading Area)

Box		Cover	
Christy	B30	Christy	B30

CITY STANDARD DETAIL NO. 864 and 865

Straight Meter Valves - Pack Joint, Brass, CC Threads

2" and 1-1/2" FL. x Compression

Ford BF43-777W and BF43-666W
Mueller P24335

(DETAIL NO. 864 and 865 continued)

2" and 1-1/2" FL. x Compression

Ford BFA43-777W and BFA43-666W
Mueller P-24276-3

2" and 1-1/2" FL. x F.I.P.

Ford BFA13-777W and BFA13-666W
Mueller B-24286

2" and 1-1/2" FL. x F.I.P.

Ford BF13-777W and BF13-666W
Mueller B24337

2" and 1-1/2" M.I.P. x F.I.P. Compression

Ford C84-67-1-1/2", C84-77-2", C14-67-1-1/2" and C14-76-2"

2" and 1-1/2" ELL 90° MIP & FIP x Compression and I.P.T.

Ford L14-66, L84-77 and L84-66
Mueller P-15531 and P-15533

2" and 1-1/2" Corporation Stop

Ford FB1000-7 and FB1000-6
Mueller P25008

Meter Boxes and Covers
(Non-Traffic Loading Areas)

Box		Cover	
Christy	B36	Christy	B36E
Extension	1395	Christy	B36
(Traffic Loading Areas)			
Christy	B1730	Christy	B1730-51G

CITY STANDARD DETAIL NO.(S) 866, 867, 868 and 886

Tapping Sleeves

Size on size up to and including 12" on 12" (Example 4" on 4", 6" on 6") and any combinations (Example 4" on 8", 6" on 8"), DIP, CIP, PVC, and existing ACP.

Powerseal-Stainless Steel 3490 AS

Ford-Stainless Steel FTSS
JCM-Stainless Steel 432
Romac-Stainless Steel SST III

CITY STANDARD DETAIL NO. 866

Meter Boxes and Covers

(Non-Traffic Loading Areas)

Box		Cover	
Christy	B52 w/Extension	Christy	B52-62-D-P/H

(Traffic Loading Areas)

Box		Cover	
Christy	B52 w/Extension	Christy	B52-62-D-P/H

CITY STANDARD DETAIL NO. 867 & 868

Meter Boxes and Covers

(Non-Traffic Loading Areas)

Box		Cover	
Christy	(Submittal on Boxes Required)	Christy	(Custom)

(Traffic Loading Areas)

Box		Cover	
Christy	(Submittal Required on Boxes)	Christy	(Custom)

CITY STANDARD DETAIL NO. 875

Meter Box, Vaults and Covers

Box		Cover	
Christy	B36	Christy	B36D
Christy	B48	Christy	B48D2
Christy	R10P36	Christy	R10-52H

CITY STANDARD DETAIL NO. 877

Gate Valves

Valves shall conform to the latest revision of AWWA Standard C509 for resilient wedge gate valves.

Valve Box

Christy G5 (or Approved Equal)

CITY STANDARD DETAIL NO. 878

Tapping Sleeves

(See Approved Material List Standard Detail 866)

CITY STANDARD DETAIL NO. 879

Butterfly Valves 16" and Larger

Valves shall conform to the latest revision of AWWA Standard C504

DeZurik BAW, or Approved Equal

CITY STANDARD DETAIL NO. 880

Detector Check Valve

Ames	1000
Watts	07F

CITY STANDARD DETAIL NO. 882

Tapping Sleeves

(See Approved Material List Standard Detail 866)

Utility Box and Cover

(Non-Traffic Loading)

Box		Cover	
Christy	B48	Christy	B48M2
Quazite	Pg3048BA18	Quazite	LG3048WAQ150

CITY STANDARD DETAIL NO. 883

Tapping Service Saddle

(See Approved Material List Standard Detail 866)

Ball Valve No. 1'

Ford	B11-444
Mueller	B25008

(DETAIL NO. 883 continued)

Corporation Stop (Ball Valve)

1" M.I.P. x Comp. 1" F.I.P. x Comp. 90° Ell 90° Ell (Brass)

Ford	L84-44G	Ford	L14-44
Jones	J2621-SG		
Mueller	H15531	Mueller	H15533

Combination Valves

APCO	143C
Crispin	AL10

(DETAIL NO. 883 continued)

Meter Box and Cover

(Non-Traffic Loading)

Box		Cover	
Christy	B36	Christy	B36D
Quazite	PG1730WA12	Quazite	PG1730WA50

Meter Box and Cover
(Traffic Loading)

Box		Cover	
Christy	B36	Christy	B36D-61D
Quazite	PG1730BA12	Quazite	PG1730HAR250

CITY STANDARD DETAIL NO. 886

(See Approved Material List Standard Detail 863 and 866)

CITY STANDARD DETAIL NO. 889.01

Meter Boxes and Covers

5/8" x 3/4" (Non-traffic Loading)

Box		Cover
Christy	B9X	Christy B9XCor D and B9X

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) 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)

AGREEMENT CERTIFICATE
(if Partnership)

STATE OF CALIFORNIA)
) ss:
COUNTY OF)

I HEREBY CERTIFY that a meeting of the Partners of the _____
_____ a partnership existing under the laws of the State of _____, held on _____, 20____, the following resolution was duly passed and adopted:

“RESOLVED, that _____, as the General Partner of the Partnership, be and is hereby authorized to execute the Agreement dated _____, 20____, by and between this Partnership and _____ and that his/her execution thereof, attested by the _____ shall be the official act and deed of this Partnership.”

I further certify that said resolution is now in full force and effect.

IN WITNESS WHEREOF, I have hereunto set my hand this _____ day of _____, 20____.

Partner

(SEAL)

AGREEMENT CERTIFICATE
(if Joint Venture)

STATE OF CALIFORNIA)
) ss:
COUNTY OF)

I HEREBY CERTIFY that a meeting of the Principals of the _____
_____ a
joint venture existing under the laws of the State of _____, held
on _____, 20___, the following resolution was duly passed and adopted:

“RESOLVED, that _____,
as _____, of the joint venture, be and is hereby authorized to execute
the Agreement dated _____, 20___, by and between this Joint Venture
and _____ and that his/her execution
thereof, attested by the _____ shall be the official act and deed
of this Joint Venture.”

I further certify that said resolution is now in full force and effect.

IN WITNESS WHEREOF, I have hereunto set my hand this _____, day of
_____, 20___.

Managing Partner

(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

SECTION VI
PROJECT PLANS

SEE ATTACHED PLANS

SECTION VII
GEOTECHNICAL REPORT



Experience is the difference

GEOTECHNICAL STUDY REPORT

NORTH MCDOWELL BOULEVARD COMPLETE STREETS PROJECT
NORTH MCDOWELL BOULEVARD
PETALUMA, CALIFORNIA

Project Number:

6498.13.PW.1

Prepared For:

BKF Engineers
% Becky Dower
200 Fourth Street, Suite 300
Santa Rosa, California

Prepared By:

RGH Consultants

Santa Rosa Office

1305 North Dutton Avenue
Santa Rosa, CA 95401
707-544-1072

Napa Office

1041 Jefferson Street, Suite 4
Napa, CA 94559
707-252-8105

A blue ink signature of Jared J. Pratt, consisting of stylized initials and a surname.

Jared J. Pratt
Principal Engineering Geologist



A blue ink signature of Eric G. Chase, featuring a cursive style with a prominent "E" and "C".

Eric G. Chase
Principal Geotechnical Engineer
Project Manager



April 5, 2022

(Revised April 6, 2022)

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INFORMATION ABOUT YOUR GEOTECHNICAL REPORT	

INTRODUCTION

This report presents the results of our geotechnical study for the roadway reconstruction to be constructed along North McDowell Boulevard from Old Redwood Highway to Sunrise Parkway in Petaluma, California. The site location is shown on Plate 1, Appendix A. Portions of the road are in poor condition with stretches that have exceeded its design life. We understand it is planned to rehabilitate the road to current design standards.

SCOPE

The purpose of our study, as outlined in our Agreement between Consultant and Subconsultant dated May 12, 2021, was to generate geotechnical information for the design and construction of the project. Our scope of services included reviewing selected published geologic data pertinent to the site; evaluating the roadway sections and subsurface conditions by drilling borings, logging trench walls, and laboratory tests; analyzing the field and laboratory data; and presenting this report with the following geotechnical information:

1. A summary of the pavement sections and subgrade conditions encountered; and
2. Conclusions and recommendations regarding:
 - a. Primary geotechnical engineering concerns and mitigating measures, as applicable; and
 - b. Pavement rehabilitation options.

STUDY

Site Exploration

We reviewed our previous geotechnical studies in the vicinity. On June 16, 2021, we performed a geotechnical reconnaissance of the site and explored the subsurface conditions by drilling 13 borings to depths ranging from about 4 to 5 feet. The borings were drilled with a truck-mounted drill rig equipped with 6-inch diameter, solid stem augers at the approximate locations shown on the Exploration Plan, Plate 2. The boring locations were determined approximately by pacing their distance from features shown on the Exploration Plan and should be considered accurate only to the degree implied by the method used. Our staff engineer located and logged the borings and obtained samples of the materials encountered for visual examination, classification and laboratory testing. Disturbed “bulk” samples were obtained at selected depths from the borings and placed in plastic bags and buckets.

As a part of a separate utility maintenance project, we also logged pavement sections along North McDowell Boulevard in portions of the open trenches from Old Redwood Highway to Clegg Street.

The table below shows our interpretation of pavement sections and subsurface soil conditions on the date and at the locations indicated. Subsurface conditions may vary at other locations and times. Our interpretation is based on visual inspection of soil samples and laboratory test results. The location of the pavement and soil boundaries should be considered approximate. The transition between soil, aggregate, pavement, and other elements of the existing section may be gradual.

Existing Pavement Section Thicknesses - Borings						
Boring	Asphalt (in)	Aggregate Base (in)	Aggregate Subbase (in)	Fill (in)	Subgrade Soil	
B-1	8½	3	-	10	Adobe Clay	
B-2	6½	4	15	-	Adobe Clay	
B-3	7	4	12	-	Adobe Clay	
B-4	8	4	11	23	Adobe Clay	
B-5	9	3		30	Adobe Clay	
B-6	7	-	16	-	Adobe Clay	
B-7	4	5	12	9	Adobe Clay	
B-8	5	-	15	28	Adobe Clay	
B-9	5	-	15	5	Adobe Clay	
B-10	9½	-	17	-	Adobe Clay	
B-11	9	-	17	10	Adobe Clay	
B-12	6½	-	16	-	Adobe Clay	
B-13	7½	9½	-	9	Adobe Clay	

Existing Pavement Section Thicknesses – Trench Logs		
Station Location	Asphalt (in)	Aggregate Base (in)
4+50	10	16
15+75	9	17
16+50	9	17
23+50	10	17
30+90	9	19
32+40	10	18 – 28
34+25	9	19

Laboratory Testing

The samples obtained from the borings and trenches were transported to our office and re-examined to verify soil classifications, evaluate characteristics, and assign tests pertinent to our analysis. Selected samples were laboratory tested to determine their grain size distribution and R-value. Results of the grain size distribution and R-value tests are presented on Plates 3 through 9.

DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

Pavement Rehabilitation Options

We understand that the options outlined below are being considered by the City of Petaluma (City) for the rehabilitation of North McDowell Boulevard. These options were developed based on the existing pavement section and subgrade conditions observed for this study and consultation with Tensar International Corporation (Tensar).

Old Redwood Highway to the SMART Train Tracks: Mill 6 inches of the existing asphalt and place a 1-inch leveling course followed by Tensar GlasGrid 8511TF. Roll the Glasgrid with rubber-tired compaction equipment to achieve adhesion, then place a total of 5 inches of compacted hot mix asphalt overlay. The approximate Traffic Index (TI) of the finished section is 11.8. We understand that the City has accepted this TI for the rehabilitation of this section of North McDowell.

SMART Train Tracks to Sunrise: Mill 5 inches of asphalt and place a 1-inch leveling course followed by Tensar GlasGrid GG8511. Roll the Glasgrid with rubber-tired compaction equipment to achieve adhesion, then place 4 inches of compacted hot mix asphalt overlay. The approximate TI of the finished section is 8.05. We understand that the City has accepted this TI for the rehabilitation of this section of North McDowell.

Pavement Overlay Construction

This section presents general recommendations for overlay construction. Tensar should be consulted for specific recommendations regarding preparation for and placement of the grids.

With the exception of remove and replace areas of the asphalt, which are discussed in more detail below, the asphalt overlay should be constructed as follows. The existing asphalt should be milled as required to conform to existing improvements, adjust drainage, and/or remove areas of deteriorated asphalt. The milling, however, should not exceed the thickness of material being placed back to reconstruct the section. After milling, the exposed surface should be cleaned, and cracks filled. Crack filling is best used for very large cracks (greater than $\frac{3}{8}$ -inch in width). The cracks are thoroughly cleaned, using compressed air, and all weed growth is killed and removed. The insertion of a weed killer is recommended, if acceptable by local environmental regulations. The cracks must be clean, dry, and wide enough to accept the crack filling material being used. Typically, the materials used for this procedure are hot or cold rubberized materials that will bond to both sides. It is critical that a sealant is placed at least 1-inch in depth and is bonded to both sides. If this procedure is desired for narrow cracks, using a router to get sufficient materials into the crack is sometimes necessary. Where pieces of asphalt are loose within the clean surface, they should be removed and replaced with $\frac{1}{2}$ inch Max Medium Type A asphalt. The cleaned and prepared surface should be covered with the leveling course.

Areas showing more distress than others should be repaired by removing and replacing the asphalt. This should be accomplished by sawcutting the existing asphalt to at least 1 foot beyond the limits of distress and removing the existing asphalt to a depth of about 4 inches below the finished milling surface. The exposed surface should be cleaned up and prepared to receive new asphalt. The surface should be observed by the project engineer to observe that it is unyielding. If yielding areas are observed, the

remainder of the asphalt should be removed to expose the aggregate base beneath the existing asphalt. Aggregate base exposed during the initial digout or to remove yielding areas should be rolled and recompacted to at least 95 percent relative compaction per ASTM Test Method D1557 and form a firm and unyielding surface prior to placement of new HMA. The approved digout surface should be tack coated at the edges and ¾ inch Max Medium Type A asphalt should be placed and compacted up to the bottom of the planned overlay. This work should be completed prior to cleaning the milled surface discussed above so that that the overlay can be placed over the entire pavement area.

Wet Weather Paving

In general, the pavements should be constructed during the dry season to avoid the saturation of the subgrade and base materials, which often occurs during the wet winter months. If pavements are constructed during the winter, a cost increase relative to drier weather construction should be anticipated. Unstable areas may have to be overexcavated to remove soft soil. The excavations will probably require backfilling with imported crushed (ballast) rock. The geotechnical engineer should be consulted for recommendations at the time of construction.

Supplemental Services

Pre-Bid Meeting

It has been our experience that contractors bidding on the project often contact us to discuss the geotechnical aspects. Informal contacts between RGH Consultants (RGH) and an individual contractor could result in incomplete or misinterpreted information being provided to the contractor. Therefore, we recommend a pre-bid meeting be held to answer any questions about the report prior to submittal of bids. If this is not possible, questions or clarifications regarding this report should be directed to the project owner or their designated representative. After consultation with RGH, the project owner or their representative should provide clarifications or additional information to all contractors bidding the job.

Plan and Specifications Review

Coordination between the design team and the geotechnical engineer is recommended to assure that the design is compatible with the soil, geologic and groundwater conditions encountered during our study. RGH recommends that we be retained to review the project plans and specifications to determine if they are consistent with our recommendations. In the event we are not retained to perform this recommended review, we will assume no responsibility for misinterpretation of our recommendations.

Construction Observation and Testing

Prior to construction, a meeting should be held at the site that includes, but is not limited to, the owner or owner's representative, the general contractor, the grading contractor, the underground contractor, any specialty contractors, the project civil engineer, other members of the project design team and RGH. This meeting should serve as a time to discuss and answer questions regarding the recommendations presented herein and to establish the coordination procedure between the contractors and RGH.

In addition, we should be retained to monitor all soil related work during construction. If, during construction, we observe subsurface conditions different from those encountered during the explorations, we should be allowed to amend our recommendations accordingly. If different conditions are observed by others, or appear to be present beneath excavations, RGH should be advised at once so that these conditions may be evaluated and our recommendations reviewed and updated, if warranted. The validity of recommendations made in this report is contingent upon our being notified and retained to review the changed conditions.

If more than 18 months have elapsed between the submission of this report and the start of work at the site, or if conditions have changed because of natural causes or construction operations at, or adjacent to, the site, the recommendations made in this report may no longer be valid or appropriate. In such case, we recommend that we be retained to review this report and verify the applicability of the conclusions and recommendations or modify the same considering the time lapsed or changed conditions. The validity of recommendations made in this report is contingent upon such review.

These supplemental services are performed on an as-requested basis and are in addition to this geotechnical study. We cannot accept responsibility for items that we are not notified to observe or for changed conditions we are not allowed to review.

LIMITATIONS

This report has been prepared by RGH for the exclusive use of BKF Engineers and the City of Petaluma and their consultants as an aid in the design and construction of the proposed improvements described in this report.

The validity of the recommendations contained in this report depends upon an adequate testing and monitoring program during the construction phase. Unless the construction monitoring and testing program is provided by our firm, we will not be held responsible for compliance with design recommendations presented in this report and other addendum submitted as part of this report.

Our services consist of professional opinions and conclusions developed in accordance with generally accepted geotechnical engineering principles and practices. We provide no warranty, either expressed or implied. Our conclusions and recommendations are based on the information provided to us regarding the proposed construction, the results of our field exploration, laboratory testing program, and professional judgment. Verification of our conclusions and recommendations is subject to our review of the project plans and specifications, and our observation of construction.

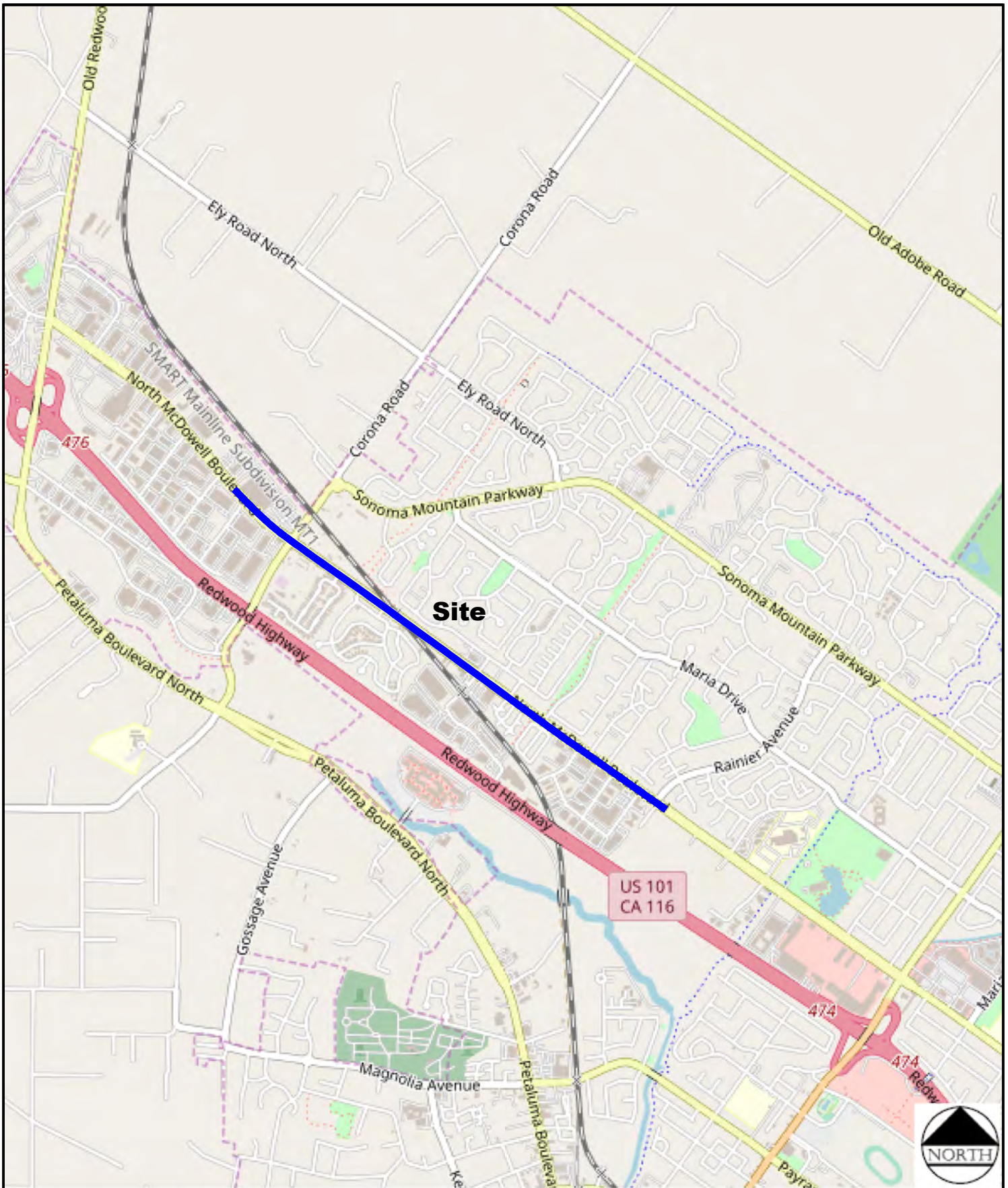
The borings and logs of utility trenches represent the subsurface conditions at the locations and on the date indicated. It is not warranted that they are representative of such conditions elsewhere or at other times. Site conditions and cultural features described in the text of this report are those existing at the time of our field exploration and may not necessarily be the same or comparable at other times.

The scope of our services did not include an environmental assessment or a study of the presence or absence of toxic mold and/or hazardous, toxic or corrosive materials in the soil, surface water, groundwater or air (on, below or around this site), nor did it include an evaluation or study for the presence or absence of wetlands. These studies should be conducted under separate cover, scope and fee and should be provided by a qualified expert in those fields.

APPENDIX A - PLATES

LIST OF PLATES

Plate 1	Site Location Map
Plate 2	Exploration Plan
Plates 3 through 5	Particle Size Analysis Data
Plates 6 through 9	Resistance (R) Value Data



Reference: Mapline

Scale: 1" = 2000'

RGH
CONSULTANTS

SITE LOCATION MAP

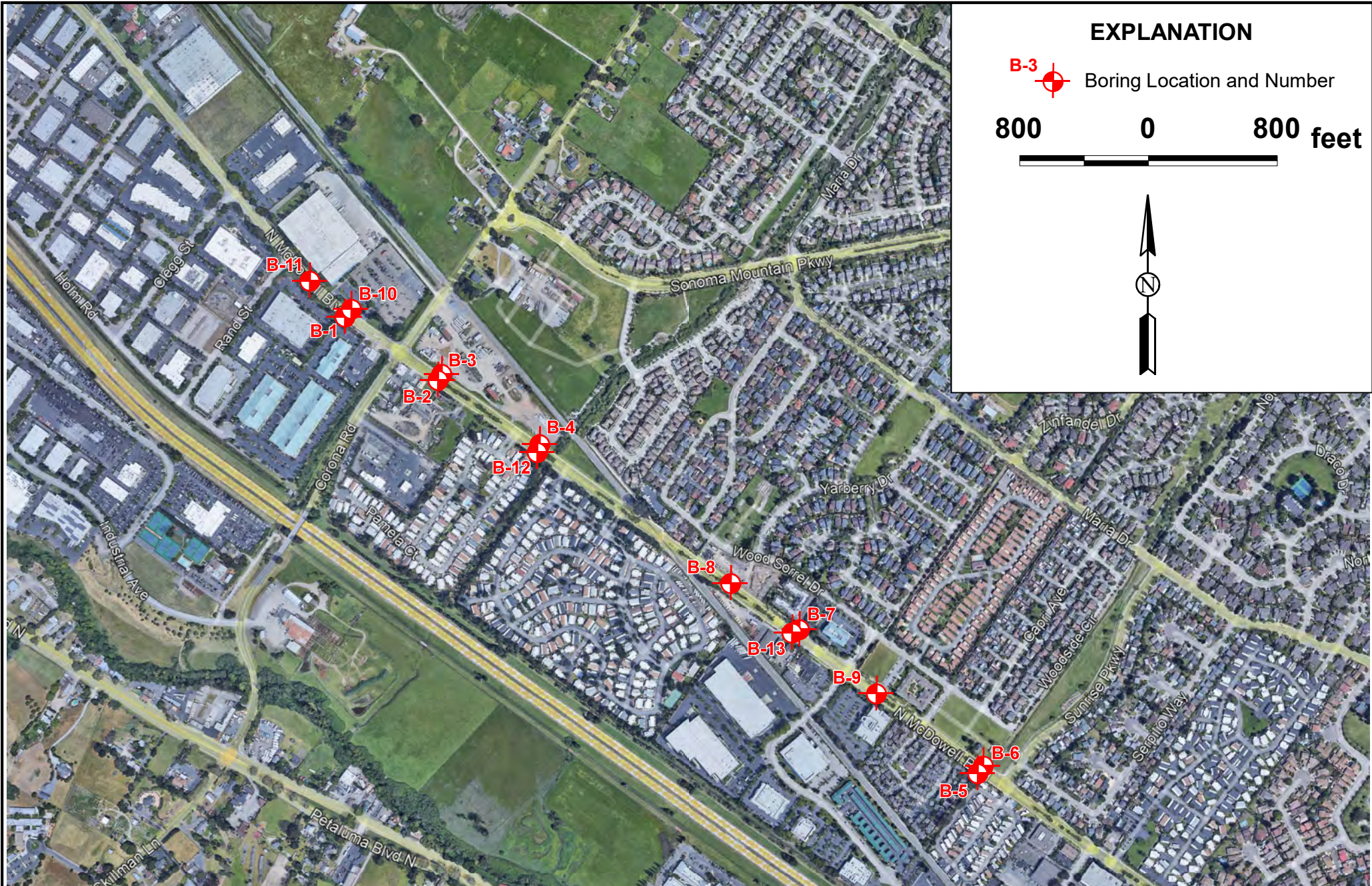
North McDowell Boulevard Complete Streets
North McDowell Boulevard
Petaluma, California

PLATE


1

Job No: 6498.13.PW.1

Date: APR 2022



EXPLANATION

B-3  Boring Location and Number

800 0 800 feet



Reference: Google Earth, March 2022

Scale: 1" = 800'

Google Earth

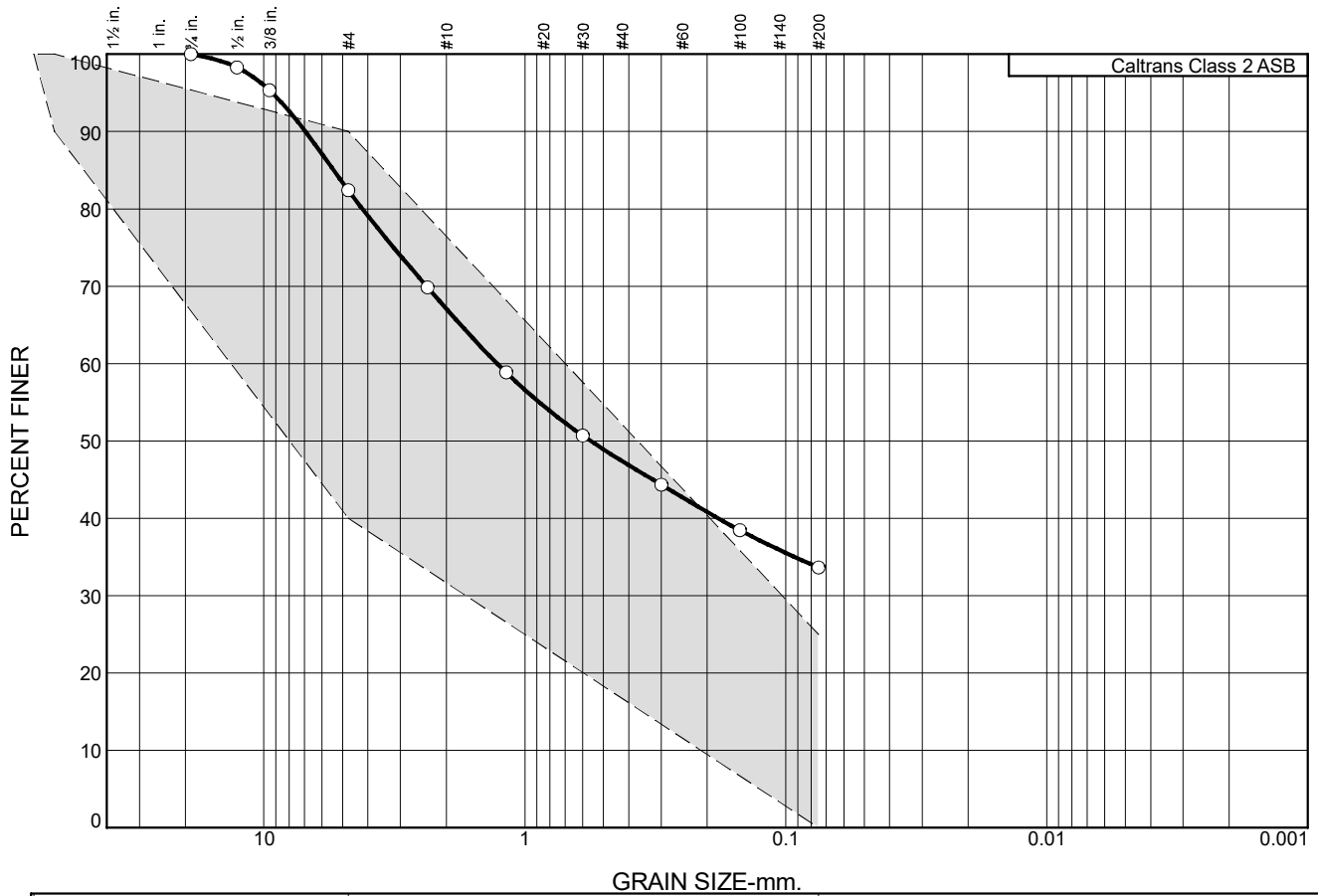
RGH
CONSULTANTS

EXPLORATION PLAN
North McDowell Blvd. Complete Streets
North McDowell Blvd.
Petaluma, California

PLATE
2

Job No: 6498.13.PW.1 | Date: APR 2022

Particle Size Distribution Report



	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	17.6	15.3	19.7	13.8	33.6	

SOIL DATA					
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	Subbase			Gray/Brown Clayey Sand W/ Gravel (SC)	SC
	Bucket #1				

	Project: North McDowell Blvd. Complete Streets Project	
	Project No.: 6498.13.PW.1	Figure

Tested By: SAM

Checked By: SEF

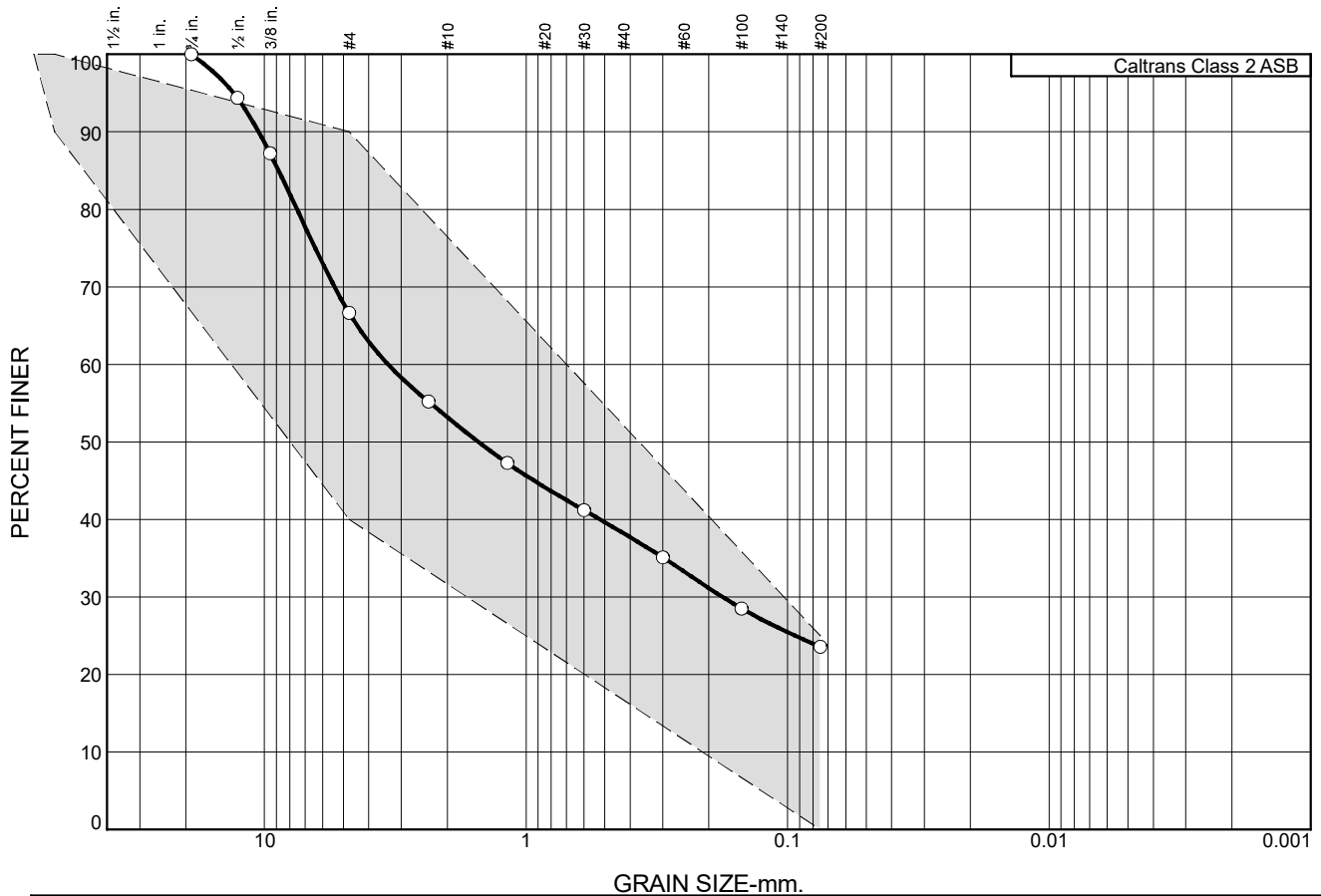


PARTICLE SIZE ANALYSIS
 North McDowell Boulevard Complete Streets
 North McDowell Boulevard
 Petaluma, California

PLATE

3

Particle Size Distribution Report



	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	33.3	13.5	14.9	14.7	23.6	

SOIL DATA					
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	Subbase			Gray Clayey Sand W/ Gravel (SC)	SC
	Bucket #2				

	Project: North McDowell Blvd. Complete Streets Project	
	Project No.: 6498.13.PW.1	Figure

Tested By: SAM

Checked By: SEF

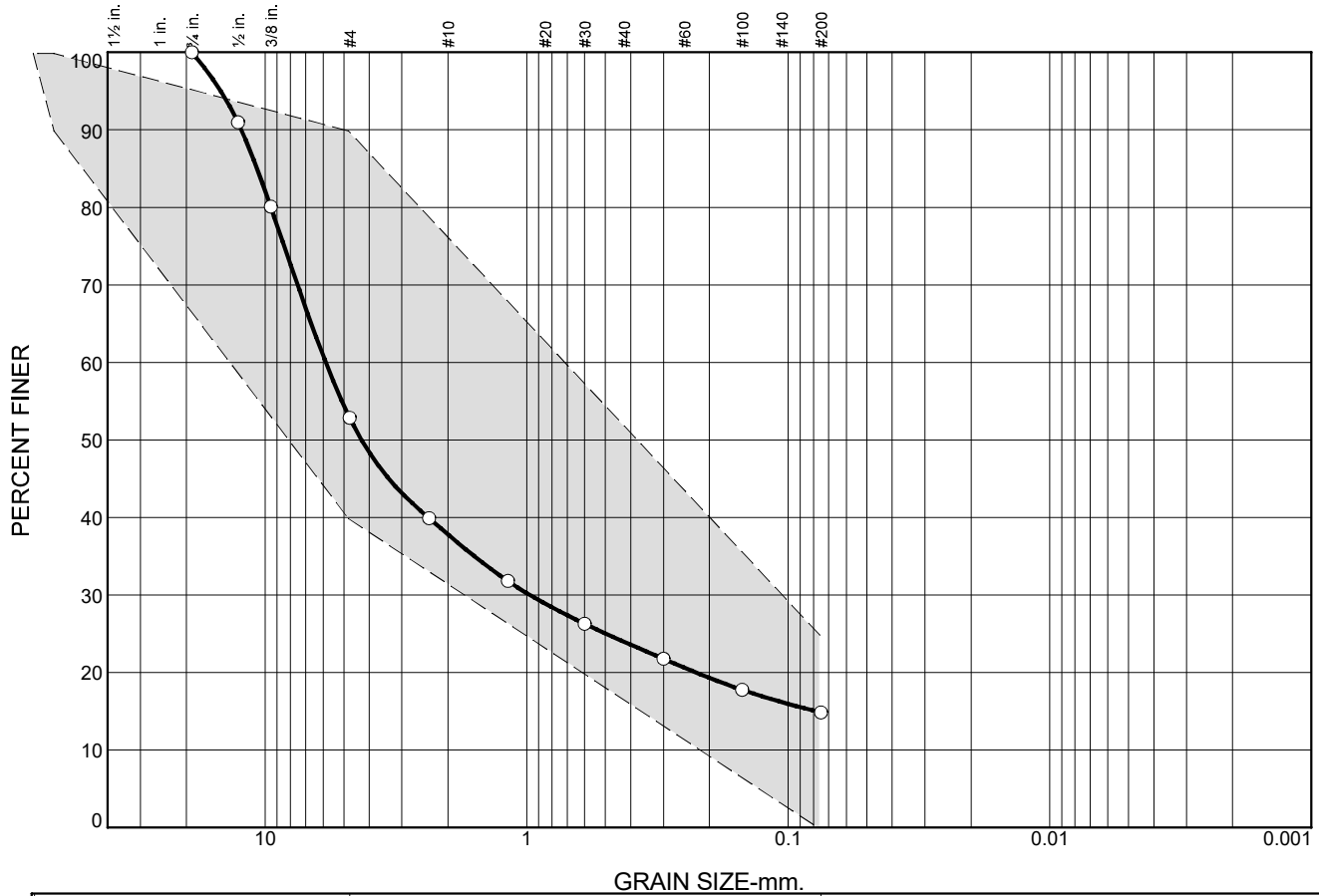


PARTICLE SIZE ANALYSIS
 North McDowell Boulevard Complete Streets
 North McDowell Boulevard
 Petaluma, California

PLATE

4

Particle Size Distribution Report



	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	47.1	15.1	13.8	9.2	14.8	

SOIL DATA					
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	Subbase			Gray/Brown Clayey Gravel W/ Sand (GC)	GC
	Bucket #3				

	Project: North McDowell Blvd. Complete Streets Project	
	Project No.: 6498.13.PW.1	Figure

Tested By: SAM

Checked By: SEF

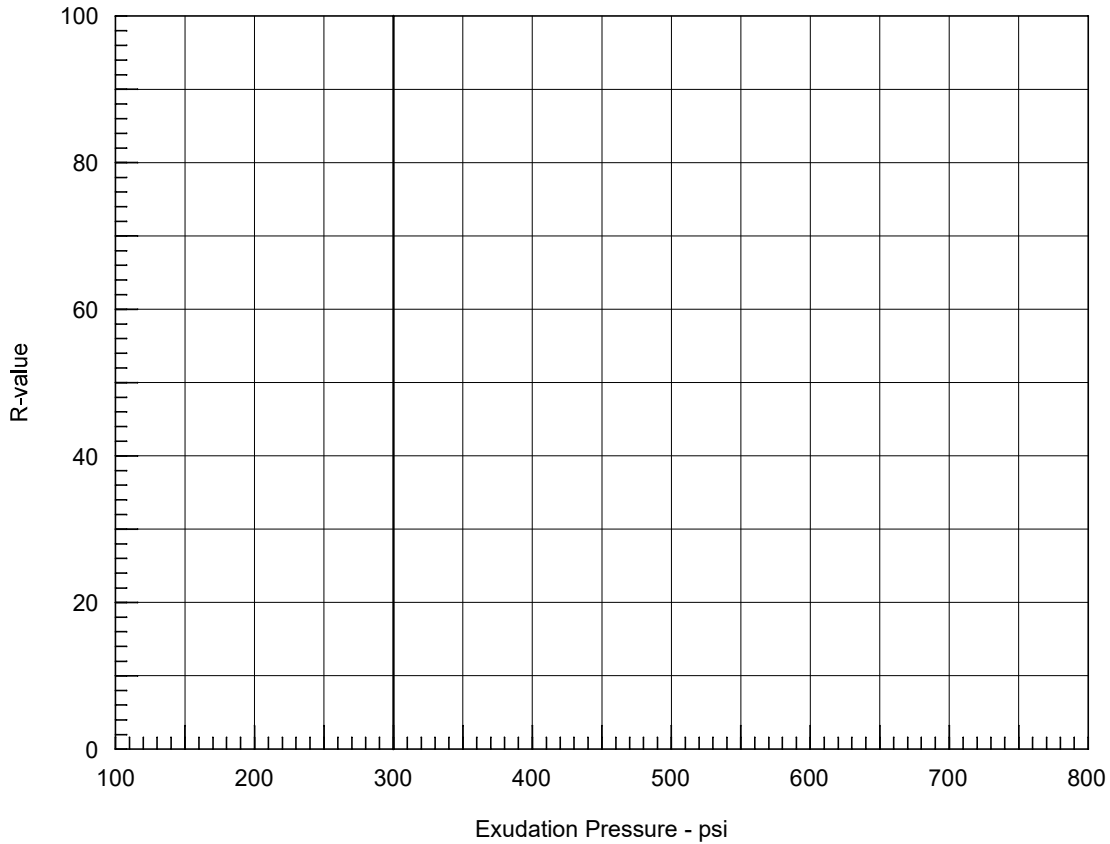


PARTICLE SIZE ANALYSIS
 North McDowell Boulevard Complete Streets
 North McDowell Boulevard
 Petaluma, California

PLATE

5

R-VALUE TEST REPORT

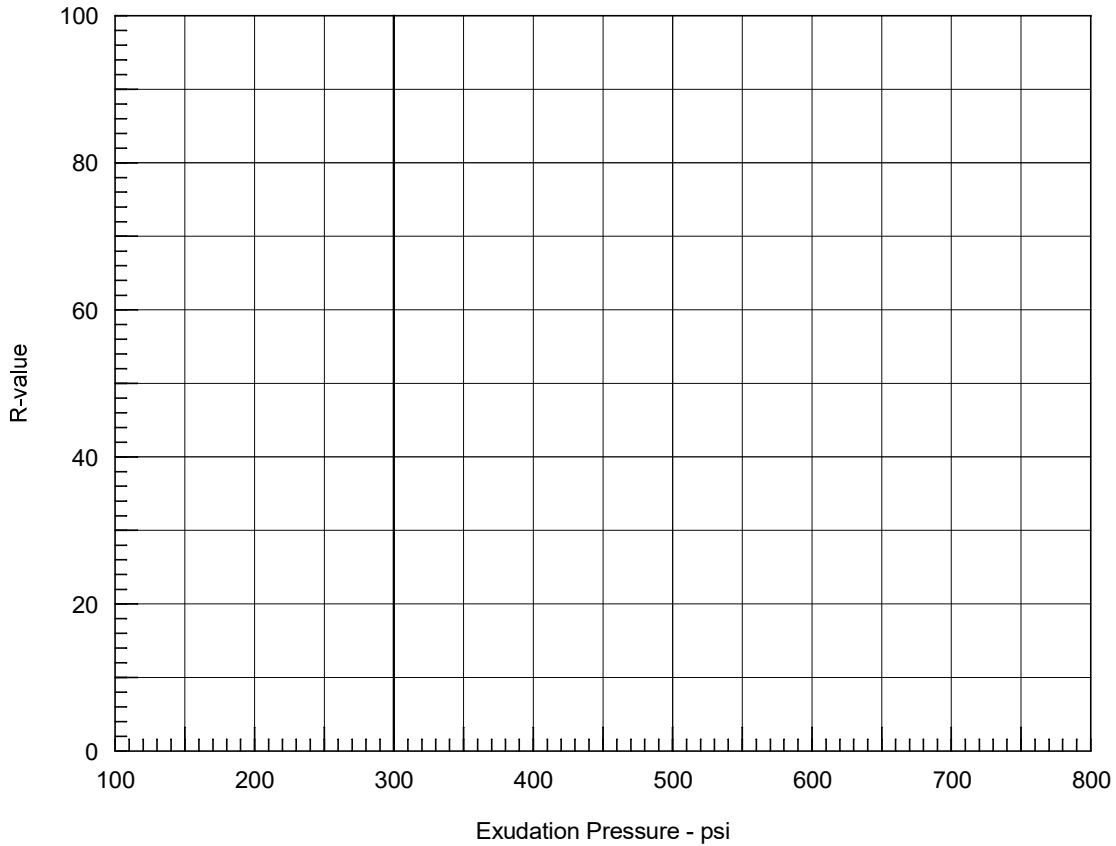


Resistance R-Value and Expansion Pressure - ASTM D2844

No.	Compact. Pressure psi	Density pcf	Moist. %	Expansion Pressure psi	Horizontal Press. psi @ 160 psi	Sample Height in.	Exud. Pressure psi	R Value	R Value Corr.

Test Results	Material Description
<p>R-value at 300 psi exudation pressure = n/a</p>	<p>Dark Brown Clay (CH)</p>
<p>Project No.: 6498.13.PW.1 Project: North McDowell Blvd. Complete Streets Project Source of Sample: Bulk 022421 Date: 3/2/2021</p>	<p>Tested by: SAM Checked by: SEF Remarks: Sample ribboned under mold and failed to produce 5 lights. R-Value should be considered <5</p>
	<p>Figure _____</p>

R-VALUE TEST REPORT

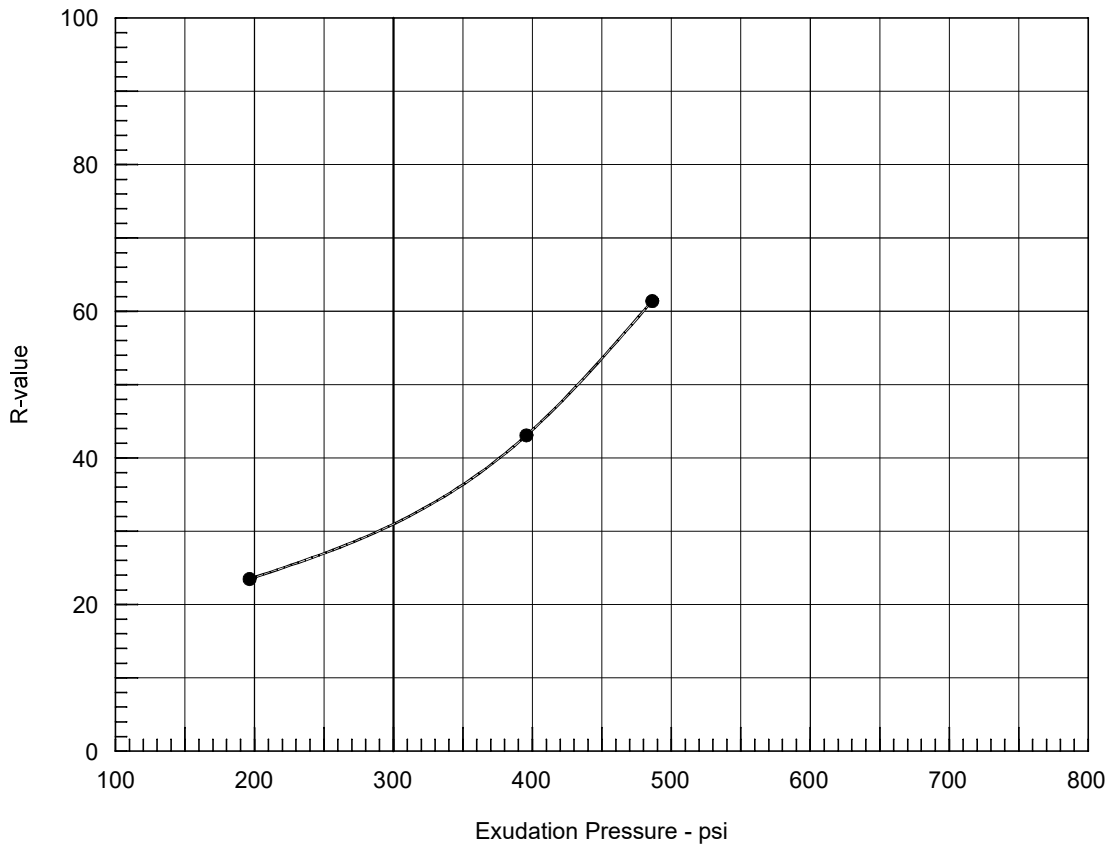


Resistance R-Value and Expansion Pressure - ASTM D2844

No.	Compact. Pressure psi	Density pcf	Moist. %	Expansion Pressure psi	Horizontal Press. psi @ 160 psi	Sample Height in.	Exud. Pressure psi	R Value	R Value Corr.

Test Results	Material Description
R-value at 300 psi exudation pressure = n/a	Dark Gray/Brown Clay (CH)
Project No.: 6498.13.PW.1 Project: North McDowell Blvd. Complete Streets Project Source of Sample: Adobe Bucket #1 & #2 Composite Date: 7/8/2021	Tested by: SAM Checked by: SEF Remarks: Sample ribboned under mold & failed to produce 5 lights. R-Value should be considered <5.
	Figure _____

R-VALUE TEST REPORT



Resistance R-Value and Expansion Pressure - ASTM D2844

No.	Compact. Pressure psi	Density pcf	Moist. %	Expansion Pressure psi	Horizontal Press. psi @ 160 psi	Sample Height in.	Exud. Pressure psi	R Value	R Value Corr.
1	50	124.8	11.6	0.00	108	2.56	196	23	23
2	125	129.6	10.0	0.00	77	2.50	396	43	43
3	200	131.1	9.3	0.00	47	2.45	486	61	61

Test Results	Material Description
R-value at 300 psi exudation pressure = 31	Gray Clayey Sand W/ Gravel (SC)
Project No.: 6498.13.PW.1 Project: North McDowell Blvd. Complete Streets Project Source of Sample: Subbase Bucket #2 Date: 7/8/2021	Tested by: SAM Checked by: SEF Remarks: Onsite Native
	Figure _____



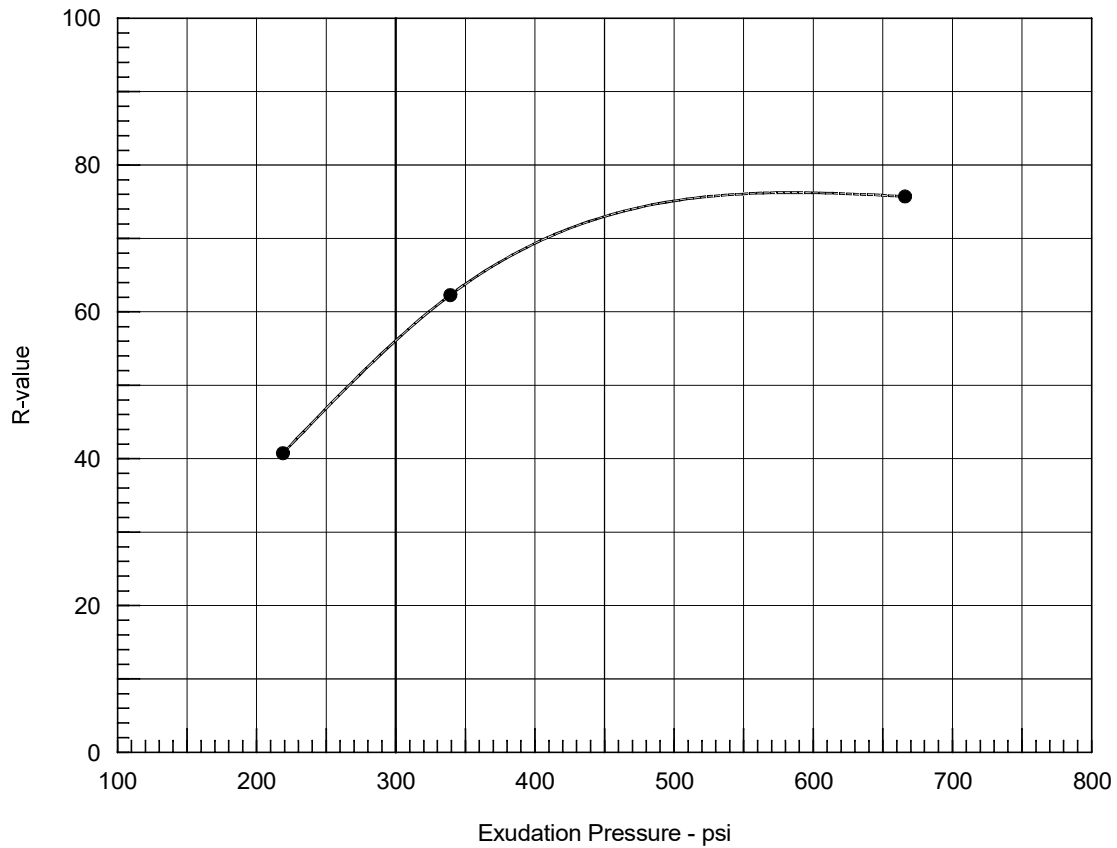
RESISTANCE (R) VALUE DATA

North McDowell Boulevard Complete Streets
 North McDowell Boulevard
 Petaluma, California

PLATE

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R-VALUE TEST REPORT



Resistance R-Value and Expansion Pressure - ASTM D2844

No.	Compact. Pressure psi	Density pcf	Moist. %	Expansion Pressure psi	Horizontal Press. psi @ 160 psi	Sample Height in.	Exud. Pressure psi	R Value	R Value Corr.
1	50	130.0	10.5	0.00	75	2.53	219	41	41
2	135	134.7	9.4	0.00	44	2.46	339	62	62
3	300	136.3	8.7	0.00	29	2.47	666	76	76

Test Results	Material Description
R-value at 300 psi exudation pressure = 56	Gray/Brown Clayey Gravel W/ Sand (GC)
Project No.: 6498.13.PW.1 Project: North McDowell Blvd. Complete Streets Project Source of Sample: Subbase Bucket #3 Date: 7/8/2021	Tested by: SAM Checked by: SEF Remarks: Onsite Native
Figure _____	



RESISTANCE (R) VALUE DATA
 North McDowell Boulevard Complete Streets
 North McDowell Boulevard
 Petaluma, California

PLATE

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APPENDIX B - DISTRIBUTION

BKF Engineers (e)
Attention: Becky Dower
200 Fourth Street, Suite 300
Santa Rosa, CA 95401
bdower@bkf.com

EGC:JJP:lfc:brw

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[https://rghgeo.sharepoint.com/sites/shared/shared documents/project files/6251-6500/6498/6498.13.pw.1 north mcdowell blvd. complete streets project/phase 01 - geotechnical design services/6498.13.pw.1 gs report - copy.docx](https://rghgeo.sharepoint.com/sites/shared/shared%20documents/project%20files/6251-6500/6498/6498.13.pw.1%20north%20mcdowell%20blvd.%20complete%20streets%20project/phase%2001%20-%20geotechnical%20design%20services/6498.13.pw.1%20gs%20report%20-%20copy.docx)

Important Information About Your Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes

The following information is provided to help you manage your risks.

Geotechnical 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 civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one - not even you* - should apply the report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- 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,

- elevation, configuration, location, orientation, or weight of the proposed structure,
- 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. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ-sometimes significantly from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final*, because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual

subsurface conditions revealed during construction. The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led

to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of 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 equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the express purpose of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

Rely on Your ASFE-Member Geotechnical Engineer For Additional Assistance

Membership in ASFE/The Best People on Earth exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with your ASFE-member geotechnical engineer for more information.



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