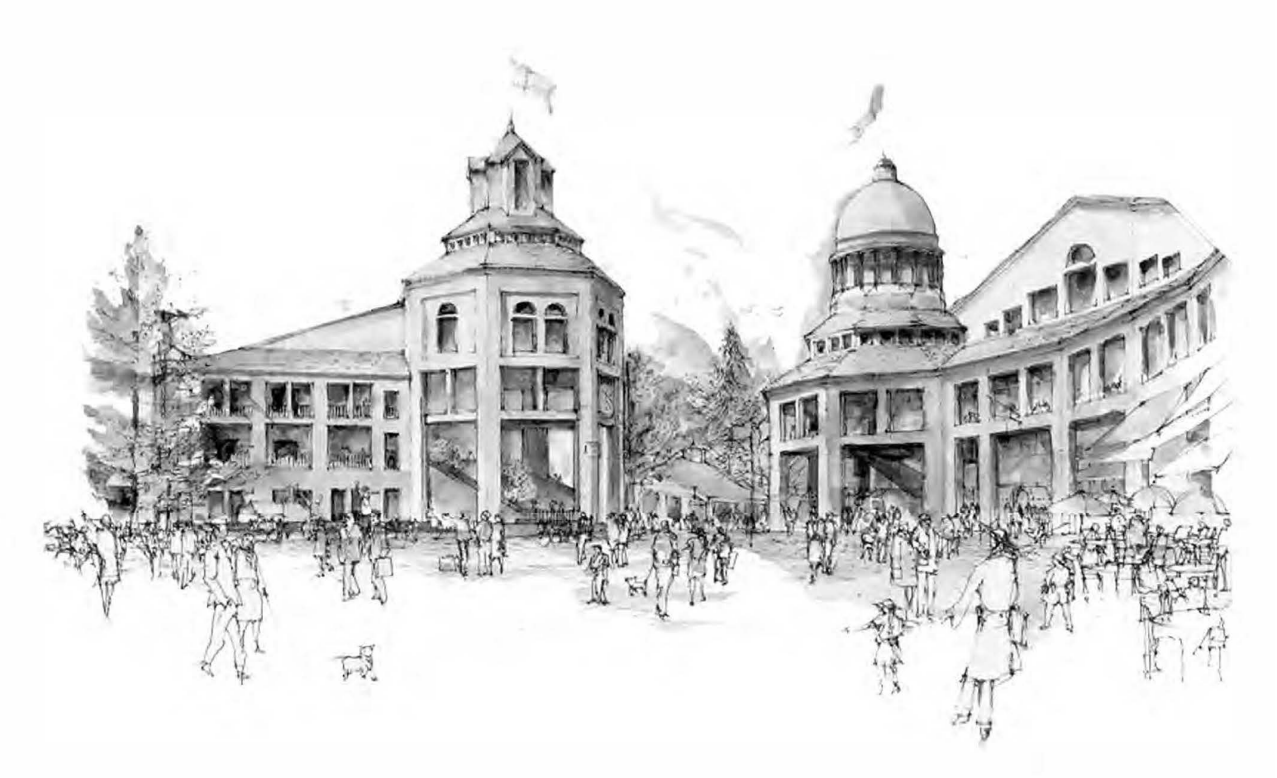
City of Mountain View

CITY OF MOUNTAIN VIEW

STANDARD PROVISIONS AND STANDARD DETAILS



PUBLIC WORKS DEPARTMENT

REVISED AUGUST 2026

CHANGELOG

Effective Date	Affected Section	Summary of Changes
March 2005	All	Various revisions
July 2019	Standard Provisions	Various revisions
July 2019	Standard Details Sections A, B, C, D, E, RW	Various Standard Details added or revised between 2005 and 2019
April 2024	Standard Provisions	Updated City logo and document style
August 2024	Standard Details Table of Contents	Added Micro-Trenching Details, A-26A and A-26B
August 2024	Standard Details Section A	Added Micro-Trenching Details, A-26A and A-26B
February 2026	Standard Details Table of Contents	Revised title for Detail RW-6
February 2026	Standard Details Section RW	Revised Details RW-6, RW-8, RW-9, RW-10, and RW-12
August 2026	Standard Details Table of Contents	Added Storm Drain Lateral Pipe Collar Connection, Detail B-2A, and Fire Hydrant Sheet 2 of 2, Detail D-7.1. Revised titles for Details B-5, C-2, D-3A, D-7, D-12, D-13, RW-3.
August 2026	Standard Details Sections B, C, D, RW	Added Details B-2A and D-7.1 Revised Details B-1, B-2, B-3, B-5, B-9, B-11, C-1, C-2, C-4, C-5, C-7, C-8, C-9, D-1, D-2, D-3, D-3A, D-3B, D-5, D-5B, D-5C, D-7, D-8, D-9, D-12, D-13, RW-1, RW-2, RW-3, RW-4, and RW-5

STANDARD PROVISIONS

TABLE OF CONTENTS

Section	Description		Page
1	**DEFINITIONS AND TERMS**		
	1-01	DEFINITIONS	1
	1-02	ABBREVIATIONS	5
2	**PROPOSAL REQUIREMENTS AND CONDITIONS**		
	2-01	CONTENTS OF PROPOSAL FORMS	6
	2-02	APPROXIMATE ESTIMATE	6
	2-03	EXAMINATION OF PLANS, SPECIFICATIONS, SPECIAL PROVISIONS, AND SITE OF THE WORK	6
	2-04	PROPOSAL FORMS	6
	2-05	REJECTION OF PROPOSALS CONTAINING ALTERATIONS, ERASURES, OR IRREGULARITIES	6
	2-06	PROPOSAL GUARANTY	7
	2-07	WITHDRAWAL OF PROPOSALS	7
	2-08	OPENING OF PROPOSALS	7
	2-09	DISQUALIFICATION OF BIDDERS	7
	2-10	COMPETENCY OF BIDDERS	7
3	**AWARD AND EXECUTION OF CONTRACT**		
	3-01	AWARD OF CONTRACT	8
	3-02	RETURN OF PROPOSAL GUARANTIES	8
	3-03	CONTRACT BONDS	8
	3-04	EXECUTION OF CONTRACT	8
	3-05	FAILURE TO EXECUTE CONTRACT	8
4	**SCOPE OF WORK**		
	4-01	WORK TO BE DONE	9
	4-02	ALTERATIONS	9
	4-03	EXTRA WORK	11
	4-04	MAINTENANCE OF DETOURS	11
	4-05	FINAL CLEANING UP	11
	4-06	MAINTENANCE AND GUARANTY	12

5 CONTROL OF WORK

5-01 AUTHORITY OF ENGINEER 13
5-02 PLANS AND WORKING DRAWINGS 13
5-03 TRENCH EXCAVATION SAFETY PLANS 13
5-04 CONFORMITY WITH CONTRACT DOCUMENTS AND ALLOWABLE DEVIATIONS 14
5-05 COORDINATION AND INTERPRETATION OF PLANS, SPECIFICATIONS, AND SPECIAL PROVISIONS 14
5-06 ORDER OF WORK 14
5-07 SUPERINTENDENCE 15
5-08 LINES AND GRADES 15
5-09 INSPECTION 15
5-10 DUST CONTROL 16
5-11 EXISTING UTILITIES 16
5-12 REMOVAL OF DEFECTIVE AND UNAUTHORIZED WORK 17
5-13 EQUIPMENT AND PLANT 18
5-14 FINAL INSPECTION 18
5-15 PROJECT SITE MAINTENANCE 18

6 CONTROL OF MATERIALS

6-01 SOURCE OF SUPPLY AND QUALITY OF MATERIALS 19
6-02 STORAGE OF MATERIALS 19
6-03 DEFECTIVE MATERIALS 19
6-04 TRADE NAME AND ALTERNATIVES 19
6-05 SAMPLES AND TESTS 20

7 LEGAL RELATIONS AND RESPONSIBILITY

7-01 LAWS TO BE OBSERVED 22
7-02 PERMITS AND LICENSES 23
7-03 PATENTS 23
7-04 PUBLIC CONVENIENCE 23
7-05 PUBLIC SAFETY 24
7-06 PRESERVATION OF PROPERTY 25
7-07 RESPONSIBILITY FOR DAMAGE 25
7-08 DISPOSAL OF MATERIALS 26
7-09 COOPERATION BETWEEN CONTRACTORS 27
7-10 CONTRACTOR'S RESPONSIBILITY FOR WORK 27
7-11 PROPERTY RIGHTS IN MATERIALS 27
7-12 NO PERSONAL LIABILITY 27

8 PROSECUTION AND PROGRESS

8-01 SUBCONTRACTING....28
8-02 ASSIGNMENT....28
8-03 PROGRESS OF THE WORK....29
8-04 CHARACTER OF WORKERS....29
8-05 TEMPORARY SUSPENSION OF WORK....29
8-06 TIME OF COMPLETION AND LIQUIDATED DAMAGES....30
8-07 TERMINATION OF CONTRACT....31
8-08 PROGRESS SCHEDULE....32

9 MEASUREMENT AND PAYMENT

9-01 MEASUREMENT OF QUANTITIES....33
9-02 SCOPE OF PAYMENT....33
9-03 PAYMENT AND COMPENSATION FOR ALTERED QUANTITIES....33
9-04 FORCE ACCOUNT WORK....33
9-05 DEDUCTIONS FROM PAYMENTS....34
9-06 PARTIAL PAYMENTS....34
9-07 NOTICE OF POTENTIAL CLAIMS....34
9-08 CLAIMS....35
9-09 FINAL PAYMENT....37

10 GENERAL REQUIREMENTS AND INFORMATION

10-01 NOTIFICATIONS....39
10-02 RIGHTS-OF-WAY....39
10-03 COORDINATION WITH OTHER AGENCIES....39

11 CLEARING AND GRUBBING

11-01 SCOPE....40
11-02 MEASUREMENT....40
11-03 PAYMENT....40

12 ROADWAY EXCAVATION AND GRADING

12-01 SCOPE....41
12-02 MEASUREMENT....41
12-03 PAYMENT....41

13 SURPLUS MATERIAL

13-01 SCOPE....42

13-02 MEASUREMENT 42
13-03 PAYMENT 42

14 SUBGRADE PREPARATION

14-01 SCOPE 43
14-02 MEASUREMENT AND PAYMENT 43

15 AGGREGATE SUBBASE

15-01 SCOPE 44
15-02 MATERIALS 44
15-03 CONSTRUCTION 44
15-04 MEASUREMENT 44
15-05 PAYMENT 44

16 AGGREGATE BASE

16-01 SCOPE 45
16-02 MATERIALS 45
16-03 CONSTRUCTION 45
16-04 MEASUREMENT 45
16-05 PAYMENT 45

17 ASPHALT CONCRETE PAVEMENT

17-01 SCOPE 46
17-02 MATERIAL AND CONSTRUCTION 46
17-03 MEASUREMENT 47
17-04 PAYMENT 47

18 BITUMINOUS SEALS

18-01 GENERAL 48
18-02 SLURRY SEAL 48
18-03 SEAL COATS 49
18-04 MEASUREMENT 50
18-05 PAYMENT 50

19 FOG SEAL

19-01 SCOPE 51
19-02 MATERIALS AND CONSTRUCTION 51
19-03 MEASUREMENT 51

19-04 PAYMENT 51

20 HEATING AND REMIXING OF EXISTING ASPHALT PAVEMENT

20-01 SCOPE 52
20-02 ASPHALT HEATER SCARIFYING EQUIPMENT 52
20-03 PREPARATION OF PAVEMENT 52
20-04 CONSTRUCTION 53
20-05 MEASUREMENT 54
20-06 PAYMENT 54

21 ASPHALT REJUVENATING AGENT FOR HEATER REMIX OPERATIONS

21-01 MATERIALS AND CONSTRUCTION 55
21-02 MEASUREMENT 56
21-03 PAYMENT 56

22 CONCRETE CURB, GUTTER, SIDEWALK, DRIVEWAY, VALLEY GUTTER, AND ISLAND CAP

22-01 SCOPE 57
22-02 MATERIALS 57
22-03 SUBGRADE PREPARATION 58
22-04 EXISTING CONSTRUCTION 58
22-05 FORMS 58
22-06 PLACING CONCRETE 59
22-07 EXPANSION JOINTS, CONTROL JOINTS, AND SCORE MARKS 59
22-08 CURING 60
22-09 CONSTRUCTION 60
22-10 MEASUREMENT 62
22-11 PAYMENT 62

23 DRIVEWAY, WALK AND ROADWAY CONFORMS

23-01 ASPHALT CONCRETE CONFORMS 63
23-02 CONCRETE DRIVEWAY AND WALK CONFORMS 64
23-03 CONFORMS TO GRAVEL DRIVEWAYS 64

24 TRENCH EXCAVATION, BACKFILL, AND RESURFACING

24-01 SCOPE 65
24-02 MATERIALS 65
24-03 TRENCH EXCAVATION 66
24-04 TRENCH BACKFILL 69

24-05 TRENCH SURFACING 71
24-06 UTILITY EASEMENTS 72
24-07 MEASUREMENT AND PAYMENT 73

25 BARRICADES, GUARDRAILS, AND HEADERBOARDS

25-01 BARRICADES 74
25-02 GUARDRAILS 74
25-03 HEADERBOARDS 74

26 MONUMENTS

26-01 MONUMENTS 75
26-02 MEASUREMENT 75
26-03 PAYMENT 75

27 ADJUSTING MANHOLE AND VALVE COVERS AND OTHER SURFACE FACILITIES

27-01 SCOPE 76
27-02 CONSTRUCTION 76
27-03 UTILITY-OWNED FACILITIES 76
27-04 PAYMENT 76

28 FINISHING ROADWAY

28-01 SCOPE 77
28-02 PAYMENT 77

29 SIGN INSTALLATION

29-01 SCOPE 78
29-02 MEASUREMENT 78
29-03 PAYMENT 78

30 WATER FOR CONSTRUCTION

30-01 SCOPE 79
30-02 PAYMENT 79

31 STORM DRAIN INSTALLATION

31-01 SCOPE 80
31-02 MATERIALS 80
31-03 CONSTRUCTION METHODS 81

31-04 MEASUREMENT 83
31-05 PAYMENT 84

32 SANITARY SEWER INSTALLATION

32-01 SCOPE 85
32-02 MATERIALS 85
32-03 CONSTRUCTION METHODS 85
32-04 MEASUREMENT 88
32-05 PAYMENT 89

33 WATER MAIN INSTALLATION

33-01 SCOPE 90
33-02 MATERIALS 90
33-03 CONSTRUCTION METHODS 93
33-04 MEASUREMENT 99
33-05 PAYMENT 100

34 WATER SERVICE INSTALLATION

34-01 SCOPE 101
34-02 MATERIALS 101
34-03 INSTALLATION 106
34-04 MEASUREMENT 111
34-05 PAYMENT 112

35 LIGHTING AND ELECTRICAL SYSTEMS

35-01 SCOPE 113
35-02 MATERIALS AND CONSTRUCTION 113
35-03 MEASUREMENT 120
35-04 PAYMENT 121

36 STREET TREES

36-01 SCOPE 122
36-02 MATERIALS 122
36-03 CONSTRUCTION 123
36-04 MAINTENANCE 125
36-05 MEASUREMENT 125
36-06 PAYMENT 125

37 IRRIGATION

37-01 SCOPE 126
37-02 MATERIALS 126
37-03 CONSTRUCTION 128
37-04 MEASUREMENT 134
37-05 PAYMENT 134

38 CATHODIC PROTECTION

38-01 SCOPE 135
38-02 GENERAL 135
38-03 REFERENCE SPECIFICATIONS 135
38-04 SUBMITTALS 135
38-05 MATERIALS 135
38-06 INSTALLATION OF CATHODIC PROTECTION 138
38-07 BASIS OF PAYMENT 140

SECTION 1: DEFINITIONS AND TERMS

1-01 DEFINITIONS. Whenever in these Standard Provisions, or in any documents or instruments where these Standard Provisions govern, the following terms or pronouns in place of them are used, the intent and meaning shall be interpreted as follows:

a. Acceptance. The approval by a majority of the City Council of the entire contract that has been completed in all respects in accordance with the contract documents and any modifications thereof previously approved.

b. Award. The acceptance by a majority of the City Council of a proposal.

c. Bidder. Any individual, firm, partnership, corporation, or combination thereof, submitting a proposal for the work contemplated, acting directly or through a duly authorized representative.

d. Bidder's Bond. Form of proposal guaranty accompanying the proposal submitted by the bidder.

e. City. The City of Mountain View, State of California, as created by law.

f. City Council. Council of the City of Mountain View.

g. City Manager. Chief administrative officer of the City.

h. Contract. The written agreement for construction services between the City and the contractor covering the performance of the work and the furnishing of labor, materials, tools, and equipment in the completion of the work. The contract shall include the notice to bidders, instruction to bidders, provisions of the City of Mountain View affirmative action contract compliance program, workers' compensation certificate, the proposal, plans, these Standard Provisions, special provisions, standard specifications, contract bonds, certificates of insurance, insurance policies if required, and affirmative action compliance report; also any and all supplemental agreements amending or extending the work contemplated and that may be required to complete the work in a substantial and acceptable manner.

i. Contract Change Order. A written order to the contractor covering changes in the plans or quantities, or both, within the scope of the contract and establishing the basis of payment and time adjustments for the work affected by the changes.

j. Contract Documents. The contract documents shall be comprised of all items included in the contract and shall include, but not be limited to, the plans, special provisions, Standard Provisions, standard specifications, and all supplemental agreements.

k. Contract Time. The number of working days or calendar days allowed for completion of the contract. If a calendar date of completion is shown in the proposal in lieu of a number of working or calendar days, the contract shall be completed by that date.

l. Contractor. The person or persons, firm, partnership, corporation, or combination thereof, private or public, who has entered into a contract with the City, acting directly or through duly authorized representatives.

m. Department of Transportation. The Department of Transportation of the State of California, as created by law.

n. Easement. A burden or servitude upon land, whether or not attached to other land as an incident or appurtenance, that allows the holder of the burden or servitude to do acts upon the land.

o. Engineer. The City of Mountain View Public Works Director, acting either directly or through properly authorized agents, such agents acting within the scope of the particular duties entrusted to them.

p. Highway, Street, or Road. A general term denoting a public way for purposes of vehicular travel, including the entire area within the right-of-way.

q. Inspector. An authorized representative of the Engineer assigned to make necessary inspections of the work performed or being performed or of the materials furnished or to be furnished by the contractor.

r. Joint Venture. A combination of individuals, corporations, partnerships, or other joint ventures, each of which hold a current, active license in good standing.

s. Laboratory. The established laboratory of the City or other laboratories authorized by the City to test materials and work involved in the contract.

t. Legal Holidays. Those days designated as state holidays in the Government Code. (New Year's Day, Martin Luther King, Jr. Day, Lincoln's Birthday, the third Monday in February, Memorial Day, Independence Day, Labor Day, Veterans Day, Thanksgiving Day, and Christmas Day, as amended.)

u. Plans. The official project plans, standard details, profiles, typical cross-sections, general cross-sections, working drawings, and supplemental drawings, or reproductions thereof, approved by the Engineer, which show the location, character, dimensions, and detail of the work to be done and which are to be considered as a part of the contract supplementary to these Standard Provisions.

v. Proposal. The offer of the bidder for the work when made out and submitted on the prescribed proposal form, properly signed and guaranteed.

w. Proposal Form. The approved form on which the City requires formal bids to be prepared and submitted for the work.

x. Proposal Guaranty. The cash, cashier's check or certified check, or bidder's bond accompanying the proposal submitted by the bidder as a guaranty that the bidder will enter into a contract with the City for the construction or performance of the work if it is awarded to that bidder.

y. Public Works Director. The head of the Public Works Department, also sometimes referred to as the "Director," acting either directly or through properly authorized agents, such agents acting within the scope of the particular duties delegated to them, also referred to as the "Engineer."

z. Right-of-Way. The whole right-of-way or area that is reserved for and secured for use in constructing the improvement and its appurtenances.

aa. Roadbed. That area between the intersection of the upper surface of the roadway and the side slopes or curb lines. The roadbed raises in elevation as each increment or layer of subbase, base, surfacing, or pavement is placed. Where the medians are so wide as to include areas of undisturbed land, a divided roadway is considered as including two (2) separate roadbeds.

bb. Roadway. That portion of the right-of-way included between the outside lines of sidewalks or curbs and gutters or side ditches, including also the appertaining structures, and all slopes, ditches, channels, waterways, and other features necessary for proper drainage and protection.

cc. Special Provisions. The special provisions are specific clauses of the contract supplemental to these Standard Provisions and setting forth conditions and requirements peculiar to the project under consideration and covering work or materials involved in the proposal and estimate and supplementary to these Standard Provisions.

dd. Standard Details. City of Mountain View standard details. The standard details are incorporated into and part of these Standard Provisions.

ee. Standard Provisions. The directions, provisions, and requirements contained herein as supplemented by any special provisions and pertaining to the method and manner of performing the work or to the quantities and qualities of materials to be furnished under the contract.

ff. Standard Specifications. Whenever, the term "Standard Specifications" is used in these Standard Provisions, it shall mean the most recent revised edition of the Standard Specifications of the Department of Transportation of the State of California.

Whenever in the State of California Standard Specifications the following terms are used, they shall be understood to mean and refer to the following, insofar as they apply:

1. Department of Transportation. The Public Works Department of the City of Mountain View.

2. Director. The City Council or authorized representative of the City of Mountain View.

3. Engineer. The Public Works Director or authorized representative of the City of Mountain View.

4. Laboratory. The laboratory designated by the City to test materials and work involved in the contract.

5. City. The City of Mountain View.

gg. State. The State of California, acting through its authorized representatives.

hh. Subgrade. That portion of the roadbed, driveway, and sidewalk surfaces that has been prepared, as specified, and upon which a layer of specified roadbed materials or base or surfacing or pavement is to be placed.

ii. Superintendent. The executive representative of the contractor present on the work at all times during progress who shall be authorized to receive and fulfill instructions from the Engineer and who shall supervise and direct the construction.

jj. Supplemental Agreements. Supplemental agreements are written agreements executed by the contractor and by the City covering alterations, amendments, or extensions to the contract, as hereinafter provided.

kk. Traveled Way. That portion of the roadway for the movement of vehicles, exclusive of shoulders and auxiliary lanes.

ll. Work. All the work specified, indicated, shown, or contemplated in the contract to construct the improvement, including all alterations, amendments, or extensions thereto made by contract change order or other written orders of the Engineer.

1-02 ABBREVIATIONS.

a. AASHTO. American Association of State Highway and Transportation Officials.

b. ACI. American Concrete Institute.

c. AIA. American Institute of Architects.

d. AISC. American Institute of Steel Construction.

e. AISI. American Iron and Steel Institute.

f. ANSI. American National Standards Institute.

g. ASTM. American Society for Testing and Materials.

h. AWG. American Wire Gauge.

i. AWS. American Welding Society.

j. AWWA. American Water Works Association.

k. IEEE. Institute of Electrical and Electronic Engineers.

l. IES. Illuminating Engineers Society.

m. NEC. National Electrical Code.

n. NEMA. National Electrical Manufacturers Association.

o. PCA. Portland Cement Association.

p. OSHA. Occupational Safety and Health Act.

q. CAL/OSHA. California Occupational Safety and Health Act.

r. Test Method No. California ( ). California Department of Transportation Test Method No. ( ).

s. UL. Underwriters' Laboratories, Inc.

SECTION 2: PROPOSAL REQUIREMENTS AND CONDITIONS

2-01 CONTENTS OF PROPOSAL FORMS. Prospective Bidders will be furnished with proposal forms that will state the location and description of the contemplated construction and will show the approximate estimate of the various quantities and kinds of Work to be performed or materials to be furnished, with a schedule of items for which unit bid prices or lump sum bid prices are asked.

2-02 APPROXIMATE ESTIMATE. The quantities given are approximate only, being given as a basis for the comparison of bids, and the City does not, expressly or by implication, agree that the actual amount of Work will correspond therewith, but reserves the right to increase or decrease the amount of any class or portion of the Work, or to omit portions of the Work, as may be deemed necessary or advisable by the Engineer.

2-03 EXAMINATION OF PLANS, SPECIFICATIONS, SPECIAL PROVISIONS AND SITE OF THE WORK.

a. The Bidder shall carefully examine the site of the Work contemplated and the Proposal, Plans, Special Provisions, as-built drawings where available, and contract forms therefor. It will be assumed that the Bidder has investigated and is satisfied as to the conditions to be encountered, as the character, quality, and quantities of Work to be performed and materials to be furnished, and as to the requirements of these Standard Provisions, the Special Provisions, Standard Specifications, and the Contract.

b. Bidders must satisfy themselves through their own investigation as to conditions to be encountered. By submitting a Proposal, the Bidder has certified that they have examined all items indicated in Paragraph a., Section 2-03, "Examination of Plans, Specifications, Special Provisions, and Site of the Work."

2-04 PROPOSAL FORMS. The Bidder shall submit a Bidder's Proposal on the forms furnished to Bidder. Proposals submitted on forms other than the ones issued to the Bidder will be disregarded. All proposals shall give the prices proposed and shall be signed by the Bidder. The Bidder shall fill out all blanks in the Proposal Form as therein required. Where a discrepancy exists between the prices written in words and the prices written in figures, the written words shall prevail. If there is a discrepancy between the unit prices and the totals, the unit prices shall prevail. Proposals without the unit prices written in words may be rejected.

2-05 REJECTION OF PROPOSALS CONTAINING ALTERATIONS, ERASURES, OR IRREGULARITIES. Proposals may be rejected if they show any alterations of forms, additions not called for, conditional bids, incomplete bids, erasures, or irregularities of any kind.

When Proposals are signed by an agent other than an officer or manager of a corporation or a member of a partnership, a power of attorney must be on file with the City prior to opening bids or shall be submitted with the Proposal; otherwise, the Proposal will be rejected as irregular and unauthorized.

2-06 PROPOSAL GUARANTY. All bids shall be presented under sealed cover and shall be accompanied by cash, cashier's or certified check, or by a Bidder's Bond made payable to the City of Mountain View and executed as surety by some corporation authorized to issue surety bonds in the State of California for an amount equal to at least ten percent (10%) of the amount of said bid, and no bid shall be considered unless such cash, cashier's or certified check, or Bidder's Bond is enclosed therewith. A Bidder's Bond will not be accepted unless it conforms to the bond form included in the "Contract Documents and Specifications" for the project and is properly filled out and executed. Blanks conforming to the above-mentioned form can be obtained by request from the Engineer. If desired, the bond form included in the "Contract Documents and Specifications" for the project, properly filled out as directed, may be executed and used as the Bidder's Bond.

2-07 WITHDRAWAL OF PROPOSALS. Any bid may be withdrawn at any time prior to, and not after, the hour fixed in the public notice for the opening of bids, provided that a request in writing, executed by the Bidder or Bidder's duly authorized representative, for the withdrawal of such bid is filed with the City Clerk or the Engineer. The withdrawal of a bid shall not prejudice the right of a Bidder to file a new bid.

2-08 OPENING OF PROPOSALS. Proposals will be opened and read at the time and place indicated in the Notice to Bidders.

2-09 DISQUALIFICATION OF BIDDERS. More than one proposal from an individual, firm, partnership, corporation, or combination thereof under the same or different names will not be considered. Reasonable ground for believing that any Bidder is interested in more than one Proposal for the Work contemplated will cause the rejection of all Proposals in which such Bidder is interested. If there is reason for believing that collusion exists among the Bidders, any or all Proposals may be rejected. Proposals in which the prices obviously are unbalanced may be rejected.

The City may reject or decline to award a construction contract to any bidder which has previously been disqualified, removed, or otherwise prevented from bidding on or completing a federal, state, or local government project because of a violation of law or a safety regulation.

2-10 COMPETENCY OF BIDDERS. No bid will be accepted from or a contract awarded to a Contractor who is not licensed in accordance with the law under the provisions of the "Contractor's License Law," Chapter 9 of Division 3 of the Business and Professions Code.

SECTION 3: AWARD AND EXECUTION OF CONTRACT

3-01 AWARD OF CONTRACT. The right is reserved to reject any and all Proposals.

The Contract, if awarded, will be to the lowest responsible Bidder whose Proposal complies with all the requirements prescribed and who complies with requirements of timely execution and return of Contract together with contract bonds. The award, if made, will be within sixty (60) days after the opening of the Proposals unless otherwise noted in the Proposal Form or Special Provisions.

All bids will be compared on the basis of the Engineer's approximate estimate of the quantities of work to be done as set forth in the Proposal Form.

3-02 RETURN OF PROPOSAL GUARANTIES. After the award of the Contract, the City will return the Proposal Guaranties accompanying those Proposals that are not to be considered further in making the award. All other Proposal Guaranties will be held until the Contract has been fully executed, after which they will be returned to the respective Bidders whose Proposals they accompany.

3-03 CONTRACT BONDS. The successful Bidder shall furnish the two (2) bonds required by the State Contract Act on the forms provided by the City in the Contract Documents. All alterations, extension of time, extra and additional work, and other changes authorized by these Standard Provisions or any part of the Contract may be made without securing the consent of the surety or sureties on the contract bonds.

3-04 EXECUTION OF CONTRACT. The Contract shall be signed by the successful Bidder and returned together with the contract bonds and insurance within fifteen (15) calendar days after the Bidder has received notice that the Contract has been awarded.

3-05 FAILURE TO EXECUTE CONTRACT. Failure to execute a Contract and file acceptable bonds as provided herewith within fifteen (15) calendar days after the Bidder has received notice that the Contract has been awarded shall be just cause for the annulment of the award and forfeiture of the Proposal Guaranty. If the successful Bidder refuses or fails to execute the Contract, the City may award the Contract to the second lowest responsible Bidder. If the second lowest responsible Bidder refuses or fails to execute the Contract, the City may award the Contract to the third lowest responsible Bidder and so on. This procedure may continue until a responsible Bidder properly and timely executes and returns the Contract together with the contract bonds or until the City rejects further Bidders. On the failure or refusal of any responsible Bidder, to whom any such Contract is so awarded, to execute the same, such Bidders' Guaranties shall be likewise forfeited to the City.

SECTION 4: SCOPE OF WORK

4-01 WORK TO BE DONE. The Work to be done consists of furnishing all labor, methods or processes, services, implements, tools, machinery, and materials, except as otherwise specified, which are required to construct all the Work specified in the Proposal, Contract, and Special Provisions or indicated on the Plans as the contemplated improvement covered by the Contract and to leave the grounds in a neat condition.

Where the Contract Documents describe portions of the Work in general terms, but not in complete detail, it is understood that the best general practice is to prevail and that only materials and workmanship of the first quality are to be used.

4-02 ALTERATIONS. The City reserves the right to increase or decrease the quantity of any item or portion of the Work or omit portions of the Work as may be deemed necessary or advisable by the Engineer; also, to make such alterations or deviations, additions to, or omissions from the Plans and Special Provisions as may be determined during the progress of the Work to be necessary and advisable for the proper completion thereof. Upon written order of the Engineer, the Contractor shall proceed with the Work as increased, decreased, or altered.

a. Alterations Not Involving Changes in the Character of the Work. In the event that the Contractor is ordered to make alterations involving an increase or decrease in the quantity of any item or portion of the Work or to omit portions of the Work, when such increases, decreases, or omissions do not materially change the character of the Work from that on which the Contractor's bid prices were based, no adjustment will be made for any increase or decrease in the cost of any given item unless the quantity of such item is increased or decreased more than twenty-five percent (25%) of the contract amount of such item. If an increase or decrease is made which, together with previous orders or agreed changes in quantity, increases or decreases the amount of any item more than twenty-five percent (25%) of the contract amount thereof, an adjustment of compensation will be made. Such adjustment will be based on the increased or decreased actual cost per unit of said item or items to the Contractor, or at the option of the City, such adjustment will be made on the basis of force account as per Paragraph 9-04, "Force Account Work," of these Standard Provisions.

The Engineer shall determine the amount of such adjustment and Engineer's decision shall be final and conclusive between the parties. Where the character of the Work is materially changed or made materially different, the following subdivision of this article shall govern, and this Subdivision "a" shall not apply.

b. Alterations Involving Changes in the Character of the Work. If the character of the Work is materially changed by reason of an order of the Engineer, from that on which the Contractor based Contractor's bid price, adjustment will be made as may be agreed upon between the Engineer and the Contractor, or in the event of failure to agree, the Contractor will

be paid on the basis of force account in accordance with the provisions of Paragraph 9-04, "Force Account Work," of these Standard Provisions.

c. Eliminated Items. Should any contract item of the Work be eliminated in its entirety, in the absence of an executed Contract Change Order covering such elimination, payment will be made to the Contractor for actual costs incurred in connection with such eliminated contract item if incurred prior to the date of notification in writing by the Engineer of such elimination.

If acceptable material is ordered by the Contractor for the eliminated item prior to the date of notification of such elimination by the Engineer, and if orders for such material cannot be canceled, it will be paid for at the actual cost to the Contractor. In such case, the material paid for shall become the property of the City, and the actual cost of any further handling will be paid for. If the material is returnable to the vendor and if the Engineer so directs, the material shall be returned, and the Contractor will be paid for the actual cost of charges made by the vendor for returning the material. The actual cost of handling the returned material will be paid for.

The actual costs or charges to be paid by the City to the Contractor as provided in this Section will be computed in the same manner as if the Work were to be paid for on a force account basis as provided in Paragraph 9-04, "Force Account Work," of these Standard Provisions.

d. Revocable Bid Items. Bid items noted as "revocable items" may be deleted entirely or in part from the Work at the option of the City. The provisions in Section 4-02(a), "Alterations Not Involving Changes in the Character of the Work," of the Standard Provisions shall not apply to such omission, and no compensation will be allowed the Contractor by reason of such omission.

When the Engineer and the Contractor fail to agree as to whether an alteration ordered by the Engineer constitutes a material change or difference in character of Work as herein contemplated or fail to agree on the compensation to be allowed for such altered work, the Contractor shall forthwith proceed with the altered work upon written order from the Engineer. Pending a settlement of the dispute, the Contractor shall file with the Engineer within ten (10) days after receiving such written notice to proceed a protest setting forth in detail in what particulars the character of the Work was changed and by what amount the unit cost was increased. The failure of the Engineer to recognize a change in the character of Work when ordering alterations shall in no way be construed as relieving the Contractor of Contractor's duty and responsibility for filing a protest as above provided. The Contractor shall receive no additional compensation for such altered work unless they file such a protest within ten (10) days after receiving notice from the Engineer to proceed and full settlement will be made on the basis of the contract unit prices.

4-03 EXTRA WORK. New and unforeseen items of work will be classified as extra work when they cannot be covered by any of the various items for which there is a bid price or by combinations of such items.

The Contractor shall do such extra work and furnish such materials and equipment therefor as may be required in writing by the Engineer, but the Contractor shall do no extra work except upon written order from the Engineer, and in the absence of such written order, the Contractor shall not be entitled to payment for such extra work. All bills for extra work shall be filed in writing with the Engineer. For such extra work, the Contractor shall receive compensation at the prices previously agreed upon in writing, or upon a failure to agree upon prices, the Contractor shall be paid on force account as provided in Paragraph 9-04, "Force Account Work," of these Standard Provisions.

All extra work shall be adjusted daily upon report sheets furnished to the Engineer by the Contractor and signed by both parties, which daily reports shall thereafter be considered the true record of extra work done.

4-04 MAINTENANCE OF DETOURS. The Contractor shall construct and maintain detours and detour bridges, including signing and traffic controls, for the use of public traffic as provided in these Standard Provisions or as shown on the Plans or as directed by the Engineer. Payment for such work will be included in other items of work, and no extra compensation will be allowed therefor. Such detour and detour bridges as may be required will be installed prior to commencing any operation that makes such a detour or detour bridge necessary.

When public traffic is routed through construction operations as provided in Paragraph 7-04, "Public Convenience," of these Standard Provisions, the providing of a reasonably smooth and even surface satisfactory for use of public traffic will not be considered as detour construction and maintenance, and no additional compensation for such work will be allowed. At all street crossings, existing driveways, water gate valves, and fire hydrants, the Contractor shall make provisions for trench crossings for free access either by means of backfill or temporary bridges as the Engineer may direct. Means shall also be provided whereby all storm and wastewater can flow uninterrupted in gutters or drainage channels. The Contractor shall keep the Emergency Communications Center (650-903-6395) informed daily regarding excavations, barricades and detours in roadway areas. Barricades with flashing lights shall be placed at excavations and as directed by the Engineer. Detours used exclusively by the Contractor for hauling materials and equipment will be constructed and maintained by the Contractor at the Contractor's expense.

The failure or refusal of the Contractor to construct and maintain detours at the proper time shall be sufficient cause for closing down the Work until such detours are in satisfactory condition for the use of public traffic.

4-05 FINAL CLEANING UP. Before final inspection, the Contractor shall clean the highway and all ground occupied by the Contractor in connection with the Work of all rubbish, excess

materials, false work, temporary structures, and equipment, and all parts of the Work shall be left in a neat and presentable condition. Full compensation for final cleaning up will be considered as included in the prices paid for the various contract items of work and no separate payment will be made therefor.

4-06 MAINTENANCE AND GUARANTY. The Contractor shall promptly repair, replace, restore, or rebuild, as the City may determine, any finished product in which defects of materials or workmanship may appear or to which damage may occur because of such defects during a one (1) year period subsequent to the date of final acceptance.

This article does not in any way limit the guaranty on any items for which a longer guaranty is specified or on any items which a manufacturer gives a guaranty for a longer period, nor does it limit the other remedies of the City in respect to a latent defect, fraud, or implied warranties. The Contractor shall furnish the City all appropriate guaranties or warranty certificates upon completion of the project.

SECTION 5: CONTROL OF WORK

5-01 AUTHORITY OF ENGINEER. The Engineer shall decide all questions which may arise as to the quality or acceptability of materials furnished and work performed and as to the manner or performance and rate of progress of the Work; all questions which may arise as to the interpretation of the Contract Documents; all questions as to the acceptable fulfillment of the Contract on the part of the Contractor; and all questions as to compensation. The Engineer's decision shall be final, and Engineer shall have authority to enforce and make effective such decisions and orders which the Contractor fails to carry out promptly.

5-02 PLANS AND WORKING DRAWINGS. The Plans furnished consist of general drawings and show such details as are necessary to give a comprehensive idea of the construction contemplated. All authorized alterations affecting the requirements and information given on the Plans shall be in writing.

The Plans shall be supplemented by such working drawings prepared by the Contractor as are necessary to control the Work adequately. No changes shall be made of any plan or drawing after the same has been approved by the Engineer except by the Engineer's direction.

Working drawings for any structure shall consist of such detailed plans as may be required for the prosecution of the Work and are not included in the Plans furnished by the Engineer. They shall include masonry layout diagrams and bending diagrams for reinforcing steel, which shall be approved by the Engineer before any work involving these plans is performed. Plans for form work will be required and shall be subject to approval unless approval is waived by the Engineer; these plans will be subject to approval insofar as the details affect the character of the finished work, but other details of design will be left to the Contractor, who shall be responsible for the successful construction of the Work.

It is expressly understood, however, that approval by the Engineer of the Contractor's working drawings does not relieve the Contractor of any responsibility for accuracy of dimensions and details or for mutual agreement of dimensions and details. It is mutually agreed that the Contractor shall be responsible for agreement and conformity of the Contractor's working drawings with the Contract Documents.

Full compensation for furnishing all working drawings shall be considered as included in the prices paid for the various contract items of work, and no additional allowance will be made therefor.

5-03 TRENCH EXCAVATION SAFETY PLANS. In advance of excavation of any trench more than five feet (5') in depth, the Contractor shall submit 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 a trench. If the plan varies from the shoring system standards established by the Construction Safety Orders, the plan shall be prepared and signed by a registered civil or structural engineer. No such plan shall allow shoring, sloping, or a protection system less effective than that required by the Construction Safety Orders of the State Division of Occupational Safety and Health.

No excavation shall be commenced until the Contractor has obtained a permit from the State Division of Occupational Safety and Health. Their office is at 455 Golden Gate Avenue, 10th Floor, San Francisco, California, 94102; telephone number: 415-703-5100. A copy of the permit shall be submitted to the Engineer.

5-04 CONFORMITY WITH CONTRACT DOCUMENTS AND ALLOWABLE DEVIATIONS. Work and materials shall conform to the lines, grades, cross-sections, dimensions, and material requirements, including tolerances, indicated in the Contract Documents. Although measurement, sampling, and testing may be considered evidence as to such conformity, the Engineer shall be the sole judge as to whether the work or materials deviate from the Contract Documents, and Engineer's decision as to any allowable deviations therefrom shall be final.

5-05 COORDINATION AND INTERPRETATION OF PLANS, SPECIFICATIONS, AND SPECIAL PROVISIONS. These Standard Provisions, the Plans, Special Provisions, Standard Specifications, and all supplementary documents are essential parts of the Contract, and a requirement occurring in one is binding as though occurring in all. They are intended to be cooperative; to describe and provide for a complete work. In the case of a conflict between one or more of these documents, the governing order of precedence among the documents shall be: (1) Special Provisions; (2) Plans; (3) these Standard Provisions and Standard Details; and (4) Standard Specifications.

Should it appear that the work to be done or any of the matters relative thereto are not sufficiently detailed or explained in the Contract Documents, the Contractor shall apply to the Engineer for such further explanations as may be necessary and shall conform to the same as part of the Contract so far as may be consistent with the original Contract Documents. In the event of any doubt or question arising respecting the true meaning of the Contract Documents, reference shall be made to the Engineer, whose decision thereon shall be final.

In the event of any discrepancy between any drawing and the figures written thereon, the figures shall be taken as correct. Detail drawings shall prevail over general drawings.

5-06 ORDER OF WORK. When required by the Contract Documents, the Contractor shall follow the sequence of operations as set forth therein. Full compensation for conforming to such requirements will be considered as included in the prices paid for the various contract items of work, and no additional compensation will be allowed therefor.

5-07 SUPERINTENDENCE. The Contractor shall designate in writing before starting work, an authorized representative who shall have the authority to represent and act for the Contractor.

When the Contractor is comprised of two 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 the Work at all times while work is actually in progress on the contract. When work is not in progress and during periods when work is suspended, arrangements acceptable to the Engineer shall be made for any emergency work which may be required.

Failure to maintain a superintendent on the site of the Work may be grounds for termination of Contract in accordance with Paragraph 8-07, "Termination of Contract," of these Standard Provisions.

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

5-08 LINES AND GRADES. Such stakes or marks will be set by the Engineer as they determine to be necessary to establish the lines and grades required for the completion of the work specified in the Contract Documents.

When the Contractor requires such stakes or marks, the Contractor shall notify the Engineer of the Contractor's requirements a reasonable length of time in advance of the Contractor's starting operations that require such stakes or marks.

Stakes and marks set by the Engineer shall be carefully preserved by the Contractor. In case such stakes and marks are destroyed or damaged by reason of the Contractor's operation, the cost of replacing or restoring them will be deducted from any moneys due or to become due the Contractor. Staking for City projects will be performed by the City or its authorized representative, unless specified otherwise in the Special Provisions.

5-09 INSPECTION. Inspection will be performed by the City.

The Work shall be done under the direct supervision and to the complete satisfaction of the Engineer and in accordance with the requirements of the City.

The Engineer shall at all times have safe access to the Work during its construction and shall be furnished with every reasonable facility for ascertaining that the stock and materials used and employed and the workmanship are in accordance with the requirements and intention

of the Contract Documents. All work done and all materials furnished shall be subject to the Engineer's inspection and approval. In the event the Contractor elects to work on a Saturday, Sunday, or legal holiday, the Contractor shall notify the Engineer in advance in order that inspection may be performed. The Contractor shall pay City's expense of providing such special inspection on a Saturday, Sunday, or legal holiday. Also, should the Contractor work more than eight (8) hours on any given work day, the Contractor shall be charged for the cost of overtime for City inspection. Normal working hours for City Inspectors are 7:30 a.m. to 4:00 p.m., Monday through Friday. The cost of overtime for City inspection will be charged to the Contractor if the Contractor works before 7:30 a.m., after 4:00 p.m., or on Saturday, Sunday, or legal holidays. The minimum charge for overtime worked on Saturdays, Sundays, or legal holidays will be for four (4) hours per inspector.

The Contractor shall notify the Engineer at least two (2) working days prior to commencing work so that inspection can be arranged. If the Contractor's work is suspended or no work has been prosecuted for three (3) days, at least two (2) days' notice shall be given to the Engineer prior to performing additional work.

The inspection of the Work shall not relieve the Contractor of any of Contractor's obligations to fulfill the Contractor's Contract as prescribed. Defective work shall be made good, and unsuitable materials may be rejected, notwithstanding that such defective work and materials have been previously overlooked by the Engineer and accepted or estimated for payment.

5-09.01 Differing Site Conditions. Differing site conditions shall comply with Section 5-1.116 of the Standard Specifications.

5-10 DUST CONTROL. Attention is directed to Section 30, "Water for Construction," of these Standard Provisions. At all times during construction and until final completion and acceptance of the Work, the Contractor shall prevent the formation of an airborne dust nuisance by oiling or watering, as required by the Engineer, to treat the site of the Work in such a manner that it will confine dust particles to the immediate surface of the Work. The Contractor shall perform such treatment within two (2) hours after notification by the Engineer that the airborne nuisance exists. If the Contractor fails to remove the nuisance within two (2) hours, the City may order that the treatment of the site be done by City personnel and equipment or by others. All expenses incurred in the performance of this treatment shall be charged to the Contractor. The cost shall be paid for by the Contractor separately or be deducted from the periodic payments to the Contractor as such costs are incurred by the City.

5-11 EXISTING UTILITIES.

5-11.01 Location of Existing Utilities. The locations of the existing major utilities are indicated on the Plans. Minor lines such as water, gas, and sewer services may not be indicated. It shall be the sole responsibility of the Contractor to determine the exact location and depth of all major utilities shown on the Plans and all minor lines, whether indicated or not.

If existing major utilities are not shown on the Plans or not found to be within reasonable proximity as shown on the Plans, the Contractor may be compensated for extra work involved in relocating the utility. The Engineer shall be judge as to whether or not compensation will be allowed.

5-11.02 Notification of Utility Companies. The Contractor shall notify AT&T, Pacific Gas and Electric Company, the California Water Service Company, TCI Cablevision of California, and/or any other operator of a utility at least two (2) working days prior to excavating near their facilities. The Contractor shall note that NOT all utility operators are represented by Underground Service Alert. See Section 10, "General Requirements and Information," for additional notification requirements.

5-11.03 Damage to Existing Utilities. The Contractor shall bear full responsibility for all damages and costs of repairs to existing utilities that are damaged as a result of the Contractor's carelessness, neglect, failure to notify the utility owners to locate their utilities prior to beginning construction work near the damaged utility, or failure to locate the utility as required in the Contract Documents. All expenses of whatever nature arising from the restoration of the said damaged utility to its original service shall be borne by the Contractor, and no additional compensation will be allowed.

5-11.04 Maintenance of Utilities. Unless otherwise indicated in the Contract Documents, the Contractor shall maintain all water, gas, and sewer lines; lighting, power, cable television, and telephone conduits; structures; house connection lines; and other surface or subsurface structures of any nature that may be affected by the Work. If the Contractor fails to maintain and protect such facilities, the City reserves the right if requested by the utility company to permit the utility company to move or maintain the utility at the Contractor's expense.

5-11.05 Rerouting or Disconnecting of Existing Utilities. Should it become necessary in the performance of the Work to disconnect or reroute any underground utility due to a direct conflict with the new work, disconnection or rerouting will be paid for as extra work in accordance with Paragraph 4-03, "Extra Work," of these Standard Provisions, unless otherwise specified in the Contract Documents. If the utility is non-City-owned, it will be disconnected or rerouted by the utility company involved.

5-12 REMOVAL OF DEFECTIVE AND UNAUTHORIZED WORK. All Work that has been rejected shall be remedied or removed and replaced by the Contractor in an acceptable manner, and no compensation will be allowed for such removal or replacement. Any Work done beyond the lines and grades shown on the Plans or established by the Engineer or any extra work done without written authority will be considered as unauthorized and will not be paid for. Work so done may be ordered removed at the Contractor's expense. Upon failure on the part of the Contractor to comply within two (2) working days of any order the Engineer made under the provisions of this article, the Engineer shall have authority to cause defective work to be

remedied or removed and replaced, unauthorized work to be removed, and to deduct the costs from any moneys due or to become due the Contractor.

5-13 EQUIPMENT AND PLANT. Equipment not suitable to produce the quality of work required will not be permitted to operate on the project.

Plants shall be designed and constructed in accordance with general practice for such equipment and shall be of sufficient capacity and of such character to ensure the production of sufficient material to carry the Work to completion within the time limit.

The Contractor shall provide adequate and suitable equipment and plants to meet the above requirements, and when ordered by the Engineer, shall remove unsuitable equipment from the Work and discontinue the operation of unsatisfactory plants.

All vehicles used to haul materials over existing highways shall be equipped with pneumatic tires. All vehicles operating on the construction site shall be equipped with backup-warning devices in accordance with state and federal safety standards (OSHA and Cal/OSHA).

5-14 FINAL INSPECTION. The Engineer will not make the final inspection until the Work provided and contemplated by the Contract has been completed and the final cleaning up performed.

5-15 PROJECT SITE MAINTENANCE. Throughout all phases of construction, including suspension of Work, the Contractor shall keep the street and work site clean and free from rubbish and debris. The Contractor shall remove materials and equipment from the site as soon as they are no longer necessary. Care shall be taken to prevent spillage on haul routes. Any such spillage shall be removed immediately and the area cleaned up. The work site shall be kept in a clean and neat appearance to the satisfaction of the Engineer. An unclean work site that causes an excessive and unreasonable nuisance to the public or is a hazard to the workers or public shall not be permitted.

When ordered by the Engineer, the Contractor shall clean up the work site within two (2) days after receiving notice. If the Contractor fails to clean up the work site within two (2) days after receiving notice, the City, at its own option, may clean up the site and charge the Contractor the full cost of the cleanup. The cost shall be paid for by the Contractor separately or be deducted from the periodic payments to the Contractor as such costs are incurred by the City. All cleanup costs shall be considered as paid for in other items of work, and no further compensation shall be allowed.

SECTION 6: CONTROL OF MATERIALS

6-01 SOURCE OF SUPPLY AND QUALITY OF MATERIALS. All materials shall be new and of a quality equal to that specified. At the option of the Engineer, the source of supply of each of the materials shall be approved by the Engineer before the delivery is started. Only materials conforming to the requirements of these Standard Provisions and approved by the Engineer shall be used in the Work.

The Contractor shall purchase and furnish mined construction material only from approved surface-mined operators identified on the state's AB 3098 list. The list is maintained by the State Department of Conservation Office of Mine Reclamation and can be viewed at their website at: www.conservation.ca.gov.

All materials proposed for use may be inspected or tested by the City at any time during their preparation and use. After trial, if it is found that sources of supply which have been approved do not furnish a uniform product, or if the product from any source proves unacceptable at any time, the Contractor shall furnish approved material from other approved sources. No material which, after approval, has in any way become unfit for use shall be used in the Work.

When sources of materials to be furnished by the Contractor are designated in the Special Provisions, the Contractor shall be satisfied as to the quality of acceptable material that may be produced at such locations. The City will not assume any responsibility as to the quality of acceptable material at the designated location.

6-02 STORAGE OF MATERIALS. Materials shall be stored as to ensure the preservation of their quality and fitness for the Work. They shall be placed under cover when directed. Stored materials shall be located as to facilitate prompt inspection.

6-03 DEFECTIVE MATERIALS. All materials not conforming to the requirements of the Contract Documents shall be considered as defective and all such materials, whether in place or not, shall be rejected. They shall be removed immediately from the site of the Work unless otherwise permitted by the Engineer. No rejected material, the defects of which have been subsequently corrected, shall be used until approval in writing has been given by the Engineer. Upon failure on the part of the Contractor to comply forthwith with any order of the Engineer made under the provisions of this article, the Engineer shall have authority to remove and replace the defective material and to deduct the cost of the removal and replacement from any moneys due or that become due the Contractor.

6-04 TRADE NAME AND ALTERNATIVES. For convenience in designation in the Contract Documents, certain equipment or articles or materials may be designated under a trade name or the name of a manufacturer with catalogue information. The use of alternative equipment or an

article or material that is of equal quality and of the required characteristics for the purpose intended will be permitted, when specified, subject to the approval of the Engineer, in accordance with the following requirements.

The burden of proof as to the comparative quality and suitability of alternative equipment or articles or materials shall be upon the Contractor, and the Contractor shall furnish, at the Contractor's own expense, all information necessary or related thereto as required by the Engineer. The Engineer shall be the sole judge as to the comparative quality and suitability of alternative equipment or articles or materials, and the Engineer's decision shall be final.

6-05 SAMPLES AND TESTS. Materials furnished by the Contractor may be tested by the City or the City's authorized representative in accordance with commonly recognized standards of national organizations or such special methods and tests as are in use at the Laboratory of the Department of Transportation of the State of California.

Field tests of materials will be made by the Engineer when deemed necessary, and these tests shall be made in accordance with standard practices of the Department of Transportation.

The Contractor shall furnish, without charge, such samples of all materials as are requested by the Engineer. No material shall be used until it has been approved by the Engineer. Samples will be secured and tested whenever necessary to determine the quality of the material.

Samples for testing local sources of material shall be taken by or in the presence of the Engineer. Otherwise, the same shall not be considered.

Promptly after the approval of the Contract, the Contractor shall notify the Engineer of the proposed sources of supply of all materials to be furnished by the Contractor.

Whenever reference is made in these Standard Provisions or Standard Specifications or standard tests or requirements of the Laboratory of the Department of Transportation, the American Society for Testing and Materials, the American Railway Engineering Association, the American Association of State Highway and Transportation Officials, or other nationally recognized organizations, the reference shall be construed to mean the standards that are in effect at the date of these Standard Provisions with subsequent amendments, changes, or additions as thereafter adopted and published by the organization referred to.

Whenever the Contract Documents permit the substitution of a similar or equivalent material or article, no tests or action relating to the approval of such substitute material will be made unless the request for approval is made in writing by the Contractor, accompanied by complete data or information demonstrating the equality of the material or article offered. Such requests shall be made in ample time to permit investigation without delaying the Work.

Materials from local deposits that have not been investigated and tested previously and approved for use will be investigated and tested upon request of the Contractor in writing. Such tests shall be in accordance with the standard methods in use at the laboratory of the Department of Transportation. The cost of any such investigation and tests made as a result of the Contractor's request shall be at Contractor's expense, and deductions shall be made from estimates due sufficient to cover the cost of such tests.

The Contractor shall notify the Engineer a sufficient time in advance of opening any material sites to allow adequate time for testing the material.

Testing of materials shall be in accordance with Section 6 of the Standard Specifications of the State of California Department of Transportation.

SECTION 7: LEGAL RELATIONS AND RESPONSIBILITY

7-01 LAWS TO BE OBSERVED. The Contractor shall keep fully informed of all existing and future state and federal laws and municipal ordinances and regulations which in any manner affect those engaged or employed in the Work, or the materials used in the Work, or which in any way affect the conduct of the Work, and of all such orders and decrees of bodies or tribunals having any jurisdiction or authority over the same. The Contractor shall at all times observe and comply with, and shall cause all Contractor's agents and employees to observe and comply with, all such existing and future laws, ordinances, regulations, orders, and decrees; and shall protect and indemnify the City, the Engineer, and all of their officers, agents, and servants against any claim or liability arising from or based on the violation of any such law, ordinance, regulation, order, or decree, whether by theirself or their employees. If any discrepancy or inconsistency is discovered in the Contract Documents for the Work in relation to any such law, ordinance, regulation, order, or decree, the Contractor shall forthwith report the same to the Engineer in writing.

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

"No discrimination shall be made in the employment of persons upon public work because of the race, religious creed, color, national origin, ancestry, physical handicap, medical condition, marital status or sex of such persons, except as provided in Section 12940 of the Government Code, and every Contractor for public works violating this section is subject to all the penalties imposed for a violation of this chapter."

b. Wage Rate. The City will not recognize any claim for additional compensation because of the payment by the Contractor of any increase in wage rate. The possibility of wage increases is one of the elements to be considered by the Contractor in determining Contractor's bid and will not under any circumstances be considered as the basis of a claim against the City on the Contract.

c. Registration of Contractors. Before submitting bids, all contractors shall be licensed in accordance with the laws of the State of California.

d. Apprentices. Attention is directed to Sections 1776, 1777.5, 1777.6, and 1777.7 of the California Labor Code and Title 8, California Administrative Code, Sections 200, *et seq*. RESPONSIBILITY FOR COMPLIANCE WITH THIS SUBSECTION LIES WITH THE CONTRACTOR. To ensure compliance and complete understanding of the law regarding apprentices and specifically the required ratio thereunder, each Contractor or subcontractor, especially if a question exists, shall contact the State of California Department of Transportation Division of Apprenticeship Standards, 455 Golden Gate Avenue, San Francisco, California, or one of its branch offices prior to commencement of work on the public works contract.

7-02 PERMITS AND LICENSES. The Contractor shall procure all permits and licenses, pay all charges and fees, and give all notices necessary and incident to the due and lawful prosecution of the Work.

The Environmental Quality Act (Public Resources Code, Section 21000 to 21176, inclusive) may be applicable to permits, licenses, and other authorizations which the Contractor must obtain from local agencies in connection with performing the Work of the Contract. The Contractor shall comply with the provisions of said statutes in obtaining such permits, licenses, and other authorizations, and they shall be obtained in sufficient time to prevent delays to the Work.

In the event that the City has obtained permits, licenses, or other authorizations applicable to the Work in conformance with the requirements in said Environmental Quality Act, the Contractor shall comply with the provisions of said permits, licenses, and other authorizations.

7-03 PATENTS. The Contractor shall assume all costs arising from the use of patented materials, equipment, devices, or processes used on or incorporated in the Work and agrees to indemnify and save harmless the City, the Engineer, and their duly authorized representatives from all suits at law or actions of every nature for or on account of the use of any patented materials, equipment, devices, or processes.

7-04 PUBLIC CONVENIENCE. This article defines the Contractor's responsibility with regard to providing for the passage of public traffic through the Work during construction.

The Contractor shall so conduct Contractor's operations as to offer the least possible obstruction and inconvenience to public traffic, and the Contractor shall have under construction no greater length or amount of work than they can prosecute properly with due regard to the rights of the public. Where existing roads are not available for use as detours, unless otherwise provided in the Special Provisions, all traffic shall be permitted to pass through the Work with as little inconvenience and delay as possible. At no time, as a result of Contractor's efforts solely or in combination with other projects that might be under way, shall access to any portion of the City be unduly limited. The Engineer, at Engineer's discretion, may stop or postpone Work, as necessary, to avoid or correct such conditions.

Convenience of abutting owners along the road shall be provided for as far as practicable. Convenient access to driveways, houses, and buildings along the line of the Work shall be maintained, and temporary approaches to crossings or intersecting highways shall be provided and kept in good condition.

At locations where traffic is being routed through construction during grading operations, roadway excavation and the construction of embankments shall be conducted in such a manner as to provide a reasonably smooth and even surface satisfactory for the use of

public traffic at all times; and if ordered by the Engineer, roadway cuts shall be excavated in lifts and embankments constructed part width at a time, construction being alternated from one side to the other and traffic routed over the side opposite the one under construction. The road bed shall be sprinkled with water, if necessary, to prevent dust nuisance. Upon completion of the rough grading, the surface of the roadbed shall be brought to a smooth, even condition free from humps and depressions and made satisfactory for the use of traffic.

After the rough grading has been completed and the surface of the roadbed has been brought to a smooth and even condition as above specified, and before subgrade operations are commenced, any blading necessary for the accommodation of public traffic will be paid for as extra work as provided in Paragraph 4-03, "Extra Work."

In order that all unnecessary delay to the traveling public may be avoided where ordered by the Engineer, the Contractor shall provide and station competent person whose sole duties shall consist of directing the movement of public traffic either through or around the Work.

7-05 PUBLIC SAFETY. This article defines the Contractor's responsibility with regard to providing for the safety of the public during construction.

Attention is directed to Paragraph 7-07, "Responsibility for Damage," of this Section.

The Contractor shall furnish, erect, and maintain such fences, barriers, lights, and signs as are, in the opinion of the Engineer, necessary to give adequate warning to the public at all times that the Work is under construction and of any dangerous conditions to be encountered as a result thereof. The warning signs, lights and other safety devices shall conform to and follow the requirements of Section 21400 of the Vehicle Code and of any sign manual issued or to be issued by the Department of Transportation.

Where ordered by the Engineer, the Contractor shall provide and station competent person whose sole duties shall consist of directing the movement of public traffic either through or around the Work.

At any and all points along the Work where the nature of construction operations in progress and the Contractor's equipment and machinery in use is of such character as to endanger passing traffic, the Contractor shall provide such lights and signs and station such guards as may appear necessary to prevent accidents and avoid damage or injury to passing traffic.

No material or equipment shall be stored where it will interfere with the free and safe passage of public traffic.

At the end of each day's work and at other times when construction operations are suspended for any reason, the Contractor shall remove all equipment and other obstructions from that portion of the roadway open for use by public traffic.

Full compensation for carrying out the precautionary and safety measures above specified shall be considered as included in the prices paid for the various contract items of work.

7-06 PRESERVATION OF PROPERTY. Due care shall be exercised to avoid injury to existing roadway improvements or facilities, utility facilities, adjacent property, and roadside trees and shrubbery that are not to be removed.

Roadside trees and shrubbery that are not to be removed and pole lines, fences, signs, survey markers and monuments, buildings and structures, conduits, pipe lines under or above ground, sewer and water lines, all roadway facilities, and any other improvements or facilities within or adjacent to the roadway shall be protected from injury or damage, and if ordered by the Engineer, the Contractor shall provide and install suitable safeguards approved by the Engineer to protect such objects from injury or damage. If such objects are injured or damaged by reason of the Contractor's operations, they shall be replaced or restored, at the Contractor's expense, to a condition as good as when the Contractor entered upon the Work, or as good as required by the Contract Documents, if any such objects are a part of the Work being performed under the Contract.

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

Full compensation for furnishing all labor, materials, tools and equipment and doing all the work involved in protecting property as above specified, shall be considered as included in the prices paid for the various contract items of work, and no additional compensation will be made therefor.

7-07 RESPONSIBILITY FOR DAMAGE. The Contractor must properly guard against all injuries and damages to persons and property. The City and the City's officers and employees thereof connected with the Work, including, but not limited to, the Engineer, shall not be answerable or accountable in any manner: for any loss or damage that may happen to the Work or any part thereof; for any loss or damage that may happen to the materials or other things used or employed in performing the Work; for injury to or death of any person, either workers or the public; or for damage to property from any cause which might have been prevented by the Contractor, or workers, or anyone employed by them.

The Contractor shall be responsible for any liability imposed by law and for injuries to or death of any person, including, but not limited to, workers and the public, or damage to property resulting from defects or obstructions or from any cause whatsoever during the progress of the Work or at any time before its completion and final acceptance.

The Contractor shall indemnify and save harmless the City and all officers and employees thereof, including, but not limited to, the Engineer, from all claims, suits, or actions of every name, kind, and description brought forth or on account of injuries to or death of any person, including, but not limited to, workers and the public, or damage to property resulting from the performance of a contract, except as otherwise provided by statute. The duty of the Contractor to indemnify and save harmless includes the duties to defend as set forth in Section 2778 of the Civil Code.

It is the intent of the parties that the Contractor will indemnify and hold harmless the City and the City's officers and employees from any and all claims, suits, or actions as set forth above regardless of the existence or degree of fault or negligence on the part of the City, the Contractor, the subcontractor, or employee of any of these other than the active negligence of the City or the City's officers and employees.

With respect to third-party claims against the Contractor, the Contractor waives any and all rights to any type of express or implied indemnity against the City and the City's officers or employees.

In case of any suits, claims, or actions and in addition to any other remedies allowed by law, the City may retain as much of the money due the Contractor under the Contract as the City deems necessary until final disposition of the suits, claims, or actions.

Further, the Contractor shall be responsible for any liability imposed by law and for injury to or death of any person and for damage to property and shall indemnify, defend, and save harmless any county or other incorporated city and its officers and employees, within the limits of which county or incorporated city highway work is being performed hereunder, all in the same manner and to the same extent as provided above for the protection of the City, except that no retention of money due the Contractor under and by virtue of the Contract will be made by the City pending disposition of suits or claims for damages brought against the county or other city.

7-08 DISPOSAL OF MATERIALS. Material disposal shall be in accordance with Section 13, "Surplus Material," of these Standard Provisions.

7-08.01 Nonpoint Source Pollution Control. In compliance with state and federal regulations on construction storm water management and nonpoint source pollution control, no pollutants will be allowed to enter the storm drainage system. The Contractor shall be responsible for containing and removing any waste from the Contractor's construction operation using the appropriate Best Management Practices (BMP) and shall properly dispose the waste from the site. The Contractor shall be responsible for cleaning catch basins if solid and liquid waste material originating from the Contractor's operation enters the storm drain. Violation of this provision shall cause the City to issue a stop-work notice and take necessary action to require the Contractor to correct and comply with the regulations. All costs related to the stop-work action and corrective work to come into compliance shall be fully borne by the Contractor.

All construction projects occurring within City limits shall be conducted in a manner which prevents the release of hazardous materials or hazardous waste to the soil or groundwater and minimizes the discharge of hazardous materials, hazardous wastes, polluted water, and sediments to the storm drain system in accordance with City Code Section 35.32.101(T). Practices which may be implemented to meet the intent of this requirement are described in the City of Mountain View's document "Stormwater Pollution Prevention Guidelines for Construction Projects" and "It's in the Contract! (But Not in the Bay)—Pollution prevention specifications for construction contractors and maintenance crew supervisors working in the City of Mountain View."

7-09 COOPERATION BETWEEN CONTRACTORS. Where two or more contractors are employed on related or adjacent work, each shall conduct their operations in such a manner as not to cause any unnecessary delay or hindrance to the other. In the event that agreement cannot be reached between contractors performing related work, the required degree of cooperation shall be established by the Engineer, whose decision shall be final.

7-10 CONTRACTOR'S RESPONSIBILITY FOR WORK. Until a formal written Notice of Completion or Notice of Cessation of the Work is adopted by the City Council and recorded with the County Recorder, the Contractor shall have the charge and care thereof and shall bear the risk of injury or damage to any part thereof by the action of the elements or from any other cause, including, but not limited to, vandalism, whether or not arising from the execution of the Work. The Contractor shall rebuild, repair, restore, and make good all injuries or damages to any portion of the Work occasioned by any of the above causes before its completion and acceptance and shall bear the expense thereof, except for such injuries or damages as are directly and proximately caused by acts of the federal government or the public enemy.

In case of suspension of work from any cause whatever, the Contractor shall be responsible for the Work as above specified. Where necessary to protect the Work from damage, the Contractor shall, at the Contractor's own expense, provide suitable drainage of the roadway and erect such temporary structures as are necessary to protect the Work from damage during any period of a suspension of Work.

7-11 PROPERTY RIGHTS IN MATERIALS. Nothing in the Contract shall be construed as vesting in the Contractor any right of property in the materials used after they have been attached or affixed to the Work or the soil, or after payment has been made for fifty percent (50%) of the value of materials delivered to the site of the Work, whether or not they have been so attached or affixed. All such materials shall become the property of the City upon being so attached or affixed.

7-12 NO PERSONAL LIABILITY. Neither the Engineer, nor any other officer or authorized employee of the City, nor any officer or employee of any county, city, or district shall be personally responsible for any liability arising under or by virtue of the contract.

SECTION 8: PROSECUTION AND PROGRESS

8-01 SUBCONTRACTING. No subcontractor will be recognized as such, and all persons engaged in the Work of construction will be considered as employees of the Contractor, and the Contractor will be held responsible for their subcontractors' work, which shall be subject to the provisions of the Contract Documents.

The Contractor shall give their personal attention to the fulfillment of the Contract and shall keep the Work under the Contractor's control. The Contractor shall perform with the Contractor's own organization that portion of the work generally required to comply with the California Contractors State License Board Regulations and as specified in the Special Provisions, except for any designated "Specialty Items" that may be performed by subcontract and the amount of any such "Specialty Items" so performed may be deducted from the original total contract price before computing the amount of work required to be performed by the Contractor with the Contractor's own organization. When items of Work in the Engineer's Estimate are preceded by the letter (S), said items are designated "Specialty Items." Where an entire item is subcontracted, the value of work subcontracted will be based on the contract item bid price. The value of the Work subcontracted shall be determined by multiplying the number of units subcontracted of any contract item by the unit price as set forth in the Contract. If any subdivision of a contract unit is subcontracted, the entire unit shall be considered as subcontracted.

Before any work is started on a subcontract, the Contractor shall file with the Engineer at the Engineer's office, 500 Castro Street, Mountain View, California, a written statement on a form provided by the City showing the Work to be subcontracted, giving the names of the subcontractors and the description of each portion of the Work to be so subcontracted.

Where a portion of the Work which has been subcontracted by the Contractor is not being prosecuted in a manner satisfactory to the City, the subcontractor shall be removed immediately on the written direction of the Engineer and shall not again be employed on the Work.

The roadside production of materials produced by other than the Contractor's forces shall be considered as subcontracted. Roadside production materials shall be construed to be production of crushed stone; asphalt or oil mixtures; gravel or sand; Portland cement concrete; asphalt concrete; and crusher run base with portable, semi-portable, or temporary crushing or screening; proportioning; and mixing plants established or reopened for the purpose of supplying local aggregate or material for a particular project or projects.

8-02 ASSIGNMENT. The performance of the Contract may not be assigned, except upon the written consent of the City. Consent will not be given to any proposed assignment which

would relieve the original Contractor or the Contractor's surety of their responsibilities under the Contract, nor will the City consent to any assignment of a part of the Work under the Contract.

The Contractor may assign moneys due or to become due to them under the Contract, and the same will be recognized by the City if given proper notice thereof, to the extent permitted by law, but any assignment of moneys shall be subject to all proper withholdings in favor of the City and to all deductions provided for in the Contract, and particularly all moneys withheld, whether assigned or not, shall be subject to being used by the City for the completion of the Work in the event that the Contractor should be in default therein.

8-03 PROGRESS OF THE WORK. The Contractor shall begin Work in accordance with the Notice to Proceed or within fifteen (15) days following the execution of the Contract by the City and shall diligently prosecute the same to completion within the time limits provided in the Contract Documents.

Should the Contractor begin work in advance of receiving notice that the Contract has been approved as above provided, any work performed by the Contractor in advance of the said date of approval shall be considered as having been done by the Contractor at the Contractor's own risk and as a volunteer unless said Contract is so approved.

Time is of the essence of this agreement. If the Contractor should fail to supply sufficient workers, material, supplies, and equipment, the City shall give written notice to the Contractor, which notice shall require that the Contractor supply sufficient workers, supplies, materials, and equipment to diligently prosecute the project. If the Contractor fails to begin or resume diligent prosecution of the Work within forty-eight (48) hours after such notice is delivered, the owner may eject the Contractor from the job, take over all supplies, equipment, and material of the Contractor on the job site and either obtain another Contractor to finish the project or finish the project with Contractor's own forces. In such event, the Contractor shall be liable to the City for any damages incurred, including, but not limited to, the full cost of completing the project.

8-04 CHARACTER OF WORKERS. If any subcontractor or person employed by the Contractor shall fail or refuse to carry out the directions of the Engineer or shall appear to the Engineer to be incompetent or to act in a disorderly or improper manner, they shall be discharged immediately on the written direction of the Engineer, and such person shall not again be employed on the Work.

8-05 TEMPORARY SUSPENSION OF WORK. The Engineer shall have the authority to suspend the Work, wholly or in part, for such period as they may deem necessary, due to unsuitable weather, or to such other conditions as are considered unfavorable for the suitable prosecution of the Work, or for such time as they may deem necessary due to the failure on the part of the Contractor to carry out orders given, or to perform any provision of the Contract. The Contractor shall immediately comply with the written order of the Engineer to suspend the Work

wholly or in part. The Work shall be resumed when conditions are favorable and methods are corrected, as ordered or approved in writing by the Engineer.

In the event that a suspension of the Work is ordered as provided above, and should such suspension be ordered by reason of the failure of the Contractor to carry out orders given, or to perform any provision of the Contract; or, by reason of weather conditions being unsuitable for performing an item or items of Work, which Work could, in the sole opinion of the Engineer, have been performed prior to the occurrence of such unsuitable weather conditions had the Contractor diligently prosecuted the Work when weather conditions were suitable, the Contractor shall, at the Contractor's own expense, do all the Work necessary to provide a safe, smooth, and unobstructed passageway through the Work for use by public traffic during the period of such suspension, as specified in Paragraphs 7-04, "Public Convenience," and 7-05, "Public Safety," of these Standard Provisions and as specified in the Special Provisions for the Work. In the event that the Contractor fails to perform the Work specified above, the City will perform such work, and the cost thereof will be deducted from progress estimates due the Contractor.

In case of a suspension of the Work, as above provided, attention is directed to the requirements of Paragraph 7-10, "Contractor's Responsibility for Work," of these Standard Provisions.

8-06 TIME OF COMPLETION AND LIQUIDATED DAMAGES. The Contractor shall complete the Work called for under the Contract in all parts and requirements within the number of working days, calendar days, or by the date specified in the Contract Documents.

A working day is hereby defined as any day except Saturdays, Sundays, and legal holidays and days on which the Contractor is specifically required by the Special Provisions to suspend construction operations, on which the Contractor is not 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 sixty percent (60%) of the normal labor and equipment force engaged on such operation or operations for at least five (5) hours toward completion of such operation or operations. This definition is applicable to projects which have a construction period specified on a working day basis and does not apply to construction periods specified on a calendar day basis.

The terms "day" and "calendar day" are defined as every twenty-four (24) hour period from midnight to midnight, including Saturdays, Sundays, and holidays.

It is agreed by the parties to the Contract that in case all work called for under the Contract in all parts and requirements is not finished or completed within the number of working days, calendar days, or by the date specified as set forth in the Contract Documents, damage will be sustained by the City, and that it is and will be impracticable and extremely difficult to ascertain and determine the actual damage which the City will sustain in the event of and by reason of such delay; and it is, therefore, agreed that the Contractor will pay to the City the sum

of Five Hundred Dollars ($500) per day for each and every calendar day's delay in finishing the work in excess of the number of working days, or calendar days prescribed or in excess of the date specified for completion of the Work, whichever is applicable in the Contract Documents; and the Contractor agrees to pay said liquidated damages as herein provided; and in case the same are not paid, agrees that the City may deduct the amount thereof from any moneys due or that may become due the Contractor under the Contract.

Partial payments paid to the Contractor after the scheduled completion dates shall not be constituted as a waiver of the City's right to assess liquidated damages.

It is further agreed that in case the Work called for under the Contract is not finished and completed in all parts and requirements within the number of working days, calendar days, or by the date specified as set forth in the Contract Documents, the Engineer shall have the right to increase the number of working days/calendar days or not, as may seem best to serve the interest of the City, and if the Engineer decides to increase the said number of working days/calendar days, they shall further have the right to charge to the Contractor, the Contractor's heirs, assigns, and sureties and to deduct from final payment for the Work all or any part, as they may deem proper, of the actual cost of engineering, inspection, superintendence, and other expenses which are directly chargeable to the contract and which accrue during the period of such extension, except that cost of final surveys and preparation of final estimate shall not be included in such charges.

The Contractor shall not be assessed with liquidated damages nor the cost of engineering and inspection during any delay beyond the time named for completion of the Work caused by acts of God or of the public enemy, acts of the state, fire, floods, epidemics, quarantine restrictions, strikes, and freight embargoes, or delays of subcontractors due to such causes; provided that the Contractor shall notify the Engineer in writing of the causes of delay within ten (10) days from the beginning of any such delay, and the Engineer shall ascertain the facts and the extent of the delay, and Engineer's findings of the facts thereon shall be final and conclusive.

If the Contractor is delayed by reason of alterations made under Paragraph 4-02, "Alterations," of these Standard Provisions, or by any act of the Engineer or of the City not contemplated by the Contract, the time of completion shall be extended proportionately, and the Contractor shall be relieved, during the period of such extension, of any claim for liquidated damages, engineering or inspection charges, or other penalties. The Contractor shall have no claim for any other compensation for any such delay.

8-07 TERMINATION OF CONTRACT. The City reserves the right to terminate the Contract for its convenience in accordance with Section 8-1.11, "Termination of Contract," of the Standard Specifications, at any time upon a determination by the City Council or designated representative that termination of the Contract is in the best interests of the City.

Failure to maintain a superintendent on the site as required in Paragraph 5-07, "Superintendence," in these Standard Provisions at all times when construction work is in

progress shall be construed as a failure to diligently prosecute the Work. Failure to adequately staff the project or failure to prosecute the Work for more than ninety-six (96) consecutive hours will constitute abandonment of the project by the Contractor and may be grounds for termination of the Contract.

Failure to supply an adequate working force, or material of proper quality, or failure to comply with Section 10262 of the State Contract Act, or in any other respect to prosecute the Work with the diligence and force specified by the Contract is grounds for termination of the Contractor's control over the Work and for taking over the Work by the City in accordance with Section 8-1.08, "Termination of Control," of the Standard Specifications, with the exception that any disputes concerning the amount to be paid by the City to the Contractor or the Contractor's surety or to be paid to the City by the Contractor or Contractor's surety shall NOT be subject to arbitration. The last paragraph in Section 8-1.08, "Termination of Control," of the Standard Specifications, which refers to arbitration, and Section 9-1.10, "Arbitration," shall not apply.

8-08 PROGRESS SCHEDULE. After the award of contract, the successful Bidder shall submit a progress schedule. The Bidder shall show thereon the time the Bidder proposes to occupy in prosecuting the various major divisions of the Work and the Bidder's proposed sequence of operations. The progress schedule will be submitted prior to the Contractor starting work and shall be prepared as a "Critical Path" diagram when required by the Engineer. The progress schedule shall include all major items of Work and their start and stop dates.

SECTION 9: MEASUREMENT AND PAYMENT

9-01 MEASUREMENT OF QUANTITIES. All Work to be paid for at a contract price per unit of measurement shall be measured by the Engineer in accordance with the United States Standard Measures. Quantities for payment shall be based upon those given in the Contract included herewith, and any written notice to the Contractor by the Engineer changing or revising same to conform to any increase or reduction in the actual Work required.

Said quantities shall not be increased except upon the approval of the Engineer and said written notice. Quantities shall be measured in the units shown in the Contract.

At a time designated by the Engineer after the completion of construction and before the issuance of a final pay letter (estimate), a representative of the Contractor and of the City shall measure and determine the final quantities.

9-02 SCOPE OF PAYMENT. The Contractor shall accept the compensation as herein provided in full payment for furnishing all materials, labor, tools, and equipment necessary to the completed Work and for performing all Work contemplated and embraced under the Contract; also for loss or damage arising from the nature of the Work, or from the action of the elements, except as hereinbefore provided, during the prosecution of the Work until final acceptance by the City and for all risks of every description connected with the prosecution of the Work; also for all expenses incurred in consequence of the suspension or discontinuance of the Work as herein specified; and for completing the Work according to the Contract Documents. Neither the payment for any estimate nor of any retained percentage shall relieve the Contractor of any obligation to make good any defective Work or material.

9-03 PAYMENT AND COMPENSATION FOR ALTERED QUANTITIES. When alterations in Plans or quantities of Work are ordered and performed, the Contractor shall accept payment in full at the contract unit price for the actual quantities of Work done, except as otherwise provided in Paragraph 4-03, "Extra Work," of these Standard Provisions. No compensation will be made in any case for loss of anticipated profits. Increased or decreased work involving Supplemental Agreements will be paid for as stipulated in such agreements.

9-04 FORCE ACCOUNT WORK. When extra work is to be paid for on a force account basis, the labor, materials, and equipment used in the performance of such work shall be subject to the approval of the Engineer, and compensation will be determined as per Section 9-1.03, "Force Account Payment," of the Standard Specifications; provided, however, that the City reserves the right to furnish such materials required as it deems expedient, and the Contractor shall have no claim for profit on the cost of such materials; and, further provided, that no additional payment therefor will be made by the City by reason of the performance of the Work by a subcontractor or other forces. For the use of equipment owned by Contractor, they shall be paid the current

prices prevailing in the locality, which shall have been previously determined and agreed upon in writing by the Engineer and by the Contractor plus fifteen percent (15%).

All force account work shall be adjusted daily upon report sheets, furnished to the Engineer by the Contractor and signed by both parties, which daily reports shall thereafter be considered the true record of force account work done.

9-05 DEDUCTIONS FROM PAYMENTS. The City may, at its option and at any time, retain out of any amounts due the Contractor: (1) sums sufficient to cover any unpaid claims which are not covered by insurance covering the City and the City's officers and employees, provided by the Contractor; and (2) any other sum which City is authorized or required to withhold under any applicable laws. The City shall withhold and retain from payments due the Contractor under the Contract all amounts which have been forfeited pursuant to the provisions of Part 7, Chapter 1 of the Labor Code, provided that no sum shall be withheld, retained, or forfeited, except from the final payment, without a full investigation by either the Division of Labor Law Enforcement of the State of California or by the City.

9-06 PARTIAL PAYMENTS. Once in each month, the Engineer shall cause an estimate in writing to be made of the total amount of work done and the acceptable materials furnished and delivered by the Contractor on the ground and not used, to the time of such estimate, and the value thereof. The City shall retain ten percent (10%) of such estimated value of the Work done, fifty percent (50%) of the value of the materials so estimated to have been furnished and delivered and unused as aforesaid as part security for the fulfillment of the Contract by the Contractor, and sums sufficient to cover any unpaid claims as detailed in Paragraph 9-05 above and any accrued liquidated damages, and shall pay monthly to the Contractor, while carrying on the Work, the balance not retained, as aforesaid, after deducting therefrom all previous payments and all sums to be kept or retained under the provisions of the Contract. No such estimate or payment shall be required to be made when, in the judgment of the Engineer, the Work is not proceeding in accordance with the provisions of the Contract, or when in Engineer's judgment, the total value of the Work done since the last estimate amounts to less than Three Hundred Dollars ($300). No such estimate or payment shall be construed to be an acceptance of any defective work or improper materials.

As per Section 4590 of the Government Code, the City will permit substitution of securities to ensure performance for any moneys withheld.

9-07 NOTICE OF POTENTIAL CLAIMS. Section 9-1.04, "Notice of Potential Claim," of the Standard Specifications is amended to read:

9-07.01 Notice of Potential Claim. The Contractor shall not be entitled to the payment of any additional compensation for any act, or failure to act, by the Engineer, including failure or refusal to issue a change order, or for the happening of any event, thing, occurrence, or other cause, unless the Contractor shall have given the Engineer due written notice of potential claim as hereinafter specified. Compliance with said Section 9-1.04 shall not be a

prerequisite as to matters within the scope of the protest provisions in Section 4-1.03, "Changes," or Section 8-1.06, "Time of Completion," or the notice provisions in Section 5-1.116, "Differing Site Conditions," or Section 8-1.07, "Liquidated Damages," or Section 8-1.10, "Utility and Non-Highway Facilities," nor to any claim which is based on differences in measurements or errors of computation as to contract quantities.

The written notice of potential claim shall be submitted to the Engineer prior to the time that the Contractor performs the Work giving rise to the potential claim for additional compensation, if based on an act or failure to act by the Engineer, or in all other cases within fifteen (15) days after the happening of the event, thing, occurrence, or other cause, giving rise to the potential claim.

The written notice of potential claim shall be submitted on Form CEM-6201 furnished by the City and shall be certified with reference to the California False Claims Act, Government Code Sections 12650-12655. 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. Unless the amount of the potential claim has been stated in the written notice, the Contractor shall, within fifteen (15) days of submitting the notice, furnish an estimate of the cost of the affected Work and impacts, if any, on project completion. The estimate of costs may be changed or updated by the Contractor when conditions have changed. When the affected Work is completed, the Contractor shall submit substantiation of the Contractor's actual costs. Failure to do so shall be sufficient cause for denial of any claim subsequently filed on the basis of said notice of potential claim.

It is the intention of said Section 9-1.04 that differences between the parties arising under and by virtue of the contract be brought to the attention of the Engineer at the earliest possible time in order that the matters may be settled, if possible, or other appropriate action promptly taken. The Contractor hereby agrees that the Contractor shall have no right to additional compensation for any claim that may be based on any act, failure to act, event, thing, or occurrence for which no written notice of potential claim as herein required was filed.

Should the Contractor, in connection with or subsequent to the assertion of a potential claim, request inspection and copying of documents or records in the possession of the Department that pertain to the potential claim, the Contractor shall make its records of the project, as deemed by the Department to be pertinent to the potential claim, available to the Department for inspection and copying.

9-08 CLAIMS. The Contractor shall submit written statement of all claims arising under or by virtue of the contract so that the Engineer receives the written approval or statement of claims no later than close of business of the thirtieth (30th) day after receiving the proposed final estimate. If the thirtieth (30th) day falls on a Saturday, Sunday, or legal holiday, then receipt of the written approval or statement of claims by the Engineer shall not be later than close of business of the next business day. No claim that was not included in the written statement or

claims will be considered, nor will any claim be allowed as to which a notice or protest is required under the provisions in Sections 4-1.03, "Changes," 8-1.06, "Time of Completion," 8-1.07, "Liquidated Damages," 5-1.116, "Differing Site Conditions," 8-1.10, "Utilities and Non-Highway Facilities," and 9-1.04, "Notice of Potential Claim," unless the Contractor has complied with the notice or protest requirements in those sections.

Claims filed by the Contractor shall be in sufficient detail to enable the Engineer to ascertain the basis and amount of said claims. If additional information or details are required by the Engineer to determine the basis and amount of the claims, the Contractor shall furnish additional information or details so that the additional information or details are received by the Engineer no later than the fifteenth (15th) day after receipt of the written request from the Engineer. If the fifteenth (15th) day falls on a Saturday, Sunday, or legal holiday, then receipt of the information or details by the Engineer shall not be later than close of business of the next business day. Failure to submit the information and details to the Engineer within the time specified will be sufficient cause for denying the claim.

The Contractor shall keep full and complete records of the costs and additional time incurred for any work for which a claim for additional compensation is made. The Engineer or any designated claim investigator or auditor shall have access to those records and any other records as may be required by the Engineer to determine the facts or contentions involved in the claims. Failure to permit access to those records shall be sufficient cause for denying the claims.

Claims submitted by the Contractor shall be accompanied by a notarized certificate containing the following language:

Under the penalty of law for perjury or falsification and with specific reference to the California False Claims Act, Government Code Section 12650, *et. seq*., the undersigned,

_____,
(name)
_____ of
(title)
_____,
(company)

hereby certifies that the claim for the additional compensation and time, if any, made herein for the Work on this Contract is a true statement of the actual costs incurred and time sought and is fully documented and supported under the Contract between parties.

Dated _____

/s/ _____

Subscribed and sworn before me this _____ day

of _____.

_____

Notary Public

My Commission Expires _____

Failure to submit the notarized certificate will be sufficient cause for denying the claim.

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.

The Engineer will make the final determination of any claims which remain in dispute after completion of the claim review. The Contractor may be allowed to make a presentation in support of those claims.

Upon final determination of the claims, the Engineer will then make and issue the Engineer's final estimate in writing. Payment on the Engineer's final estimate shall be in accordance with Section 9-09, "Final Payment." That final estimate shall be conclusive and binding against both parties to the contract on all questions relating to the amount of work done and the compensation payable therefor, except as otherwise provided in Sections 9-1.03C, "Records," and 9-1.09, "Clerical Errors."

9-09 FINAL PAYMENT. After the completion of the Work and prior to its acceptance by the City Council, the Engineer will make a proposed final estimate in writing of the quantities of Work done under the Contract and the value of such Work and will submit such estimate to the Contractor. Within thirty (30) days thereafter and prior to City Council acceptance, the Contractor shall submit to the Engineer the Contractor's written approval of said proposed final quantities or a written statement of all claims which the Contractor has for additional compensation claimed to be due under the Contract.

On the Contractor's approval, or if the Contractor files no claims within said period of thirty (30) days, the Engineer will issue a final written estimate as submitted to the Contractor, and the City shall pay the entire sum so found to be due after deducting there from all previous payments and all amounts to be kept and all amounts to be retained under the provisions of the Contract.

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

The final estimate shall be conclusive and binding against both parties to the Contract on all questions relating to the performance of the Contract and the amount of work done thereunder and compensation therefor, except in the case of gross error.

Payment on the final estimate will be made after thirty-five (35) days have elapsed from the date of acceptance of the project by the Engineer or City Council, whichever is required.

SECTION 10: GENERAL REQUIREMENTS AND INFORMATION

10-01 NOTIFICATIONS.

10-01.01 The Contractor shall notify the Engineer at least two (2) working days prior to commencing Work, so that inspection can be arranged (reference Paragraph 5-09, "Inspection"). If the Contractor's Work is suspended or no Work has been prosecuted for three (3) days, at least two (2) days' notice shall be given to the Engineer prior to performing additional Work.

10-01.02 The Contractor shall keep the City Emergency Communications Center (650-903-6395) informed daily regarding excavations, barricades, and detours in roadway areas. Flashers shall be placed at excavations, barricades, and as directed by the Engineer (reference Paragraph 4-04, "Maintenance of Detours").

10-01.03 The Contractor shall leave an emergency phone number with the City Emergency Communications Center (650-903-6395).

10-01.04 The Contractor shall notify Pacific Bell at least two (2) working days prior to excavating near any of its facilities (reference Paragraph 5-11, "Existing Utilities").

10-01.05 The Contractor shall notify the Pacific Gas and Electric Company at least two (2) working days prior to excavating near any of its facilities (reference Paragraph 5-11, "Existing Utilities").

10-01.06 The Contractor shall notify the California Water Service Company at least two (2) days prior to excavating near any of its facilities (reference Paragraph 5-11, Existing Utilities").

10-01.07 The Contractor shall notify TCI of Santa Clara at least two (2) working days prior to excavating near any of its facilities (reference Paragraph 5-11, "Existing Utilities").

10-02 RIGHTS-OF-WAY. The Contractor shall make their own arrangements and pay all expenses for additional area required by them outside the limits of the right-of-way shown on the Plans.

10-03 COORDINATION WITH OTHER AGENCIES. Moving and adjusting of private utility poles, valve covers, water and gas services, and mains and other facilities may be undertaken by their owners during the progress of the Work. The Contractor shall cooperate with the owners of these facilities and shall coordinate work in a manner to avoid damage to these installations or interference with their removal and reinstallation.

SECTION 11: CLEARING AND GRUBBING

11-01 SCOPE. Roadway clearing shall conform to the requirements of Section 15, "Existing Highway Facilities," and Section 16, "Clearing and Grubbing," of the Standard Specifications except as modified herein. Included shall be the grading to a relatively smooth final grade of the area between the sidewalk and right-of-way line. All deleterious material, rocks, paper, and other objectionable material shall be removed. The Contractor shall separate asphalt concrete or Portland cement concrete improvements which are to remain from those to be removed by sawcutting along the conform line.

11-02 MEASUREMENT. Clearing and grubbing shall be measured on a lump sum basis.

11-03 PAYMENT. The lump sum price paid for clearing and grubbing shall include compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the Work involved in clearing and grubbing as required in the Special Provisions, shown on the Plans and specified herein, but excluding any work for which there is a pay item in the Contract.

SECTION 12: ROADWAY EXCAVATION AND GRADING

12-01 SCOPE. Roadway excavation and grading shall conform to Section 19, "Earthwork," of the Standard Specifications except as modified herein.

A form-fitting piece of plywood or other suitable material shall be placed on the base of each existing sanitary and storm drain manhole prior to beginning excavation to prevent dirt, rock, or other debris from entering the system. This shall be removed upon the completion of the Work.

Prior to excavation, the Engineer shall indicate certain gate valves to which access must be maintained at all times for emergency operation. It shall be the Contractor's responsibility to maintain the gate valve risers to grade and free of foreign material.

Excavation and grading for curb, gutter, sidewalk, driveways, and paved conform areas will be measured and paid for under Section 22, "Concrete, Curb, Gutter, Sidewalk, Driveway Valley Gutter and Island Cap," and Section 23, "Driveway, Walk and Roadway Conforms," respectively, of these Standard Provisions.

Roadway excavation shall include the removal of existing pavement where shown on the Plans.

12-02 MEASUREMENT. Roadway excavation and grading shall be measured by the square foot from lip of gutter to lip of gutter or to the limits of paving as shown on the Plans.

12-03 PAYMENT. The contract unit price paid per square foot for roadway excavation and grading shall include compensation for furnishing all labor, material, tools, equipment, and incidentals and for doing all work involved in excavating and grading the areas as required in the Special Provisions, shown on the Plans and specified herein.

SECTION 13: SURPLUS MATERIAL

13-01 SCOPE. Surplus material and construction debris remaining upon completion of the Work shall become the property of the Contractor, unless otherwise specified herein or noted on the Plans, and shall be removed from the Work site by the Contractor and disposed of off-site in a lawful manner.

13-02 MEASUREMENT. The disposal of surplus material shall be measured on a lump-sum basis.

13-03 PAYMENT. The lump-sum price paid for hauling and depositing surplus material shall be full compensation for furnishing all labor, material, tools, equipment, and incidentals and for doing all work involved in hauling and depositing the surplus material as required in the Special Provisions, shown on the Plans, and specified herein.

Where no bid item is provided for surplus material, the cost paid for hauling and depositing surplus material shall be considered as paid for in other items of Work, and no further compensation shall be allowed.

SECTION 14: SUBGRADE PREPARATION

14-01 SCOPE. Subgrade preparation shall conform to Section 19, "Earthwork," of the Standard Specifications, except as modified herein.

The Engineer may require that the basement material be scarified to a depth of six inches (6") below subgrade and recompacted in place. Whether scarification is required or not, the compacted subgrade material shall have a relative compaction of not less than ninety-five percent (95%) as determined by Test Method No. California 216. Immediately prior to placing subsequent layers of material thereon, the surface of the grading plane at any point shall not vary more than 0.05' above the grade established by the Engineer. No material shall be placed on the subgrade until the subgrade is in a condition satisfactory to the Engineer.

The Contractor shall be responsible for protecting the subgrade after it has been graded and compacted. The Contractor will not be allowed any additional compensation for the recompaction or retesting of the subgrade due to the Contractor's failure to provide adequate subgrade protection or failure to place the successive aggregate subbase, aggregate base, asphalt concrete pavement, or other materials within a reasonable time period as determined by the Engineer. The Contractor shall pay for all costs to retest the subgrade at no cost to the City.

14-02 MEASUREMENT AND PAYMENT. Full compensation for subgrade preparation shall be considered as included in the price paid for excavation, grading, scarification, compaction, and subgrade protection, and no additional compensation shall be allowed.

SECTION 15: AGGREGATE SUBBASE

15-01 SCOPE. Aggregate subbase shall conform to the requirements of Section 25, "Aggregate Subbases," of the Standard Specifications except as modified herein.

15-02 MATERIALS. The aggregate subbase shall be three-quarter inch (3/4") maximum and Class 2 (R-value 50 minimum) and shall be of the thickness as shown on the Plans. No waiver of R-value will be allowed. The aggregate subbase shall be untreated material.

15-03 CONSTRUCTION. The aggregate subbase may be spread by the use of motor graders as long as segregation of large or fine particles of aggregate is avoided and the material as spread is free from pockets of large or fine material. Segregated materials shall be remixed until uniform. Subgrade preparation for roadway as specified in Section 14, "Subgrade Protection," of these Standard Provisions is required at all times prior to placing aggregate subbase material. Aggregate subbase shall have a relative compaction of not less than ninety-five percent (95%) as determined by Test Method No. California 216.

The Contractor shall be responsible for protecting the aggregate subbase after it has been placed and compacted. The Contractor will not be allowed any additional compensation for the recompaction or retesting of the aggregate subbase due to the Contractor's failure to provide adequate aggregate subbase protection or failure to place the successive aggregate base, asphalt concrete pavement, or other materials within a reasonable time period as determined by the Engineer. The Contractor shall pay for all costs to retest the aggregate subbase at no cost to the City.

15-04 MEASUREMENT. Aggregate subbase shall be measured by the square foot.

15-05 PAYMENT. The contract unit price paid per square foot for aggregate subbase shall include full compensation for furnishing all labor, materials, tools, aggregate subbase protection, equipment, and incidentals and for doing all work involved in construction of aggregate subbase as required in the Special Provisions, shown on the Plans, and specified herein.

SECTION 16: AGGREGATE BASE

16-01 SCOPE. Aggregate base shall conform to the requirements of Section 26, "Aggregate Bases," of the Standard Specifications except as modified herein.

16-02 MATERIALS. The aggregate base shall be three-quarter-inch (3/4") maximum and Class 2 (R-value 78 minimum) and shall be of the thickness as shown on the Plans. No waiver of R-value will be allowed. The aggregate base shall be untreated material.

16-03 CONSTRUCTION. The aggregate base may be spread by the use of motor graders as long as segregation of large or fine particles of aggregate is avoided and the material as spread is free from pockets of large or fine materials. Subgrade preparation for roadway as specified in Section 14, "Subgrade Preparation," of these Standard Provisions is required when placing aggregate base on native material. Aggregate base shall have a relative compaction of not less than ninety-five percent (95%) as determined by Test Method No. California 216.

The Contractor shall be responsible for protecting the aggregate base after it has been placed and compacted. The Contractor will not be allowed any additional compensation for the recompaction or retesting of the aggregate base due to the Contractor's failure to place the successive asphalt concrete pavement or other materials within a reasonable time period as determined by the Engineer. The Contractor shall pay for all costs to retest the aggregate base at no cost to the City.

16-04 MEASUREMENT. Aggregate base under asphalt concrete paving shall be measured by the square foot in place and shall include that portion which may be required under Paragraph 23-01, "Asphalt Concrete Conforms," of these Standard Provisions.

16-05 PAYMENT. The contract unit price paid per square foot for aggregate base shall include full compensation for furnishing all labor, materials, tools, aggregate base protection, equipment, and incidentals and for doing all work involved in constructing base as required in the Special Provisions, shown on the Plans, and specified herein.

SECTION 17: ASPHALT CONCRETE PAVEMENT

17-01 SCOPE. Asphalt concrete shall conform to the requirements of Section 39, "Asphalt Concrete," of the Standard Specifications except as modified herein.

17-02 MATERIAL AND CONSTRUCTION. Asphalt concrete shall be Type B (medium) and shall be of the thickness as shown on the Plans or as specified in the Special Provisions. Maximum aggregate size shall be as follows:

Thickness AC	Max. Agg.
1" and 1-1/2" Surface Course	1/2"
2" and 2-1/2" Surface Course	3/4"
Base Course	3/4"

Surface course layer of asphalt concrete shall not exceed two and one-half inches (2-1/2") nor be less than one and one-half inches (1-1/2") in compacted thickness.

Compaction shall be a minimum of ninety-five percent (95%) of the laboratory maximum density of the asphalt concrete. Laboratory maximum density shall be determined by field samples submitted to a testing laboratory by the Engineer. Cost for testing shall be paid by the City.

Asphalt binder to be mixed with aggregate shall be paving asphalt, having a viscosity grade of AR-4000 and shall conform to the requirements of Section 92, "Asphalts," of the Standard Specifications.

The prime coat shall be liquid asphalt (SC-70) conforming to the requirements of Section 93, "Liquid Asphalts," of the Standard Specifications. As much liquid asphalt shall be applied to the prepared base as will soak in during a twenty-four (24) hour period without puddling. Sand cover shall be applied at driveways, intersections, and to the roadbed surface where continuous traffic access must be maintained.

Paint binder (asphaltic tack coat) shall be asphaltic emulsion Grade SS-1h and shall conform to the requirements of Section 94, "Asphaltic Emulsions," of the Standard Specifications. The rate of application shall be approximately 0.05 to 0.15 gallon per square yard. The exact rate of application will be determined by the Engineer. A one-to-one (1:1) dilution of SS-1h in water shall be used. It is important that the water be added to the emulsion, NOT the emulsion to the water, to prevent premature breaking.

Newly installed asphalt concrete shall be fog sealed in accordance with Section 19, "Fog Seal," of these Standard Provisions.

The Contractor is required to provide adequate protection of the subgrade, aggregate subbase, aggregate base, and other materials if the asphalt concrete pavement is not placed within a specified time as determined by the Engineer. Retesting of the subgrade, aggregate subbase, aggregate base, or other material will be required and will be paid for by the Contractor if the asphalt concrete pavement is not placed within a specified time as determined by the Engineer.

17-03 MEASUREMENT. Asphalt concrete shall be measured by the square foot in place or by the ton as determined from certified weight tickets furnished at the time of delivery to the Engineer in the field. At the end of each workday, total weight tags shall be delivered to the Engineer.

17-04 PAYMENT. The contract unit price paid per square foot or per ton in place shall be considered to be full compensation for furnishing and placing the asphalt concrete section, including the prime coat, paint binder, and sand cover, as required in the Special Provisions, shown on the Plans, directed by the Engineer, and specified herein. Fog seal shall be paid for under Section 19, "Fog Seal," of these Standard Provisions.

SECTION 18: BITUMINOUS SEALS

18-01 GENERAL. Bituminous seals shall conform to the requirements of Section 37, "Bituminous Seals," of the Standard Specifications except as modified herein.

18-02 SLURRY SEAL.

18-02.01 Scope. Slurry seal shall conform to the requirements of Section 37.2, "Slurry Seal," of the Standard Specifications except as modified herein.

18-02.02 Materials and Construction. Slurry seal shall be State Standard Type II.

Asphalt emulsion shall be cationic "quick setting" CQS1h grade and conform to Section 94, "Asphaltic Emulsions," of the Standard Specifications.

Aggregate shall meet the requirements of a Type II grading and conform to Section 37-2.02C, "Aggregate," of the Standard Specifications except as modified herein. Aggregate shall be Type II consisting of sound, durable crushed stone with no round particles, and shall be of volcanic in origin and black in color. The percentage composition by weight of the aggregate shall conform to the following gradings:

Sieve Sizes	Percentage Passing
1/8"	100
No. 4	90-100
No. 8	65-90
No. 16	40-70
No. 30	25-50
No. 200	5-15

The composition of dry aggregate in the slurry seal shall be 7.5% to 13.5% by weight of the theoretical asphalt content. Rate of application shall be 12 pounds to 18 pounds per square yard.

Slurry seal shall contain caboxilated polymer latex such as poly-chloroprene-methacrylic acid latex with polyvinyl alcohol or approved equivalent. The amount of latex shall be between two percent (2%) and three percent (3%) by weight of the asphalt residue content. Poly-chloroprene-methacrylic acid latex shall meet the following requirements:

Test	Requirement
Total Solid, % Min.	47
Average Particle Size, µm	0.30
pH at 77°F (25°C)	7
Brookfield Viscosity at 77°F (25°C)	350-500
Mechanical Stability, Min	650

The Contractor shall protect all manhole and valve covers from slurry seal by oiling or masking.

18-03 SEAL COATS.

18-03.01 Scope. The type of seal coat (fog, fine, medium fine, medium, coarse, or double) to be applied will be designated on the Plans or specified in the Special Provisions.

18-03.02 Materials and Construction. Pavement coating shall be of the type that may be applied cold. It shall be composed of a refined petroleum asphalt emulsion, fillers, and fibers, such as Overkote manufactured by Reed and Graham, Inc., or approved equal.

Screenings shall be of 30 mesh blast sand composed of clean, hard, durable, uncoated particles free of clay or organic matters.

Sealer shall be mixed to a uniform, free-flowing consistency. Water shall be added to obtain a semifluid consistency. The amount of water added shall not exceed fifteen percent (15%) by volume.

The Contractor shall remove all weeds and vegetation growing through the pavement surface to be sealed and spray the areas with suitable sterilant chemical. All surface cracks one-half inch (1/2") or wider in width shall be cleaned and filled with asphalt concrete. Cracks one-eighth inch (1/8") to one-half inch (1/2") wide shall be cleaned and filled with crack filler. Cracks smaller than one-eighth inch (1/8") in width shall be cleaned and filled with multiple coats of sealer. Remove oil and grease deposits by scraping, burning, or the use of detergent. When detergent is used, the pavement shall be thoroughly rinsed with water. After the oil or grease deposits are removed, the areas shall be sealed with oil-spot sealant prior to seal coat application.

A tack coat consisting of one part emulsified asphalt binder (SS-1h) and four parts water shall be uniformly applied over the entire pavement surface at the rate of 0.05 to

0.10 gallon per square yard. Sweep out any "pools" of wet binder remaining in depressions. Allow the tack coat to dry before applying seal coat.

No seal coating work shall be performed when the ambient temperature is below 55°F or above 110°F or within 24 hours prior to or during rainfall.

Sealer shall be applied in continuous parallel lines and spread immediately by use of rubber face squeegees or power spreader.

Pavement surface to be sealed shall receive two coats of sealer. A primary seal coat application of a minimum thirty (30) gallons of undiluted sealer per one thousand (1,000) square feet of area shall be done to smooth out the rough surface. The surface after this primary application shall be uniformly smooth and show no evidence of coarse or uneven texture. As soon as the primary application is dry to the touch and will not scuff when walked on, another application shall be made. After the second application, the surface shall be allowed at least twenty-four (24) hours for complete curing.

The Contractor shall protect all manhole and valve covers from seal coat by oiling or masking.

18-04 MEASUREMENT. Bituminous seals shall be measured by the square foot installed.

18-05 PAYMENT. The contract unit price paid per square foot in place shall be considered full compensation for furnishing and placing bituminous seal as required in the Special Provisions, shown on the Plans, directed by the Engineer, and specified herein.

SECTION 19: FOG SEAL

19-01 SCOPE. Fog seal shall conform to the requirements of Section 37, "Bituminous Seals," and Section 94, "Asphaltic Emulsion," of the Standard Specifications except as modified herein.

19-02 MATERIALS AND CONSTRUCTION. Paving asphalt shall be used for the bituminous base in manufacturing mixing-type emulsion SS-1h. Water shall be added to the emulsion in such proportions that the resulting mixture will not contain more than fifty percent (50%) of added water.

The rate of application of the diluted fog seal emulsion shall be approximately 0.10 gallon per square yard on new asphalt concrete and 0.05 gallon per square yard on existing asphalt concrete. The exact rate of application will be determined in the field by the Engineer.

19-03 MEASUREMENT. Fog seal shall be measured by the ton of asphaltic emulsion and water mixture as determined from certified weight tickets furnished at the time of delivery to the Engineer in the field. At the end of each workday, total weight tags shall be delivered to the Engineer.

19-04 PAYMENT. The contract unit price paid for fog seal per ton in place shall be considered to be full compensation for furnishing all labor, tools, equipment and material and performing all work necessary to complete the fog seal as required in the Special Provisions, shown on the Plans, and specified herein.

SECTION 20: HEATING AND REMIXING OF EXISTING ASPHALT PAVEMENT

20-01 SCOPE. This work will consist of heating and scarifying existing asphalt concrete pavement in one operation, followed immediately by an application of asphalt rejuvenating agent conforming to Section 21, "Asphalt Rejuvenating Agent," and recompaction of the asphalt concrete pavement.

20-02 ASPHALT HEATER SCARIFYING EQUIPMENT. The asphalt heater scarifier shall be a self-contained machine specifically designed to reprocess upper layers of bituminous pavements without excessive smoke. It shall burn propane or butane, have a minimum rating of 15,000,000 BTU output per hour, and shall comply with the requirements of the Bay Area Air Quality Management District.

The machine shall consist of a heating unit with insulated combustion chamber and scarifier. The scarifier shall be adjustable in width from eight feet (8') to twelve feet (12'). The height of the combustion chamber above the pavement shall be readily adjustable. The heater furnace shall be positioned and controlled by side shifting and rear wheel steering to heat areas divergent from the machine's longitudinal axis. The scarifier attachment shall be divided into sufficient sections individually controlled to conform with the existing cross-section, including inverted sections, and shall provide satisfactory protective devices to ensure that no damage will be done to manholes, water valves or other existing structures. The scarifier shall be pressure loaded and consist of two (2) rows of spring-equalized, hydraulic or pneumatic scarifier leveling rakes with removable teeth incorporating a release for manholes and utility covers protection. The spacing of the teeth shall be such that the aggregate be remixed by spinning or tumbling. Other means of mechanical scarification may be used with the approval of the Engineer. The machine shall be insulated and shielded in such a manner as to ensure complete protection against scorching to trees, shrubbery, vegetation, and miscellaneous structures.

The heater scarifier shall have rubber tires installed over iron wheels or other method approved by the Engineer, when the travel distance between Work sites is one thousand feet (1,000') or greater.

All equipment, tools, and machines shall be subject to the approval of the Engineer and shall be maintained in a satisfactory working condition throughout the construction period. Equipment not meeting the specifications shall be rejected. Rejected equipment shall be removed from the job site immediately and replaced with suitable types at no extra cost to the City.

20-03 PREPARATION OF PAVEMENT. Immediately prior to the heating and remixing operation, the Contractor shall remove all raised pavement markers within the limit of Work and sweep the streets with a power broom to remove dirt, debris and other loose materials from the pavement surface. Where necessary, hand-brooming or other cleaning methods, in addition to

the power brooming, shall be required to bring the entire pavement surface to a clean, suitable condition ready for heater remixing process.

20-04 CONSTRUCTION. The heating and scarifying machines shall be utilized in tandem. A minimum of two (2) machines with a combined heating chamber length of thirty-six feet (36') shall be required. Additional machines may be used at the Contractor's option, but only the rakes of the last heating unit in the heating train shall scarify.

At the start of the heater remixing operation, the ambient temperature shall be at least 50°F and rising. If the ambient temperature is 50°F and falling during the process, the heater remixing operation shall cease.

The asphalt pavement surface to be treated shall be evenly heated and scarified to a minimum depth of one inch (1") by continuously moving the heating-scarifying machines. To ensure this result, tests will be performed by weighing the scarified material. For testing purposes, 1 square foot of scarified material shall weigh at least 12 pounds (based on 144 lb./cu.ft. of existing material). Scarification shall be deemed acceptable when the moving average of three consecutive random weight tests per hour satisfy the 12 lb./square foot requirement. Alternatively, the required depth of scarification may be determined by insertion of a properly calibrated probe or other suitable stabbing instrument into the uncompacted pavement. If the Contractor is unable to achieve the required depth on the first pass during the heating and scarifying operation, the City shall have the right to require a second pass or to delete any or all work on the street upon which the specified depth of scarification is not achieved. No adjustment in the contract unit prices will be allowed in the event of such deletion. The second pass, if required, shall not be considered for payment.

The path of the rakes shall not be wider than the heating chamber. A minimum ninety percent (90%) of the pavement aggregate to be remixed shall be moved by spinning or tumbling to ensure that existing cracks are filled. The scarified materials immediately behind the scarifier shall not be lower than 220°F or higher than 300°F when measured three (3) minutes following the scarification. The hot, loose, scarified material shall be spread evenly across the treated surface. The aggregates, after the heating and scarifying, shall not pulverize, spall, or break.

Care shall be taken to avoid damaging existing pavements, sidewalk, curb, gutter, trees, bushes, shrubs, and other improvements along the street being treated. The pavement that is not part of the project shall not soften more than six inches (6") beyond the Work limit. During the heater remixing operation, the Contractor shall thoroughly spray all trees, shrubs, bushes and other vegetation along the street with water to protect them from being scorched by the heat. If any pavement not being overlaid is scored or otherwise damaged by the transport of the heater furnace machinery, full cost of repair will be borne by the Contractor. The minimum acceptable repair work will be to fog seal the entire area of the damaged pavement and replace the damaged pavement markers and street structures. If necessary, more extensive repair work,

as determined by the Engineer, will be done at the Contractor's expense. Other improvements, if damaged, shall be repaired or replaced to the satisfaction of the Engineer.

Immediately following the heating, scarifying and remixing process, and while the material is hot, an asphalt rejuvenating agent shall be applied in accordance with Section 21, "Asphalt Rejuvenating Agent for Heater Remix Operations," of the Standard Provisions.

Immediately following the asphalt rejuvenating and while the remixed surface is in a softened state, a twelve (12) ton or heavier double-steel-drum or equivalent roller approved by the Engineer shall be used for compaction. No surface shall be allowed to stand after heating for such a period of time as to prevent proper compaction and bonding of remixed material. Rolling shall be performed in a manner that will preserve the wedge cut at the lip of gutter or face of curb.

Unless otherwise specified, the Contractor shall overlay the streets within forty-eight (48) hours following the heating and remixing operation.

20-05 MEASUREMENT. Heater remix shall be measured by the square foot.

20-06 PAYMENT. The contract unit price paid per square foot of heater remix pavement shall constitute full compensation for furnishing all labor, tools, materials and equipment; including heating, scarifying, applying asphalt rejuvenating agent, and compacting to complete the Work as required in the Special Provisions, shown on the Plans, and specified herein.

SECTION 21: ASPHALT REJUVENATING AGENT FOR HEATER REMIX OPERATIONS

21-01 MATERIALS AND CONSTRUCTION. The asphalt rejuvenating agent (Cationic Maltenes Emulsion) shall be composed of a petroleum resin oil base uniformly emulsified with water. The asphalt rejuvenating agent shall conform to the following requirements:

Specification Designation	Test Method	Requirements
Viscosity, S.F., at 77°F., Seconds	AASHTO T59	15-40
Residue - % Min.	Calif. 351	60
Cement Mixing Test, Percent	AASHTO T59	Zero
Sieve Test* (Distilled Water) % Max.	AASHTO T59	0.10
Particle Charge Test	Calif. 343A	Positive
Tests on Residue from Calif. 351 Viscosity, CS, 140°F	ASTM D445	100- 200
Asphaltenes, % Max.	Calif. 352	0.75

* Test procedure identical with AASHTO T59 except that distilled water shall be used in place of two percent (2%) sodium oleate solution.

Water shall be added to the material and mixed therewith in such a proportion that the resulting mixture shall have the following approximate proportions:

1 Part Water to 2 Parts of Emulsion

The exact quantity of added water will be determined by the Engineer.

Asphalt rejuvenating agent shall be applied by means of a distributor truck. Distributor trucks shall be of the pressure type with insulated tanks and in general shall conform to the requirements stated in Section 93-1.03, "Mixing and Applying," of the Standard Specifications.

The asphalt rejuvenating agent shall not be applied when the atmospheric temperature is below fifty degrees (50°) Fahrenheit. Asphalt rejuvenating agent shall be placed within twenty-four (24) hours after the placement of asphalt concrete.

The rate of spread for the diluted asphalt rejuvenating agent shall be approximately 0.05 gallon per square yard. The exact rate of application shall be determined by the Engineer. In the event that the pavement surface to be open to traffic becomes slippery after the application of asphalt rejuvenating agent, a sand coat shall be applied to absorb the excess asphalt rejuvenating emulsion.

21-02 MEASUREMENT. The quantity of asphalt rejuvenating agent per ton to be paid for shall be determined from a weight certificate which shall be furnished for each truckload delivered, certifying the net weight. At the end of each workday, total weight tags shall be delivered to the Engineer from the material supplier.

21-03 PAYMENT. The contract price paid per ton of diluted asphalt rejuvenating agent shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, including, but not limited to, sweeping streets, flagmen, sand, barricades, and "No Parking" signs and for doing all the Work in placing the material, complete and in place, all as required in the Special Provisions, shown on the Plans, specified in these Standard Provisions, and directed by the Engineer.

SECTION 22: CONCRETE CURB, GUTTER, SIDEWALK, DRIVEWAY, VALLEY GUTTER, AND ISLAND CAP

22-01 SCOPE. Portland cement concrete curb, gutter, sidewalk, driveways, valley gutters, and island caps shall be constructed as shown on the Standard Details at the locations and to the dimensions shown on the Plans and specified herein.

22-02 MATERIALS.

22-02.01 Concrete. Concrete shall conform to Section 90, "Portland Cement Concrete," of the Standard Specifications except as modified herein.

The classes of concrete and the combined aggregate grading shall be dependent upon the purpose for which the concrete is intended and shall conform to the table below:

Types of Concrete Work	Concrete Class	Combined Aggregate Grading	Min. Cem (Sks/CY)	Max. w/c Ratio (Gal/Sack)	Max. Slump (Inches)	Min. Str. Test Cyl. 28 Days (PSI)
Curb, Gutter, Sidewalks, Driveways, and Island Caps	B	1-1/2" Max.	5	7.0	3	2,500
Valley Gutters	A	1-1/2" Max.	6	6.0	3	3,300

22-02.02 Adhesives. Adhesives shall conform to Section 95, "Epoxy," of the Standard Specifications.

22-02.03 Lampblack. Lampblack shall be of approved quality mixed at the rate of one-half (1/2) pound per cubic yard of concrete. In the case of island curb, gutter, and cap, the lampblack shall be omitted.

22-02.04 Joint Filler. Premolded joint fillers shall conform to specifications of ASTM Designation D1751 and shall be at least three-eighths inch (3/8") wide.

22-02.05 Dowels. Steel dowels shall conform to ASTM Designation A615.

22-02.06 Bar Reinforcement. Bar reinforcement shall conform to Section 52, "Reinforcement," of the Standard Specifications.

22-02.07 Curing Compound. Curing compound shall conform to the specifications of AASHTO Designation M148, Type II, clear, and shall consist of a practically colorless impervious liquid which will thoroughly seal the surface of the concrete and will not impart a slippery surface thereto. The quality and the quantity to be used shall be approved by the Engineer. The use of any membraned material which would impart a slippery surface to the concrete or alter its natural color will not be permitted. The colorless, impervious liquid shall contain not less than twenty-five percent (25%) solids.

22-03 SUBGRADE PREPARATION. The subgrade shall be constructed true to grade and cross-sectioned as shown on the Plans. The required thickness of aggregate subbase shall be placed in accordance with the Standard Details and compacted to ninety-five percent (95%) relative compaction under the curb, gutter, and driveway areas and ninety percent (90%) relative compaction under the sidewalk area as tested in conformance with Test Method No. California 216.

22-04 EXISTING CONSTRUCTION. Where the Plans provide for the reconstruction of a portion of an existing curb, gutter, sidewalk, or driveway, the existing section shall be cut to a minimum depth of one and one-half inches (1-1/2") with an abrasive-type saw at the first scoring line at or beyond the planned joint and the entire section to be reconstructed shall be removed. The new work shall adjoin the old work at this line. If the old work is damaged beyond this line in removing the old concrete, a new line shall be cut at the next score line beyond the line of damage, and the damaged concrete shall be removed and replaced at no additional cost. Where new concrete work conforms to existing concrete work, steel dowels consisting of No. 4 reinforcement bars shall be placed in existing curb, sidewalk, and driveway sections in accordance with Paragraph 22-09.03, "Sidewalks, Driveways, Island Caps, and Valley Gutters" of these Standard Provisions.

22-05 FORMS. Forms shall be true and shall have a smooth, straight upper edge. Metal forms may be used upon approval by the Engineer.

Timber forms shall be surfaced on the side placed next to the concrete and shall not be less than one and one-half inches (1-1/2") thick after being surfaced except on curb returns, horizontal curves, and vertical curves where laminated timber forms, benders, or thin plank forms may be used.

The form boards of the exposed face of curb shall be milled to the proper radius at the lower inside corner.

Front face forms shall not be removed in less than two (2) hours after the concrete has been placed. In no event shall forms be removed while the concrete is sufficiently plastic to

slump. Side forms for sidewalks, island caps, valley gutters, and driveways shall not be removed in less than thirty-six (36) hours after the concrete has been placed.

22-06 PLACING CONCRETE. No concrete shall be placed until the forms have been checked by the Engineer and unless the Engineer is present. No concrete shall be placed when the air temperature is below forty degrees Fahrenheit (40°F) or during rain. During weather when frosts may be expected, the Contractor shall carefully cover recently deposited concrete with burlap, straw, or provide for other approved curing method. No concrete shall be placed within three (3) hours of sunset. Before placing concrete, the aggregate base or subbase shall be properly moistened with water, and the form faces shall be oiled.

Concrete shall be placed and compacted in forms without segregation. After placing, the concrete shall be consolidated sufficiently to produce a dense mass, struck off, and floated. Final finishing operations shall not proceed until all bleed water has evaporated from the surface. Sprinkling of dry cement to absorb excessive surface moisture shall not be allowed.

The area around utility poles, electroliers, wooden street sign posts, drop inlets, and hydrants shall be blocked out during the initial placing of concrete.

22-07 EXPANSION JOINTS, CONTROL JOINTS, AND SCORE MARKS. Expansion joints shall be placed in the concrete curbs, gutters, sidewalks at not more than fifty foot (50') intervals, and at each side of the driveways and in all returns. Expansion joints shall be placed at right angles to the curb or sidewalk line and extend through the entire thickness of the concrete. Where sidewalk is constructed against concrete curbs, the joints shall be in line with the joints through the curb. Concrete adjacent to expansion joints shall be finished with an edger tool.

Expansion joints shall be placed around utility poles, drop inlets, and hydrants so that no concrete is in contact with the appurtenance.

Where existing sidewalks and/or curb and gutter are to be removed and replaced with a driveway, no expansion joints will be required at the cold joints.

Where electroliers are located back of sidewalk, expansion joint material shall be placed at the back of walk between the sidewalk and the electrolier base.

Bases for electroliers within the sidewalk shall be completely separated from the sidewalk by felt roofing paper.

Locations for wooden street sign posts, including street name signs which are to be installed in concrete sidewalk or island cap areas, shall be blocked out in accordance with the Standard Details.

Control joints, scored at least one-fifth (1/5) the depth of concrete being placed shall be constructed at intervals not to exceed ten feet (10') in concrete curbs, gutters, sidewalks,

centerline of driveways, and island caps. The width of the control joints shall not exceed one-fourth inch (1/4") and the edges of control joints shall be finished with a "T" bar. All joints shall be scored at right angles to the curb or sidewalk line.

The sidewalk between control joints shall be divided by transverse score marks placed at nominal thirty-inch (30") intervals and longitudinal score marks placed at uniform intervals not to exceed thirty-six inches (36"), unless otherwise shown on the Plans or directed by the Engineer. All score marks shall be straight, uniformly spaced, one-fourth inch (1/4") in depth, and left in a cleanly rounded condition.

Maximum delay between successive pours shall not exceed the time of initial set unless a construction joint is installed.

22-08 CURING. As soon as the concrete is set, it shall be cured for a period of at least seventy-two (72) hours by applying a suitable cover that will keep all exposed surfaces continually damp or by spraying with an approved impervious membrane curing compound.

The Contractor shall protect from damage, including graffiti marks, all completed Work. Special emphasis shall be placed on protecting the edge of gutter from being damaged or gouged during grading operations. The Contractor shall keep all equipment off new or existing sidewalks. Repairs shall be made by removing and replacing the entire unit between score lines or joints. All discolored concrete shall be cleaned to a uniform color. Repairs and cleaning of new concrete shall be at the expense of the Contractor.

22-09 CONSTRUCTION. Where new curb and new gutter are shown on the Plans adjacent to new sidewalk, the curb, gutter, and sidewalk (monolithic pour) shall be constructed together as a unit.

22-09.01 Curb and Gutter (Also Curb Only). Where new curb and new gutter are shown on the Plans, they shall be constructed together as a unit.

Immediately after removing the front curb forms, the face of the curb shall be troweled smooth and then finished with a steel trowel until a dense, hard, smooth surface has been obtained.

The top surfaces of the curb and gutter shall be finished with a steel trowel to a dense, hard, smooth surface and a straight edge ten feet (10') long is laid on the top or face of the curb or on the surface of gutters; the surface shall not vary more than 0.01' from the edge of the straight edge except at grade changes or curves. After the top surface of the curb has been finished to a dense, hard, smooth surface, it shall be given a final brushed finish using a fine, dry brush with brush strokes parallel to the line of the curb.

Where the grade is one-half percent (1/2%) or flatter, a water flow test will be required to detect depressions in the gutter.

Concrete curbs to be constructed directly over an existing pavement shall be anchored to the pavement by three-quarter-inch (3/4") (minimum) round steel dowels ten inches (10") long on four-foot (4') centers set in cement grout in the existing pavement prior to constructing the curb.

Where new curb and gutter is installed adjacent to existing pavement, the existing pavement within twelve inches (12") of the edge of gutter shall be neatly sawcut, removed, and replaced with new pavement. The new pavement shall be installed after the curb and gutter have been constructed and shall have the same structural sections and layer thickness as the existing pavement. However, deep lift asphalt concrete may be used provided that the deep lift asphalt concrete pavement has the same gravel equivalent as the existing pavement.

"S" and "W" shall be stamped in the face of curb where sewer laterals and water services pass under the curb.

22-09.02 Extruded Curb. Extruded curb construction shall conform to Section 73-1.05B, "Extruded or Slip-Formed Curb Construction," of the Standard Specifications and Paragraph 22-09.01 above. Extruded curb will only be allowed when specified. The extrusion of monolithic curb, gutter and sidewalk shall not be permitted.

The combined concrete aggregate shall be three-eighths inch (3/8") maximum grading.

22-09.03 Sidewalks, Driveways, Island Caps, and Valley Gutters. Sidewalks, driveways, island caps, and valley gutters shall be formed in place. The fresh concrete shall be struck off and compacted until a layer of mortar has been brought to the surface. The surface shall be finished to grade and cross-section with a wood or aluminum float, troweled to a dense, hard, smooth finish with a steel trowel, and finished with a fine, wet, and soft brush with brush strokes transverse to the line of traffic.

The finished surface shall not vary more than 0.01' from a ten-foot (10') straight edge, except at grade changes, and the finished surface shall be free from blemishes.

When existing sidewalk is to be removed and replaced, the new concrete is to be tied to the remaining concrete curb, sidewalk, and driveway sections with dowels. The dowels shall be No. 4 with a minimum length of nine inches (9") and shall be installed at eighteen inches (18") on center along the back of the remaining walk and/or three feet (3') on center on the back of the remaining curb. The dowels are to be inserted to a minimum penetration of four inches (4") into the remaining sidewalk and/or curb and shall fit tightly into the existing concrete.

Three No. 4 steel reinforcing bars shall be placed as longitudinal reinforcement in all valley gutters.

22-10 MEASUREMENT. For the purpose of determining final pay quantities, sidewalks, driveways, island caps, and valley gutters will be calculated to the nearest square foot and curb and gutter to the nearest linear foot.

22-11 PAYMENT. The price paid per linear foot of each type of concrete curb and gutter and per square foot of sidewalk, driveway, island cap, and valley gutter shall include full compensation for furnishing all labor, materials, water, tools, and equipment; doing all the work, including excavation, filling, forming, and scoring; furnishing and placing expansion joint filler, aggregate subbase, concrete steel dowels where required, and adhesives; and doing all the necessary Work of constructing the various items of Work complete in place as required in the Special Provisions, shown on the Plans, and specified herein.

SECTION 23: DRIVEWAY, WALK, AND ROADWAY CONFORMS

23-01 ASPHALT CONCRETE CONFORMS.

23-01.01 Scope. Asphalt concrete conforms shall be constructed at the locations and to the dimensions shown on the Plans and specified herein.

23-01.02 Material. Materials for asphalt concrete conforms shall be as specified in Section 16, "Aggregate Base," and Section 17, "Asphalt Concrete Pavement," of these Standard Provisions.

23-01.03 Construction. Where back of walk, depressed curb, or new pavement elevation is above adjacent existing asphalt concrete, asphalt concrete shall be placed on the existing to limits specified by the Engineer so as to provide a smooth conform. The existing asphalt concrete shall be thoroughly cleaned and a paint binder (tack coat) shall be applied to vertical surfaces of Portland cement concrete or existing asphalt surfacing that will come in contact with the asphalt concrete conform.

Where back of walk, depressed curb, or new pavement elevation is below adjacent existing asphalt concrete, the existing pavement shall be sawcut back to a point as specified on the drawings or by the Engineer so as to provide a smooth transition between existing asphalt and new construction. The areas so cut back shall be excavated and graded so as to provide for the placing of six inches (6") of aggregate base and two inches (2") of asphalt concrete. A prime coat of liquid asphalt SC-70 shall be applied to the aggregate base and a paint binder shall be applied to vertical surfaces of Portland cement concrete and to cleaned surfaces of existing asphalt surfacing that will come in contact with the asphalt concrete conform. The asphalt concrete conform will be laid over the prime aggregate base and feathered over the existing asphalt concrete as required by the Engineer.

Headerboards shall be permanently installed along any unbordered edges of asphalt concrete driveway conforms. Headerboards shall conform to the requirements of Paragraph 25-03, "Headerboards," of these Standard Provisions.

23-01.04 Measurement. Asphalt concrete conforms shall be measured by the square foot.

23-01.05 Payment. The contract unit price per square foot for asphalt concrete conforms shall include full compensation for furnishing all materials, labor, equipment, and performing all work necessary, including sawcutting, headerboards, excavation, grading, prime coat, and paint binder, to complete the asphalt conforms as required in the Special Provisions, shown on the Plans, directed by the Engineer and specified herein. The placing of six-inch (6")

aggregate base, where required, will be paid for under the bid item for six-inch (6") Class 2 aggregate base and conform to Section 16, "Aggregate Base," of these Standard Provisions.

23-02 CONCRETE DRIVEWAY AND WALK CONFORMS.

23-02.01 Scope. Concrete driveways and walk conforms shall be constructed at the locations and to the dimensions shown on the Plans and specified herein.

23-02.02 Materials. Materials for concrete driveway and walk conforms shall be as specified in Section 22, "Concrete Curb, Gutter, Sidewalk, Driveway, Valley Gutter, and Island Cap," of these Standard Provisions.

23-02.03 Construction. Existing concrete driveways or walks shall be cut with a concrete saw to provide a neat line for conforming with new concrete driveway approach or walk. Where necessary, the existing concrete driveway or walk shall be removed to a point sufficiently behind the back of walk line to provide a smooth transition.

All concrete driveway conforms shall be six-inch (6") Portland cement concrete laid on six-inch (6") Class 2 aggregate subbase and concrete walk conforms shall be four-inch (4") Portland cement concrete laid on three-inch (3") Class 2 aggregate subbase conforming to Section 16, "Aggregate Base," and Section 22, "Concrete Curb, Gutter, Sidewalk, Driveway, Valley Gutter, and Island Cap," of these Standard Provisions.

Concrete conforms shall match existing concrete as to scoring pattern, color, and texture.

23-02.04 Measurement. Concrete driveway and walk conforms shall be measured to the nearest square foot as actually constructed.

23-02.05 Payment. The contract unit price per square foot for concrete driveway and walk conforms shall include full compensation for furnishing all materials, labor, equipment, and performing all work necessary, including sawcutting, excavation, grading, prime coat, and aggregate subbase, to complete the concrete driveway and walk conforms as required in the Special Provisions, shown on the Plans, directed by the Engineer, and specified herein.

23-03 CONFORMS TO GRAVEL DRIVEWAYS.

23-03.01 Scope. Where existing driveways have a gravel or rock surfacing, they shall be made to conform with the new driveway approach by the addition of two-inch (2") asphalt concrete on six-inch (6") Class 2 aggregate base. Where necessary, a portion of the existing driveway shall be excavated as shown on the Plans and directed by the Engineer and replaced with the above-described structural section. Material, measurement, and payment shall conform to Paragraph 23-01, "Asphalt Concrete Conforms," of these Standard Provisions.

SECTION 24: TRENCH EXCAVATION, BACKFILL, AND RESURFACING

24-01 SCOPE. This work shall consist of trench excavation, backfill, and resurfacing, all as required for the installation of underground utilities and shall be in accordance with these Standard Provisions and the Standard Details.

24-02 MATERIALS.

24-02.01 Select Backfill Material. Select backfill material shall be sand or granular material of the quality herein specified. Select backfill material shall have a size and gradation falling within the following limits:

Sieve Size	Percentage Passing Sieve
1/2"	100
No. 4	50-100
No. 200	15 Maximum

The minus two hundred (-200) portion of the material expressed as a percentage multiplied by the Plasticity Index shall not exceed one hundred (100). The material shall be compacted to a relative compaction of ninety percent (90%) as determined by Test Method No. California 216.

24-02.02 Aggregate Base (AB). Aggregate base shall be Class 2 as specified in Section 16, "Aggregate Base," of these Standard Provisions.

24-02.03 Asphalt Concrete (AC). Asphalt concrete shall be Type B of the one-half inch (1/2") maximum (medium) grading as specified in Section 17, "Asphalt Concrete Pavement," of these Standard Provisions.

24-02.04 Controlled Density Fill (CDF). Controlled density fill (CDF) shall consist of a fluid, workable mixture of aggregate, cement, and water. CDF may be accepted in lieu of sand or granular fill as a nonstructural backfill material only upon written approval by the Engineer, unless otherwise specified in these Standard Provisions. In no case shall CDF be used for structural backfill.

Cement shall meet the standards as set forth in ASTM C-150 for Type II Cement.

Fly ash shall meet the standards as set forth in ASTM C-618 for Class F Pozzalans. The fly ash shall not inhibit the entrainment of air.

Air entrainment agent shall meet the standards as set forth in ASTM C-260.

Coarse aggregate shall be no larger than three-eighths inch (3/8") (pea gravel) top size, nor shall the three-eighths inch (3/8") aggregate comprise more than forty percent (40%) of the total aggregate content. Fine aggregate shall be commercial quality concrete sand and not comprise more than seventy percent (70%) of the total aggregate content.

Water shall be free from oil, slats, and other impurities which would have an adverse effect on the quality of the backfill material.

The aggregate, cement, and water shall be proportioned either by weight or by volume. Not less than ninety (90) pounds (1-sack) nor more than one hundred eighty (180) pounds (2-sacks) of cement shall be used for each cubic yard of material produced. The water content shall be sufficient to produce a fluid, workable mix that will flow and can be pumped without segregation of the aggregate while being placed. Entrained air content shall be a minimum of eight percent (8%). The material produced shall reach unconfined compressive strengths from 50 psi to a maximum of 150 psi at twenty-eight (28) days.

Materials for CDF shall be thoroughly machine-mixed at a batch plant and delivered to the job site by means of transit mixing trucks. Material tags from the CDF supplier shall be provided to the Public Works Inspector by the end of each working day. CDF shall be placed in the work within one (1) hour after mixing.

24-03 TRENCH EXCAVATION.

24-03.01 Existing Paving. Prior to excavation, the existing pavement shall be neatly sawcut along the limits of the proposed excavation. Existing pavement over the trench shall be removed and hauled away from the job site. If a longitudinal pavement joint or edge of pavement is located within three feet (3') of the limit of the excavation, the Contractor shall remove and replace all intervening pavement after completing the trench backfill and prior to the installing permanent trench surfacing. All utilities shall be laid in open trench and/or tunnels as indicated on the Plans or as directed by the Engineer.

24-03.02 Trench Width. The allowable trench width at the top of pipe shall conform to the following:

Pipe Type (Abbreviation)	Trench Width (Maximum)
Vitrified Clay Pipe (VCP) Polyvinylchloride Pipe (PVC) Concrete Cylinder Pipe (CCP) Ductile Iron Pipe (DIP) Welded Steel Pipe (WSP)	Outside Diameter of Barrel + 18”
Corrugated Metal Pipe (CMP) Reinforced Concrete Pipe (RCP)	Outside Diameter of Barrel + 24”

The maximum trench width shall be inclusive of all shoring.

Whenever the maximum allowable trench width is exceeded for any reason, the Contractor shall, at their 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 barrel be less than six inches (6”).

24-03.03 Pipe Bedding. The trench shall be excavated below the grade of the pipe bottom the following minimum depths:

Pipe Type (Abbreviation)	Depth
Vitrified Clay Pipe (VCP)	6”
Polyvinylchloride Pipe (PVC)	6”
Ductile Iron Pipe (DIP)	6”
Welded Steel Pipe (WSP)	6”
Concrete Cylinder Pipe (CCP)	6”
Corrugated Metal Pipe (CMP)	6”
Reinforced Concrete Pipe (RCP)	6”

Sufficient “Select Backfill Material” as specified above 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 percent (90%) as determined by Test Method No. California 216. The “Select Material” shall be shaped by hand. Holes for bells and fittings shall be excavated by hand. It is the intention of these requirements to provide uniform bearing under the full length of pipe to a width of at least sixty percent (60%) of the external diameter.

When the trench bottom is unstable due to a wet or spongy foundation, the trench bottom must be stabilized with gravel or crushed rock. If the unstable condition was

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 or crushed rock needed 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. Payment for removal of any soft material not caused by operations of the Contractor and replacement with gravel or crushed rock shall be paid for as extra work.

24-03.04 Excavated Material. Material excavated in streets and roadways shall be laid alongside the trench and kept trimmed so as to cause as little inconvenience as possible to public traffic. All material excavated in streets or roadways and not required for backfill shall be immediately removed and disposed of by the Contractor in accordance with Section 13, "Surplus Material," of these Standard Provisions. No surplus material shall be placed on private property unless written permission, signed by the owner of the property, is furnished to and approved by the Engineer.

24-03.05 Open Trench. No more than three hundred feet (300') of trench shall be open at any one time. Not more than thirty feet (30') of trench shall be left open at the end of the day or as the Engineer may direct.

a. At all street crossings, existing driveways, water gate valves, and fire hydrants, the Contractor shall make provisions for trench crossings and for free access either by backfill or temporary bridges as the Engineer may direct.

b. Provisions shall be made whereby all surface runoff water can flow uninterrupted in gutters or drainage channels.

24-03.06 Bracing and Shoring. Excavation and trenches shall be supported and excavation operations conducted in accordance with Article 6, "Excavations, Trenches and Earthwork," of the State Division of Industrial Safety Construction Safety Orders, as amended. Attention is directed to the requirements in Paragraph 5-03, "Trench Excavation Safety Plans," of these Standard Provisions.

During backfilling, the bottom of the shoring shall be kept above the level of the backfill at all times.

24-03.07 Grade Control. All storm drains, water mains and sanitary sewers shall be accurately laid to grade. An offset string line (or other acceptable method) should be stretched between accurately surveyed grade stakes set at intervals not to exceed twenty-five feet (25'). The Contractor shall make available to the inspector adequate equipment to check both the grade of the string line prior to excavation and the grade of the pipe prior to backfilling. Any deviation from the proposed grade shall be approved by the Engineer, and the Contractor shall make the necessary corrections before any pipe is laid.

24-04 TRENCH BACKFILL. Prior to pipe laying and trench backfill, the Engineer shall inspect and approve the condition of the trench.

24-04.01 Initial Backfill. "Select Backfill Material" as specified in Paragraph 24-02.01, "Select Backfill Material," of these Standard Provisions shall be used for initial backfill unless CDF has been approved by the Engineer as a backfill material or as otherwise specified in these Standard Provisions. When CDF has been approved as a backfill material, steel dowel stakes (rebar) or other material approved by the Engineer may be used to secure the pipes to the bottom of the trench to prevent the pipes from floating in the CDF. After the pipe has been properly laid and inspected, select backfill material shall be placed on both sides of the pipe to such a depth that after thorough consolidation by jetting or hand-tamping, the final depth of select backfill material shall be as follows:

Pipe Type (Abbreviation)	Depth
Vitrified Clay Pipe (VCP) Polyvinylchloride Pipe (PVC) Ductile Iron Pipe (DIP) Welded Steel Pipe (WSP) Concrete Cylinder Pipe (CCP)	12" Above Top of Pipe
Corrugated Metal Pipe (CMP) Reinforced Concrete Pipe (RCP)	1/2 Outside Diameter of Pipe (Pipe Springline)

24-04.02 Initial Backfill Compaction.

a. Jetting may be allowed for compacting sand backfill when approved by the Engineer. When jetting, it is important that proper precautions be taken to prevent floating of the pipe. The Contractor shall be wholly responsible for damage resulting from neglect of these precautions. After consolidation by jetting, the relative compaction of the initial backfill material shall be not less than ninety percent (90%) as determined by Test Method No. California 216.

b. At the Contractor's option, the initial backfill may be compacted by hand-tamping in lieu of jetting. The use of machine tampers will not be permitted. The initial backfill material shall be hand-tamped in layers not exceeding four inches (4") in uncompacted depth. The final depth of compacted initial backfill shall be as noted above. After hand-tamping, the relative compaction of the initial backfill material shall be not less than ninety percent (90%) as determined by Test Method No. California 216.

24-04.03 Subsequent Backfill.

a. Above the level of initial backfill, the trench shall be backfilled with select imported material. Subsequent imported backfill within two and one-half feet (2-1/2') of the finished surface grade or one and one-half feet (1-1/2') of the finished subgrade, whichever is lowest in elevation, shall be mechanically compacted by tamping or rolling. Subsequent imported backfill below two and one-half feet (2-1/2') of the finished surface grade or one and one-half feet (1-1/2') of the finished subgrade, whichever is lowest in elevation, shall be compacted by jetting or mechanical compaction.

1. If the Contractor elects to compact by jetting, the backfill material shall be placed in layers not exceeding four feet (4') in loose depth, each layer being thoroughly and uniformly wetted by means of a jet pipe of sufficient length to reach the bottom of the layer being compacted.

2. If the Contractor elects to compact by tamping or rolling, the backfill material shall be placed in layers not exceeding eight inches (8") in loose depth, each layer being thoroughly compacted before succeeding layers are placed. The use, setup, and operation of free-fall hammers, vibratory plates, and mini-sheep's foot mechanical compactors is subject to the Engineer's approval. The use of double acting mechanical compactors will NOT be permitted.

b. Subsequent backfill placed by jetting or by tamping or rolling shall be free from stones or lumps exceeding three inches (3") in greatest dimension, vegetable matter, or other unsatisfactory material and shall be compacted to a relative compaction of not less than ninety percent (90%) as determined by Test Method No. California 216, except that the relative compaction shall not be less than ninety-five percent (95%) within two and one-half feet (2-1/2') of finished permanent surfacing grade or one and one-half feet (1-1/2') below the finished subgrade, whichever is greater.

c. Where CDF has been approved by the Engineer as a backfill material, it shall be placed in a uniform manner that will prevent voids in or segregation of the backfill. Foreign material which falls into the trench prior to or during placing of the CDF shall be immediately removed. Backfilling over or placing any material over the CDF shall not commence until it has sufficiently self-consolidated and the surface water is gone so that the surface will withstand the process of subsequent backfilling without displacement or disruption.

24-04.04 Reexcavation. If the compaction requirements as previously specified are not met within sixty (60) calendar days after jetting the backfill, the trench shall be reexcavated. Backfill material shall then be compacted by mechanical methods as previously specified until the compaction requirements are satisfied.

24-05 TRENCH SURFACING.

24-05.01 General. In unimproved areas not in a traveled way, the trench shall be restored to its original surface.

Where a gravel surface is encountered, surfacing shall be replaced over the width of the trench with Class 2 aggregate base as specified in Section 16, "Aggregate Base," of these Standard Provisions to a minimum depth of six inches (6").

Where the existing surface is some type of paving, surfacing shall be restored with a temporary surface followed by a permanent surface specified herein.

24-05.02 Temporary Surfacing. The temporary surfacing shall consist of two and one-half inches (2-1/2") of asphalt concrete (Type B, 3/4" maximum aggregate) on twelve inches (12") of Class 2 aggregate base. As noted in Paragraph 24-05.03, "Permanent Surfacing," of these Standard Provisions, asphalt concrete (Type B) in excess of two and one-half inches (2-1/2") and aggregate base in excess of twelve inches (12") may be required in order to use the temporary surfacing as part of the permanent surfacing.

All temporary surfacing shall be laid within one (1) day after backfilling or as specified. Before the trenching area 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 constantly maintained so that at no time will there be any mudholes, nor shall the surface settle below one inch (1") or be raised more than one inch (1") from the existing pavement grade.

24-05.03 Permanent Surfacing. Permanent surfacing shall not be constructed until the compaction requirements for backfill and subgrade of these Standard Provisions are satisfied.

All trenches shall be permanently surfaced within thirty (30) calendar days after compacting backfill.

Prior to installing permanent surfacing, any irregularities in the original wheelcut along the limits of the excavation shall be corrected by wheelcutting and removing the jagged pavement. Also, adjacent pavement noted to be removed per Paragraph 24-03.01, "Existing Paving," of these Standard Provisions shall be removed.

The base rock for permanent surfacing shall be Class 2 aggregate base as specified in Section 16, "Aggregate Base," of these Standard Provisions. The aggregate base shall be equal in depth to the existing pavement structural section but not less than twelve inches (12") in depth.

The wearing surface for permanent surfacing on improved streets shall be asphalt concrete equal in thickness to the existing pavement but not less than two and one-

half inches (2-1/2") in depth. The asphalt concrete shall be Type B asphalt concrete conforming to the requirements of Section 17, "Asphalt Concrete Pavement," of these Standard Provisions. Asphalt concrete shall be placed by a paving machine unless otherwise approved by the Engineer.

At the option of the Contractor, the temporary surfacing may be used as an integral part of the permanent pavement section provided that the following requirements are satisfied:

1. The compaction requirements for backfill and subgrade are met, as determined by testing. The Contractor shall bear the cost of exposing the aggregate base, subgrade or backfill as necessary for the Engineer to conduct tests.

2. The existing pavement along the limits of the excavation is neatly sawcut.

3. The base rock is installed as part of the temporary surfacing and is equal in depth to the existing pavement structural section, but is not less than twelve inches (12") in depth.

4. Cut-back asphalt shall not be used in the temporary surfacing.

5. A one-inch (1") minimum asphalt concrete overlay (Type B, medium, 3/8" maximum aggregate) shall be installed over the existing temporary surfacing in no less than thirty (30) days and no more than sixty (60) days.

6. The combined depth of the asphalt concrete installed as part of the temporary surfacing and the one-inch (1") minimum overlay for permanent surfacing shall be equal to or greater in depth than the existing asphalt concrete pavement.

If any of the above requirements are not met, the Contractor shall remove the temporary surfacing to limits specified by the Engineer and replace it with permanent surfacing as necessary to fulfill the above-stated permanent surfacing specifications.

Permanent surfacing shall extend twelve inches (12") beyond neatly cut lines in the existing pavement as shown in the Standard Details.

24-06 <u>UTILITY EASEMENTS</u>. Whenever the trench lies within property controlled by agencies such as the Southern Pacific Railroad, State of California, Santa Clara County, San Francisco Water Department, Pacific Bell, or Pacific Gas and Electric Company, the trench backfill and resurfacing shall comply with the requirements of these agencies as well as with the requirements of these Standard Provisions. If permits must be obtained or bonds posted before entering these right-of-ways, the Contractor shall obtain and pay for such permits and bonds.

24-07 MEASUREMENT AND PAYMENT. Wheelcutting, sawcutting, trench excavation, shoring, dust control, backfill, and resurfacing shall not be measured for payment but shall be considered as paid for in the contract price for pipe installation. Excess material disposal shall be paid for under Section 13, "Surplus Material," of these Standard Provisions. When there is a separate bid item for shoring, all sheeting, shoring and other trench protection shall be paid for under that item.

SECTION 25: BARRICADES, GUARDRAILS, AND HEADERBOARDS

25-01 BARRICADES. Barricades shall conform to the Standard Details and shall be located as shown on the Plans. Barricade posts shall be construction heart redwood, S4S. Barricade rails shall be construction grade Douglas fir, S4S. Both posts and rails shall be graded in accordance with Section 57-2.02, "Grading Rules and Requirements," of the Standard Specifications.

25-01.01 Measurement. Barricades shall be measured on a linear foot basis.

25-01.02 Payment. The full price paid per linear foot for barricades shall include full compensation for furnishing all materials, labor, equipment, and performing all work necessary to complete the barricades as required in the Special Provisions, shown on the Plans, directed by the Engineer, and specified herein.

25-02 GUARDRAILS. Metal beam guardrails shall conform to the requirements of Section 83, "Railings and Barriers," of the Standard Specifications.

25-03 HEADERBOARDS. Headerboards shall be installed at locations shown on the plans. Headerboards and stakes shall be construction heart redwood, S4S, graded in accordance with Section 57-2.02, "Grading Rules and Requirements," of the Standard Specifications. Nails shall be hot-dipped galvanized.

When headerboards are installed along unprotected edges of pavement, the top edges of the headerboard shall conform to the line and grade of pavement.

Headerboards shall be 2"x6", unless otherwise noted, and shall be held in place with 2"x3" stakes of lengths necessary to extend twelve inches (12") into solid ground.

Stakes shall be of sound material, neatly pointed, driven vertically, located at butt joints and elsewhere, spaced not over four feet (4') on centers, and securely nailed to the headerboards. Headerboards shall have a continuous bearing on undisturbed earth or compacted earth or base rock.

25-03.01 Measurement. Headerboards shall be measured by the linear foot, except when installed as part of AC driveway conforms, in which case headerboards shall not be measured for payment (see Section 16 of these Standard Provisions).

25-03.02 Payment. The contract unit price per linear foot for headerboards measured for payment, in place, shall include full compensation for furnishing all materials, labor, equipment, and performing all work necessary to complete the headerboards as required in the Special Provisions, shown on the Plans, and specified herein.

SECTION 26: MONUMENTS

26-01 MONUMENTS. Standard City monuments shall be constructed at the locations shown on the plans or as directed by the Engineer and specified herein. Monuments shall be constructed to the dimensions and details shown on the Standard Details and shall be installed after placing the asphalt concrete surface.

Concrete shall be Class A or B conforming to the requirements of Section 90, "Portland Cement Concrete," of the Standard Specifications. Aggregate used shall conform to the grading requirements of three-quarter-inch (3/4") maximum combined aggregate sizes.

Castings shall be tough gray iron; free from cracks, holes, and swells; shall be of workmanlike finish; and shall conform to ASTM A48, Class 30B.

The solid brass monument marker, as shown in the Standard Details, shall be set in the concrete before the concrete begins to set. The Engineer shall stamp the marker for the Contractor.

26-02 MEASUREMENT. Monuments shall be measured on a per-each basis.

26-03 PAYMENT. 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 as required in the Special Provisions, shown on the Plans, and specified herein.

SECTION 27: ADJUSTING MANHOLE AND VALVE COVERS AND OTHER SURFACE FACILITIES

27-01 SCOPE. Where shown on the Plans or as directed by the Engineer, existing manholes, manhole covers, valve covers, or other sanitary sewer covers or utility service structures shall be adjusted to grade in accordance with the provisions of Section 15-2.05A, "Frames, Covers, Grates and Manholes," of the Standard Specifications except as herein modified.

27-02 CONSTRUCTION. Unless otherwise directed by the Engineer, a structure located in the pavement area shall be constructed to final grade before the final lift of pavement or surfacing has been completed.

When manhole adjustment work is undertaken, dirt, rocks, or debris will not be permitted to enter sewer or storm drain lines and a temporary cover shall be placed over the bottom of the manhole to prevent entry of material from the manhole to the pipe. Manhole adjustment shall include modification of existing manhole cones, precast sections, or barrel or risers, as necessary, in order to adjust manhole covers to final grade. When valve covers are raised to grade, backfill shall be sand to the grading plane. During sealing or paving operations, all surface structures shall be preserved from coverings, and no adhesive materials shall be permitted to seal or fill the joint between the frame and cover of any existing utility structure.

27-03 UTILITY-OWNED FACILITIES. Unless noted otherwise on the Plans or in the Special Provisions, existing surface and subsurface utility structures owned by California Water Service Company, Pacific Gas and Electric Company, or AT&T shall be raised to grade by the owning utility at the utility's expense.

27-04 PAYMENT. Full compensation for furnishing all labor, materials, tools, and equipment and doing all the Work involved in adjusting to grade existing utility surface and subsurface structures as specified herein shall be considered as included in the price per square foot for asphalt concrete surfacing and other items of Work and no additional compensation will be allowed therefor.

SECTION 28: FINISHING ROADWAY

28-01 SCOPE. Finishing roadway shall conform to Section 22, "Finished Roadway," of the Standard Specifications except as modified herein.

28-02 PAYMENT. Full compensation for finishing roadway shall be considered as included in the prices paid for the various contract items of work, and no additional compensation will be allowed therefor.

SECTION 29: SIGN INSTALLATION

29-01 SCOPE. Signs shall be installed as shown on the Standard Details and at locations shown on the Plans.

Installation shall be completed prior to placing concrete for sidewalk. All existing signs shall be maintained until relocated as shown on the Plans or until replacement signs are installed.

The Contractor shall furnish and install street name signs and all other street signs, including sign plates, sign posts, and sign brackets, in accordance with Standard Detail A-13.

Public street name signs shall have four-inch (4") white reflective Type B letters on a blue reflective background on a six-inch (6") tall, eight-hundredths-inch (0.080") thick aluminum plate. Private street name signs shall have four-inch (4") white reflective Type B letters on a green reflective background on a six-inch (6") tall, eight-hundredths-inch (0.080") thick aluminum plate. Private street name signs shall include the phrase "Private Street" (three-inch (3") white reflective Type B letters) at the bottom and must be approved in advance by the City Engineer.

Mounting hardware for street name signs shall be as shown on Standard Detail A-13.

29-02 MEASUREMENT. Sign installation shall be measured on a per-each basis. Posts containing more than one (1) sign shall be measured as one (1) unit only.

29-03 PAYMENT. The price paid for each sign installation shall include full compensation for furnishing all labor, materials, tools and equipment and for performing all work necessary to complete the installations as required in the Special Provisions, shown on the Plans, and specified herein.

SECTION 30: WATER FOR CONSTRUCTION

30-01 SCOPE. Water and watering shall conform to Section 17, "Watering," of the Standard Specifications and Paragraph 5-10, "Dust Control," of these Standard Provisions, except as modified herein.

A permit for the use of City water is required. Permits, backflow prevention devices, and meters are issued at the Municipal Operations Center, 231 North Whisman Road. A deposit is required; use charges will be levied. The City may revoke the permit for nonadherence to its provisions.

During filling operations, tanker trucks must use an approved backflow prevention device or have an approved visible air gap mounted on the outside of the water tank.

Water shall be applied for dust control as directed by the Engineer. Dust control shall be maintained at all times, including nonworking days. The Engineer may, if they consider the dust to be a public nuisance, stop all work until effective dust control is provided.

30-02 PAYMENT. Full compensation for furnishing and applying all water shall be considered as included in the prices paid for the various contract items of work, and no additional allowance will be made therefor.

SECTION 31: STORM DRAIN INSTALLATION

31-01 SCOPE. This work shall consist of furnishing and installing reinforced pipe, storm drains, manholes, inlets, underdrains, fittings, and all other materials and appurtenances in accordance with the Plans and these Standard Provisions.

31-02 MATERIALS.

31-02.01 Reinforced Concrete Pipe. Reinforced concrete pipe shall conform to the requirements of ASTM C76, as amended to date. The wall design shall be at the option of the manufacturer. The manufacturer shall furnish to the City certificates showing that the pipe conforms to the specified ASTM designation. All pipe shall be Class III unless otherwise shown on the Plans. Nonreinforced concrete pipe meeting all requirements of reinforced concrete pipe may be substituted for all sizes twenty-four inches (24") in diameter and smaller.

Pipe designated by D-Load shall be marked as described in the ASTM Specifications except that the D-Load shall be marked on the pipe. The D-Load shall be determined during tests as described in the ASTM Specifications.

31-02.02 Reinforced Concrete Pipe Joints. Pipe shall be constructed with self-centering joints.

31-02.03 Precast Manhole Sections. Precast manhole sections shall conform to size, shape, and details shown on the Standard Details. Precast reinforced concrete manhole risers, cones, and grade rings shall conform to ASTM Designation C478 as amended to date.

31-02.04 Castings. Castings for manhole rings, cover, and other purposes shall conform accurately to the form and dimensions shown on the Standard Details. The surface of casting shall be reasonably smooth, free from defects of any kind, and the castings shall conform to the requirements of ASTM A48, Class 30B as amended to date. Bottom rim of cover and seat of frames shall be machined to form a close fit free from wobble. The combined weight of cover and frame shall not exceed two hundred sixty-five (265) pounds.

Before leaving the foundry, all castings shall be thoroughly cleaned and coated by dipping in asphalt applied at a temperature of three hundred degrees (300°) Fahrenheit in such a manner as to provide a firm, durable, tenacious coating.

31-02.05 Inlets. All inlets shall conform to size, shape, and details as shown on the Standard Details. The type of inlet shall be as specified on the Plans or in the Special Provisions.

31-02.06 Inlet Grates and Grate Frames. Inlet grates and grate frames shall conform to size, shape, and details as shown on the Standard Details or on the Plans. Rectangular

frames shall be fabricated from structural steel conforming to the requirements of ASTM A36. The bar portion of the frames may be fabricated from special quality, hot-rolled steel bars conforming to the American Iron and Steel Institute Designation No. C1021. Frames and grates shall be match marked in pairs before delivery to the job site and the grates shall fit into their frames without rocking.

31-02.07 Reinforcing Bars. Reinforcing bars shall be deformed billet steel bars conforming to the specifications of ASTM A615, Grade 60, including Supplementary Requirement S1 and shall be of the size shown on the Standard Details or on the Plans. Bars shall be of the round deformed type; free from injurious seams, flaws, or cracks; and shall be cleaned of all rust, dirt, grease, loose scale, and any other coating of any character that would destroy or reduce the bond.

31-02.08 Portland Cement Concrete. Portland cement concrete for manhole bases, inlets, and other concrete structures shall conform to the requirements of Section 90, "Portland Cement Concrete," of the Standard Specifications and specified herein.

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 of one and one-half inch (1-1/2") 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 520. The concrete shall have a minimum compressive strength of three thousand three hundred (3,300) PSI after twenty-eight (28) days.

31-02.09 Mortar. Mortar shall conform to the requirements of Section 65, "Reinforced Concrete Pipe," of the Standard Specifications.

31-02.10 Underdrains. Underdrains shall conform to Section 68, "Subsurface Drains," of the Standard Specifications.

31-02.11 Underdrain Risers. Underdrain risers shall conform to Section 68, "Subsurface Drains," of the Standard Specifications.

31-02.12 Curb Drains. Curb drains shall conform to the Standard Details and shall be located where shown on the Plans.

Three-inch (3") ductile iron pipe for curb drains shall conform to ASTM designation.

31-03 CONSTRUCTION METHODS.

31-03.01 Trenching. Trench excavation, shoring, grade control, backfill, and resurfacing shall conform to the requirements of Section 24, "Trench Excavation, Backfill, and Resurfacing," of these Standard Provisions.

31-03.02 Handling of Material. Reinforced concrete pipe, precast concrete manhole sections, inlet frames, grates, and fittings must be carefully handled at all times. Only suitable and proper equipment and appliances shall be used for the safe loading, hauling, unloading, handling, and placing of materials. Any material which is checked, spalled, out of round, or damaged shall not be installed and such material must be permanently removed from the job site within twenty-four (24) hours after notification.

31-03.03 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 section of tongue-and-groove pipe pointed in the direction of flow.

Split pipe shall be used through a manhole except for changes in pipe grade, size, type, or direction.

Each section of pipe 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 cleaned of all dirt and debris. 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 every joint immediately after jointing has been completed. Pipe shall not be laid when the condition of the trench or the weather is unsuitable.

After the joint is assembled and if jetting is to be accomplished the same day as the pipe is installed, a moisture-resistant band of polyethylene, heavy-gauge sheeting, "Kordite," or approved equal shall be placed around the outside of the pipe and centered over the joint to prevent damage to the joint and entry of water and dirt into the pipe.

Concrete pipe with elliptical reinforcement shall be laid with the minor axis of the reinforcement cage in a vertical position.

31-03.04 Joints. The joints shall be completely filled and compacted with mortar so as to make a strong joint. No mortar will be required in the outside joint recesses of self-centering pipe. Unless otherwise approved by the Engineer, all joints shall be finished smooth on the inside of the pipe.

In pipe sizes twenty-one inches (21") and larger, inside joint recesses shall be hand-pointed. In pipe sizes eighteen inches (18") and smaller, inside joint recesses shall be buttered prior to closure. After the closure is made, the joint shall be pointed inside the pipe and excess mortar removed by means of a long-handled brush, an inflated swab, or squeegee.

31-03.05 Manholes. Manholes shall be located as shown on the Plans and installed in accordance with the Standard Details.

31-03.06 Inlets. Inlets shall be located as shown on the Plans and installed in accordance with the Standard Details and the following specifications. All the inside and exposed surfaces of concrete shall be smooth and uniform when finished, and the concrete shall be thoroughly compacted around all reinforcing bars. Inlets installed in curb returns shall have angle anchors curved to conform to the curb return radius. Precast inlets will be permitted when meeting the above requirements and when approved by the Engineer.

31-03.07 Television Inspection. After completion of the pipe installation and cleaning, the storm drain line shall be televised with a color closed-circuit television with tilt-head camera recorded in VHS format. The original video tape and log sheets shall be provided to the Engineer.

31-04 MEASUREMENT.

31-04.01 Reinforced Concrete Pipe. Reinforced concrete pipe shall be measured horizontally by the linear foot for the various strengths and sizes along the centerline of the pipe less the design distance between the ends of the pipe in manholes and inlets through which the pipe does not continuously pass. Whenever split pipe is required through a manhole, such pipe shall be included in the measurement.

31-04.02 Manholes. Manholes shall be measured as one complete installed unit, including base, precast sections, frame, and cover.

31-04.03 Inlets. Inlets shall be measured as one complete installed unit, including grate and frame.

31-04.04 Underdrains. Underdrains shall be measured by the linear foot, including excavation, pipe, fittings, backfill material, building paper, and appurtenances.

31-04.05 Underdrain Risers. Underdrain risers shall be measured as one complete installed unit, including pipe, ells, fittings, cover, and cleanout box, if required.

31-04.06 Curb Drains. Curb drains shall be measured as one complete installed unit, including inlet box and frame and grate, installation of outlet through face of curb or connection to existing inlet, pipe, and wire mesh or reinforcing bars.

31-04.07 Trench Surfacing. Trench surfacing shall not be measured for payment and shall be considered as paid for in the various items of work.

31-04.08 Rechanneling Manhole Bases. Rechanneling manhole bases and breaking into manholes shall not be measured for payment and shall be considered as paid for in the various items of work.

31.04.09 Television Inspection. Television inspection shall not be measured for payment and shall be considered paid for in the various items of work.

31-05 PAYMENT.

31-05.01 Reinforced Concrete Pipe. The Contract unit price per linear foot for reinforced concrete pipe shall constitute full compensation for furnishing all labor, materials, tools, and equipment and for doing all Work, including excavation, backfill, compaction, resurfacing, and televising required to install the reinforced concrete pipe complete as required in the Special Provisions, shown on the Plans, and specified herein.

31-05.02 Manholes. The Contract unit price paid for each manhole shall include full compensation for all labor, materials, tools, and equipment and for doing all Work, including excavation, backfill and compaction, and resurfacing, all as required in the Special Provisions, shown on the Plans, and specified herein.

31-05.03 Inlets. The Contract unit price for each inlet shall include full compensation for labor, materials, tools, and equipment and for doing all Work, including excavation, backfill and compaction, and resurfacing, all as required in the Special Provisions, shown on the Plans, and specified herein.

31-05.04 Underdrains. The Contract unit price per linear foot for underdrains shall include full compensation for furnishing labor, materials, tools, and equipment and for doing all Work, including excavation, permeable material backfill, and compaction required to install the underdrain pipe complete as required in the Special Provisions, shown on the Plans, and specified herein.

31-05.05 Underdrain Riser. The Contract unit price per each underdrain riser shall include full compensation for labor, materials, tools, and equipment and for doing all Work, including pipe, ells, fittings, cover, and cleanout box, if required, as required in the Special Provisions, shown on the Plans, and specified herein.

SECTION 32: SANITARY SEWER INSTALLATION

32-01 SCOPE. The Work shall consist of furnishing and installing sewer mains, manholes, laterals, cleanout fittings, and appurtenances; and testing, flushing and cleaning the same in accordance with the Plans and these Standard Provisions.

32-02 MATERIALS.

32-02.01 Vitrified Clay Pipe. Vitrified clay pipe and fittings shall be bell and spigot, unglazed, extra strength, conforming to ASTM C700, as amended to date.

32-02.02 Polyvinylchloride Pipe. Polyvinylchloride pipe and fittings shall be bell and spigot, conforming to ASTM D3034 (SDR 26) for diameters from four inches (4") through fifteen inches (15") and ASTM F679 for diameters from eighteen inches (18") through twenty-four inches (24"), as amended to date.

32-02.03 Vitrified Clay Pipe Joints. Vitrified clay pipe joints shall be of the resilient preformed type conforming to ASTM C425, as amended to date, except that rubber sleeve (Band-Seal) couplings will not be allowed in new main or new lateral installation.

32-02.04 Polyvinylchloride Pipe Joints. Polyvinylchloride pipe joints shall be bell-gasketed joints. Gaskets shall meet the requirements of ASTM F477. The joints shall meet the requirements of ASTM D3212.

32-02.05 Precast Manhole Sections and Castings. These items shall conform to Section 31, "Storm Drain Installation," of these Standard Provisions.

32-02.06 Standard Sewer Main Cleanouts. Standard sewer main cleanouts built in accordance with the Standard Details shall be installed where shown on the Plans.

32-02.07 Sewer Laterals and Cleanouts. Sewer laterals and cleanouts shall be constructed of materials specified in the Standard Details. Sewer lateral cleanouts shall be the same size as the sewer lateral.

32-02.08 Portland Cement, Portland Cement Concrete, and Mortar. These items shall conform to Section 31, "Storm Drain Installation," of these Standard Provisions.

32-03 CONSTRUCTION METHODS.

32-03.01 Handling of Materials. Vitrified clay pipe, polyvinylchloride pipe, fittings, precast concrete manhole sections, and cast iron frames and manhole covers must be carefully handled at all times. Only suitable and proper equipment and appliances shall be used for the

safe loading, hauling, unloading, handling, and placing of all materials. Special care shall be exercised so that the preformed resilient joints on pipe and fittings will not be damaged. Any pipe or fitting with a joint damaged or flattened will be rejected.

32-03.02 Trenching. Trench excavation, shoring, grade control, backfill, and resurfacing shall conform to Section 24, "Trench Excavation, Backfill, and Resurfacing," of these Standard Provisions.

32-03.03 Pipe Laying. Pipe laying shall proceed upgrade with the spigot end of bell and spigot pipe pointing in the direction of flow. Each pipe 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. Pipe shall not be laid when the condition of the trench or the weather is unsuitable. When Work is not in progress, open ends of pipe and fittings shall be plugged. As pipe laying proceeds, bell holes shall then be excavated at each joint to facilitate the jointing operations and shall be only of sufficient size for that purpose.

32-03.04 Manholes. Manholes shall be located as shown on the Plans and installed in accordance with the Standard Details. When a manhole is constructed over an existing sewer main, the City Inspector shall be present when the Contractor makes the cut into the existing main.

32-03.05 Cleanouts. Cleanouts on mains and laterals shall be installed in accordance with the Standard Details.

32-03.06 Sewer Laterals. Sewer laterals shall be installed in accordance with the Standard Details. All taps into existing sewer mains shall be made by machine taps ("Tap Tite"), or, for VCP only, utilize Mission Clay insertion wye with Band-Seal fittings. Stamp or grind an "S" on the curb face where a sewer lateral crosses under the curb if no "S" currently exists.

32-03.07 Testing Sewer Lines.

a. Exfiltration/Infiltration Testing. Sewer pipe joints and manholes shall be so watertight that leaking into the sewer by groundwater infiltration shall not exceed 0.039 gallons per minute, per inch diameter, per one thousand feet (1,000') of main-line sewer and sewer laterals being tested. The measure of the infiltration shall be defined as the exfiltration out of the pipeline when the lower end is plugged at the manhole and the upper end is filled at a manhole so as to create a hydrostatic head in the line of a minimum four feet (4') and a maximum five feet (5') above the invert at the upper end of the line. If groundwater is encountered, the head above the invert of the pipe at the upper end of the line shall be increased so that the net hydrostatic head shall be a minimum of four feet (4') and a maximum of five feet (5'). The amount of exfiltration in one (1) hour measured through a water meter or other convenient device by bringing the water level back up to the starting level at the upper manhole shall determine the rate of exfiltration. The Contractor shall furnish and install the necessary and

required plugs for the tests. The length of the laterals entering the section of main line being tested shall be included.

b. Air Testing. Air testing of sewer mains may be allowed in lieu of exfiltration/infiltration testing.

Air testing of vitrified clay pipe shall be in accordance with ASTM C-828, "Standard Test Methods for Low-Pressure Air Test of Vitrified Clay Pipe Lines." Air testing of PVC pipe shall be in accordance with the requirements specified in the most current Uni-B-6 pamphlet, "Recommended Practice for Low-Pressure Air Testing of Installed Sewer Pipe," issued by the Uni-Bell PVC Pipe Association, or as per the pipe manufacturer's specifications. At the approval of the Engineer, air testing of high-density polyethylene (HDPE) pipe installed by pipe-bursting method may be in accordance with the most current Installation Test Standard IS-16 issued by the International Association of Plumbing and Mechanical Officials.

c. Acceptance. During the testing and flushing operation, a wire screen with a one-quarter-inch (1/4") mesh or smaller shall be placed over the downstream outlet of the lower manhole to prevent any debris from being washed into the existing sewer system.

In no case shall the Contractor place the newly constructed sewer in operation without the approval of the Engineer.

In the event that infiltration or leakage exceeds the limits indicated above, the Contractor shall, at their own expense, immediately proceed to make necessary repairs, and no further payment shall be allowed, nor shall the project be finally accepted, until the tests indicate that the entire project meets the above requirements.

The Contractor shall furnish the necessary pumps, water, labor, equipment, and materials and shall assist the Engineer in making tests of the completed sewerage project before the system is placed in operation or connected to other lines.

The Engineer shall designate the length or section of the sewer to be tested and may approve portions or all of the project without testing.

32-03.08 Flushing and Cleaning Sewer Lines. After all backfilling and pavement restoring operations have been completed, the Contractor shall flush and clean all sanitary sewer lines in the following manner under the supervision of the Engineer or Inspector:

A heavy rubber ball, such as "MacWane Ball," manufactured by Sidu Company, Long Beach, California, or approved equal, inflated with air and having an outside diameter equal to the interior diameter of the pipe to be cleaned shall be furnished by the Contractor. The ball shall be inflated so that it will fit snugly into the sewer line. The ball shall be placed in the last (upper) manhole on the line and water introduced into the manhole back of the ball. The ball shall pass through the pipe with only the pressure of the water behind it. The

rate at which the ball is allowed to pass through the pipe shall be controlled by a rope at all times. Debris flushed ahead with the ball shall be removed at the lower manhole where its presence is evident. This cleaning shall be conducted on each section of pipe installed. Care shall be exercised not to feed the ball too rapidly in order that all debris can be removed at each manhole.

During the flushing and cleaning operation, a wire screen with a one-quarter-inch (1/4") mesh or smaller shall be placed over the downstream outlet of the lower manhole to prevent any debris from being washed into the existing sewer system.

32-03.09 Television Inspection. After completion of the pipe installation, service connections, flushing, and cleaning, the sewer line shall be televised with a color closed-circuit television with tilt-head camera recorded in VHS format. The original videotape and log sheets shall be provided to the Engineer.

32-03.10 Abandoning Existing Sewer Mains. The existing sewer main to be abandoned shall be cut a minimum of twelve inches (12") clear of the manhole and abandoned in place at the location shown on the Plans after the new sewer is installed. The main shall be filled with sand and ends plugged with a minimum of six inches (6") of Portland cement concrete at each required cut.

32-04 MEASUREMENT.

32-04.01 Sewers. Sewers shall be measured horizontally by the linear foot. The measured distance for payment shall be the total distance along the centerline of the pipe, including all connections, 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.

32-04.02 Sewer Lateral. Sewer laterals shall be measured horizontally by the linear foot from the centerline of the main sewer to the end of the lateral and shall include all fittings and connections.

32-04.03 Manholes. Manholes shall be measured as one complete installed unit, including base, precast sections, frame, and cover.

32-04.04 Standard Sewer Main Cleanout. Standard sewer main cleanout shall be measured as one complete installed unit, including frame, cover, and pipe.

32-04.05 Sewer Lateral Cleanout. Sewer lateral cleanouts shall be measured as one complete unit, including fittings, cleanout plug, box, cover (including metal traffic cover where required on the Plans or in the Special Provisions), and pipe.

32-04.06 Trench Surfacing. Trench surfacing shall not be measured for payment and shall be considered paid for under various items of Work.

32-04.07 Rechanneling Manhole Bases. Rechanneling manhole bases and breaking into manholes shall not be measured for payment and shall be considered as paid for in the various items of Work.

32.04.08 Television Inspection. Television inspection shall not be measured for payment and shall be considered paid for in the various items of Work.

32.04.09 Abandoning Existing Sewer Mains. Existing sewer main pipelines to be abandoned shall be measured as one complete unit, including concrete for both ends.

32-05 PAYMENT.

32-05.01 Sewer Main. The price per linear foot of sewer main shall include all wye branches and connections shown on the drawings; all labor, materials, and pipe necessary to excavate the trench, bed, place, and joint the pipe; backfill the trench; flushing, cleaning, testing, and televising; all other work necessary to produce a complete and finished job, as required in the Special Provisions, shown on the Plans, and specified herein.

32-05.02 Sewer Lateral. The price per linear foot of sewer lateral shall include one-eighth (1/8) bends, pipe, connections to main line sewer, and all labor and materials necessary to excavate the trench, bed, place, and joint the pipe; backfill the trench; and all other work necessary to produce a complete and finished job as required in the Special Provisions, shown on the Plans, and specified herein.

32-05.03 Manhole. The Contract unit price paid for each manhole shall include full compensation for all labor, materials, tools, and equipment and for doing all Work, including excavation, backfill, compaction, and resurfacing, as required in the Special Provisions, shown on the Plans, and specified herein.

32-05.04 Standard Sewer Main Cleanout. The Contract unit price per each "Standard Sewer Main Cleanout" shall include full compensation for all labor, materials, tools, and equipment and for doing all Work necessary and incidental to furnishing and installing a cleanout complete as required in the Special Provisions, shown on the Plans, and specified herein.

32-05.05 Sewer Lateral Cleanouts. The Contract unit price per each sewer lateral cleanout shall include full compensation for wye branch, one-eighth (1/8) bend, riser, iron body cleanout with plug, box and lid, connection to lateral, labor, materials, tools and equipment, excavation, backfilling, and resurfacing required in the Special Provisions, as shown on the Plans and specified herein.

32-05.06 Abandoning Existing Sewer Mains. The Contract unit price for each sewer main pipeline that is abandoned shall constitute full compensation for all Work and materials required to complete the abandonment of the sewer main as required in the Special Provisions, shown on the Plans, and specified herein.

SECTION 33: WATER MAIN INSTALLATION

33-01 SCOPE. The Work shall consist of furnishing and installing water mains, valves, fittings, fire hydrants, thrust blocks, and appurtenances; and testing and chlorinating the same in accordance with the Plans and these Standard Provisions, with the end result being a completed project ready for use.

33-02 MATERIALS.

33-02.01 Ductile Iron Water Pipe. Ductile iron water pipe shall be Class 52 conforming to AWWA Standards C150 and C151 with cement lining conforming to AWWA Standard C104. Ductile iron pipe ends shall be push-on or mechanical joint conforming to AWWA Standard C111 or with ends joined by a method approved by the Engineer which employs a single circular rubber gasket. Rubber gaskets and rings shall be neoprene synthetic rubber ASTM Type CR. All ductile iron pipes and fittings shall be wrapped in an eight millimeter (8 ml) thick polyethylene film sleeve.

33-02.02 Polyvinylchloride Pipe. Polyvinylchloride pipe shall conform to the requirements of the latest revision of the "AWWA Standard for Polyvinylchloride (PVC) Pressure Pipe, 4" through 12" for Water" (ANSI/AWWA C900). Polyvinylchloride (PVC) pipe shall conform to the requirements of "Class 200" pipe of the above specification except where otherwise noted. Certificates of requirements will be required from the manufacturers of the pipe to be used. Rubber rings and gaskets shall be as required by the manufacturer.

33-02.03 Fittings, Ductile Iron Pipe. Fittings for ductile iron pipe shall be cement-lined in accordance with AWWA Standards C104, C110 or C153. Mechanical joint or push-on joint ends may be substituted for the bell ends. Flange ends, except as required by the Plans or the Standard Details, may be substituted only after approval of the Engineer.

33-02.04 Fittings, Polyvinylchloride Pipe. Fittings for polyvinylchloride pipe shall be cement-lined in accordance with AWWA Standards C104, C110 or C153. Mechanical joint or push-on joint ends may be substituted for the bell ends. Flange ends, except as required by the Plans or the Standard Details, may be substituted only after approval of the Engineer. The joints shall also conform in all respects to the latest revision of AWWA C111.

33-02.05 Gate Valves. Gate valves shall be epoxy-coated Mueller RSGV A-2360 resilient seat gate valves with stainless steel bolts, "O" ring seals, nonrising stem, open left, two-inch (2") brass square wrench nut and with 304 stainless steel retainer nut inside, in accordance with AWWA C509, or an approved equal. The valves shall have ends designed to joint directly with the type of pipe being used or with ends called for on the Plans. 304 stainless steel bolts and nuts shall be used for flanged joints, and cord 10 bolts and nuts shall be used for mechanical joints. Tapping valves shall be Mueller RSGV H-687 or an approved equal.

33-02.06 Gate Valve Boxes. Gate valve boxes shall be Christy Concrete Products, Inc., Type G-5 traffic valve box with C-275 lid or an approved equal. Covers shall be marked "Water." Gate valve risers shall be a single length of eight-inch (8") cast iron pipe or eight-inch (8") polyvinylchloride pipe Class 150.

33-02.07 Blowoff and Air Relief Boxes. Valve boxes for manual blowoffs and air relief assemblies shall be Christy Concrete Products, Inc., Type G-12 traffic valve box with G-12C lid or approved equal. Covers shall be marked, "Water."

33-02.08 Fire Hydrants. Fire hydrants shall be fusion epoxy-lined Clow Company No. 76 or Jones No. J3700 with two 2-1/2" N.S.T. hose outlets, one 4-1/2" N.S.T. hose outlet, one 1/8" pentagonal tips on caps and valve stems, or an approved equal. Hydrant bury shall be 30" to 48" long with 6" inlet.

33-02.09 Hydrant Riser. Hydrant risers or extension shall be Rich Valve Company or Logan with localized breakoff scoring on the exterior near each flanged end or an approved equal. Break-off bolts shall be hollow.

33-02.10 Mechanical Joint. The mechanical joint bell, flange, bolts, follower gland sealing gasket, and accessories shall conform to the requirements of AWWA Standard C-111. Bolts shall be of high-strength low-alloy steel in accordance with AWWA C-111.

33-02.11 Flanges. Steel pipe flanges shall conform to the requirements of AWWA Standard C207, Class D.

Bolts shall be of high-strength, low-alloy steel in accordance with AWWA C-111. Flange and bolt coatings shall match adjacent pipe.

33-02.12 Insulating Flanged Joints. Each insulating flange set shall consist of a full-face central gasket, a full-length sleeve for each flange bolt, and two (2) insulating washers with two (2) steel washers for each bolt. The ring type central gasket shall be one-eighth inch (1/8") thick sheet packing having a high dielectric constant. Bolt sleeves shall be fabric reinforced phenolic resin, and insulating washers shall be constructed of fabric-reinforced phenolic resin. The complete assembly shall have an ANSI pressure rating equal to that of the flanges between which it is installed.

33-02.13 Casings for Water Mains. Steel casings utilized used for boring and jacking for water mains shall conform with the Standard Specifications Section 70, Paragraph 70-1.02B. All metallic water mains installed in casing shall be electrically isolated from the casing by means of casing insulators. The casing shall be coated and lined with coal tar enamel in accordance with AWWA C203.

33-02.14 Casing Insulators. Insulators utilized for electrical isolation shall be twelve inches (12") wide, two-piece steel band type. Each insulator shall have an insulating liner with a thick retainer type edge to isolate the steel bands from the carrier pipe. Insulating runners shall be one inch (1") wide steel capped with molded rubber or polyester fiberglass. Insulator spacing shall be determined by the Contractor according to manufacturer's recommendations for each pipeline alternate and approved by the Engineer. The outside diameter of the casing insulator skids shall be sufficient height to isolate all portions of the carrier pipe from the casing.

33-02.15 Casing End Seals. After installation of the carrier pipe, the ends of the casing shall be sealed. End seals shall be pull-on type, S-shaped, constructed of one-eighth inch (1/8") minimum highly flexible synthetic rubber. Each end seal shall be furnished with two (2) one-half-inch (1/2"), fourteen (14) gauge stainless steel bands for banding the seal to the casing and carrier pipe.

33-02.16 Epoxy Coatings. Epoxy coatings for fittings shall be twelve millimeter (12 mm) minimum thickness Scotchkote 206N fusion-bonded epoxy coating manufactured by 3M or equal. The application of the coating and preparation of the substrate shall be in accordance with the manufacturer's recommendations.

All valves, flexible coupling adapters, and flexible couplings shall be fusion epoxy-coated to not less than twelve millimeters (12 mm) and shall be subjected to thickness and discontinuity (holiday) testing at the discretion of the City Engineer.

33-02.17 Portland Cement Concrete. Portland cement concrete for hydrant bases, thrust blocks, and anchors shall conform to the requirements of Section 90, "Portland Cement Concrete," of the Standard Specifications and specified herein. The concrete shall be Class "B" containing five (5) sacks of Portland cement per cubic yard of concrete. The grading of the combined aggregate shall conform to the requirements of one and one-half inches (1-1/2") maximum. The addition of calcium chloride for high early-strength concrete shall not be permitted.

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 520. The concrete shall have a minimum compressive strength of 2,500 PSI after twenty-eight (28) days.

33-02.18 Chlorine. Hypochlorite shall conform to AWWA Standard B300. Liquid chlorine shall conform to the AWWA Standard B301.

33-02.19 Bitumastic. Bitumastic for coated couplings, rods, fittings, and joints shall conform to the requirements of Bureau of Reclamation Specification CA-50.

33-02.20 Tracer Wire. Unless otherwise specified on the Plans, tracer wire shall be bare six (6) gauge copper wire.

33-03 CONSTRUCTION METHODS. The Contractor shall give forty-eight (48) hours' notice to the City's Public Services Division when making connections to existing water facilities. At all times, the manipulation of existing valves shall be done by Water Division personnel.

33-03.01 Handling of Materials. Water pipe, fittings, hydrants, and valves must be carefully handled at all times. Only suitable and proper equipment and appliances shall be used for the safe loading, hauling, unloading, handling, and placing of materials. Special care shall be exercised so that the coating on pipe, valves, and fittings will not be damaged. If such damage should occur, the coating shall be repaired to the satisfaction of the Engineer. Chain slings will not be permitted. Pipe loaded on trucks or stacked one upon another shall be supported on wooden blocking. Pipe handled on skidways shall not be skidded or rolled against pipe already on the ground.

33-03.02 Trenching. Trench excavation, shoring, backfill, and resurfacing shall conform to the requirements of Section 24, "Trench Excavation, Backfill, and Resurfacing," of these Standard Provisions.

33-03.03 Pipe Laying. All pipe shall be laid to conform to AWWA Standards C600 and C603. All pipe shall be laid true to line and grade as shown on the Plans or as directed by the Engineer to pass existing obstructions. Before any length of pipe is laid, it shall be carefully inspected for defects. No pipe or other material which is cracked or shows other defects shall be installed.

When the pipe joints are to be caulked, initial backfilling (by hand tamping between the pipe joints) shall be completed before caulking.

All pipe, valves, and fittings must be carefully wiped out and cleaned as they are installed. Any earth or rubbish which may have lodged inside during or before laying shall be removed. Every open end of installed pipe shall be capped or plugged with an approved fitting at all times when work is suspended, at the close of the workday, and as directed by the Engineer.

Pipe must be given a solid, uniform bearing in the bottom of the trench. Blocking or supporting pipe on earth mounds will not be permitted. Whenever it is necessary to use a short length of pipe at a fitting or valve, the minimum length shall be thirty-two inches (32"). If it is necessary to cut pipe, said cut shall be made with an approved pipe cutter. The use of hammer and chisel for pipe cutting will not be permitted.

A six (6) gauge solid copper wire shall be installed in the trench with C-900 polyvinylchloride pipe and spliced to any existing tracer wire. The wire shall be taped to the top center of the pipe. The wire shall be installed in such a manner that there is no direct contact between the copper and any other metal in the trench.

33-03.04 Joints. All joints shall be assembled to conform to AWWA Standards C600 and C603. All joints shall be watertight and shall be made by competent workers. Unless otherwise specified on the Plans or in these Standard Provisions, joints may be of any of the types listed below which are consistent with the type of pipe being used, except that joints shall in no case be caulked with cement. Bond all rubber gasket joints of ductile iron or steel pipes and fittings.

33-03.05 Work Involving Asbestos-Cement Pipe. Field cutting and machining operations involving asbestos-cement pipe shall be in compliance with OSHA Asbestos Construction Activities, CCR Title 8, Construction Safety Orders (CSO), Section 1529.

Power-driven saws and abrasive discs shall not be used for the dry cutting or beveling of asbestos-cement pipe unless they are equipped with local exhaust ventilation and a high efficiency particulate air (HEPA) filter dust collection system.

Pressure or "wet" tapping of asbestos-cement pipe shall be positive purge, blowoff, or other type that allows pipe cuttings to be flushed from the pipe.

33-03.06 Mechanical Joints. The last eight inches (8") of the outside of the spigot and inside of the bell of mechanical joints shall be thoroughly cleaned of all oil, grit, and other foreign material by brushing with a wire brush and then painted with a soap solution made by dissolving one-half (1/2) cup of granular soap in one (1) gallon of water. The cast iron gland shall be placed on the pipe with the lip extension of the gland toward the socket or bell end of the joint, and the rubber gaskets shall be painted with a soap solution and placed on the pipe with the thick edge toward the gland. The pipe shall be pushed into the bell to seat the spigot and the gasket pressed into place within the bell, being careful to have the gasket evenly located around the entire joint. The cast iron gland shall be placed against the gasket, the bolts inserted, and the nuts tightened with a suitable (preferably torque-limiting) wrench. The range of torque for three-quarters inch (3/4") bolts shall be seventy-five (75) to ninety (90) foot-pounds. Nuts spaced one hundred eighty degrees (180°) apart shall be tightened alternately in order to produce an equal pressure on all parts of the gasket. Bond all mechanical joints.

33-03.07 Push-On Joints for Ductile Iron Pipe. The joints shall be of a type which employs a single elongated rubber gasket to effect the joint seal. The assembly of the joint shall be made as recommended by the manufacturer. Bond all push-on joints.

33-03.08 Setting Valves, Fittings, and Hydrants. Gate valves shall be set with stems in vertical position and provided with valve boxes. Gate valves shall be anchored as shown on the Plans or the Standard Details.

Fire hydrants and fire hydrant connections shall be installed where indicated on the Plans, except where the Engineer directs that they shall be relocated to avoid an obstruction. The Contractor shall make such relocations at the time of reconstruction and

without additional compensation. Each hydrant shall be installed in accordance with the Standard Detail for hydrants or as shown on the Plans.

33-03.09 Connection to Existing Mains. The Contractor shall make connections to existing mains where indicated on the Plans. The newly installed facilities are to be kept isolated from the City system until bacteriologically acceptable. If isolation is provided by a closed gate valve, pressure testing for leakage in the new facilities shall only be conducted after bacteriological acceptance.

The Engineer shall designate method and sequence of connecting to existing mains to minimize contamination danger. Connections to existing valves prior to obtaining satisfactory leakage and pressure tests of the new facilities shall be at the Contractor's risk.

The City will assume no responsibility for the watertightness of existing valves.

Service in existing mains can be interrupted only upon authorization of the Engineer, who will specify time and duration of the outage. The Contractor shall notify all affected users in writing at least forty-eight (48) hours in advance of service interruption using printed forms provided by the Engineer. The Contractor shall request the Engineer to notify the City Public Services Division personnel at least forty-eight (48) hours in advance to schedule valve closing for service interruption. Manipulation of new or existing valves shall only be done by Water Division personnel.

33-03.10 Air Reliefs and Blowoffs. Air relief and blowoff assemblies shall be located as shown on the Plans and installed in accordance with the Standard Details.

33-03.11 Painting. All metals anodic to ductile iron that are not adequately protected against corrosion by a suitable protective coating shall be carefully cleaned and given a thick coating of a good quality mastic coating solution paint. This paint shall be allowed to harden before the material is covered with polyethylene wrap and backfill material.

All valves, flexible coupling adapters, and flexible couplings shall be fusion epoxy coated to not less than twelve millimeters (12 mm) and shall be subjected to thickness and discontinuity (holiday) testing at the discretion of the City Engineer.

Bolts, nuts, washers, and any other metallic elements exposed to the soil shall be coated with bitumastic in accordance with Section 33-02.19, "Bitumastic," of these Standard Provisions.

Fire hydrants shall be painted bright silver with rust preventive paint such as "Aervoe," "Krylon," "Rustoleum," or an approved equal.

33-03.12 Joint Bonding. All nonwelded rubber gasket joints, mechanical joints, and fusion epoxy coated flanges shall be bonded in accordance with Standard Details or as shown on the drawings. Joint bonds shall be installed with a cable loop extended above the field joint mortar or joint coating for pretensioned concrete cylinder pipe and mortar lined and coated steel pipe. The overall length of the conductor shall permit maximum movement of the pipe joint without transferring any tensile stress to the cable. Cable to rod connections shall be accomplished as specified below. All exposed surfaces of the steel rod shall be completely encased in joint mortar as shown on the drawings.

33-03.13 Insulating Flanged Joints. All insulating components of the insulating flanged gasket set shall be cleaned of all dirt, grease, oil, and other foreign materials immediately prior to assembly. Bolt holes in mating flanges shall be properly aligned at the time bolts and insulating sleeves are inserted to prevent damage to the insulation. After flanged bolts have been tightened, each insulating washer shall be inspected for cracks or other damage. All damaged washers shall be replaced. After assembly, resistance between each bolt and flange shall be measured with an approved ohmmeter, and the minimum resistance shall be fifty thousand (50,000) ohms. Where the insulating joint is assembled in the shop and shipped as a unit, resistance shall be measured in the shop between the flanges and between each bolt and flange and shall meet the above requirements. All insulating flanged joints shall be coated as shown on the Standard Details and specified herein.

33-03.14 Leakage Tests. Each run of pipe between two (2) sectionalizing valves or between a valve and a cap or plug shall be tested for leakage. Only one (1) run of pipe shall be tested at a time, but the pressure may be applied through sections of pipe already tested. Services and fire hydrant runs may be tested individually or with the sections of water main. It is the intention of these tests to test the watertightness of the closed gate valves as well as the piping. When the newly constructed facilities are connected to existing water mains, bacteriological clearance shall be obtained before conducting pressure or leakage tests.

The Contractor shall furnish all equipment for making tests, including a suitable gauge for measuring the applied line pressure. The tank containing the water to maintain line pressure shall be of a design such that the volume of water may be accurately measured.

The hydrostatic test pressure shall be one hundred fifty (150) pounds per square inch, based on the elevation of the lowest point of the section under test and corrected to the elevation of the test gauge.

The test pressure shall be maintained for one (1) hour by pumping water from the measuring tank into the line. At the end of the hour, the volume of water pumped into the line will be measured and recorded as the leakage.

No pipe installation will be accepted until the leakage in each section is less than the following:

a. Ductile Iron Pipe. The allowable leakage rate shall be as defined in AWWA Standard C600, Section 4.

b. Steel Pipe with Welded Field Joints. No leakage allowed. Testing procedures shall conform to AWWA Standard C206, Section 6.

c. Polyvinylchloride Pipe. The allowable leakage rate shall be as defined in ANSI/AWWA C900-81, AWWA Manual M23.

33-03.15 Disinfecting. All lines, mains, and branches shall be disinfected by chlorination in accordance with AWWA Standards C651 and B301, "Disinfecting Water Mains," and specified herein. Chlorine may be a one percent (1%) solution (containing ten thousand (10,000) parts per million available chlorine) or may be obtained by the use of dry chlorine in tablet form firmly attached to interior walls of the pipe.

The weight of chlorine or chlorine compound required to make one percent (1%) chlorine solution is as follows:

Product	Amount of Compound	Quantity of Water (Gallons)
High-Test Calcium Hypochlorite (65%-70% Cl)	1 Lb.	7.50
Chlorinated Lime (32%-35% Cl)	2 Lbs.	7.50
Liquid Laundry Bleach (5.25% Cl)	1 Gal.	4.25
Liquid Chlorine (100% Available Chlorine)	0.62 Lbs.	7.50

The required concentration of chlorine in the pipe is fifty (50) parts per million. This concentration may be attained by adding five (5) gallons of the chlorine solution to one thousand (1,000) gallons of water.

The required concentration of chlorine in the mains may be obtained by the use of HTH tablets as produced by Olin Mathieson in the following quantities:

HTH TABLET (70% DOSAGE)

Number of Tablets Per Length of Pipe

LENGTH OF SECTION	DIAMETER OF PIPE 4"	6"	8"	10"	12"
13'	1	2	2	3	5
18'	1	2	3	5	6
20'	1	2	3	5	7
30'	2	3	5	7	10
36'	2	3	5	8	12
40'	2	4	6	9	14
100'	4	9	15	23	30

a. Liquid Chlorine Solution Method. Flush all foreign matter from mains, branch runs, hydrant runs, and installed services. Introduce liquid chlorine solution at appropriate locations to assure uniform distribution through the facilities at the proper concentration. Installed copper service lines shall not be used to convey the concentrated solution to the mains. The sanitizing solution shall be retained in the facilities for a period of twenty-four (24) hours, after which each service, hydrant run, branch run, and dead end shall be flushed until the residual chlorine is less than one (1) part per million or is no greater than the concentration of chlorine in the water supplied for flushing.

b. HTH Tablet Method. Tablets are to be fastened to the inside top surface of each length of pipe using "Permatex No. 2" at time of pipe laying. Tablets shall not be available at any time for casual pilferage by the general public or by children. The new facilities are to be slowly filled with water. Air is to be exhausted from each dead end, branch run, hydrant run, and installed service. Retain water for a period of twenty-four (24) hours, after which each service, hydrant run, branch run, and dead end shall be thoroughly flushed to clear foreign matter and until the residual chlorine concentration is less than one (1) part per million or is no greater than the concentration of chlorine in the water supplied for flushing.

c. Bacteriological Testing. Samples shall be gathered and tests conducted at the expense of the Contractor by a laboratory approved by the Engineer. Samples are to be taken at representative points at the direction of the Engineer as follows:

1. The first sample shall be taken twelve (12) hours after the line is flushed.

2. The second sample shall be taken twenty-four (24) hours later.

The tested line shall be required to be coliform negative for at least two (2) consecutive days. If any sample is positive, that location shall be resampled.

The new facilities shall remain isolated and out of service until satisfactory test results have been obtained which meet the requirement of the California Department of Public Health and the Engineer has accepted the results as indicative of the bacteriological condition of the facilities. If unsatisfactory or doubtful results are obtained from the initial sampling, the chlorination process shall be repeated until acceptable test results are reported.

33-03.16 Abandoning Existing Water Mains. The existing water main pipeline to be abandoned shall be cut a minimum of twelve inches (12") clear from the main pipeline to be left in service. Nonmetallic water main pipelines to be abandoned shall be filled with sand. All water main pipelines to be abandoned shall be plugged at the ends with a minimum of six inches (6") of Portland cement concrete at each required cut.

33-04 MEASUREMENT.

33-04.01 Water Mains. Water mains shall be measured horizontally by the linear foot through valves and fittings. Pipe for fire hydrant runs shall not be measured as water main.

33-04.02 Gate Valves. Gate valves shall each be measured as one complete installed unit in operable condition, including gate valve, anchor block, valve box, and valve box riser.

33-04.03 Fire Hydrants. Fire hydrants shall each be measured as one complete installed unit in operable condition, including hydrant, gate valve (if specified), breakoff riser, breakoff check valve (if specified), bury, thrust block, and piping from main to bury.

33-04.04 Air Relief, Blowoff Assemblies. Air relief and blowoff assemblies shall each be measured as one complete installed unit in operable condition, including valve, valve box, curb stop, copper tubing, corporation stop, service clamp, and any other necessary fittings.

33-04.05 Fittings for Water Mains. Fittings for water mains shall be included as part of the water main installation payment.

33-04.06 Trench Surfacing. The surfacing over mains, fire hydrant runs, and stubouts shall not be measured for payment.

33-04.07 Anchors and Thrust Blocks. Anchors and thrust blocks shall not be measured for payment.

33-04.08 Abandoning Existing Water Mains. Existing water main pipelines to be abandoned shall be measured as one complete unit, including concrete for both ends.

33-05 PAYMENT.

33-05.01 Water Main. The Contract price per linear foot for water mains shall constitute full compensation for all labor, materials, and tests necessary to furnish and install the pipe, including fittings, thrust blocks and anchorage, trenching, polyethylene sleeve, bond joints, backfill, and surfacing as required in the Special Provisions, shown on the Plans, and specified herein.

33-05.02 Gate Valves. The Contract price per each gate valve shall constitute full compensation for all Work and materials, including gate valve, anchor block, valve box, and valve box riser necessary to complete installation of gate valves, as required in the Special Provisions, shown on the Plans, and specified herein.

33-05.03 Fire Hydrants. The Contract price per each for fire hydrants shall constitute full compensation for all Work and materials, including hydrants, gate valves (if specified), breakoff riser, breakoff check valve (if required), bury thrust block, polyethylene sleeve, bond joints, and piping from the water main gate valve to bury necessary to complete installation of fire hydrants as required in the Special Provisions, shown on the Plans, and specified herein.

33-05.04 Air Relief, Blowoff Assemblies. The Contract price per each air relief and blowoff assemblies shall constitute full compensation for all Work and materials, including valve box, curb stop, copper tubing, corporation stop, service clamp, and any other fittings necessary to complete installation of the air relief and blowoff assemblies as required in the Special Provisions, shown on the Plans, and specified herein.

33-05.05 Abandoning Existing Water Mains. The Contract unit price for each water main pipeline that is abandoned shall constitute full compensation for all Work and materials required to complete the abandonment of the water main as required in the Special Provisions, shown on the Plans, and specified herein.

SECTION 34: WATER SERVICE INSTALLATION

34-01 SCOPE. This Work shall consist of furnishing and installing all materials required to complete the installation and testing of the service from the water main to the meter box, including installation of the meter box and tapping or cutting into the existing main.

34-02 MATERIALS.

34-02.01 Brass Goods. Brass goods shall be as manufactured by the Mueller Company, James-Jones Company, AY McDonald, Ford Meter Box Company, or an approved equal from the latest edition of the City's Approved Material List. Identical items from either of the above-named sources may be substituted.

a. Corporation Stops. Mueller No. H-15010 with 1/8 bend coupling, gasket, and coupling nut or an approved equal from the latest edition of the City's Approved Material List.

b. Curb Stops (Water Meter Stops).

1. All curb stops shall be angle ball valve type with lock wings. Straight ball valve curb stops will be allowed on manifolds and special installations only.

2. 3/4" angle ball valve curb stops for 3/4" meters:

   Ford - BA23-342W—1" copper flare inlet x 3/4" meter nut,
   Mueller - B24255-R-3—1" copper flare inlet x 3/4" meter nut,
   McDonald - 4642-B—1" copper flare inlet x 3/4" meter nut,

   or an approved equal from the latest edition of the City's Approved Material List.

3. 1" angle ball valve curb stops for 1" meters:

   Ford - BA23-444W—1" copper flare inlet x 1" meter nut,
   Mueller - B24255-3—1" copper flare inlet x 1" meter nut,
   McDonald - 4602-B—1" copper flare inlet x 1" meter nut,

   or an approved equal from the latest edition of the City's Approved Material List.

4. 1-1/2” and 2” angle ball valve curb stops for 1-1/2” and 2” meters:

   Ford—FV13-777W—2” FIP x 1-1/2” or 2” FIP,
   Mueller—B24286-3—2” FIP x 1-1/2” or 2” meter flange,
   McDonald—4602-B-2”—2” flare x 1-1/2” or 2” meter flange,

   or an approved equal from the latest edition of the City’s Approved Material List.

5. 3/4” straight ball valve curb stops for 3/4” meters:

   Ford—B13-332-W—3/4” FIP x 3/4” meter nut,
   Mueller—B24351-3—3/4” FIP x 3/4” meter nut,
   McDonald—6101MW-3/4”—3/4” FIP x 3/4” meter nut,

   or an approved equal from the latest edition of the City’s Approved Material List.

6. 1” straight ball valve curb stops for 1” meters:

   Ford—B13-444W—1” FIP x 1” meter nut,
   Mueller—B24351-3-1”—1” FIP x 1” meter nut,
   McDonald—6101MW-1”—1” FIP x 1” meter nut,

   or an approved equal from the latest edition of the City’s Approved Material List.

7. 1-1/2” and 2” straight ball valve curb stops for 1-1/2” and 2” meters:

   Ford—B11-777W—2” FIP x 1-1/2” or 2” FIP,
   Mueller—B-24337-3—2” FIP x 1-1/2” or 2” meter flange,
   McDonald—6101MW-2”—2” FIP x 1-1/2” or 2” meter flange,

   or an approved equal from the latest edition of the City’s Approved Material List.

c. Tubing Splice Fittings.

1. Three-part union, copper to copper, Mueller No. H-15400, or an approved equal from the latest edition of the City’s Approved Material List.

2. Quarter-bend coupling, Mueller No. H-15525, or an approved equal from the latest edition of the City’s Approved Material List.

34-02.02 Copper Tubing Services. Service runs of sizes two inches (2") and smaller shall be of Type K soft copper tubing conforming to ASTM Specification B88 or Federal Specification WW-T-799. All copper and brass shall be primed and taped as per Standard Detail D-31.

34-02.03 Ductile Iron and PVC Pipe Services. Service runs of sizes four inches (4") and larger shall be Class 200 polyvinylchloride pipe conforming to ANSI/AWWA Standard C900 or Class 52 ductile iron pipe conforming to AWWA Standards C150 and C151 with cement lining conforming to AWWA Standard C104. Fittings shall be cement lined and conform to AWWA Standards C104 and C110. All ductile iron service runs shall have bonded joints and shall be wrapped in an eight millimeter (8 mm) thick polyethylene film sleeve.

34-02.04 Service Clamps and Tapping Sleeves.

a. Service Clamps (Service Saddles). For asbestos-cement pipe, use double-strap style with bronze body tapped with C.C. tapered threads, bronze straps flattened on one side for pipe protection and shaped to give a maximum resistance to corrosion. For ductile iron pipe, use stainless steel full-circle clamp with tapped outlet provide 7-1/2" (minimum) wide band for 1" taps, and 12" (minimum) for 2" taps. Gasket shall be full faced of Buna-N, NBR Rubber, or an approved equal from the latest edition of the City's Approved Material List. Entire service saddle or full circle clamp shall be coated and wrapped according to Standard Details D-31 and D-32. Stainless steel service clamps (saddles) shall be as manufactured by Sensus Technology, JCM Model 102, or an approved equal from the latest edition of the City's Approved Material List, as approved by the Engineer, and shall be of the proper diameter as designated by the manufacturer for the outside diameter of the pipe on which it will be mounted. No double-strap service clamps shall be used for plastic mains. Service saddles to be used on plastic mains shall be approved by the Engineer.

b. Tapping Sleeves. The following tapping sleeves are acceptable:

1. Tapping sleeves shall be constructed entirely of Type 304 stainless steel including outlet flange, bolts, and nuts. Tapping sleeves shall completely surround the pipe to be tapped and shall be fully lined with a waffle pattern gasket. Tapping sleeves shall be Style FTSS as manufactured by Ford Meter Box Company with removable bolts, 360 degrees gasket, and carbon steel flange, or an approved equal from the latest edition of the City's Approved Material List.

2. Tapping sleeves shall be epoxy-coated model FTSC as manufactured by Ford Meter Box Company or an approved equal from the latest edition of the City's Approved Material List.

34-02.05 Gate Valves. Gate valves shall be Mueller Model No. RSVG A-2360 epoxy coated resilient seat gate valve with stainless steel bolts, "O" ring seals, nonrising stem, open left, two-inch (2") brass square wrench nut, EPDM rubber components, and with 304 stainless steel

retainer nut inside, in accordance with AWWA C509, or an approved equal from the latest edition of the City's Approved Material List. 304 stainless steel bolts and nuts shall be used for flanged joint and high-strength low-alloy steel in accordance with AWWA C111 bolts and nuts shall be used for mechanical joints. Tapping valves shall be Mueller RSVG H-687 or an approved equal from the latest edition of the City's Approved Material List.

34-02.06 Gate Valve Boxes. Gate valve boxes shall be in accordance with Paragraph 33-02.06, "Gate Valve Boxes," of these Standard Provisions.

34-02.07 Water Meters.

a. Meters for Potable Water.

1. Two inch (2") and smaller sizes: Badger Recordall Disc Series.

Meter shall consist of a bronze body and bottom plate, a removable radio-read type Badger Orion, SE Integral register. The RTR/HRE register shall have a factory-engraved serial number on its lid before shipment from the distributor. One and one-half inch (1-1/2") and two-inch (2") meters shall have flanged ends. The meter shall register water flow in cubic feet.

2. Three inch (3") and larger sizes: Badger Turbo Series.

Meter shall come with an integral or external strainer, a removable radio-read type Badger Orion, SE Integral, register. The RTR/HRE register shall have a factory-engraved serial number on its lid before shipment from the distributor.

b. Meters for Reclaimed Water.

All meters for reclaimed water shall be Badger Reclaimed Turbo Series type with an integral or external strainer when using sizes 1.5" through 8".

All reclaimed water meters shall conform to the requirements for potable water meters as described in Section 34-02.07.a above, except that the reclaimed water meters shall have purple registers and lids with the word "RECLAIMED" engraved or cast on the meter housings and the nonpotable water symbol on the register lids.

34-02.08 Meter Boxes. Meter boxes shall be as follows, or approved equal from the latest edition of the City's Approved Material List.

Service Size	Heavy-Duty Traffic* or Nontraffic	Manufacturer	Box No.	Cover or Lid No.
1"	Non and Light Traffic Heavy-DutyTraffic*	Oldcastle Oldcastle**	FL12T B1017 H/20	FL12D B1017-51GH
2"	Non and Light Traffic Heavy-Duty Traffic*	Oldcastle Oldcastle**	FL36T B1730 H/20	FL36D B1730-51GH
3" or 4"	Nontraffic Light Traffic Heavy-Duty Traffic*	Oldcastle** Oldcastle** Oldcastle**	N48 N48 R17P24	B48M2 B48-62G R17-52HT
6" and larger	Nontraffic Light Traffic Heavy-Duty Traffic*	Oldcastle** Oldcastle** Oldcastle**	N52 N52 R17P24	B52M3 B52-62G R17-52HT

* Heavy-duty traffic boxes and lids shall be preapproved for use by Engineer prior to installation.
** Christy box.

34-02.09 Backflow-Prevention Assemblies for Domestic or Irrigation Water Services. All backflow-prevention assemblies for domestic or irrigation service shall be reduced-pressure type. Three-quarters of an inch (3/4") to two-inch (2") backflow-prevention assemblies shall have full-port domestic ball valves with threaded ends. Two and one-half inch (2-1/2") to ten-inch (10") backflow-prevention assemblies shall have NRS flanged resilient seated gate valves.

Backflow-prevention assemblies for domestic and irrigation water services shall be reduced pressure type as follows:

COMPANY	MODEL	SIZE
Febco	825Y	3/4" to 2"
Wilkins	975XL 375 475	3/4" to 2" 3" to 10" 3" to 10"

34-02.10 Fire Service Backflow-Prevention Assemblies. All backflow-prevention assemblies for fire services shall be Double Check Detector Assembly (DCDA) type with cubic feet bypass meters, and the assemblies shall have OSY flanged resilient seated valves.

Approved DCDA backflow-prevention assemblies for fire services shall be as follows:

COMPANY	MODEL	SIZE
Febco	LF876V	4" to 10"
Wilkins	350 DA 450 DA	4" to 10" 4" to 10"

EXCEPTION: When a Class 3 or Class 4 fire service incorporates the use of chemicals in the fire prevention systems or connects to a nonapproved auxiliary water source, the backflow-prevention assemblies shall be a Reduced Pressure Detector Assembly (RPDA).

Approved reduced pressure detector backflow-prevention assemblies shall be as follows:

COMPANY	MODEL	SIZE
Febco	LF860	4" to 10"
Wilkins	375 DA 475 DA	4" to 10" 4" to 10"

34-03 INSTALLATION.

34-03.01 Corporation Stops. All sizes of service taps on ductile iron mains and all sizes on asbestos-cement pipe shall be threaded into a service saddle mounted on the main.

Taps in the water main shall not be located closer to a pipe end than thirty inches (30"). Adjacent taps shall be spaced not less than eighteen inches (18") apart and shall be staggered at forty-five degrees (45°) minimum.

a. Service Clamp. The service clamp shall be mounted square with the axis of the pipe, and where bales are specified, the bales are to be in full contact with the barrel of the pipe for the length of the formed portion of the bale. The service clamp will also be coated and wrapped according to Standard Details D31 and D32.

The tapped outlet shall be positioned forty-five degrees (45°) above the horizontal at a location directly out from the meter setting position. The corporation stop shall be threaded into the saddle clamp and turned to a final position which will make a completely watertight connection and which will locate the operating key above the horizontal. The key nut shall be tightened sufficiently to prevent weeping of the stop under pressure. The water mains shall be drilled using an approved drilling machine mounted on the corporation stop. Drill or shell cutter shall be sharp and have the proper tip for the material to be drilled. Drill sizes for the corporation stops are:

Corporation Stop Size	Drill Size
1”	15/16”
2”	1-7/8”

The corporation stop shall be turned to a final position which will prevent any leakage or weeping and which will locate the operating key above the horizontal.

34-03.02 Copper Tubing. The copper tubing shall be located a minimum of forty-two inches (42”) below the finished top-of-curb line and thirty-six inches (36”) below the finished roadway surface at the water main. All copper tubing and any brass manifolding shall be primed and taped according to Standard Details D1 and D31. Stamp or grind a “W” on the curb face where the copper tubing crosses under the curb if no “W” currently exists.

Copper tubing shall be installed beneath all existing sidewalk, curb, gutter, and improved roadway areas constructed in accordance with the City standards by means of boring. In the event that excavation of any existing sidewalk, curb, gutter, or roadway area becomes necessary, all such excavations shall be backfilled with sand and thoroughly tamped.

The diameter of the boring tool to be used shall be no larger than is necessary to provide sufficient clearance for the copper tubing. Prior to inserting the copper tubing in the bored hole, the end shall be plugged in a manner that will prevent any material from entering the tubing.

When installing the copper tubing, care shall be taken to prevent kinking, flattening, or in any other way damaging the tubing.

Splicing of service line runs shall conform to the following: one inch (1”) diameter copper tubing, one (1) splice only, located not less than six feet (6’) from any service line fitting. One and one-half inch (1-1/2”) and two-inch (2”) diameter copper tubing, splices spaced at not less than sixteen feet (16’), and located not less than six feet (6’) from any service line fitting.

Between the side of the water main trench and the corporation stop, an "S"-type curve shall be introduced into the tubing in order to provide flexibility between the service and the water main. Extreme care shall be exercised in the bending operation to prevent kinking or flattening the tubing.

34-03.03 Connection of Fittings to Copper Tubing. The coupling nut on the fitting shall be removed and the end of the copper tubing inserted through the coupling nut. Threads on the fitting shall be lubricated with an approved-type thread lubricant. When the tubing is connected, there shall be no strain exerted by the tubing on the fitting.

34-03.04 Curb Stops (Water Meter Stops). Copper tubing cuts and the location of ninety degree (90°) bends shall be such that the location and elevation of the curb stop will be as shown on the Standard Details. The curb stop outlet shall be so positioned that later meter installation will place no strain on the fittings or tubing.

34-03.05 Flushing and Testing. When the service line has been completed, water from the main shall be flushed through the service with the operating key on the corporation stop and on the curb stop in a full open position. With the service line under pressure, all connections shall be wiped clean and inspected. Leaks or "weeping" are to be corrected before requesting inspection. The Engineer shall be notified of completion of Work and an inspection requested before backfilling any portion of the Work.

Testing procedure for services installed with new water mains shall conform to the requirements of Paragraphs 33-03.14, "Leakage Tests," and 33-03.15, "Disinfecting."

34-03.06 Ductile Iron Pipe Services. Ductile iron pipe services four inches (4") or larger in size shall be installed in accordance with the Standard Details and shall comply with the applicable provisions of this Section. Stamp or grind a "W" on the curb face where the service crosses under the curb if no "W" currently exists.

34-03.07 Polyvinylchloride Pipe Services. Polyvinylchloride pipe services four inches (4") or larger in size shall be installed in special cases when noted on the Plans and approved by the Engineer only. Stamp or grind a "W" on the curb face where the service crosses under the curb if no "W" currently exists.

34-03.08 Meters.

a. Meters shall be installed without the Badger Orion RTR SE Integral Registers. The Badger Orion RTR SE Integral Registers shall be shipped directly from the

distributor or delivered by the Contractor to the City's Water Meter Section for subsequent installation by City personnel. Ship or deliver the Badger Orion RTR SE Integral Registers to:

City of Mountain View
Municipal Operations Center
Attention: Water Meter Section
231 North Whisman Road
Mountain View, CA 94043

Street address where the water meter is to be installed shall be included with the shipment or delivery.

b. Meters shall be set and positioned as shown on the Standard Details. When in place, meter registers shall be oriented to read from a position on the sidewalk.

c. The Contractor shall tag all water meters that are in a bank of meters with a 2"x2" or a one and one-half inch (1-1/2") diameter metal tag, stamped with the unit number, and attached by a sealing wire to the water meter.

d. Water meter tailpiece (downstream meter coupling):

1. Water Meters, Size 3/4": Tailpiece shall be a Mueller H 10890 or Ford C38-23-2.5, installed into a 3/4" FIP X FIP threaded brass coupling. A 3/4"x6" long PVC Schedule 80 MIP X MIP threaded nipple shall be connected to the brass coupling to electrically isolate the meter from the customer service pipe.

2. Water Meters, Size 1": Tailpiece shall be a Mueller H 10890 or Ford C38-44-2.625, installed into a 1" FIP X FIP threaded brass coupling. A 1"x6" long PVC Schedule 80 MIP X MIP threaded nipple shall be connected to the brass coupling to electrically isolate the meter from the customer service pipe.

e. Water meter insulating flange kit:

1. Water Meters, Size 1-1/2": Meters shall have flanged ends and be connected with gasket and nonstainless steel nuts and bolts, size 5/8"x2-1/2". Downstream meter connection shall be 1-1/2" FIP brass meter flange with a 1-1/2"x6" long PVC Schedule 80 MIP X MIP threaded nipple connected to the brass meter flange to electrically isolate the meter from the customer service pipe.

2. Water Meters, Size 2": Meters shall have flanged ends and be connected with gasket and nonstainless steel nuts and bolts, size 3/4"x2-1/2". Downstream meter connection shall be 2" FIP brass meter flange with a 2"x6" long PVC Schedule 80 MIP X MIP threaded nipple connected to the brass meter flange to electrically isolate the meter from the customer service pipe.

f. An insulating flange with test leads shall be installed on 4" and larger services. The insulating flange shall conform to Paragraph 33-03.13, "Insulating Flanged Joints."

g. When backflow-prevention assemblies are installed behind water meters (all sizes), the 6" long PVC Schedule 80 MIP X MIP threaded nipple shall be installed downstream of the backflow-prevention assembly instead of the meter.

h. Where PVC pipe is used for the customer piping (downstream of the meter, for any meter size), the 6" long PVC Schedule 80 MIP X MIP threaded nipple is not required.

34-03.09 Meter Boxes. Meter boxes shall be located and positioned as shown on the Standard Details or as required by the Engineer and set to the established grade with the top level. Center the reading lid opening over the water register. Change of grade resulting from landscaping shall be met by repositioning the box to suit. Boxes shall be supported along their entire perimeter with either 2"x6" redwood blocks or bricks. After the box is installed and prior to backfilling, block meter box wall penetrations to prevent soil from entering the meter box.

34-03.10 Reduced-Pressure Backflow Preventers. Where a reduced-pressure backflow preventer is installed more than eight feet (8') behind the water or irrigation meter, the piping between the backflow preventer and the meter shall be encased in controlled density fill (CDF) to discourage future taps in the pipe. The piping and CDF shall be deep enough so not to interfere with the landscaping and topsoil located over the trench.

34-03.11 Fire Service Backflow-Prevention Devices. Testing, certification, and repair (if needed) of new backflow prevention assemblies on fire lines shall be completed by an independent contractor. Per State Health Regulation Title 17, the assemblies shall be tested and certified by a certified AWWA backflow-prevention tester. The certified backflow-prevention assembly test report shall be forwarded to the City's Cross-Connection Control Specialist prior to acceptance of the project.

34-03.12 Abandoning Existing Water Services.

a. Services Two Inches (2") and Smaller in Size. Remove existing saddle at the main and install an all stainless steel full-circle repair clamp fifteen inch (15") wide with stainless bands, couplers, bolts and nuts. Coat the entire clamp with a mastic coating solution and wrap the entire clamp in eight millimeter (8 ml) polyethylene. Remove the water service piping within the excavation hole, including fittings and valves. Remove the meter and meter box. Salvage the meter and deliver to the Municipal Operations Center.

b. Services Four Inches (4") and Larger in Size. Remove the existing gate valve and install a blind flange. Coat the blind flange with a mastic coating solution and wrap

the entire fitting with eight millimeter (8 ml) polyethylene. Remove the water service piping within the excavation hole, including fittings and valves. Install thrust block against the blind flange to prevent pipe movement. Remove the meter and meter box. Salvage the meter and deliver to the Municipal Operations Center. If the tee or gate valve is not in good condition as determined by the Engineer, it shall be removed. Payment for the removal of the tee or gate valve, if not caused by the operation of the Contract, shall be paid for as extra work.

34-03.13 Replacing Existing Service Saddle. When replacing an existing service saddle on all mains, only all stainless steel full circle clamp will be permitted, minimum width of fifteen inches (15”), unless approved by the Engineer.

34-04 MEASUREMENT.

34-04.01 Services Two Inches (2”) and Smaller in Size. Services shall be measured as one complete installed unit, including corporation stop, tubing, primed and taped fittings, curb stop, service saddle, and meter box.

34-04.02 Services Four Inches (4”) and Larger in Size. Services shall be measured as one complete installed unit, including water main fittings, tapping sleeve (if required), gate valve, solid bypass assembly, valve box and riser, pipe, polyethylene sleeve, bond joints, terminal cap or plug, thrust blocks, and meter box.

34-04.03 Meters. Meters shall be measured as one complete installed unit, including the meter box (unless covered by Paragraph 34-04.01, “Services Two Inches (2”) and Smaller in Size,” Paragraph 34-04.02, “Services Four Inches (4”) and Larger in Size,” or noted otherwise in the Special Provisions). Meters three inches (3”) and larger shall include all valves, fittings, pipe, and meter box as noted in the Standard Details.

34-04.04 Meter Boxes. Where meter boxes are specified on the Plans to be installed at service terminal points without installing meters, the meter box shall be measured as a part of the service.

34-04.05 Abandoning Existing Water Services. Existing water services to be abandoned shall be measured as one complete unit, including full-circle repair clamp, band, coupling, bolts, nuts, eight millimeter (8 ml) polyethylene, mastic coating solution if required, blind flange if required, and removal and disposal of the remaining water service.

34-04.06 Backflow Prevention Devices. Backflow prevention devices shall be measured as one complete installed unit, including piping, valves, fittings, pipe supports, thrust blocks, and concrete pad.

34-05 PAYMENT.

34-05.01 Services Two Inches (2") and Smaller in Size. The Contract price for each service shall constitute full compensation for all Work and materials required to complete the installation and testing from the water main to the curb stop, including tapping of the water main and the meter box, as required in the Special Provisions, shown on the Plans, and specified herein.

34-05.02 Services Four Inches (4") and Larger in Size. The Contract price for each service shall constitute full compensation for all Work and materials required to complete the installation and testing from the water main to the terminal cap or plug, including tapping or cutting into the water main, as required in the Special Provisions, shown on the Plans, and specified herein.

34-05.03 Meters and Meter Boxes. The Contract price for each meter shall constitute full compensation for all Work and materials required to complete the installation as required in the Special Provisions, shown on the Plans, and specified herein.

34-05.04 Abandoning Existing Water Services. The Contract price for each water service that is abandoned shall constitute full compensation for all Work and materials required to complete the abandonment of the water service as required in the Special Provisions, shown on the Plans, and specified herein.

Payment for the removal of the tee for four inches (4") or larger services, where required, that is not caused by the Contractor's operations shall be paid for as extra work.

34-05.05 Backflow-Prevention Devices. The Contract price paid for each backflow-prevention device shall constitute full compensation for all Work and materials required to complete the installation including testing, certification, and connecting the backflow preventor to the water meter as required in the Special Provisions, shown on the Plans, and specified herein.

SECTION 35: LIGHTING AND ELECTRICAL SYSTEMS

35-01 SCOPE. The Work shall consist of furnishing, installing, and testing luminaires containing an integral ballast system; clear, high-pressure sodium lamps; photoelectric cells; pullboxes; pole numbers; electrolier standards, mast arms and foundations; in-line fuses; conduit and cable, and all other materials and appurtenances in accordance with the Plans and these Special Provisions. The end result shall be a system complete and in operation to the satisfaction of the Engineer.

35-02 MATERIALS AND CONSTRUCTION.

35-02.01 General. All materials delivered to the job shall be new, best quality of their respective grades, in accordance with these Special Provisions, and packed in their original sealed containers. All materials to be installed shall bear the Underwriters Laboratories, Inc., UL Label.

The Contractor shall use materials mentioned in these Special Provisions as standard, or an approved equal from the latest edition of the City's Approved Material List, and in no case will a substitute be allowed without written approval of the Engineer.

All Work shall be in compliance with the requirements of the applicable sections of the Standard Specifications and the City of Mountain View Standard Details. In case of conflict, the higher requirement shall govern.

All Work and material shall be protected at all times. Pipe openings shall be closed with protective caps during installation and all materials shall be covered and protected against dirt, water, and mechanical or other injury. All materials damaged during the course of construction shall be replaced or repaired to the original condition by the Contractor.

The Contractor shall not allow or cause any of the Work to be covered up or enclosed until it has been inspected and approved by the Engineer. Should any of the Work be enclosed or covered up before such inspection, the Contractor shall, at their own expense, uncover the Work and, after it has been inspected and approved, make all repairs with such material as may be necessary to restore all Work to its original and proper condition.

35-02.02 Foundations. Foundations shall conform to Section 86-2.03, "Foundations," of the Standard Specifications and with the Standard Details except as modified herein. The top four inches (4") of the foundation shall not be placed until the standard is erected and leveled.

35-02.03 Electrolier Standards. Electrolier standards shall conform to Section 86-2.04, "Standards, Steel Pedestals and Posts," of the Standard Specifications and with

the Standard Details except as modified herein. See Section 35-02.08, "Painting," of these Standard Provisions for painting requirements. Allen head screws shall be used in all electrolier hand hole covers.

a. Type "B" Streetlight. The lighting post shall be all aluminum, one-piece construction, with a classic tapered and fluted base design. The shaft shall be five inches (5") diameter fluted. The post shall be catalog No. NY11FMOD/17MODPT18-CA/BK manufactured by Antique Street Lamps, Inc., or WPBBH 11'-6"-EF50 manufactured by Western Lighting, or an approved equal.

The base shall be heavy wall, copper-free, cast aluminum produced from certified ASTM 356.1 ingot per ASTM B-179-95a or ASTM B26-95. The straight shafts shall be extruded aluminum, ASTM 6061 alloy, heat-treated to a T6 temper. A door shall be provided in the base for anchorage and wiring access. A grounding screw shall be provided inside the base opposite the door. The shaft shall be double-welded to the base casting and shipped as one piece. The shaft shall be circumferentially welded inside the base casting at the top of the access door and externally where the shaft exits the base. All exposed welds shall be ground smooth. All welding shall be per ANSI/AWS D1.2-90.

The acorn styled luminaire shall consist of a decorative luminaire base with an integral globe holder/ballast housing and an acorn-shaped globe. The luminaire shall be catalog No. AA25BFMOD/BK-S100/120-III-PEC manufactured by Antique Street Lamps, Inc., or FXS2PT30 manufactured by Western Lighting, or an approved equal. The luminaire base, ballast housing, and globe holder shall be heavy wall, copper-free, cast aluminum produced from certified ASTM 356.1 ingot per ASTM B-179-95a or ASTM B26-95. Globe material shall be clear textured polycarbonate. Internal refractors shall be boroscilicate glass with an IES Type 3 distribution. Finials shall be injection-molded polycarbonate.

Luminaires shall be furnished with an H.I.D. ballast, socket assembly, photoelectric control, and lamp. Luminaire shall be UL-listed and labeled as suitable for wet locations. Sockets shall be glazed porcelain, medium base, with a copper alloy nickel-plated screw shell and center contact. Ballast shall be core and coil, high power factor, regulating type.

The luminaire shall mount on a 3" O.D. tenon with six 1/4" diameter socket set screws. The globe shall be secured to the luminaire by four 1/4" diameter socket set screws. The ballast and socket assembly shall be furnished with a quick disconnect plug and mount on a removable ballast plate. The ballast plate shall be removed by loosening a thumbscrew.

Lamps shall be General Electric Company LU70/DX/MED or wattage as specified on the Plans or the project Specifications. Equivalent lamps manufactured by Sylvania or Westinghouse are acceptable but shall be from the latest edition of the City's Approved Material List.

All metal finishes shall be black. All hardware shall be tamper-resistant stainless steel. Anchor bolts shall be completely hot-dip galvanized.

35-02.04 Conduit. Conduits shall conform to Section 86-2.05, "Conduit," of the Standard Specifications except as modified herein.

A run of conduit installed without conductors and having a bend of ninety degrees (90°) or more shall have installed within the entire run a No. 12 AWG copper pull wire. The ends of all empty conduits shall be capped.

Connections from metal conduit to nonmetallic conduit shall be made at pullboxes or a minimum of four inches (4") inside electrolier foundations so that the connection will be completely covered by concrete.

Excavating and backfilling shall conform to Section 86-2.01, "Excavating and Backfilling," and Section 86-2.02, "Removing and Replacing Improvements," of the Standard Specifications except as modified herein. The maximum width of trench shall be eight inches (8"). Trenching shall not occur in street pavement unless otherwise specified. "Initial Backfill" shall be sand. "Subsequent Backfill" shall be native material free of stones, hard pan lumps, broken concrete, or paving material. The backfill material shall be brought to the elevation of the bottom of the subbase material of the sidewalk or pavement. Backfill shall be placed in layers not exceeding eight inches (8") in depth and shall be thoroughly tamped in such a manner as to prevent future settlement. Should the Contractor elect to use all sand backfill, the eight-inch (8") layer construction may be omitted, and compaction may be obtained by ponding.

Conduits to be installed under street pavement shall be one and one-half inch (1-1/2") rigid steel conduit conforming to the requirements in Publication UL 6 for Rigid Metallic Conduit. The zinc coating shall be in accordance with ASTM Designation A239 unless otherwise specified.

Conduits to be installed other than under street pavement shall be one and one-half inch (1-1/2") rigid steel conduit or Schedule 40 rigid plastic (nonmetallic) conduit conforming to the requirements in the Underwriters Laboratories Standard for Rigid Nonmetallic Conduit (Publication UL 651). Rigid plastic conduit connections shall be of the solvent weld type. See Paragraph 35-02.07, "Bonding and Grounding," of these Standard Provisions for grounding in plastic conduit.

Cutting and machining of conduit shall be in accordance with the manufacturer's recommendations. Preassembly of sections of conduit shall not be permitted except where jacking is required.

When jacking is required, a galvanized metal pipe sleeve conforming to Section 86-2.05, "Conduit," of the Standard Specifications of sufficient diameter to contain the

conduit shall be jacked across the required distance. The conduit shall then be threaded through the pipe and connected to the conduit system.

Trench-laid conduit installed outside of street pavement shall be placed not less than eighteen inches (18") below the surface of the ground or sidewalk. The conduit shall be laid over two inches (2") of uniformly spread sand. Native material may be used for backfill around and above the conduit.

Trench-laid conduit installed under street pavement shall be placed not less than thirty inches (30") below the pavement surface. The conduit shall be laid over two inches (2") of uniformly spread sand. A minimum of four inches (4") of the same type of material shall be placed over the conduit. The remaining trench may be backfilled with native material up to subgrade.

The minimum cover requirements for trench-laid conduit installed under street pavement may be reduced to eighteen inches (18") if the conduit is backfilled with controlled density fill (CDF). The CDF shall meet the requirements as specified in these Standard Provisions. CDF shall be placed to three inches (3") below the pavement surface. The top three inches (3") of the trench shall be backfilled with asphalt concrete produced from commercial-quality paving asphalt and aggregates. Prior to spreading asphalt concrete, paint binder (tack coat) shall be applied as specified in these Standard Provisions. Spreading and compacting of asphalt concrete shall be performed by any method which will produce an asphalt concrete surface of uniform smoothness, texture, and density.

Conduit installed under street pavement by means of pushing, jacking, or boring shall be placed not less than thirty inches (30") below the pavement surface.

35-02.05 Pullboxes. Pullboxes shall conform to Section 86-2.06, "Pullboxes," of the Standard Specifications and with the Standard Details.

A pullbox shall be installed adjacent to all electrolier standards. The pullbox shall be a No. 3-1/2 or as otherwise noted on the Plans.

35-02.06 Conductors and Wiring. Conductors and wiring shall conform to Section 86-2.08, "Conductors," and Section 86-2.09, "Wiring," of the Standard Specifications. The insulation for No. 10 and larger conductors shall be one of the following:

a. Type TW polyvinylchloride conforming to the requirements of ASTM Designation D2219.

b. Type THW or THWN polyvinylchloride.

Splicing shall conform to the following methods as specified in Section 86-2.09, “Wiring,” of the Standard Specifications or approved equal:

A standard C-shaped compression connector and insulated per method B or the “Wiring Details and Fuse Rating,” Detail ES-13, of the Department of Transportation’s Standard Plans.

Multiple lighting conductors shall only be spliced in pullboxes.

Streetlight cable shall be stranded copper conductor of sizes as specified on the Plans or in the Special Provisions. Minimum conductor sizes shall be No. 8 AWG and No. 10 AWG within the standard. Conductors shall be of consistent wire gauge and insulation unless otherwise specified. Conductors shall have a minimum of two feet (2’) of slack in all pullboxes that are located next to the base of each electrolier and at each splice.

A 10-amp in-line fuse shall be installed in the base of each electrolier and be accessible through the hand hole. Fuse holders shall conform to Section 86-2.095, “Fused Splice Connectors,” of the Standard Specifications.

35-02.07 Bonding and Grounding. Bonding and grounding shall conform to Section 86-2.10, “Bonding and Grounding,” of the Standard Specifications except as modified herein. Bonding connections shall be made with No. 4 AWG bare copper wire or with copper ground straps of equal cross-sectional area.

The ground electrode for the electrolier standards shall be as shown on the Standard Details.

Where conductors and wires are installed in nonmetallic conduits, a properly sized, green insulated, No. 8 AWG minimum copper wire (equipment grounding wire) shall be installed continuously in all circuits from the point of service to each pullbox and light standard. The ground wire shall be properly grounded in the pullbox located closest to the service point in accordance with Section 86-2.10,” Bonding and Grounding,” of the Standard Specifications and Paragraph 35-02.10, “Service Connection,” of these Standard Provisions.

35-02.08 Painting. Painting shall conform to Section 86-2.16, “Painting,” of the Standard Specifications except as modified herein. The prime coats, two (2) required, shall be red iron oxide-type primer or approved equal.

The finish coats shall be dark olive green industrial enamel finishes as manufactured by Tresco Paint Manufacturing Company, No. 1372-SA115-18DK or approved equal. The finish coat shall be applied in not less than two (2) applications.

Factory finish on new equipment will be acceptable if of proper color and if equal in quality to the specified finish. The final finish coat on standards and mast arms may be applied in the field.

Failure to comply with any part of the foregoing painting specifications shall be sufficient cause for the City to require the Contractor to completely remove all applied coats and reapply required prime and finish coats in accordance with these Standard Provisions.

The Contractor shall provide protective devices, such as tarps, screens, or covers, as necessary, to protect curb and gutters, glassware, adjacent buildings, parked automobiles, and other property or persons from all cleaning and painting operations. Paint or paint stains, which result in an unsightly appearance on surfaces not designated to be painted, shall be removed or obliterated by the Contractor at their expense and to the satisfaction of the Engineer.

When pole painting is complete, the Contractor shall furnish and install pole identification plates, except on Type "B" streetlight poles. On Type "B" streetlight poles, the Contractor shall furnish and install self-adhesive reflective numbers (white on black) sized two and one-half inch (2-1/2") by one and one-half inch (1-1/2") with one-quarter inch (1/4") spacing between letters/numbers and approved by the City. The City will assign pole identification numbers.

35-02.09 Luminaires. Luminaires shall conform to Section 86-6.01, "High-Intensity-Discharge Luminaires," of the Standard Specifications except as modified herein.

Luminaires shall consist basically of an aluminum housing, photoelectric control receptacle, reflector, prismatic refractor, integral ballast, and an adjustable socket capable of producing IES Types II or III. Type IV shall be provided only when required. Glare shields shall not be installed. Distribution type shall be medium, semi-cutoff or as specified on the Plans or Special Provisions. Luminaires, complete with lamps, shall be installed on the mast arms in the proper orientation to produce the desired light pattern and shall be completely assembled and connected to the conductor. Each refractor shall be acrylic unless noted otherwise. The integral ballast need not be mounted on a down-opening door.

a. Multiple Circuits. Luminaires for multiple circuits shall have Mogul multiple sockets and internal ballast of the regulator type capable of operating from a multiple 120- or 240-volt circuit as noted on the Plans. The high-pressure sodium luminaires shall be as listed below or an approved equal from the latest edition of the City's Approved Material List.

Lamp Wattage	Primary Voltage	Thomas & Betts	General Electric
70	120	113-562E2-6000A0	M2AR07S1H2AMS21
70	240	113-563E2-6000A0	M2AR07S3H2AMS21
100	120	113-56213-6000A0	M2AR10S1M2AMS31
100	240	113-56313-6000A0	M2AR10S3M2AMS31
150	120	113-56263-6000A0	M2AR15S1M2AMS31
150	240	113-56363-6000A0	M2AR15S3M2AMS31
200	120	125-062J3-0000A0	M2AR20S1A2GMS31
200	240	125-063J3-0000A0	M2AR20S3A2GMS31

b. Lamps. Each luminaire shall be equipped with a clear high-pressure sodium lamp of the following ANSI Code Number.

Lamp Wattage	ANSI Code No.
70	S62-ME-70
100	S54-SB-100
150	S55-SC-150
200	S66-MN-200

c. Photoelectric Control. Photoelectric control shall conform to Section 86-6.07, "Photoelectric Controls," of the Standard Specifications except as modified herein.

All photoelectric control shall be Type IV. A photoelectric unit shall be supplied for each luminaire, connected to the same voltage as the luminaire.

35-02.10 Service Connection. Electrical service installation and materials shall conform to the requirements of the serving utility. Service equipment shall be installed as soon as possible to enable the utility to schedule work well in advance of the completion of the project. Service connections for electroliers served by underground electrical systems will be made at the nearest Pacific Gas and Electric Company secondary box. The Contractor shall provide conduit and wire from the secondary box to the electrolier.

When a circuit serviced from an underground secondary box serves more than one electrolier, the circuit shall be fused at the first pullbox from the secondary box. Pullbox shall be sized No. 31/2 unless otherwise noted.

The circuit fuse shall be 40-amp for No. 8 AWG wire and shall be installed in an in-line, waterproof holder. Fuses for larger wires will be sized by the Engineer. Both hot legs of 240-volt circuits shall be fused.

Only the one hot leg of 120-volt circuits shall be fused. A ground electrode and ground clamp conforming to Section 86-2.10, "Bonding and Grounding," of the Standard Specifications shall be installed in the pullbox in which the circuit is fused. The purpose

of the ground electrode is to facilitate grounding the circuit when the fuse holder is disconnected, thus eliminating the possibility of energizing the circuit while it is being repaired.

Service connections for electroliers served by overhead electrical systems will be made at a junction box at the base of the service riser pole. The Contractor shall provide the junction box and conduit and wire from the junction box to the nearest electrolier. In all cases where the service is from a riser pole, the Contractor shall install a ground electrode and shall fuse the circuit in this adjacent junction box in accordance with the above requirements. Junction box shall be sized No. 31/2 or larger.

All service connections will be made by Pacific Gas and Electric Company. The Contractor shall bear all costs charged by Pacific Gas and Electric Company for the service connection.

35-02.11 Field Tests. Field tests shall conform to Section 86-2.14, "Testing," of the Standard Specifications except as modified herein.

The Contractor shall be responsible for maintaining the lighting system during the functional test period.

35-02.12 Pole Identification Plates. The City will assign pole identification numbers. The Contractor shall furnish and install pole identification plates. The letters/numbers shall be white reflective, Highway Gothic "B", 1-3/4" tall, spaced 5/8" apart. The letters/numbers shall be mounted vertically on 3"x12"x0.080 aluminum plates with 1/2" radius corners and 5/16" holes punched 1/2" in from the top and bottom. The color of the plates shall be Bottle Green 3M #7725-276 pressure sensitive for installation on green poles; and black pressure sensitive for installation on black poles.

35-03 MEASUREMENT.

35-03.01 Electroliers. Electroliers shall each be measured as one complete installed unit in operable condition, including concrete foundation, electrolier standard with mast arm, luminaire complete with ballast and lamp, photoelectric unit, conductors, and wiring, including in-line fuse at hand hole, bonding and grounding, and pole identification numbers and plates.

35-03.02 Conduit. Conduit shall be measured horizontally by the linear foot through all phases of the electrical underground street lighting system.

35-03.03 Pullboxes. Pullboxes shall be measured as one complete installed unit, including the rock and concrete base, precast sections, bonding, and grounding.

35-03.04 Conductors and Wiring. Conductors and wiring shall be measured horizontally by the linear foot for each pair of wires through pullboxes. Conductors and wiring in electroliers shall be measured as part of the unit in which they are installed.

35-03.05 Photoelectric Control. Photoelectric controls shall be included as part of electroliers and will not be measured for payment.

35-03.06 Service Connection. Service connection, including fusing of the circuit, installation of a ground electrode and clamp and Pacific Gas and Electric Company connection charges, shall be considered included in other items of Work and will not be measured for payment. Pullboxes installed as a requirement of the service connection will be paid for under Paragraph 35-04.04, "Pullboxes," of these Standard Provisions.

35-03.07 Testing. Testing shall be considered as included in other items of work and will not be measured for payment.

35-04 PAYMENT.

35-04.01 Electroliers. The Contract price paid per each electrolier shall constitute full compensation for furnishing all labor, materials, tools, and equipment and doing all Work, including excavation and placing concrete foundations, erecting the standard with mast arm, installing luminaires complete with ballast and lamp, photoelectric unit wiring, and conductors, including in-line fuse, bonding, grounding, and all other incidental work required to install the electrolier complete as required in the Special Provisions, shown on the Plans, and specified herein.

35-04.02 Conduit. The Contract price paid per linear foot for each type or size of conduit shall constitute full compensation for furnishing all labor, materials (including fittings and couplings), tools, and equipment and doing all Work, including excavation, concrete caps, sand, casing, and jacking, as required to install the conduit complete as required in the Special Provisions, shown on the Plans, and specified herein.

35-04.03 Conductors and Wiring. The Contract price paid per linear foot for each pair of conductors and wiring shall constitute full compensation for furnishing all labor, materials, tools, and equipment and doing all Work required to install the conductors complete as required in the Special Provisions, shown on the Plans, and specified herein.

35-04.04 Pullboxes. The Contract unit price paid per each pullbox shall constitute full compensation for furnishing all labor, materials, tools, and equipment and doing all Work, including excavating and placing base material and concrete, and all other incidental work required to install the pullboxes complete as required in the Special Provisions, shown on the Plans, and specified herein.

SECTION 36: STREET TREES

36-01 SCOPE. Street trees shall be planted at the locations shown on the Plans and specified herein.

36-02 MATERIALS.

36-02.01 Trees. Trees shall be well-established, fifteen (15) gallon size, nursery stock measuring a minimum of six feet (6') in height. The type of tree shall be shown on the Plans. In the event the trees specified are not available, it shall be the Contractor's responsibility to obtain a substitute that has been approved by the Engineer.

All trees shall have a growth habit that is normal to the species, have straight trunks with a single leader intact, be uniform in size, be sound, healthy, vigorous, and free from insect pests, plant disease, sun scald, fresh abrasions of the bark, excessive healed abrasions, broken branches, and other objectionable disfigurements. Tree trunks shall be sturdy and well-hardened off. All trees shall have normally well-developed branch systems, where applicable. All trees shall have vigorous and fibrous root systems, that are neither root- nor container-bound, nor so recently canned that the root system is not developed throughout the container.

Random samples of the trees will be closely inspected upon delivery before being accepted. All trees not meeting the above standards will be rejected. If any rootbound trees are found, the Contractor will be required to open all cans for inspection or the entire lot will be rejected. It is the Contractor's responsibility to schedule this inspection prior to planting.

36-02.02 Stakes. Stakes shall be Lodgepole pine, clear redwood, or equivalent, 2"x2"x10' or two inch (2") diameter by ten foot (10') pressure-treated C.C.A.

36-02.03 Tree Ties. Tree ties shall be one and one-half inch (1-1/2") rubber tree straps with a No. 14 gauge wire tied to both ends, or equivalent approved by the Engineer.

36-02.04 Backfill Mix. Backfill mix shall consist of one-third (1/3) Nitrohumus, one-third (1/3) Olympia bend sand, and one-third (1/3) native soil. The Contractor shall furnish vendor's tags or invoices as to material.

36-02.05 Slow-Release Fertilizer. Agriform tree pellets, Osmocote 18-6-12, or approved equivalent.

36-02.06 Root Barriers and Root Shields. Deep root control planter, or approved equivalent.

36-03 CONSTRUCTION.

36-03.01 Installation of New Trees.

a. Dig holes twice as large in diameter and one and one-fourth (1-1/4) times as deep as container in which plant was delivered and scarify sides of holes. Build six inch (6") berm of native soil.

b. Fill hole with one hundred percent (100%) backfill mix to level appropriate to allow the plant's soil level to be slightly above finished grade.

c. Install root barrier, drain pipe, or both, as necessary.

d. Remove root ball carefully from container by supporting it from below. Sever any circling roots (3/16" diameter or greater) with sharp shears or knife; rootbound trees shall be rejected. Do not pull root ball apart. The severing of large roots will encourage new growth at cuts.

e. Fill half way with backfill and put slow-release fertilizer on this surface, use three (3) Agriform tree pellets, one-quarter (1/4) pound Osmocote 18-6-12, or approved equivalent, per 15-gallon tree. Continue to fill hole with backfill and tamp.

f. Water tree thoroughly, fill basin, and allow water to settle; repeat this process two (2) more times.

g. Install stakes. Secure tree using specified tree ties.

h. Attach "Tree Care" tag provided by the City.

i. Add a two-inch (2") layer of medium-size redwood chips.

36-03.02 Protection of Existing Trees During Construction Activities.

a. All existing Heritage trees and designated trees on the job site require protection from construction activities within the drip lines. Temporary chain-link fencing and plastic construction fence are acceptable as protective barriers for tree protection purposes. Fencing shall be minimum five feet (5') high. Tree protection shall remain in place until all construction is complete. The City reserves the right to issue a stop-work notice if the tree protection devices are not installed of if the devices are not maintained.

b. No excavations within the tree protection area are allowed unless approved by the City and under the supervision of a licensed arborist. Any filling within the tree protection area shall be done in accordance with a detailed improvement plan approved by the

City. No trimming, cutting, or pruning of designated trees can occur without approval by the City and supervision of a licensed arborist.

c. No storage of materials; disposal of paints, solvents, or other noxious materials; operation of equipment, parked cars, unnecessary trenching, grading, or compaction shall be allowed within the drip line of any trees.

36-03.03 Removal of Tree Roots Encountered During Construction Activities.

a. Cutting and removal of roots smaller than two inches (2") in diameter shall be done by chain saw or hand saw to provide a flat and smooth cut and cause the least damage possible to the root and tree's health. Cutting roots by means of tractor-type equipment or other than chain saws and hand saws will not be permitted. Proper pruning technique shall encourage callusing of the roots. A ninety degree (90°) cut that stimulates new growth is unacceptable. Root cutting and removal shall not exceed thirty-five percent (35%) of total root surface. The Contractor shall remove any wood chips or debris that may be left over from root removal that may affect the construction of improvements as directed by the Engineer.

b. If any roots over two inches (2") in diameter are severed during any excavation, the following procedure shall be followed:

i. Tree roots shall be shaded by immediately covering the entire trench with plywood or by covering the sides of the trench with burlap sheeting that is kept moist with twice-per-day wettings.

ii. When ready to backfill, each root shall be severed cleanly with a handsaw. Where practical, they should be cut back to a side root. Immediately, a plastic bag shall be placed over the fresh cut and secured with a rubber band or electrical tape. Shading should immediately be placed until backfilling occurs.

iii. Plastic bags shall be removed prior to backfilling. Backfill shall be clean, native material free of debris, gravel, or wood chips.

c. If roots three inches (3") in diameter or larger are encountered during excavation, the Contractor shall contact the Public Works Construction Section and the City Parks Division immediately and request a field inspection by the Engineer and the City Tree Supervisor, or their designated representatives, and obtain instruction as to how the roots should be treated. No roots three inches (3") in diameter or larger shall be cut and removed without prior approval from the Engineer and the City Tree Supervisor, or their designated representatives. Failure to notify the Public Works Department or the Parks Division for root inspection will result in the Contractor paying for damages and/or replacing the damaged tree as determined by the Engineer.

36-04 MAINTENANCE. All new trees installed shall be maintained for a minimum period of sixty (60) days after the last tree is planted and installation is approved by the Engineer. Said period shall not be shortened by the acceptance by the City of the balance of the street improvement construction. Should this period expire before final acceptance of the project by the City, maintenance shall continue to said acceptance.

During the maintenance period, all trees that die or that are in an unhealthy condition will be replaced. This shall be done just as soon as it is reasonably possible after the unsatisfactory condition is evident and shall not be postponed until the end of the maintenance period.

At the conclusion of the maintenance period, an inspection of the Work will be made to determine maintenance work needed to be done and to determine the condition of all trees. Any trees missing or not in a healthy condition will be noted, and these trees are to be removed from the site and replaced. Any deficiencies in maintenance shall be corrected. Replacement of trees shall be made promptly and in the same manner as specified in the original planting and at no extra cost to the City. The maintenance period for any replacement trees will extend a full sixty (60) days.

36-05 MEASUREMENT. New trees shall be measured on a per-each basis and shall include root barriers or root-control planters where shown on the Plans or specified herein. Protection of existing trees and root removal shall not be measured for payment and shall be included in other items of Work.

36-06 PAYMENT. The Contract unit price paid for each new tree installed shall constitute full compensation for furnishing all labor, tools, equipment, and materials and for performing all Work necessary to complete the tree installation as required in the Special Provisions, shown on the Plans, and specified herein.

SECTION 37: IRRIGATION

37-01 SCOPE. The Work shall consist of furnishing the materials and installing an irrigation system complete in accordance with the Special Provisions, Plans, and these Standard Provisions.

All Work shall be in full accordance with the latest rules and regulations of the safety orders of the Division of Industrial Safety, the Uniform Plumbing Code published by the Western Plumbing Officials Association, National Electric Code, Electrical Safety Orders of the State of California Division of Industrial Safety, and other applicable state or local codes or regulations.

Nothing in the Special Provisions, Plans, or these Standard Provisions is to be construed to permit Work not conforming to these codes, rules, and regulations. When specifications call for a material or construction of a better quality or larger size than required by the codes, rules, and regulations, specifications shall take precedence over the requirements of said codes, rules, and regulations.

37-02 MATERIALS.

37-02.01 General. Materials, equipment, apparatuses, and appliances used throughout the system shall be new and in perfect condition and shall comply with the Special Provisions, Plans, and these Standard Provisions.

37-02.02 Materials. Within five (5) days after notice to proceed and before any irrigation system materials have been delivered to the job site, submit to the Engineer a complete list of all irrigation system materials proposed to be installed. Show the manufacturer's name and catalog number for each item, furnish complete catalog cuts and technical data for each item, and the manufacturer's recommendations for method of installation. Upon approval by the Engineer or designated representative, the printed recommendations will become the basis for acceptance or rejection of actual methods of installation used in the Work. No irrigation system component shall be brought onto the job site unless it has been approved by the Engineer.

37-02.03 Plastic Pipe. All plastic pipe shall be free of blisters, internal striations, cracks, or any other defects. The pipe shall be continuously and permanently marked with the name of the manufacturer, material type, size, schedule or class, and quality control identifications (for example, ASTM and SDR numbers). Individual sections of pipe are to be of the same manufacturer.

a. Rigid Type. All Grade 1, Type 1 polyvinylchloride with solvent weld connections (PVC).

1. Main line pipe shall be Schedule 40 conforming to ASTM D1784 and D1785.

2. Lateral pipe shall be Class 200 conforming to ASTM D1784 and D2241.

37-02.04 Fittings. Pipe and hose fitting shall be Schedule 40, uniformly white in color, Type 1, Grade 1 polyvinylchloride (PVC) conforming to ASTM D1784 and D2466.

37-02.05 Nipples. Nipples shall be flexible polyplastic as specified on the Plans.

37-02.06 Solvents and Joint Compounds. Joint compound for all threaded connections shall be by Teflon seal.

Primer and solvents shall be as recommended by the pipe manufacturer.

All cans shall have labels intact and stamped with the date of manufacture. No cans dated over one (1) year old will be permitted. No solvent or primer shall be thinned in any manner whatsoever.

37-02.07 Control Wiring. All wires shall be solid copper, Type US-AWG, UL-approved for direct burial. Wire shall be continuously and permanently marked with the manufacturer's name, wire size and identification. The size and color of control wire shall be as follows: pilot wire—No. 14 red; common wire—No. 12 white.

All wire splices shall be made with a plastic heat-shrink type splice compound. All wire splices must be made in a splice box such as a Brooks 1419 heavy-duty plastic valve box with locking top or approved equal. Label splice boxes "splice" in one inch (1") letters with white enamel paint.

37-02.08 Backflow-Prevention Devices. The backflow unit shall be Febco 825 or 825Y with ball valves to the size shown on the Plans or an approved equal.

37-02.09 Pressure Regulating Valves. Pressure-regulating valves shall be of the type and size shown on the Plans.

37-02.10 Sprinklers. Sprinkler heads shall be Hunter Model No. I-20, I-25, I-40; Toro 570, 700, 640 Series; or Rainbird 18 Series, whichever is noted on the Plans, or an approved equal.

37-02.11 Automatic Control Valves. Automatic control valves shall be Griswold 2030 valve or an approved equal. Control valves shall be normally closed, electrically operated, and compatible for operation with the automatic controller. Control valves shall have two (2) inlets provided on each valve to enable installation in straight or angled configuration. The solenoid pilot must be corrosion-proof, molded in epoxy, and encased in brass housing. The valve must be constructed of brass and cast iron.

37-02.12 Automatic Controllers. The controllers shall be Rainmaster Model RME "Eagle," or an approved equal, or as noted on the Plans, and shall have the number of stations specified on the Plans.

37-02.13 Controller Enclosures. Controller enclosures shall be stainless steel as manufactured by Strong Box or an approved equal.

37-02.14 Valve Boxes. Valve boxes shall be Carson-Brooks product Model No. 1419 over the rim cover or an approved equal.

37-02.15 Ball Valves. Ball valves shall be cast steel and shall be as manufactured by Red-White Valve Corporation or an approved equal.

37-02.16 Master Valves. Master valves shall be installed downstream of reduced-pressure backflow preventor and shall be as manufactured by Griswold, Clay, Watts, or an approved equal.

37-03 CONSTRUCTION.

37-03.01 General. The Contractor shall install all products in strict accordance with the manufacturer's printed directions. If those directions conflict with Standard Provisions, the matter shall be brought to the attention of the Engineer for clarification prior to proceeding with the Work.

37-03.02 Superintendence. During the progress of this Work, a Contractor's Superintendent shall be on site at all times and shall be known to the Engineer. The Superintendent shall supervise the Work constantly and shall not be changed without seven (7) calendar days' notification to the Engineer. The Superintendent shall represent the Contractor in their absence, and their field decisions shall be as binding as if given by the Contractor. The Superintendent shall have a complete set of Plans on the job site at all times.

37-03.03 Layout and Verification. The Contractor shall stake out the locations, all pipes, backflow prevention equipment, valves, quick coupling valves, sprinkler heads, and emitters in accordance with the Plans. The Contractor shall check and verify dimensions of layout and report any variations to the Engineer before proceeding. Lay out Work as accurately as possible to the Plans.

Minor changes in locations to the above from locations shown shall be made as necessary to avoid existing or proposed planting, piping, utilities, or structures, at the Contractor's expense, when directed by the Engineer, providing such change is ordered before such items of Work directly connected to the same are installed and providing no additional material are required.

The Contractor will be held responsible for the relocation of any items without first obtaining the Engineer's approval. The Contractor shall remove and relocate such items, at the Contractor's expense, if so directed by the Engineer.

Before starting work on the irrigation system, the Contractor shall carefully check all grades to determine that Work may safely proceed, keeping within the specified material depths. The Contractor shall be aware of the fact that the Plans are horizontal dimensions. Actual measurements taken along the slope bank will differ from notes shown on the Plans.

No fittings shall be installed on pipe located underneath pavement or walls except where they are noted on the Plans. If such a need should occur, the Contractor shall bring it to the attention of the Engineer.

The Contractor shall verify the exact location of backflow-prevention devices with the Engineer prior to installation.

All changes to the Plans shall be recorded on the record drawings.

37-03.04 Water and Electrical Points of Connections. The Contractor shall provide connections to water and electrical sources as noted on the Plans. The Contractor shall also coordinate with local utility districts for service connections and bear all costs charged by the utility companies.

37-03.05 Workmanship. The Contractor shall install all irrigation system components in accordance with the Special Provisions, Plans, and these standard Provisions. The workmanship of the entire job must in every way be first class, and only experienced and competent persons will be allowed to work on the project. At least one (1) person shall be present at all times during the execution of this portion of the Work who shall be thoroughly familiar with the type of materials being installed and the manufacturer's recommendations as to method of installation and who shall direct all Work performed under this section. The Contractor shall replace, at the Contractor's expense, at any time within one (1) year after installation is accepted any and all defective parts.

37-03.06 Excavation and Trenching. The Contractor shall restore all surfaces, existing underground installations, etc., damaged or cut as a result of the excavations to their original condition and in a manner satisfactory to the Engineer.

The Contractor shall use all means necessary to protect planting materials before, during, and after the irrigation installation and immediately make all repairs necessary to the approval of the Engineer at no additional cost to the City. Care shall be taken to examine the existing trees that are to remain, and any roots cut that are larger than three-quarters of an inch (3/4") in diameter shall be filled with a tar-base sealant immediately. Trenches for mains and laterals shall be straight and true with bottoms graded on uniform slopes

to low points. Trenches shall be made wide enough to allow a minimum of four inches (4") between parallel pipelines of other trades. Parallel lines shall not be installed directly over one another. Maintain two inch (2") minimum vertical clearance between irrigation lines at a minimum transverse angle of forty-five degrees (45°). Trenches for pipelines shall be made of sufficient depth to provide the minimum cover from finished grade as follows:

a. Minimum twenty-four inches (24") of cover over main line pipes (2-1/2" outside diameter to 4" outside diameter; eighteen-inch (18") cover over pipes (1" to 2" diameter).

b. Lateral Lines: Minimum fourteen inches (14") of cover over laterals; except for a minimum of eighteen inches (18") of cover over remote control valve control lines (laterals) to sprinkler heads and eight inches (8") minimum of cover over emitter lines.

37-03.07 <u>Pipe Installation</u>. The Contractor is cautioned to exercise care in handling, loading and unloading, and storing plastic pipe and fittings. All plastic pipe and fittings will be stored under cover before using and will be transported in a vehicle with a bed long enough to allow the length of pipe to lay flat so as not be subject to undue bending or concentrated external load at any point. Any section of pipe that has been dented or damaged will be discarded until said section of pipe is cut out and rejoined with a coupling.

The Contractor shall provide the necessary means, lines, and supports to ensure installation of the pipe to line and grade. The Contractor's facilities for lowering the pipe into the trench shall be such that neither the pipe nor the trench will be damaged or disturbed.

Connections to irrigation main lines shall be made with service saddles as approved by the Engineer.

All pipes shall be assembled free from dirt and pipe scale and shall be reamed and burrs removed. The main line supply shall be flushed out and tested for leaks before backfilling and with control valves in place before lateral pipes are connected to valves. Each section of lateral pipe shall be flushed out before sprinkler heads are attached.

The Contractor shall not lay plastic pipe when there is water in the trench.

The Contractor shall not use solvent-weld pipe length sections shorter than fifteen feet (15') without the approval of the Engineer.

The Engineer shall inspect all pipe before it is laid and reject any section that is damaged by handling or is found to be defective to a degree which will materially affect function and service of the pipe.

All foreign matter and dirt shall be removed from the inside of the pipe before it is lowered into position in the trench, and it shall be kept clean by approved means during and after laying the pipe.

37-03.08 Solvent Weld Joints. The Contractor shall use only the solvent recommended by the manufacturer to make plastic pipe joints. All connections shall be made as per manufacturer's recommendations for solvent-weld type.

All solvent weld joints shall be first primed.

The pipe and fittings shall be thoroughly cleaned of dirt, dust, and moisture before applying solvent.

The Contractor shall make solvent weld joints with a nonsynthetic bristle brush in the following sequence:

a. Apply a liberal, even coat of solvent to the inside of the fitting.

b. Apply a liberal, even coat of solvent to the outside of the pipe, making sure the coated area is equal to the depth of the fitting socket.

c. Insert the pipe quickly into the fitting and turn the pipe approximately one-quarter (1/4) turn to distribute the solvent and remove air bubbles. Hold the joint for approximately fifteen (15) seconds so the fitting does not push off the pipe.

d. Use a clean rag and wipe off all excess solvent. This is to prevent weakening at the joint.

e. Allow at least fifteen (15) minutes of set-up time for each welded joint before moving it.

37-03.09 Closing Pipe. Open ends of the laterals and mains shall be capped or plugged, leaving caps and plugs in place until removal is necessary for completion of installation. The Contractor shall take other precautions as necessary to prevent dirt and debris from entering pipe or equipment. Do not allow or cause any of the Work of this section to be closed until it has been inspected, tested, and approved by the Engineer.

37-03.10 Flushing Lines. Lines shall be thoroughly flushed out before installing valves and sprinkler heads. After flushing, main line pipe may be partially backfilled, but joints, fittings, and connections shall remain free and visible. Secure emitter line "N" caps.

37-03.11 Hydrostatic Tests—Open Trench.

a. Test to be accomplished at the expense of the Contractor and in the presence of the Engineer.

b. Set up piping with small amount of backfill to prevent arching or slipping under pressure. Do not cover any joints.

c. While the joints are exposed, all piping shall be subjected to a hydrostatic test. The Contractor shall supply all caps, belts, and pumps and accurately calibrate recording gauges to be installed in a minimum of two (2) places. All piping shall meet the following requirements:

1. Supply lines must hold at 150 PSI for a minimum of four (4) hours with an allowable loss of 5 PSI.

2. Lateral lines must hold at 100 PSI for a minimum of one (1) hour with an allowable loss of 5 PSI.

d. During the test, all detectable leaks, regardless of the amount of leakage, should be stopped and all defects corrected. Materials and installation procedure used for making corrections shall be identical to those specified herein.

e. No pipe shall be backfilled until it has been inspected and approved in writing by the Engineer.

37-03.12 Backfilling and Compaction. Initial backfill on all lines shall be of sand with no foreign matter larger than one-half inch (1/2") in size from an approved source. Backfill material shall be tamped in four-inch (4") layers under the pipe and uniformly on both sides for the full width of the trench and the full length of the pipe. Material shall be sufficiently damp to permit thorough compaction under and on each side of the pipe to provide support free of voids. Backfill for trenching shall be compacted to dry density equal to ninety percent (90%) of adjacent undisturbed soil and shall conform to adjacent grades without dips, sunken areas, humps, or other irregularities.

37-03.13 Sprinkler Heads. Sprinkler heads shall be installed where indicated and as detailed on the Plans.

37-03.14 Remote Control Valves. Install one (1) assembly per box where indicated and as detailed. Install no closer than six inches (6") to curb.

37-03.15 Valve Boxes. Install the top of the box level and flush with the finished grade and in a neat and orderly manner. Boxes shall be aligned parallel to paving or curbs. The

number of the circuit shall be stenciled on the top of the box in two-inch (2") letters with white enamel. Valve boxes shall not rest or come in contact with RCV.

37-03.16 Automatic Control Wiring. Install control wires, main line, and laterals in common trenches wherever possible. Install control wires alongside pipe with a minimum of twenty-four inches (24") of cover. Wires shall be a minimum of one inch (1") from any pipe or fitting, except at terminal points. Provide looped slack twenty-four inches (24") at valves and snake wires in trench to allow for contraction of wire. Control wires shall be routed from the controllers in tight groupings. Tie wires and trench in bundles at ten foot (10') intervals with plastic electrical tape at a minimum of six (6) turns. All pilot and common wires shall be permanently marked at terminal points. Wherever wire is routed under concrete paving, walls, stairs, or curbs, it shall be installed in a rigid PVC control wire sleeve. Refer to the materials section of these Special Provisions for color coding of wiring.

Control wires shall be connected to each controller in accordance with the sequence indicated on the Plans. The Contractor shall be responsible for the coordination of hookups and connections and for the installation of any materials and equipment necessary; all to facilitate the proper and complete operation of the controllers and electrical system.

37-03.17 Percentage Control Adapter (PCA). PCAs (12 or 24), including antennas, shall be installed at each irrigation controller as indicated on the Plans.

37-03.18 Automatic Controllers. Automatic controllers shall be installed as required in the Special Provisions, shown on the Plans and specified herein.

All control wires shall be labeled at the controller terminal points with preprinted vinyl-impregnated, self-adhesive number markers. The Contractor shall be responsible for the coordination of hookups and connections and for the installation of any materials and equipment necessary; all to facilitate the proper and complete operation of the controllers and electrical system. Install irrigation controller cabinet as detailed on the Plans.

The Contractor shall provide one (1) controller chart for each automatic controller supplied, showing the area covered by the controller. The chart shall be a reduced drawing of the actual as-built system. However, the controller sequence must be legible when a drawing is reduced.

Charts shall be a black-line print with a different color used to show area of coverage for each station. When completed and approved, the chart shall be inserted between two (2) pieces of plastic, each piece being a minimum of twenty millimeters (20 ml) thick. The chart must be completed and approved prior to final inspection of the irrigation system.

37-03.19 Adjusting System. Adjust valves and align and adjust head coverage. If the Engineer determines that adjustments in the irrigation equipment will provide more adequate coverage, the Contractor shall make necessary changes or make arrangements with

the manufacturer to have the adjustments made prior to any planting. These changes or adjustments shall be made without additional cost. The entire system shall be operating properly before any planting operations commence.

37-03.20 Cleanup. Upon completion of the Work, make the ground surface level, remove excess materials, rubbish, and debris, and remove construction and installation equipment from the premises.

37-03.21 Manuals. The Contractor shall furnish preindividually bound service manuals to the Engineer. The manuals shall contain complete exploded drawings, diagrams, and spare part list of all equipment installed, showing components and catalog number together with the manufacturer's name and address. In addition, each service manual shall contain the following:

1. Index sheet indicating the Contractor's name, address, and phone number.

2. Copies of equipment warranties and certificates.

3. Complete operating and maintenance instructions and sufficient detail to permit operating personnel to understand, operate, and maintain all equipment.

37-03.22 As-Built Drawings. The Contractor shall prepare an as-built drawing on a print of the irrigation plans showing deviations and changes in the layouts. Reproducible as-built drawings shall be delivered to the City for approval before final acceptance of the Work.

As-built drawings shall be maintained on the site at all times. Dimension the revised locations from a permanent point of reference (for example, building, sidewalk, curb, pavement, monuments, etc.). All dimensions shall be taken prior to backfill. All such changes shall be indicated in red.

37-04 MEASUREMENT. The Work performed under these Special Provisions shall be measured by units or lump sum price as designated in the Special Provisions.

37-05 PAYMENT. The Contract unit or lump sum prices designated in the Special Provisions shall constitute full compensation for all labor, materials, tools, equipment, tests, and all incidentals necessary to install a complete and operational irrigation system in accordance with the Special Provisions, shown on the Plans, designated by the Engineer, and specified herein.

When there are no separate contract items for any Work and materials necessary to complete the irrigation system as required in the Special Provisions, shown on the Plans, and specified herein, such Work or material shall be furnished and installed. Full compensation for this Work and materials shall be considered as included in the prices paid for the various contract items of irrigation system, and no separate payment will be made thereof.

SECTION 38: CATHODIC PROTECTION

38-01 SCOPE. The Work shall consist of furnishing and installing the cathodic protection in accordance with the Plans and these Standard Provisions.

38-02 GENERAL. All materials shall conform to the requirements set forth herein as shown on the Standard Details, unless otherwise specified. All materials must be new, free from defects, and shall be the best commercial quality for the purpose specified. All necessary items and accessories not shown on the Standard Details or specified herein but which are required to fully carry out the specified intent of the Work shall be furnished by the Contractor without additional cost to the owner.

38-03 REFERENCE SPECIFICATIONS.

1. American Society for Testing and Materials (ASTM).

2. National Electrical Manufacturers Association (NEMA).

3. Underwriters Laboratory (UL).

38-04 SUBMITTALS.

38-04.01 Product Data. Submittals shall include catalog cuts, product data sheets, or shop drawings to clearly define to demonstrate full compliance with the Plans and this section of the Standard Provisions.

38-05 MATERIALS.

38-05.01 Galvanic Anodes. Zinc anodes shall be sized as shown on the Standard Details. Each anode shall be cast with a steel core, and the core shall protrude from one end and shall be of sufficient length to permit attachment of a lead wire. Each anode shall conform to the chemical composition as required by ASTM B418-73, Type I.

Magnesium anodes shall be sized as shown on the Standard Details. Each anode shall be cast with a steel core, and the core shall protrude from one end with sufficient length to permit attachment of an anode cable. Each anode shall conform to the following chemical composition:

Aluminum	0.01% maximum
Manganese	0.50% to 1.3%
Iron	0.03% maximum
Nickel	0.001% maximum

Copper	0.02% maximum
Total impurities	0.30%
Other impurities	0.05%
Magnesium	Balance

Each anode shall be furnished with a lead wire attached to one end of the steel core, and the wire shall be of sufficient unspliced length to attach the terminal in the terminal box as shown on the Standard Details. The wire shall be connected to the steel core by silver soldering, and the connections shall be mechanically secure by soldering with at least two (2) turns of wire to the steel core. The entire connection shall be insulated with an electrical potting compound. The cable attached to the anode shall be No. 10 AWG, Type THW, stranded, single conductor, and shall conform to Federal Specification J-C-30.

The anode shall be packaged in a permeable cloth bag filled with a mixture of seventy-five percent (75%) ground hydrated gypsum, twenty percent (20%) powdered bentonite, and five percent (5%) anhydrous sodium sulfate. Backfill grain size shall pass one hundred percent (100%) through a one hundred (100) mesh sieve. The mixture shall be firmly packed around the anode within the cloth bag by vibrations so that the zinc ingot is completely surrounded with a minimum one inch (1") of backfill material.

38-05.02 Cables. All underground cables used for the cathodic protection testing and binding cable shall be sized as shown on the Standard Details and shall be stranded, single conductor, copper, Type CP, and shall be insulated with an extruded plastic insulation. The cable shall be insulated for six hundred (600) volts, high molecular weight polyethylene, one hundred ten millimeter (110 ml) minimum thickness, in accordance with the requirements of ASTM D-1248, Type 1, Class C, Grade 5 and ICEA-NEMA S-61-402.

38-05.03 Rigid PVC Conduit and Fittings. Rigid polyvinylchloride (PVC) conduit and fittings shall be Schedule 80, manufactured to NEMA TC-2 and WC-1094 specifications, and shall be UL-approved.

38-05.04 Insulating Flexible Couplings. Insulating-type flexible couplings shall comply with all requirements for fittings furnished for the pipeline and shall be provided with synthetic rubber boots (sleeves) which electrically isolate the ends of the attached pipe from the fitting as shown on the Standard Details. The couplings shall be epoxy-coated in accordance with Section 33-02.16, "Epoxy Coatings."

38-05.05 Flexible Couplings (Noninsulating). All noninsulating flexible couplings shall be bonded as shown on the Standard Details and shall be epoxy-coated in accordance with Section 33-02.16, "Epoxy Coatings."

38-05.06 Ducseal Putty. Putty used for cable to pipe connection seal around welder shall be manufactured by Duco Company or an approved equal.

38-05.07 Polyethylene Tape. Polyethylene tape shall be twelve millimeter (12 ml) thick adhesive backed No. 930-12 Polyken applied over a Polyken 927 primer.

38-05.08 Exothermic Welds. All cable connections to pipe or fittings shall be accomplished by using a "Cadweld" by Erico Products, Inc., or an approved equal. Each cable shall be fitted with a copper sleeve at the weld. Cartridge (weld metal) sleeves and molds for each weld shall be furnished by the same manufacturer. Weld material used for welds of ductile iron or malleable iron shall be used as required by the manufacturer for cast iron.

38-05.09 Terminal Boxes. Terminal boxes shall be constructed of high-impact, molded, Lexan plastic and furnished with a PVC conduit as shown. Each box shall be furnished with an integral high-impact Lexan terminal board with a sufficient number of terminals for each cable. All boxes shall be blue color for easy identification.

38-05.10 Terminal Hardware. Nuts, bolts, and washers shall be nickel-plated brass, and bonded straps shall be nickel-plated copper.

38-05.11 Shunts. Anode metering shunts shall be 0.01 ohm rated for six (6) amperes with two percent (2%) accuracy. Shunts furnished for the service installations shall be a manganin wire, Type RS, Holloway or approved equal.

38-05.12 Ground Clamps. Ground clamps shall be all brass with a brass set screw.

38-05.13 Valve Boxes. Valve boxes shall be in accordance with Paragraph 33-02.07, "Gate Valve Boxes," of these Standard Provisions. The cover shall be manufactured with "CTS" cast in two-inch (2") high letter markings for easy identification.

38-05.14 Insulating Flange Joints. Each insulating flange set shall consist of a full-face central gasket, a full-length sleeve for each flange bolt, and two (2) insulating washers with two (2) steel washers for each bolt. The ring-type central gasket shall be one-eighth inch (1/8") thick sheet packing having a high dielectric constant. Bolt sleeves and insulating washers shall be constructed of fabric-reinforced phenolic resin. The complete assembly shall have an ANSI pressure rating equal to that of the flanges between which is installed.

38-05.15 Meter Couplings. Meter couplings (tailpieces) at the service meter shall be Mueller H-10871 or an approved equal.

38-05.16 Epoxy Putty. Putty used for the cable to pipe connection seal dam shall be "A + B" epoxy No. 9901 as manufactured by Hexcel Company or an approved equal.

38-05.17 Epoxy. Epoxy used for sealing anode to cable and cable to pipe connections shall be Concresive No. 1011, as manufactured by Adhesive Engineering; Scotchcast Resin No. 4, as manufactured by 3M Company; CC-1 Potting Compound, manufactured by PSI Products; or an approved equal.

38-05.18 Bitumastic. Bitumastic for coating couplings and insulated flange joints shall conform to the requirements of Bureau of Reclamation Specification CA-50.

38-06 INSTALLATION OF CATHODIC PROTECTION.

38-06.01 General. All workmanship, installation, and materials shall conform with all requirements of the legally constituted authority having jurisdiction. These authorities include, but are not limited to, the latest version of the State of California, Department of Industrial Relations, Division of Industrial Safety, Electrical Order; the National Electric Code, General Construction Safety Orders of the Industrial Accident Commission; and all other applicable state, County, or City codes and regulations. Nothing in these Standard Provisions is to be construed to promote work not conforming to these regulations and codes. Larger size or better grade materials shall be installed as required by these regulations and codes.

38-06.02 Storage of Materials. All equipment and materials to be used in construction shall be stored in such a manner to protect from detrimental effects from the elements. Damaged or defective equipment and materials shall not be used or stored on the site.

38-06.03 Cables. Cables buried in the ground shall be laid straight, without kinks, and shall have a minimum cover of thirty inches (30”). Each cable run shall be free of joints or splices and continuous in length. Care shall be used during installation to avoid cuts, punctures, or similar damage to insulation. Any damage to insulation will require replacement of the entire cable length. Pullboxes and splice boxes shall be installed where shown and where otherwise required to facilitate installation of conductors and to comply with code requirements. Backfill surrounding the cable shall be native soil free of rocks, gravel, and foreign material.

38-06.04 Galvanic Anodes. Galvanic anodes shall be installed in an eight-inch (8”) diameter hole drilled to the proper depth or placing a horizontal trench at the proper depth. Prior to placing anodes, paper or plastic bags shall be removed, but the cloth bag shall remain around the anode. Care shall be exercised during installation to prevent damage to the cloth bag and loss of backfill material. After placing anodes, native soil, free of rocks and other foreign objects, shall be placed around the anode and to a minimum of six inches (6”) above the anode. Backfill shall then be flooded with water. Remainder of the hole/trench shall be backfilled with native soil in unimproved areas and select native backfill or import material to pavement subgrade. During installation, anodes shall not be supported or handled by the use of attached wires. Backfill and compaction shall be equal to or greater than ninety percent (90%) relative density.

38-06.05 Joint Bonding. All pipe and fitting joints shall be bonded for electrical continuity in accordance with details shown on the Standard Details except welded or flanged joints not epoxy-coated. The bond cable shall be installed with a cable loop with sufficient length to allow maximum movement of the pipe without producing tensile stress in the cable.

38-06.06 Bonding Flexible Couplings. After installation, all noninsulating flexible-type couplings shall be bonded as shown on the Standard Details. The overall length of each conductor shall be sufficiently greater than the distance between weld connections to permit maximum pullout of pipe ends from the coupling without transferring any tensile stress to the cable or welds. Connection of cable to pipe shall be in accordance with the requirements specified herein.

38-06.07 Cable to Pipe and Coupling Connections. Cable to pipe and coupling connections shall be installed in the manner and at the location shown on the Standard Details. Coating materials shall be removed from the surface over an area just sufficient to make the connection. The iron and steel surface shall be cleaned to white metal by grinding or filing prior to welding the conductor. Grinding with resin-impregnated wheels shall not be allowed. The conductor shall be welded to the pipe by the exothermic process with a copper sleeve fitting over the conductor, and only sufficient insulation shall be removed from the conductor to allow placing in the welding mold. After the weld has cooled, all slag shall be removed and the welds shall be tested with a sharp hammer blow to assure proper metallurgical bond. All defective welds shall be removed and replaced. All exposed surfaces of copper and steel shall be covered with a minimum thickness of one-fourth inch (1/4") of insulating materials as shown on the Standard Details.

38-06.08 Anode Junction Boxes. Anode junction boxes shall be installed at locations designated from the Standard Details. Exact location of anode junction boxes shall be determined by the Engineer in the field. The color of each cable shall be utilized to identify the cable as shown—test cable shall be red, and drain cable shall be white. Anode cables shall be black.

38-06.09 Insulated Flanged Joints. All insulating components of the insulating flanged gaskets shall be cleaned of all dirt, oil, grease, and all foreign materials immediately prior to assembly. Bolt holes in mating flanges shall be properly aligned at the time bolts and insulating sleeves are inserted to prevent damage to the insulation. After flanged bolts have been tightened, each insulating washer shall be inspected for cracks or other damage. All damaged washers shall be replaced. After assembly, resistance between each bolt and flange shall be measured with an approved ohmmeter, and the minimum resistance shall be fifty thousand (50,000) ohms. Where the insulating joint is assembled in the shop and shipped as a unit, resistance shall be measured in the shop between the flanges in between each bolt and flange and shall meet the above requirements. After installation, all flanges buried, submerged, or located in the ground-level boxes shall have a bitumastic coating applied to all bare metal such as bolt threads and chipped paint and shall be completely encased in a polyethylene wrap.

38-06.10 Coating Mechanical Couplings. All buried mechanical couplings shall be epoxy-coated in accordance with Paragraph 33-02.16, "Epoxy Coatings." Pipe and coupling components shall be cleaned of dirt and foreign materials prior to placement of the coating. After

installation of the fitting, a bitumastic coating shall be applied to all bare metal, such as bolt threads and chipped paint, and shall be completed encased in a polyethylene wrap.

38-06.11 Energizing and Testing. The Contractor shall be responsible for all cathodic protection testing by a corrosion specialist certified by the National Association of Corrosion Engineers (NACE) or a corrosion engineer licensed in the State of California. No connection shall be allowed between the pipe and the anode prior to testing so the Contractor or Contractor's testing firm can get true native soil potentials. The Contractor or Contractor's testing firm will make the final connections. The Contractor shall mark the wires and submit a drawing that identifies the wires prior to testing. All testing will be done in the presence of the Engineer.

The cathodic protection system, including all anode, joint bonds, and insulation flanged joints shall be tested prior to paving and, upon completion of tests, a detailed report shall be submitted to the City describing any deficiencies detected. Criteria for acceptance of cathodic protection system are defined in the National Association of Corrosion Engineering Publication RP-01-69. Any deficiencies shall be corrected by the Contractor at no additional cost. Final testing of the system shall be done after final paving and all deficiencies shall be corrected by the Contractor prior to final acceptance and a detailed report shall be submitted to the City's Engineer.

38-06.12 Cleanup. The Contractor shall be responsible for cleanup and removal of all debris, extra material, and equipment utilized for installation of the cathodic protection system.

38-07 BASIS OF PAYMENT.

38-07.01 Payment Basis. The lump sum contract price for this item of Work shall constitute full compensation for all Work and materials required to complete the installation and testing of the cathodic protection, as required in the Special Provisions, shown on the Plans, and specified herein.

38-07.02 Measurement for Payment. Measurement for payment shall be a lump-sum basis and shall include all Work specified in these Standard Provisions and not included in other items of Work.

City of Mountain View

CITY OF MOUNTAIN VIEW

STANDARD DETAILS

STANDARD DETAILS

TABLE OF CONTENTS

Section	Description	Page
A	**SURFACE (A-1 through A-25)**	
	Standard Sidewalk Section	A-1
	Geometric Section—60-Foot Street	A-2
	Standard Geometric Street Sections—55-Foot Frontage Road	A-3
	Standard Geometric Street Sections—4-Lane Arterial	A-4
	Standard Geometric Street Sections—6-Lane Arterial	A-5
	Standard Curb and Gutter and Extruded Median Curb	A-6
	Standard Cross-Sections, Curb, Gutter, Sidewalk and Driveway Approach	A-7
	Modified Driveway Approach/Level Sidewalk Cross-Section	A-7A
	Driveway Detail for Detached Sidewalk (Driveway with Planter Strip 4.5' or Greater)	A-8
	Driveway Detail for Detached Sidewalk (Driveway with Planter Strip Less than 4.5')	A-8A
	Driveway and AC Conform Details	A-9
	Standard Concrete Apron and Valley Gutter	A-10
	Standard Barricade	A-11
	Standard Monument	A-12
	Street Name Sign	A-13
	Stop Sign	A-14
	4" x 4" Wooden Sign Post Blockout Hole Details	A-15
	Curb Ramp Details	(former A-16 & A-17) see latest Caltrans Standards
	Trench Paving, Backfill and Pipe Bedding Sections	A-18
	Object Markers	A-19
	Exploratory Pothole Restoration	A-20
	Median Island Hardscaped	A-21
	Side Street/Driveway Pedestrian and Vehicle Triangle of Safety	A-22
	Corner/Intersection Visibility Traffic Safety Visibility Area	A-23
	Underground Garage Driveway Ramp	A-24
	Speed Hump	A-25
	Micro-Trenching (Sheet 1 of 2)	A-26A
	Micro-Trenching (Sheet 2 of 2)	A-26B

B STORM DRAIN (B-1 through B-12)

Storm Drain Manhole for Pipe 48” Diameter and Less B-1
Storm Manhole Base with Branches.....B-2
Storm Drain Lateral Pipe Collar Connection B-2A
Storm Manhole Frame and Cover.....B-3
Storm Curb Inlet.....B-4
Storm Curb Inlet Frame and Bicycle Safe Grate B-5
Storm Gutter Depression.....B-6
Storm Area Drain Inlet B-7
Property Line Storm Drain Inlet and Clean-Out.....B-8
Frame and Grate for Property Line Storm Drain Inlet and Clean-Out.....B-9
Storm Curb Drain B-10
Storm Frame and Grate for Face of Curb Drain Inlet.....B-11
Storm Face of Curb Outlet B-12

C SANITARY SEWER (C-1 through C-9)

Sanitary Sewer Manhole for 36” and Smaller Diameter Pipes.....C-1
New Sewer Main Connection to Existing Manhole C-2
Sanitary Sewer Manhole Sections C-3
Sanitary Sewer Manhole Frame and Cover C-4
Sewer Lateral and Deep Sewer Riser C-5
Sewer Lateral Connections to Sewer Mains C-6
Sewer Lateral Clean-Out for New 4” and 6” Laterals C-7
Sewer Lateral Clean-Out for Existing 4” and 6” Laterals C-8
Sewer Service Connection for Common Green Developments—
4” and 6” Laterals.....C-9

D WATER (D-1 through D-38)

1” and 2” Water Services with 3/4”, 1”, 1-1/2” and 2” Water Meters D-1
Water and Fire Service 4” or Larger with 3” or Larger Meters..... D-2
3” or Larger Water Meter Turbine Type..... D-3
Multiple Water Meter Installation – 2” Service and Manifold.....D-3A
Multiple Water Meter Installation—4” Service and Manifold D-3B
Transfer Service (used when replacing Main and not Services)..... D-4
Reduced Pressure Backflow Prevention Assembly..... D-5
Double Check Detector Assembly (Below Grade)
(this detail is not for new construction).....D-5A
Fire Double Check Detector Assembly (Above Grade) D-5B
Fire Double Check Detector Assembly (Above Grade—Compact)..... D-5C

Detector Check Valve (Below Grade)
(this detail is not for new construction) D-6
Fire Hydrant Sheet 1 of 2 ..... D-7
Fire Hydrant Sheet 2 of 2 ..... D-7.1
Gate Valve Box and Anchor D-8
Blow-Off at End of Main D-9
2” Blow-Off Valve D-10
Air Relief Valve D-11
P.V.C. and D.I.P. Stub-Out D-12
Thrust Block for Horizontal and Vertical Downward Bends D-13
Standard Thrust Block for Tees D-14
Standard Anchor for Upward Thrust D-15
Standard Reducer Anchor D-16
Fire Hydrant Guard Post D-17
Standard Cathodic Protection System—Ductile Iron Pipe D-18
Standard Ductile Iron Pipe Anode Requirements—Table 1 ..... D-19
Standard Ductile Iron and Cast Iron Fittings Cathodic Protection
for Non-metallic Pipe D-20
Standard Cathodic Protection Station—Anode Installation D-21
Standard Alternative Anode Installation D-22
Standard Test and Anode Junction Box D-23
Standard Anode Terminal Box (Cover Not Shown) D-24
Standard Test Station and Terminal Box (Box Covers Not Shown) D-25
Standard Joint Bond for Ductile Iron Pipe D-26
Standard Cable to Pipe Connection D-27
Standard Insulating Flexible Coupling Section D-28
Standard Flexible Coupling Bond D-29
Standard Copper Service Line Anode Requirements— Corrosion
Control Details—Table 2 ..... D-30
Standard 2” or Smaller Copper Service Installation—D.I.P. Main
Corrosion Control Details D-31
Standard 4” or Larger Meter Installation—Corrosion Control
Details D-31A
Standard Fire Hydrant Installation—Corrosion Control Details—
ACP Mains D-31B
Standard 2” or Smaller Copper Service Installation—ACP Mains
Corrosion Control Details D-32
2” Standard Blow-Off Valve Cathodic Protection D-33
Standard Air Relief Valve Cathodic Protection D-34
Standard Blind Flanged Gate Valve at End of Main—Cathodic Protection D-35
Standard Insulating Flange D-36
Standard Magnesium Anode D-37
Standard 12-Lb. Zinc Anode D-38

E STREET LIGHTING (E-1 through E-11)

Standard Electrolier E-1A
Illumination Levels at Signalized Intersections & Mid-Block Crosswalks E-1B
Standard Pole Base—Sheet 1 of 3 ..... E-2
Standard Pole Base—Sheet 2 of 3 ..... E-3
Standard Pole Base—Sheet 3 of 3 ..... E-3A
Standard Pullbox E-4
Street Light Fuse and Ground Connection E-5
Type “B” Streetlight Details E-6
Type “B” Streetlight—Globe and Finial Details E-7
Type “B” Streetlight—Fixture and Globe Holder Details E-8
Type “B” Streetlight—Pole Details E-9
Type “B” Streetlight—Miscellaneous Details E-10
Traffic Signal Detector Loops E-11

F LANDSCAPING AND IRRIGATION (F-1)

Tree Planting and Staking F-1

RW RECYCLED WATER (RW-1 through RW-13)

Recycled Water Standard 1” and 2” Water Services with 3/4”, 1”, 1-1/2” and 2” Water Meters RW-1
Recycled Water Service 4” or Larger with 3” or Larger Meter RW-2
Recycled Water 3” or Larger Water Meter Turbine Type RW-3
Recycled Water Reduced Pressure Backflow Preventer Installation RW-4
Recycled Water Gate Valve Box and Anchor RW-5
Recycled Water Separation Standards for Mains and Services RW-6
Recycled Water Irrigation Box Lid Identification RW-7
Recycled Water Warning Tag Detail and Pipe Identification RW-8
Recycled Water Valve Labeling RW-9
Recycled Water Advisory Signs RW-10
Recycled Water Controller Box Identification RW-11
Recycled Water 2” Blow-Off Valve RW-12
Recycled Water Air Relief Valve RW-13

CITY OF MOUNTAIN VIEW

STANDARD DETAILS—LIST OF ABBREVIATIONS

A

ABAND	ABANDONED
AB	AGGREGATE BASE
AC	ASPHALT CONCRETE
ACP	ASBESTOS CEMENT PIPE
AD	AREA DRAIN
APPROX	APPROXIMATE
ARV	AIR RELEASE VALVE
AGGR	AGGREGATE
ASTM	AMERICAN SOCIETY for TESTING MATERIALS
ATS	ANODE TEST STATION
AWG	AMERICAN WIRE GAUGE

B

BC	BEGINNING OF CURVE
BCR	BEGIN CURB RETURN
BEG	BEGIN
BM	BENCHMARK
BO	BLOW-OFF
BOV	BLOW OFF VALVE
BVC	BEGIN VERTICAL CURVE
BW	BACK OF WALK

C

CB	CATCH BASIN
C & G	CURB AND GUTTER
CIP	CAST IRON PIPE
CL	CENTER LINE
CLF	CHAIN LINK FENCE
CL	CLASS
CLR	CLEARANCE
CMP	CORRUGATED METAL PIPE
CMV	CITY OF MOUNTAIN VIEW
CO	CLEAN OUT
COMP	COMPACTION
COMPL	COMPLETE
CONC	CONCRETE
CONST	CONSTRUCT or –TION
CORP	CORPORATE
CR	CURB RETURN
CTS	CATHODIC TEST STATION
CUP	COPPER PIPE
CVC	CENTER OF VERTICAL CURVE
CY	CUBIC YARD

D

DCDA	DOUBLE CHECK DETECTOR ASSEMBLY
DEFL	DEFLECTION
DI	DROP INLET
DIA	DIAMETER
DIP	DUCTILE IRON PIPE
DIST	DISTANCE
DOM	DOMESTIC
D/W	DRIVEWAY

E

E	EAST or ELECTRIC
EA	EACH
EC	END OF CURVE
ECR	END OF CURB RETURN
EG	EDGE OF GUTTER
EL	ELEVATIONS
ELECT	ELECTRICAL
EP	EDGE OF PAVEMENT
EVC	END OF VERTICAL CURVE
EXIST or (E)	EXISTING

F

FC	FACE OF CURB
FDC	FIRE DEPARTMENT CONNECTION
FF	FINISHED FLOOR
FG	FINISHED GRADE
FH	FIRE HYDRANT
FI	FIELD INLET
FL	FLOW LINE
FM	FORCE MAIN
FS	FINISHED SURFACE
FT	FOOT or FEET

G

G	GAS
GA	GAGE OR GAUGE
GALV	GALVANIZED
GB	GRADE BREAK
GIP	GALVANIZED IRON PIPE
GV	GATE VALVE

H

HC	HANDICAP
HOR	HORIZONTAL
HP	HIGH POINT
H&T	HUB & TACK

I

ID	INSIDE DIAMETER
IFC	INSULATING FLEXIBLE COUPLING
IJTS	INSULATING JOINT
INV	INVERT
IPS	IRON PIPE SIZE
IRR	IRRIGATION

J

JP	JOINT POLE
JT	JOINT TRENCH

L

LF	LINEAL FEET
L.G	LIP OF GUTTER
LH	LAMPHOLE
LT	LEFT

M

MAX	MAXIMUM
MECH	MECHANICAL
Mg	MAGNESIUM
MGB	METAL BEAM GUARD
MH	MANHOLE
MIN	MINIMUM
MJ	MECHANICAL JOINT
MON	MONUMENT

N

N	NORTH
NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATIONS
NIC	NOT IN CONTRACT
No.	NUMBER
N&S	NAIL AND SHINER
N.T.S.	NOT TO SCALE

O

OC	ON CENTER
OD	OUTSIDE DIAMETER
OG	ORIGINAL GROUND
OS & Y	OUTSIDE STEM & YOKE

P

PB	PULLBOX
PUE	PUBLIC UTILITY EASEMENT
PCC	PORTLAND CEMENT CONCRETE
PED	PEDESTRIAN
PSE	PUBLIC SERVICES EASEMENT
PI	POINT OF INTERSECTION
PIV	POST INDICATOR VALVE
PL	PROPERTY LINE
POC	POINT ON CURVE
PP	POWER POLE
PRC	POINT OF REVERSE CURVE
PS	PUMP STATION
PUE	PUBLIC UTILITY EASEMENT
PVI	POINT OF VERTICAL INTERSECTION
PVC	POLYVINYL CHLORIDE

Q

QCV	QUICK COUPLER VALVE

R

R	RADIUS
RCB	REINFORCED CONCRETE BOX
RCP	REINFORCE CONCRETE PIPE
RCV	REMOTE CONTROL VALVE
REV	REVISION or REVISED
RIM EL	RIM ELEVATION
RT	RIGHT or RING-TITE
R/W or ROW	RIGHT OF WAY

S

S	SLOPE or SOUTH
SAN.	SANITARY
SD	STORM DRAIN
SDMH	STORM DRAIN MANHOLE
SECT	SECTION
SHT	SHEET
SI	STORM INLET
SPEC	SPECIFICATION
SQ	SQUARE
SS	SANITARY SEWER
SSMH	SANITARY SEWER MANHOLE
ST	STREET
STA	STATION
STD	STANDARD
STRUCT	STRUCTURAL
SUPT	SUPERINTENDENT
S/W	SIDEWALK

T

T	TELEPHONE
T/C or TOC	TOP OF CURB
TEMP	TEMPORARY
THK	THICKNESS
TP	TOP OF PAVEMENT
TS	TAPPING SLEEVE
TYP	TYPICAL

U

UL	UNDERWRITERS LABORATORY

V

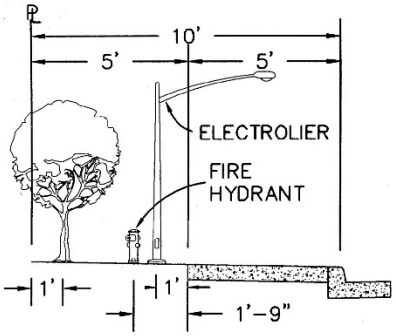
VC	VERTICAL CURVE
VCP	VITRIFIED CLAY PIPE
VERT	VERTICAL

W

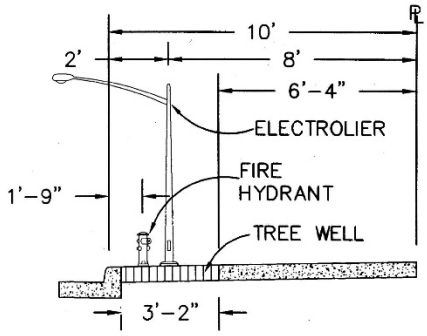
W	WEST
W/	WITH
W/O	WITHOUT
W,WL	WATER LINE
WCE	WIRE CLEARANCE EASEMENT
WM	WATER METER
WS	WATER SERVICE
WWF	WELDED WIRE FABRIC

X

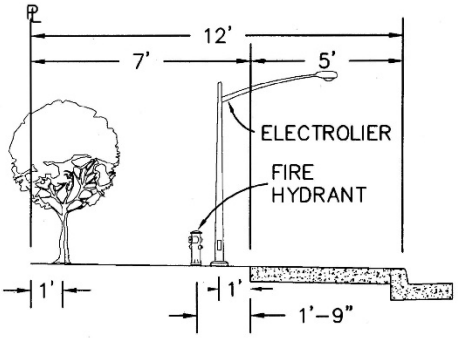
XING	CROSSING



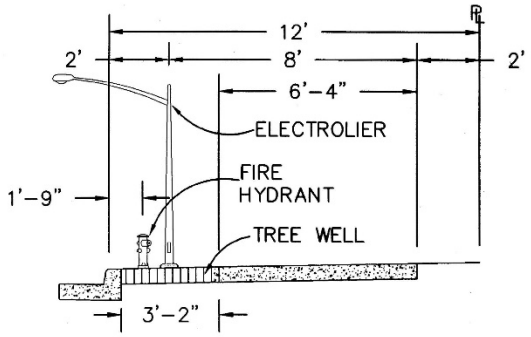
10' LOW DENSITY RESIDENTIAL



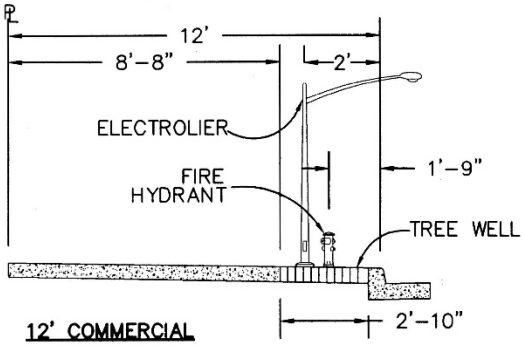
10' HIGH DENSITY RESIDENTIAL
10' COMMERCIAL



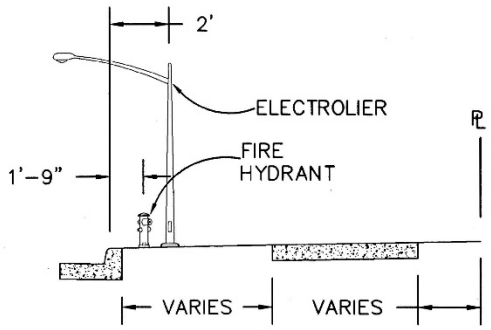
12' INDUSTRIAL
12' LOW DENSITY RESIDENTIAL



12' HIGH DENSITY RESIDENTIAL



12' COMMERCIAL



DETACHED SIDEWALK

SIDEWALK SECTION TO BE USED SHALL BE INDICATED ON THE PLANS

Revision	Date	Approved
Drawn : QT	Date : 05-07-99	
Checked : RK	Scale : NTS	

APPROVED BY:

ASSISTANT PUBLIC WORKS DIRECTOR

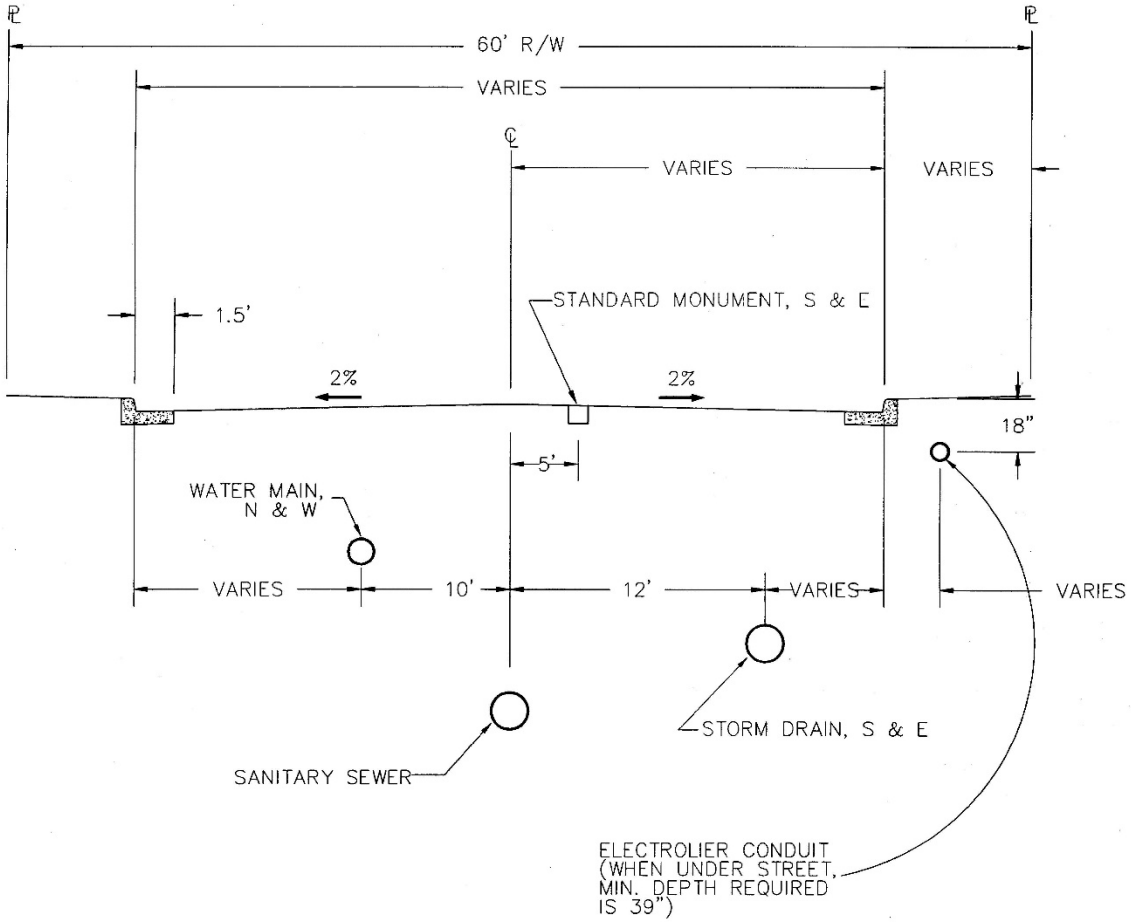
06-29-99 DATE | 06-30-01 EXP. | 27089 R.C.E. NO.

REGISTERED PROFESSIONAL ENGINEER TIMOTHY Y. [illegible] No. 27089 EXP. 03-31-01 CIVIL STATE OF CALIFORNIA

CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

STANDARD SIDEWALK SECTION

FILE NO. A-1



UTILITY LOCATIONS ARE TYPICAL FOR ALL STREET WIDTHS

Revision	Date	Approved
Drawn : QT	Date : 05-07-99	
Checked : RK	Scale : NTS	

APPROVED BY: [signature]
ASSISTANT PUBLIC WORKS DIRECTOR

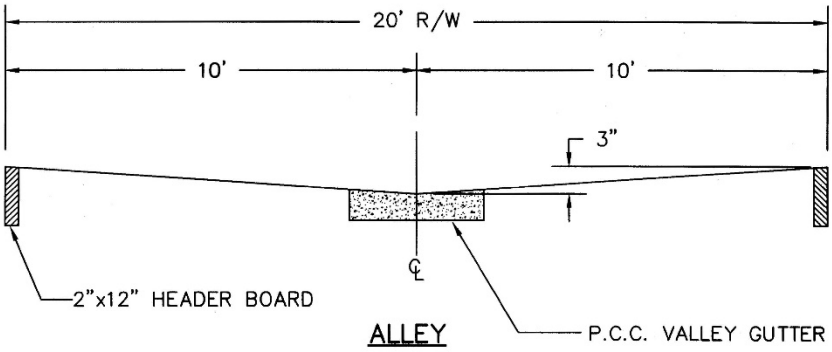
06-29-99 DATE | 03-31-01 EXP. | 27089 R.C.E. NO.

REGISTERED PROFESSIONAL ENGINEER TIMOTHY Y. MOY No. 27089 EXP. 03-31-01 STATE OF CALIFORNIA

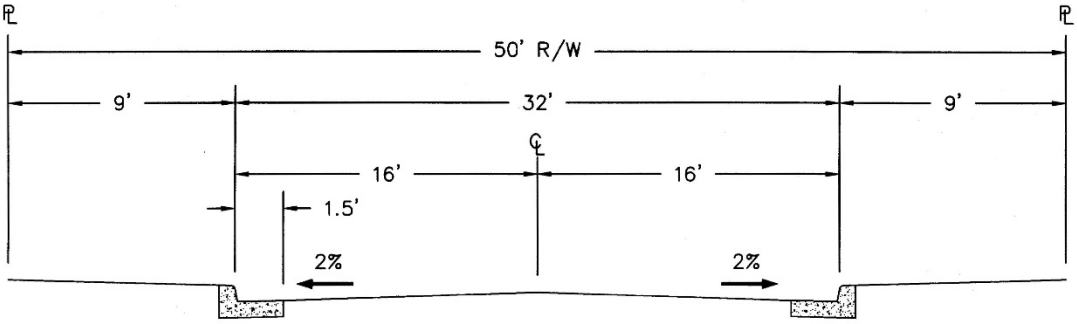
CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

GEOMETRIC SECTION
60-FOOT STREET

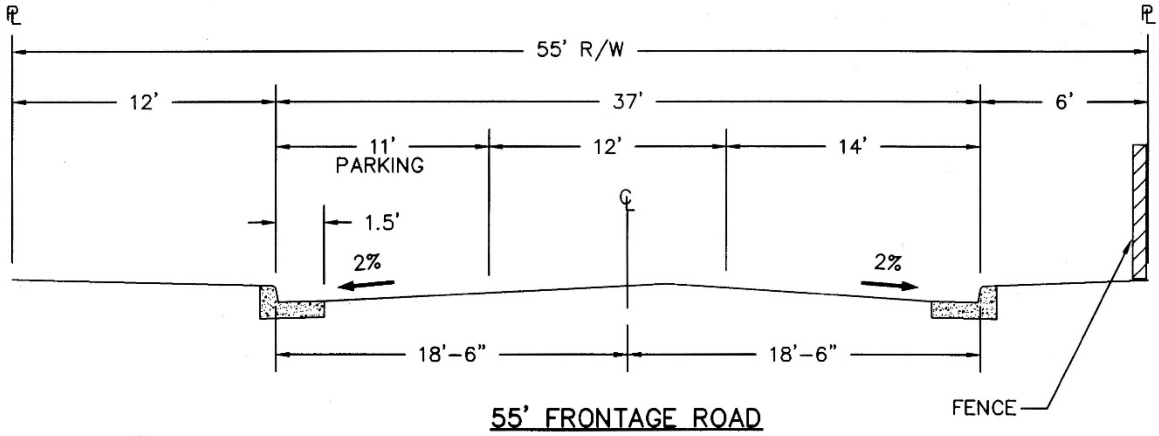
FILE NO. A-2



ALLEY



50' STREET



55' FRONTAGE ROAD

Revision	Date	Approved
Drawn : QTA	Date : 05-07-99	
Checked : RK	Scale : NTS	

APPROVED BY:

ASSISTANT PUBLIC WORKS DIRECTOR

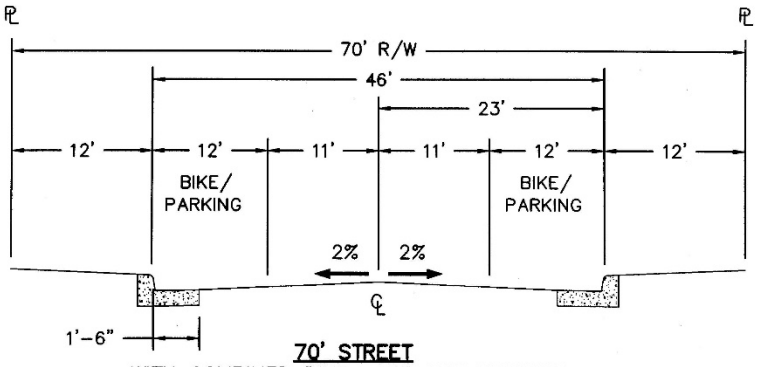
REGISTERED PROFESSIONAL ENGINEER — TIMOTHY Y. TYLE — No. 27089 — EXP. 03-31-01 — STATE OF CALIFORNIA

06-29-99 DATE | 03-31-01 EXP. | 27089 R.C.E. NO.

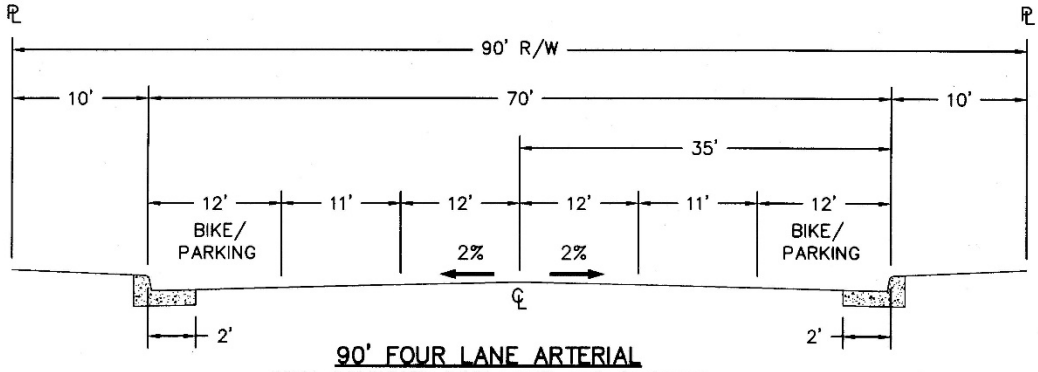
CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

STANDARD GEOMETRIC STREET SECTIONS

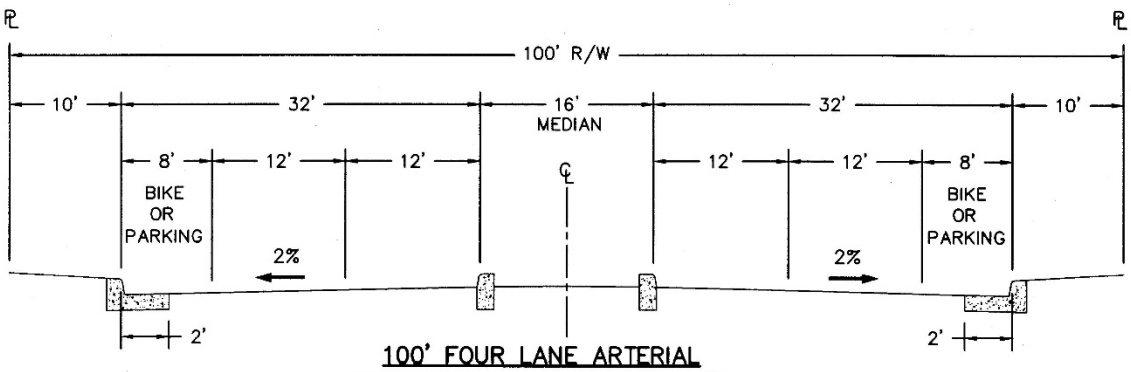
FILE NO. A-3



70' STREET
WITH COMBINED BIKE LANE AND PARKING



90' FOUR LANE ARTERIAL
WITH COMBINED BIKE LANE AND PARKING



100' FOUR LANE ARTERIAL
WITH BIKE LANE OR PARKING LANE

Revision	Date	Approved
Drawn : QT	Date : 05-07-99	
Checked : RK	Scale : NTS	

APPROVED BY: _____
ASSISTANT PUBLIC WORKS DIRECTOR

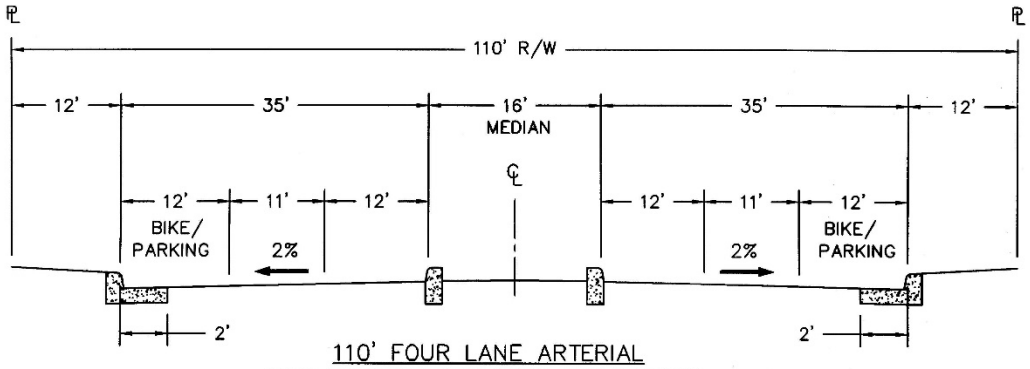
REGISTERED PROFESSIONAL ENGINEER
TIMOTHY Y. [illegible]
No. 27089
EXP. 03-31-01
CIVIL
STATE OF CALIFORNIA

06-29-99 DATE | 03-31-01 EXP. | 27089 R.C.E. NO.

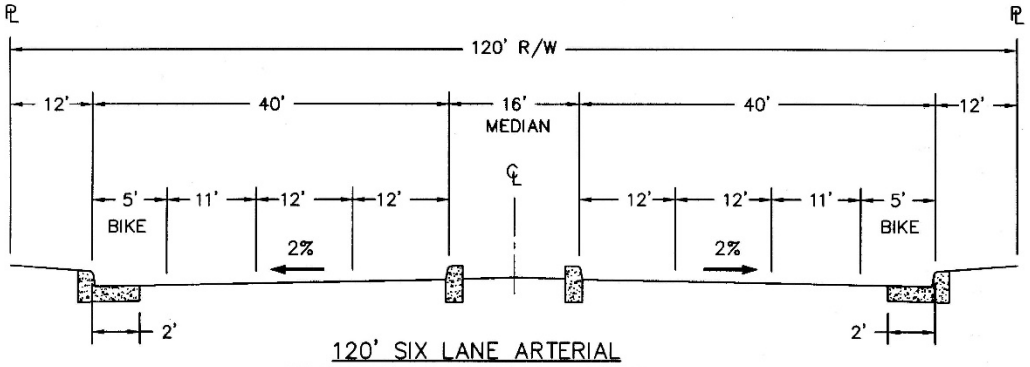
CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

STANDARD GEOMETRIC
STREET SECTIONS

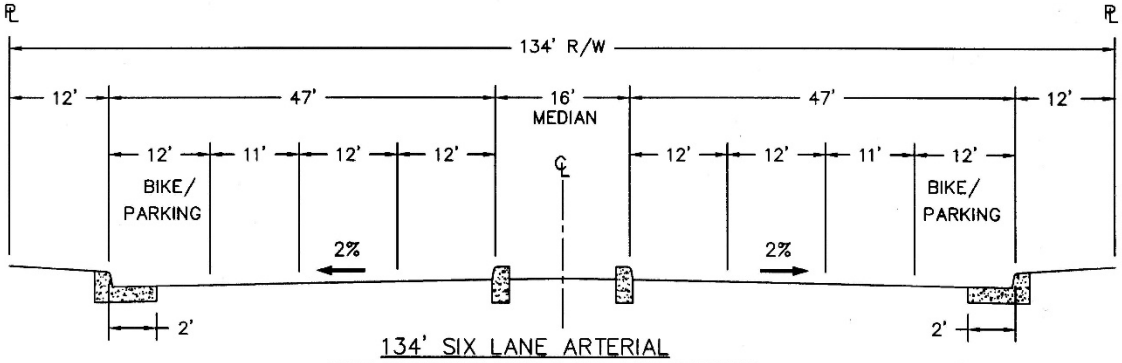
FILE NO. A-4



110' FOUR LANE ARTERIAL
WITH COMBINED BIKE LANE AND PARKING



120' SIX LANE ARTERIAL
WITH BIKE LANE AND NO PARKING



134' SIX LANE ARTERIAL
WITH COMBINED BIKE LANE AND PARKING

Revision	Date	Approved
Drawn : QT	Date : 05-03-99	
Checked : RK	Scale : NTS	

APPROVED BY: EXP: 03-31-01
ASSISTANT PUBLIC WORKS DIRECTOR

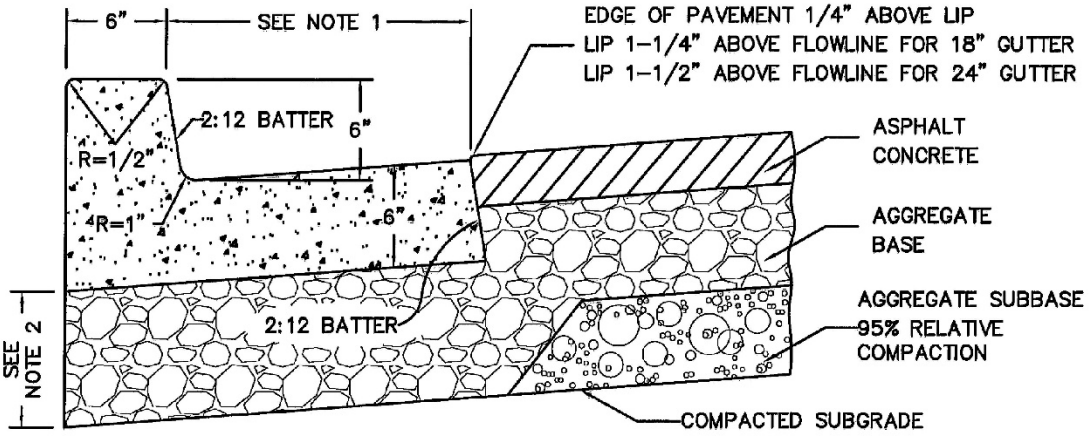
REGISTERED PROFESSIONAL ENGINEER
TIMOTHY Y. OJI
No. 27089
CIVIL
STATE OF CALIFORNIA

06-29-99 DATE | 03-31-01 EXP. | 27089 R.C.E. NO.

CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

STANDARD GEOMETRIC
STREET SECTIONS

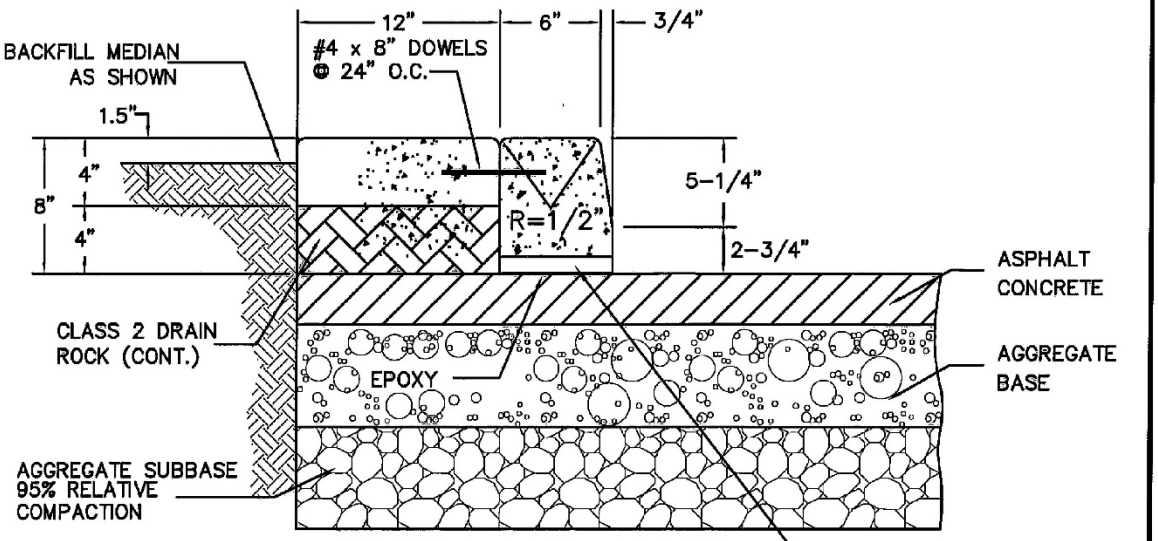
FILE NO. A-5



NOTES:

1. THE GUTTER WIDTH IS TO BE 18" OR 24" AS SPECIFIED IN THE STANDARD GEOMETRIC STREET SECTION DETAILS.
2. THICKNESS OF AGGREGATE BASE SHALL BE:
   * FOR NEW STREET SECTION: AS DETERMINED BY EXTENSION OF THE ROADWAY GRADING PLANE, OR
   * FOR EXISTING STREET SECTION: 6"

CURB AND GUTTER DETAIL



EXTRUDED MEDIAN CURB DETAIL

Revision	Date	Approved
Drawn : QT	Date : 02-25-05	
Checked : RK	Scale : NTS	

APPROVED BY: No. 27089 EXP. 03-31-07 REGISTERED PROFESSIONAL ENGINEER STATE OF CALIFORNIA

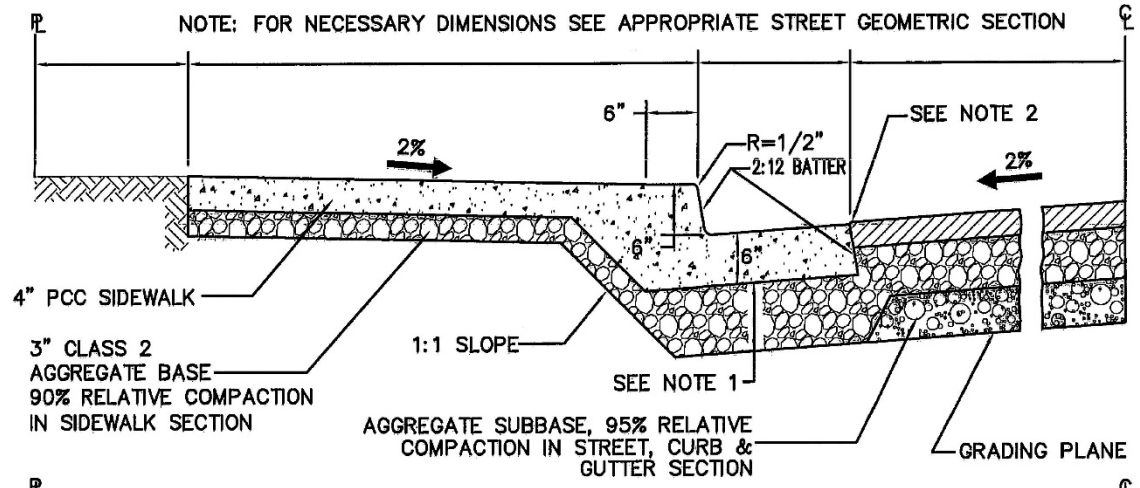
ASSISTANT PUBLIC WORKS DIRECTOR

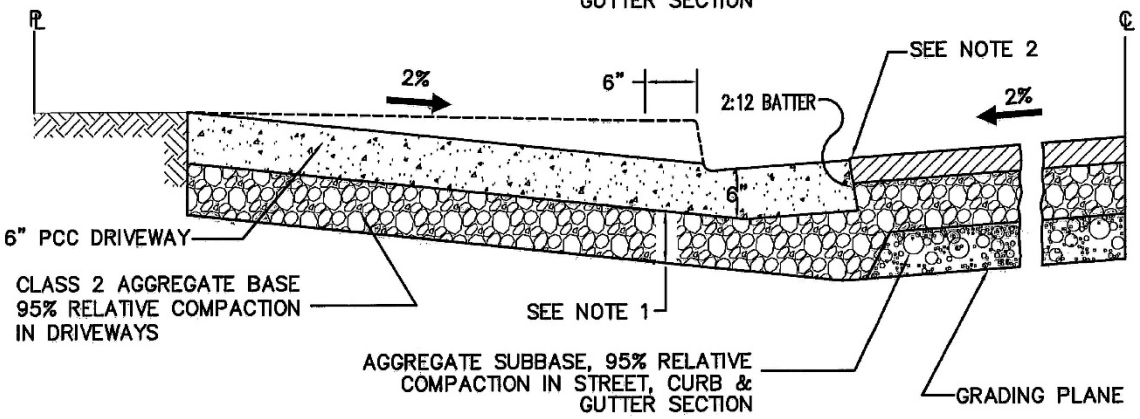
02-25-05 DATE | 03-31-07 EXP. | 27089 R.C.E. NO.

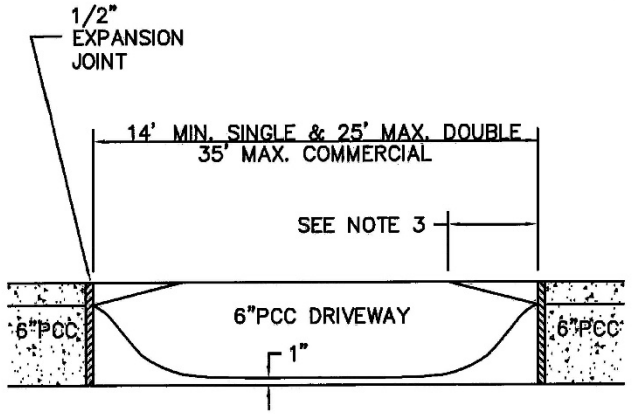
CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

STANDARD CURB & GUTTER AND EXTRUDED MEDIAN CURB

FILE NO. A-6







STANDARD DRIVEWAY APPROACH

NOTES:

1. THICKNESS OF AGGREGATE BASE UNDER CURB & GUTTER SHALL BE:
   FOR NEW STREET SECTION–AS DETERMINED BY EXTENSION OF THE ROADWAY GRADING PLANE
   OR
   FOR EXISTING STREET SECTION: 6"
2. EDGE OF PAVEMENT 1/4" ABOVE LIP
   LIP 1.25" ABOVE ℄ FOR 1.5' GUTTER
   LIP 1.5" ABOVE ℄ FOR 2' GUTTER
3. DRIVEWAY FLARE WIDTH:
   –1.5' FOR RESIDENTIAL
   –3.0' FOR COMMERCIAL & INDUSTRIAL OR OTHERWISE NOTED.

Revision	Date	Approved
Drawn : QT	Date : 02-25-05	
Checked : RK	Scale : NTS	

REGISTERED PROFESSIONAL ENGINEER TIMOTHY Y. LO No. 27089 EXP. 03-31-07 STATE OF CALIFORNIA

APPROVED BY:

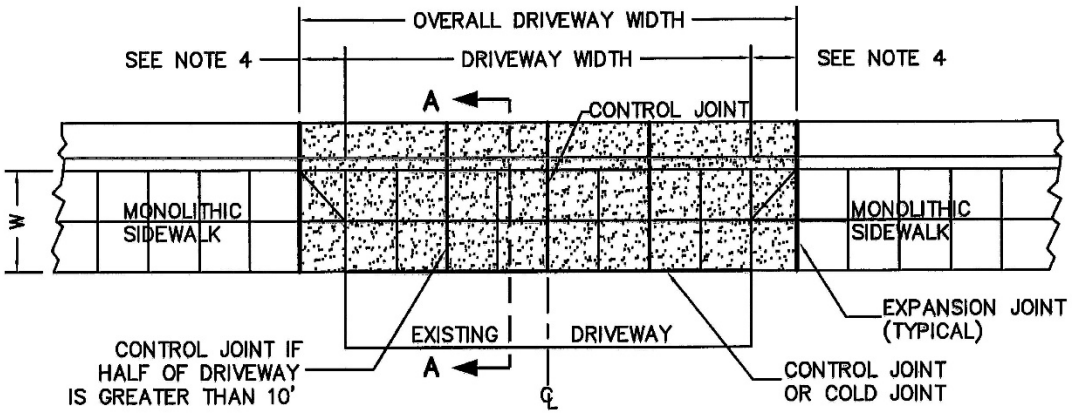
ASSISTANT PUBLIC WORKS DIRECTOR

02-25-05 DATE | 03-31-07 EXP. | 27089 R.C.E. NO.

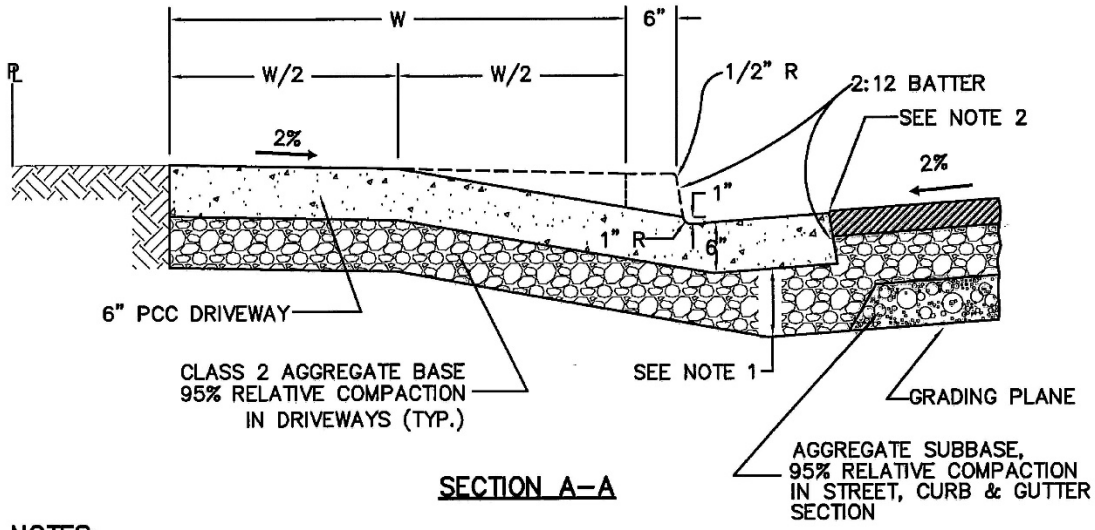
CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

STANDARD CROSS–SECTIONS
CURB, GUTTER, SIDEWALK
AND DRIVEWAY APPROACH

FILE NO. A–7



PLAN



SECTION A–A

NOTES:

1. THICKNESS OF AGGREGATE BASE UNDER CURB & GUTTER SHALL BE:
   FOR NEW STREET SECTION : AS DETERMINED BY EXTENSION OF THE ROADWAY GRADING PLANE
   OR
   FOR EXISTING STREET SECTION : 6"
2. EDGE OF PAVEMENT 1/4" ABOVE LIP
   LIP 1.25" ABOVE ℄ FOR 1.5' GUTTER
   LIP 1.5" ABOVE ℄ FOR 2' GUTTER
3. W = WIDTH OF ADJACENT MONOLITHIC SIDEWALK
4. DRIVEWAY FLARE WIDTH:
   –1.5' FOR RESIDENTIAL
   –3.0' FOR COMMERCIAL & INDUSTRIAL OR OTHERWISE NOTED.

Revision	Date	Approved
Drawn : QT	Date : 02-25-05	
Checked : RK	Scale : NTS	

REGISTERED PROFESSIONAL ENGINEER TIMOTHY Y. [illegible] No. 27089 EXP. 03-31-07 STATE OF CALIFORNIA

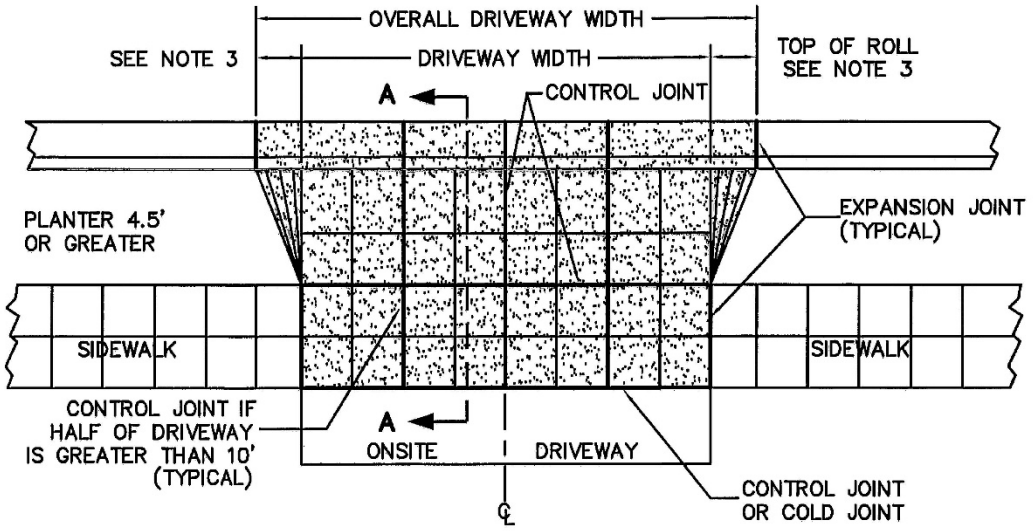
APPROVED BY: [signature]
ASSISTANT PUBLIC WORKS DIRECTOR

02-25-05 DATE | 03-31-07 EXP. | 27089 R.C.E. NO.

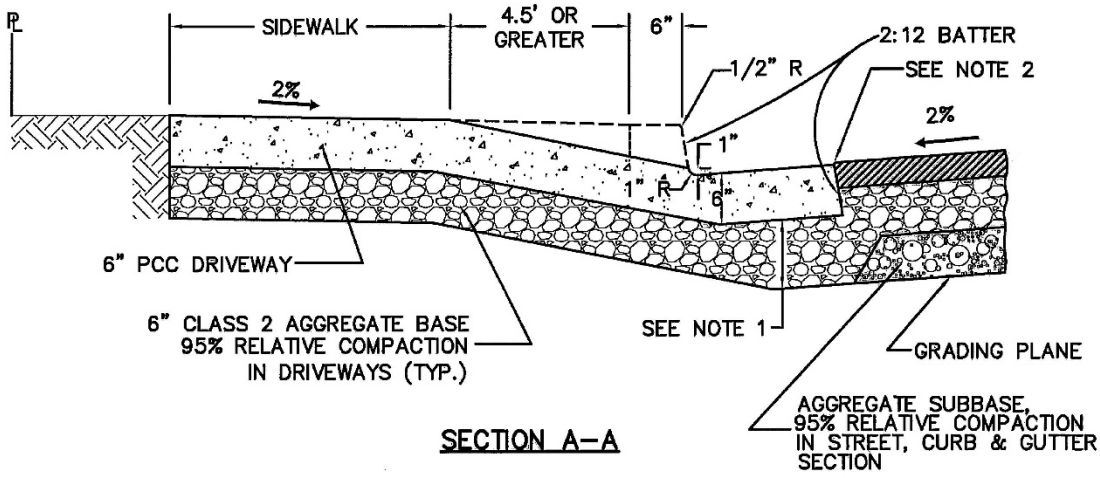
CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

MODIFIED
DRIVEWAY APPROACH/LEVEL SIDEWALK
CROSS-SECTION

FILE NO. A7–A



PLAN



SECTION A–A

NOTES:

1. THICKNESS OF AGGREGATE BASE UNDER CURB & GUTTER SHALL BE:
   FOR NEW STREET SECTION : AS DETERMINED BY EXTENSION OF THE ROADWAY GRADING PLANE
   OR
   FOR EXISTING STREET SECTION : 6"
2. EDGE OF PAVEMENT 1/4" ABOVE LIP
   LIP 1.25" ABOVE ℄ FOR 1.5' GUTTER
   LIP 1.5" ABOVE ℄ FOR 2' GUTTER
3. DRIVEWAY FLARE WIDTH:
   –1.5' FOR RESIDENTIAL
   –3.0' FOR COMMERCIAL & INDUSTRIAL
   OR OTHERWISE NOTED.

Revision	Date	Approved
Drawn : QT	Date : 02-25-05	
Checked : RK	Scale : NTS	

APPROVED BY: REGISTERED PROFESSIONAL ENGINEER NO. 27089 EXP. 03-31-07 CIVIL STATE OF CALIFORNIA

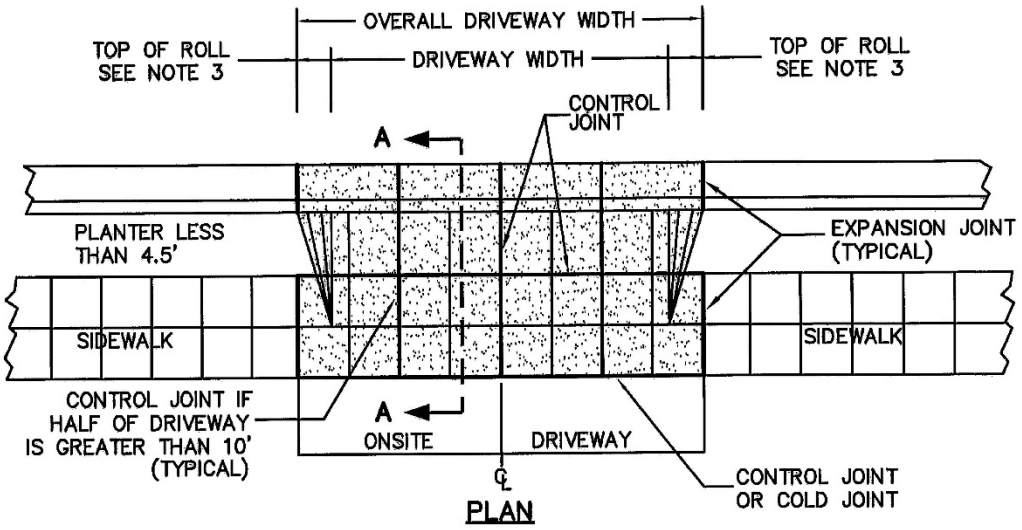
ASSISTANT PUBLIC WORKS DIRECTOR

02-25-05 DATE | 03-31-07 EXP. | 27089 R.C.E. NO.

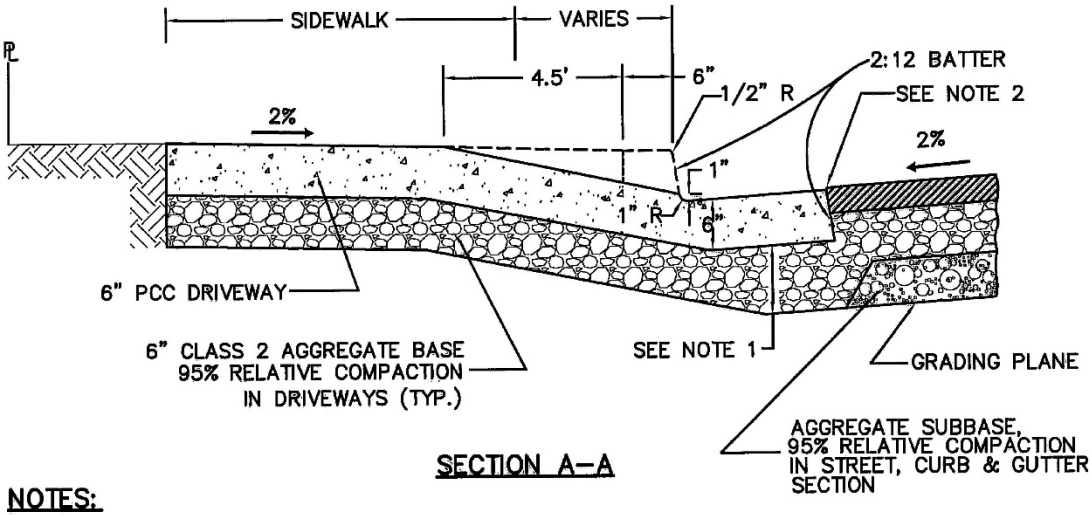
CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

DRIVEWAY DETAIL
FOR
DETACHED SIDEWALK
(DRIVEWAY WITH PLANTER STRIP 4.5' OR GREATER)

FILE NO. A–8



PLAN



SECTION A–A

NOTES:

1. THICKNESS OF AGGREGATE BASE UNDER CURB & GUTTER SHALL BE:
   FOR NEW STREET SECTION : AS DETERMINED BY EXTENSION OF THE ROADWAY GRADING PLANE
   OR
   FOR EXISTING STREET SECTION : 6"
2. EDGE OF PAVEMENT 1/4" ABOVE LIP
   LIP 1.25" ABOVE ℄ FOR 1.5' GUTTER
   LIP 1.5" ABOVE ℄ FOR 2' GUTTER
3. DRIVEWAY FLARE WIDTH:
   –1.5' FOR RESIDENTIAL
   –3.0' FOR COMMERCIAL & INDUSTRIAL
   OR OTHERWISE NOTED.

Revision	Date	Approved
Drawn : QT	Date : 02-25-05	
Checked : RK	Scale : NTS	

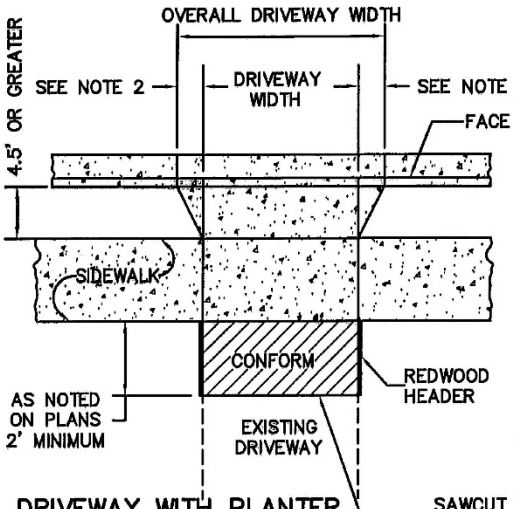
APPROVED BY: ASSISTANT PUBLIC WORKS DIRECTOR

02-25-05 DATE | 03-31-07 EXP. | 27089 R.C.E. NO.

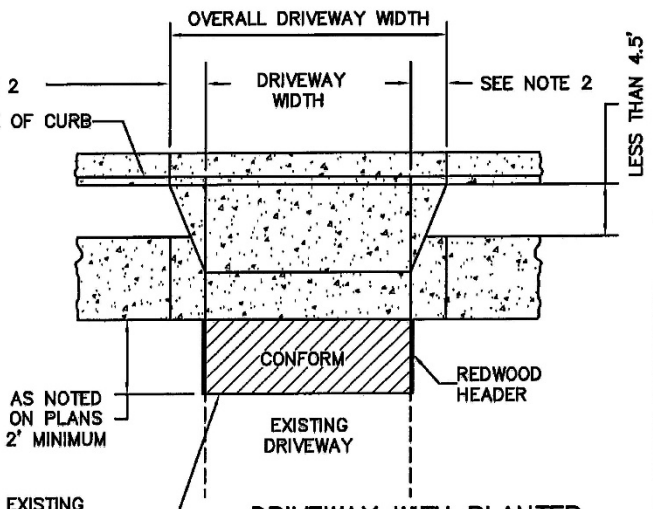
CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

DRIVEWAY DETAIL FOR DETACHED SIDEWALK (DRIVEWAY WITH PLANTER STRIP LESS THAN 4.5')

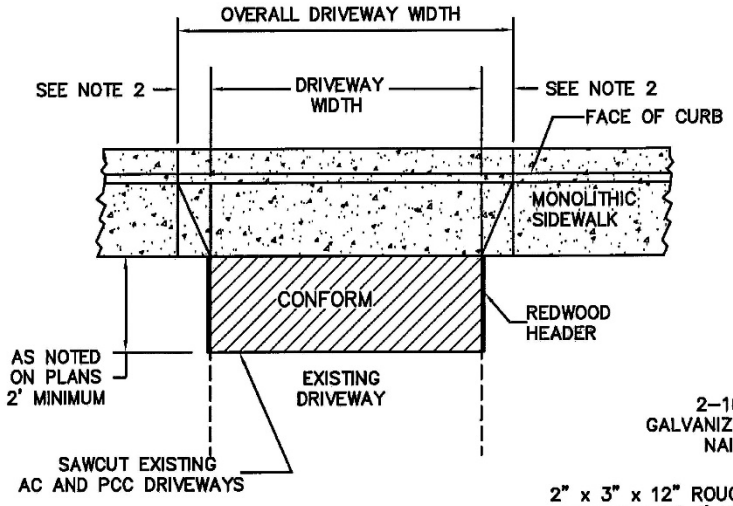
FILE NO. A–8A



DRIVEWAY WITH PLANTER STRIP 4.5' OR GREATER

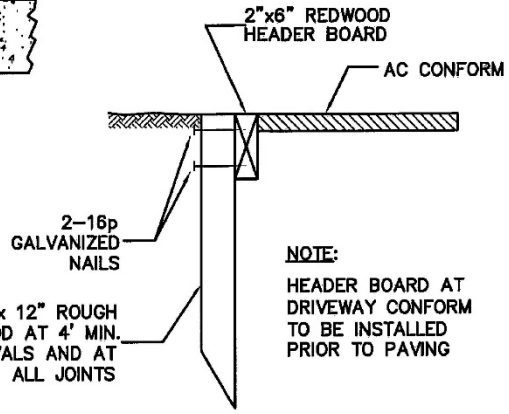


DRIVEWAY WITH PLANTER STRIP LESS THAN 4.5'



DRIVEWAY WITH MONOLITHIC SIDEWALK

EXISTING DRIVEWAY	REQUIRED CONFORM
DIRT	6" A.B.
GRAVEL OR AC	2" A.C. ON 6" A.B.
P.C.C.	6" P.C.C. ON 6" A.S.B.



HEADER BOARD DETAIL

NOTE:

1. THE AGGREGATE BASE (A.B.), AGGREGATE SUB-BASE (A.S.B.), AND SUBGRADE SHALL BE COMPACTED TO 95% RELATIVE COMPACTION.

2. DRIVEWAY WIDTH:
-1.5' FOR RESIDENTIAL
-3.0' FOR COMMERCIAL & INDUSTRIAL OR OTHERWISE NOTED.

Revision	Date	Approved
Drawn : QT	Date : 02-25-05	
Checked : RK	Scale : NTS	

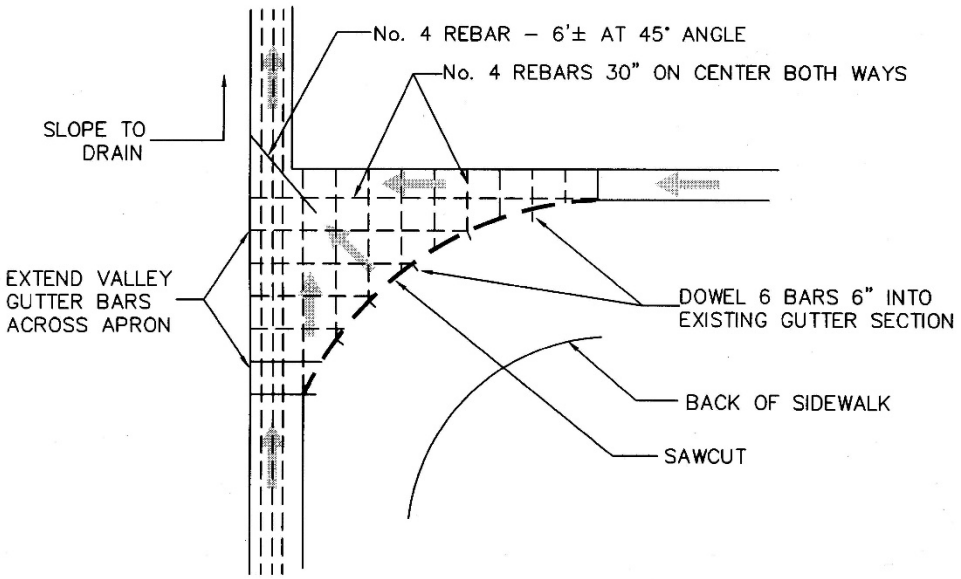
APPROVED BY: Timothy Ko
ASSISTANT PUBLIC WORKS DIRECTOR

02-25-05 DATE | 03-31-07 EXP. | 27089 R.C.E. NO.

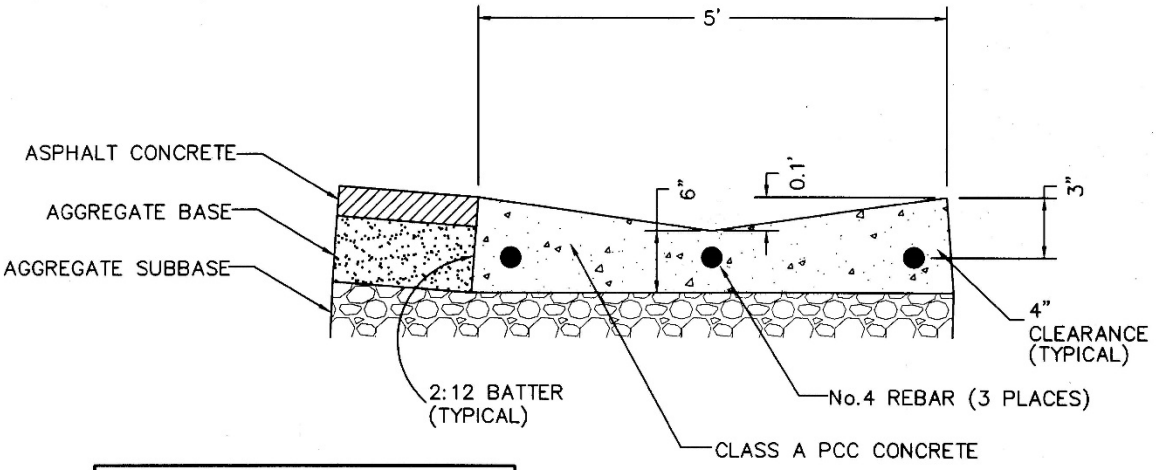
CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

DRIVEWAY AND AC CONFORM DETAILS

FILE NO. A-9



CONCRETE APRON



NOTE: ROCK EXTENDS UNDER GUTTER

VALLEY GUTTER

Revision	Date	Approved
Drawn : QT	Date : 05-28-99	
Checked : RK	Scale : NTS	

REGISTERED PROFESSIONAL ENGINEER TIMOTHY Y. TAM No. 27089 EXP. 03-31-01 STATE OF CALIFORNIA

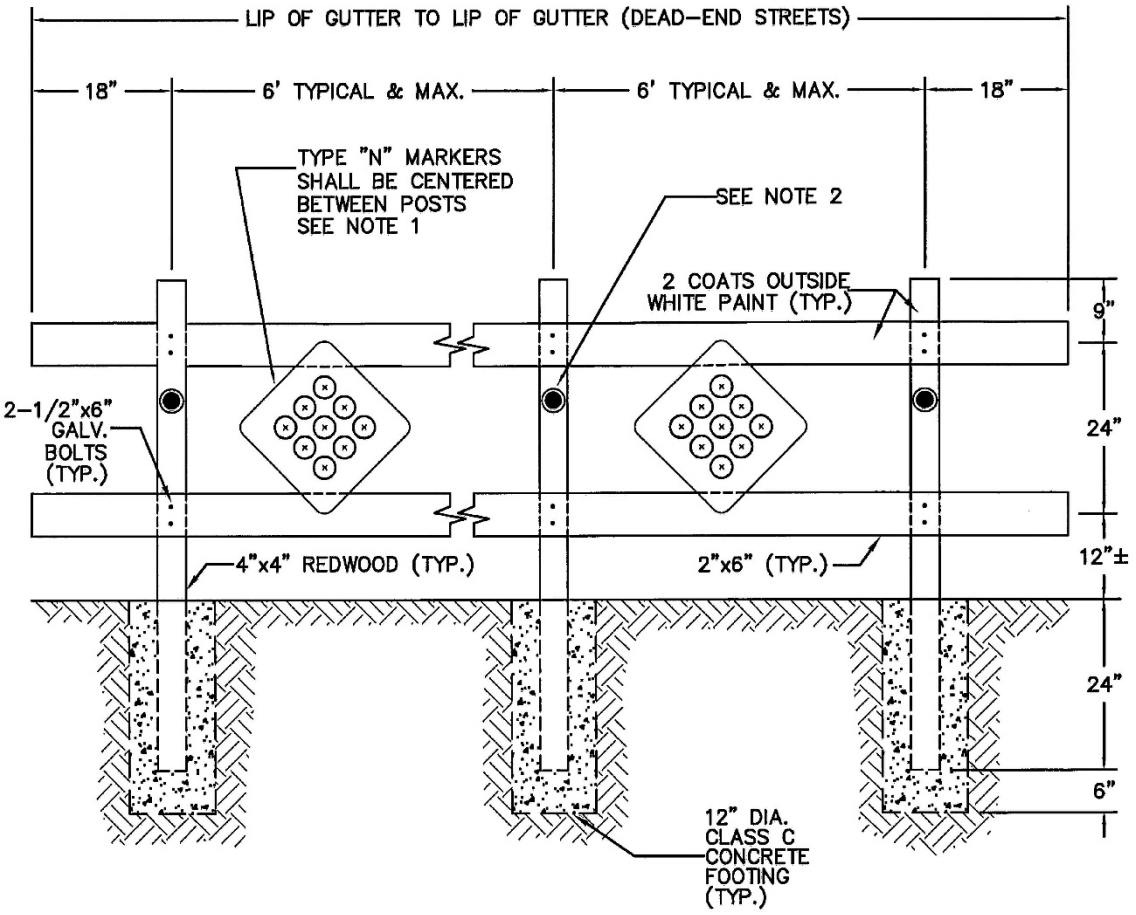
APPROVED BY: _____
ASSISTANT PUBLIC WORKS DIRECTOR

06-29-99 DATE | 03-31-01 EXP. | 27089 R.C.E. NO.

CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

STANDARD CONCRETE APRON AND VALLEY GUTTER

FILE NO. A–10



NOTES:

1. TYPE N-4 MARKERS WITH AMBER PLASTIC REFLECTORS FOR BARRICADE ON THE SIDES OF THE STREET.
   TYPE N-5 MARKERS WITH RED PLASTIC REFLECTORS FOR BARRICADE AT DEAD-END OF THE STREET.
2. AMBER PLASTIC DISK FOR BARRICADE ON THE SIDES OF THE STREET.
   RED PLASTIC DISK FOR BARRICADE AT DEAD-END OF THE STREET.

Revision	Date	Approved
Drawn : QT	Date : 02-25-05	
Checked : RK	Scale : NTS	

APPROVED BY:

ASSISTANT PUBLIC WORKS DIRECTOR

02-25-05 DATE | 03-31-07 EXP. | 27089 R.C.E. NO.

CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

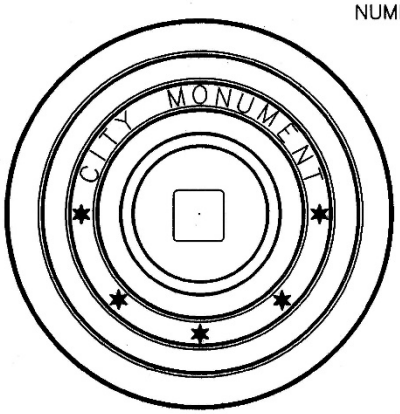
STANDARD BARRICADE

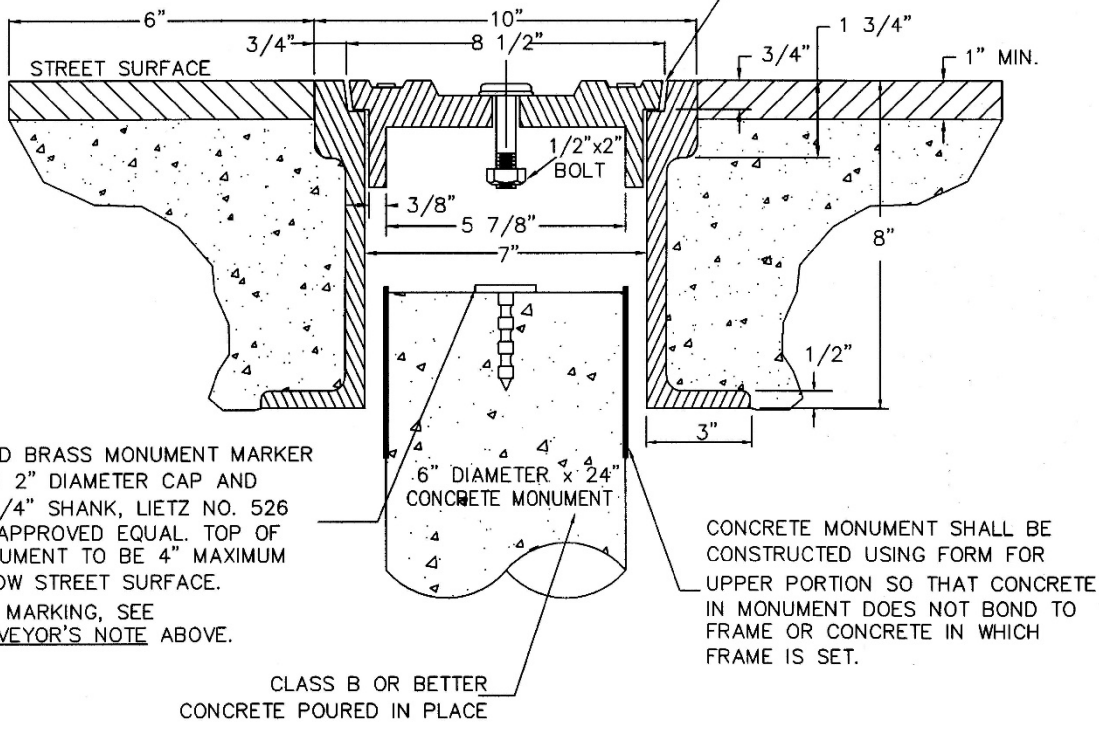
FILE NO. A-11

FRAME AND COVER – EMPIRE FOUNDRY CO. NO. MN–78, PHOENIX IRON WORKS NO. P–2001, OR APPROVED EQUAL OVER MONUMENT. FRAME AND COVER TO BE SET IN CONCRETE AFTER PAVING.

SURVEYOR'S NOTE:

EXACT POINT TO BE DETERMINED BY ACCURATE SURVEY AND CLEARLY PUNCHED IN TOP OF BRASS MARKER TOGETHER WITH ENGINEER'S R.C.E. NUMBER IN 1/8" HIGH NUMERALS.





Revision	Date	Approved
Drawn : QT	Date : 05-08-99	
Checked : RK	Scale : NTS	

REGISTERED PROFESSIONAL ENGINEER TIMOTHY Y. TOM No. 27089 EXP. 03-31-01 CIVIL STATE OF CALIFORNIA

APPROVED BY: _____ ASSISTANT PUBLIC WORKS DIRECTOR

06-29-99 DATE | 03-31-01 EXP. | 27089 R.C.E. NO.

CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

STANDARD MONUMENT

FILE NO. A–12

SIGN:

STREET NAME SIGN(S) SHALL BE SUPPLIED AND INSTALLED BY THE CONTRACTOR AS APPROVED BY THE CITY. SIGN(S) SHALL BE 3M HIGH INTENSITY PRISMATIC REFLECTIVE SHEETING BLUE (#3935) OR EQUAL WITH WHITE LETTERING. SEE LATEST CA MUTCD FOR REQUIRED LETTER HEIGHT, FONT AND RETROREFLECTIVITY LEVELS.

POSTS:

ALL POSTS SHALL BE STRAIGHT AND HAVE A SMOOTH UNIFORM FINISH AND SIZE.

POSTS SHALL BE TELESPAR OR APPROVED EQUAL PERFORATED 1-3/4" SQUARE, FOURTEEN (14) GAUGE STEEL POSTS AND MINIMUM 11'-4" IN LENGTH. POSTS SHALL BE MANUFACTURED FROM HOT-DIPPED GALVANIZED STEEL CONFORMING TO ASTM A 653, G-90, STRUCTURAL QUALITY, CLASS 1. THE CORNER WELD SHALL BE ZINC COATED AFTER SCARFING OPERATION. THE POST SHALL ALSO BE COATED WITH A CONVERSION COATING AND CLEAR ORGANIC POLYMER TOPCOAT. BOTH THE INTERIOR AND THE EXTERIOR OF THE POST SHALL BE GALVANIZED.

ANCHORS:

ANCHORS SHALL BE TELESPAR OR APPROVED EQUAL PERFORATED 2" SQUARE, TWELVE (12) GAUGE HOT-DIPPED GALVANIZED STEEL ANCHORS. A TWO-PIECE BREAKAWAY ANCHOR SYSTEM (ANCHOR ASSEMBLY) SHALL BE USED BY WELDING AN EIGHTEEN INCH (18") LONG, TWELVE (12) GAUGE OUTER SLEEVE OF THE NEXT LARGER SIZE PERFORATED TUBE TO THE ORIGINAL 2" SQUARE PERFORATED ANCHOR BASE.

HARDWARE:

STREET NAME SIGN BRACKETS SHALL BE APPROVED BY THE CITY AND SUPPLIED BY THE CONTRACTOR.

A. MOUNTED ON SIGN POST

PARTS	HAWKINS SIGN MOUNTING BRACKETS (UNLESS OTHERWISE SPECIFIED)
90° CROSSPIECE	V14F-(HD)SL-105(90)
SQUARE TUBE CAP	V14F-(HD)SL-107(2S)

B. MOUNTED ON ELECTROLIERS

WING BRACKET WITH SET SCREWS: V14-(HD)SL-AB-S68

POSTS AND ANCHORS INSTALLATION:

CONTRACTOR SHALL DRIVE THE ANCHOR ASSEMBLY INTO THE GROUND LEAVING TWO HOLES (APPROXIMATELY 2") OF THE ANCHOR ASSEMBLY EXPOSED ABOVE THE SURFACE. THE SIGN POST SHALL THEN BE INSERTED AND RIVETED INTO THE ANCHOR ASSEMBLY. CONTRACTOR SHALL USE 30" LONG ANCHORS IN DIRT AND LANDSCAPE AREAS AND 24" LONG ANCHORS IN SIDEWALK AREAS.

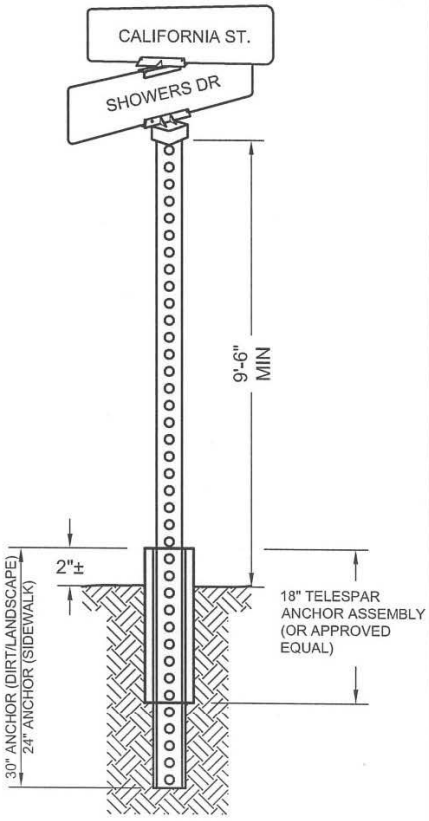
SIGN INSTALLATION:

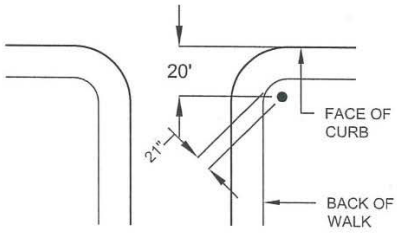
ALL SIGNS SHALL BE INSTALLED ON POSTS/POLES WITH A MINIMUM 9 FEET 6 INCHES CLEARANCE FROM THE GROUND TO THE BOTTOM OF THE SIGN.

SIGN PLACEMENT

STREET NAME SIGNS SHALL BE PLACED ON NORTHWEST AND SOUTHEAST CORNERS OF INTERSECTION UNLESS OTHERWISE DIRECTED BY CITY TRAFFIC ENGINEER.

FOR LOCATIONS WHERE BOTH STOP SIGN AND STREET NAME SIGNS ARE TO BE INSTALLED, PLACEMENT OF SIGNS SHALL BE APPROVED BY CITY TRAFFIC ENGINEER.





TYPICAL STREET NAME SIGN LOCATION

Revision	Date	Approved
Drawn: MG	Date: 03-20-17	
Checked: AB	Scale: NTS	

APPROVED BY:

Jacqueline A Solomon

ASSISTANT PUBLIC WORKS DIRECTOR

3/22/17 DATE

12-31-17 EXP.

57093 R.C.E. NO.

REGISTERED PROFESSIONAL ENGINEER JACQUELINE ANDREWS SOLOMON No. 57093 CIVIL STATE OF CALIFORNIA

CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

STREET NAME SIGN

FILE NO. A-13

SIGN:

SIGN SHEETING SHALL BE 3M HIGH INTENSITY PRISMATIC (HIP) REFLECTIVE SHEETING OR APPROVED EQUAL. SEE LATEST CA MUTCD FOR REQUIRED LETTER HEIGHT, FONT AND RETROREFLECTIVITY LEVELS.

POSTS:

ALL POSTS SHALL BE STRAIGHT AND HAVE A SMOOTH UNIFORM FINISH AND SIZE.

POSTS SHALL BE TELESPAR OR APPROVED EQUAL PERFORATED 1-3/4" SQUARE, FOURTEEN (14) GAUGE STEEL POSTS AND MINIMUM 11'-4" IN LENGTH. POSTS SHALL BE MANUFACTURED FROM HOT-DIPPED GALVANIZED STEEL CONFORMING TO ASTM A 653, G-90, STRUCTURAL QUALITY, CLASS 1. THE CORNER WELD SHALL BE ZINC COATED AFTER SCARFING OPERATION. THE POST SHALL ALSO BE COATED WITH A CONVERSION COATING AND CLEAR ORGANIC POLYMER TOPCOAT. BOTH THE INTERIOR AND THE EXTERIOR OF THE POST SHALL BE GALVANIZED.

ANCHORS:

ANCHORS SHALL BE TELESPAR OR APPROVED EQUAL PERFORATED 2" SQUARE, TWELVE (12) GAUGE HOT-DIPPED GALVANIZED STEEL ANCHORS. A TWO-PIECE BREAKAWAY ANCHOR SYSTEM (ANCHOR ASSEMBLY) SHALL BE USED BY WELDING AN EIGHTEEN INCH (18") LONG, TWELVE (12) GAUGE OUTER SLEEVE OF THE NEXT LARGER SIZE PERFORATED TUBE TO THE ORIGINAL 2" SQUARE PERFORATED ANCHOR BASE.

HARDWARE:

DEPENDING ON THE TYPE OF INSTALLATION ON NEW OR EXISTING POSTS/POLES, THE FOLLOWING HARDWARE SHOULD BE USED:

- 3/8" STEEL RIVETS NO. VCR231 (WITH WASHERS) FOR NEW OR EXISTING SQUARE POSTS.
- BRACKET NO. M2G-C2B FOR EXISTING ROUND POSTS. 2 BRACKETS PER SIGN.
- VANDAL PROOF BOLTS TO ATTACH SIGNS.

SIGN INSTALLATION:

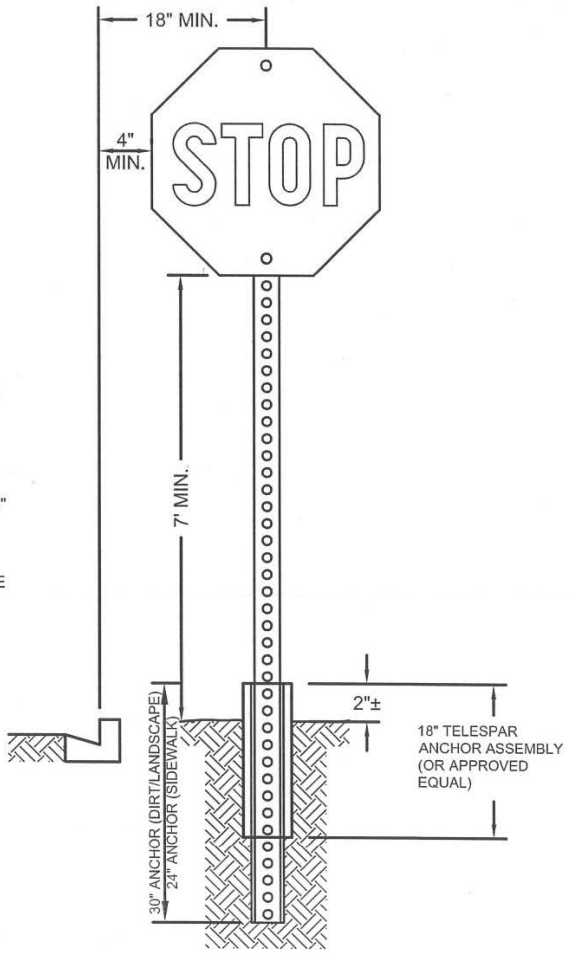
ALL SIGNS SHALL BE INSTALLED ON POSTS/POLES WITH A MINIMUM 7 FEET CLEARANCE FROM THE GROUND TO THE BOTTOM OF THE SIGN.

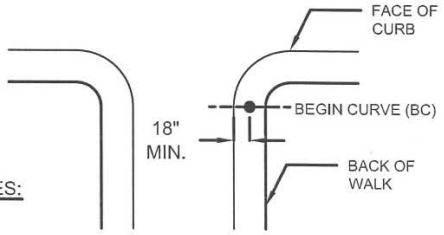
POSTS AND ANCHORS INSTALLATION:

CONTRACTOR SHALL DRIVE THE ANCHOR ASSEMBLY INTO THE GROUND LEAVING TWO HOLES (APPROXIMATELY 2") OF THE ANCHOR ASSEMBLY EXPOSED ABOVE THE SURFACE. THE SIGN POST SHALL THEN BE INSERTED AND RIVETED INTO THE ANCHOR ASSEMBLY. CONTRACTOR SHALL USE 30" LONG ANCHORS IN DIRT AND LANDSCAPE AREAS AND 24" LONG ANCHORS IN SIDEWALK AREAS.

HARDWARE FOR SIGN INSTALLATION ON EXISTING STREET LIGHT POLES:

- BANDING MATERIAL 3/4" NO. C-206
- STRAIGHT LEG BRACKET GAL. NO. VCC260SG
- BUCKLE NO. C-256





TYPICAL STOP SIGN LOCATION

Revision	Date	Approved
Drawn: MG	Date: 03-20-17	
Checked: AB	Scale: NTS	

REGISTERED PROFESSIONAL ENGINEER — ANDREW BOUDREAU — No. 57093 — CIVIL — STATE OF CALIFORNIA

APPROVED BY:

Jacqueline C. Solomon

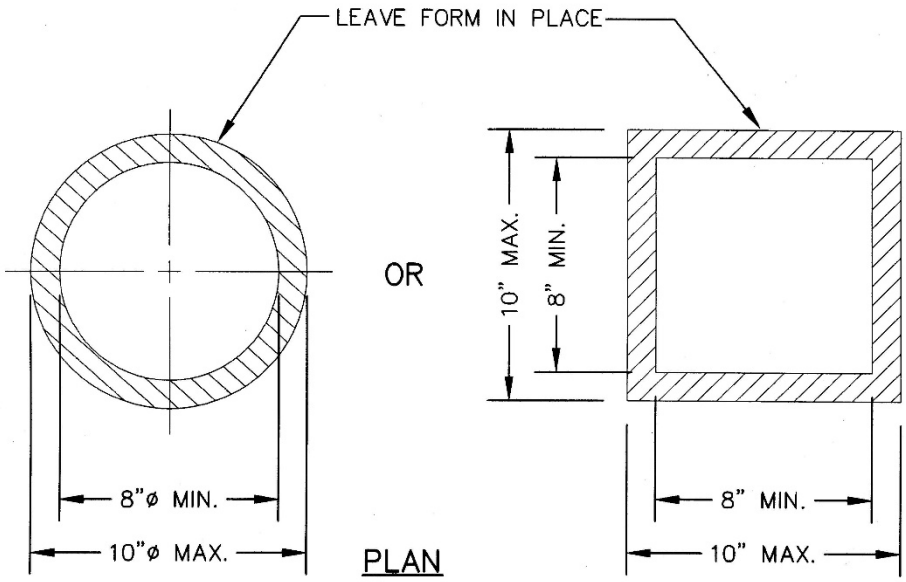
ASSISTANT PUBLIC WORKS DIRECTOR

3/22/17 DATE | 12-31-17 EXP. | 57093 R.C.E. NO.

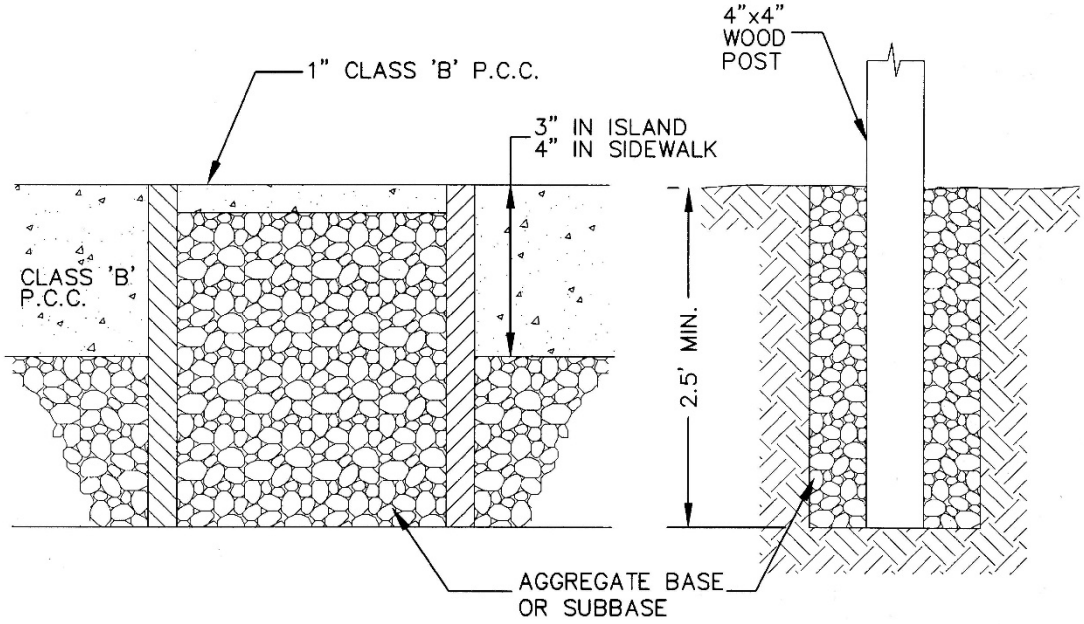
CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

STOP SIGN

FILE NO. A-14



PLAN



SECTION

WOODEN SIGN POST FOUNDATION

Revision	Date	Approved
Drawn : QT	Date : 05-08-99	
Checked : RK	Scale : NTS	

APPROVED BY: No. 27089 EXP. 03-31-01

REGISTERED PROFESSIONAL ENGINEER TIMOTHY Y. CHUNG CIVIL STATE OF CALIFORNIA

ASSISTANT PUBLIC WORKS DIRECTOR

06-29-99 DATE | 03-31-01 EXP. | 27089 R.C.E. NO.

CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

4" x 4" WOODEN SIGN POST BLOCKOUT HOLE DETAILS

FILE NO. A-15

STANDARD DETAIL FOR CURB RAMPS

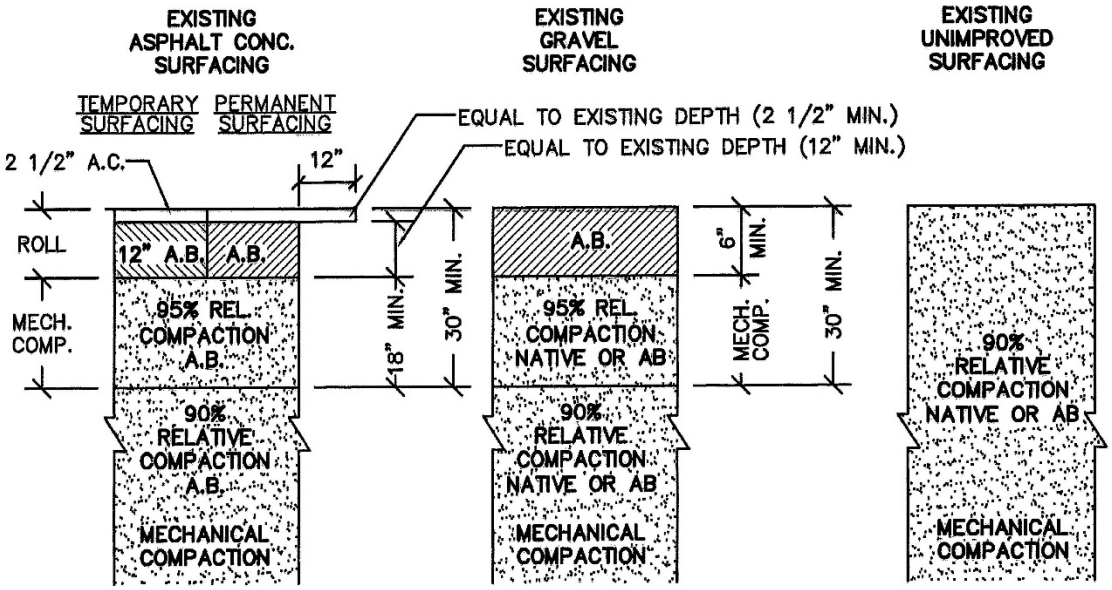
SEE LATEST CALTRANS STANDARD PLAN RSP A88A

NOTE: CITY ENGINEER TO APPROVE CURB RAMP CASE FOR EACH PROJECT APPLICATION

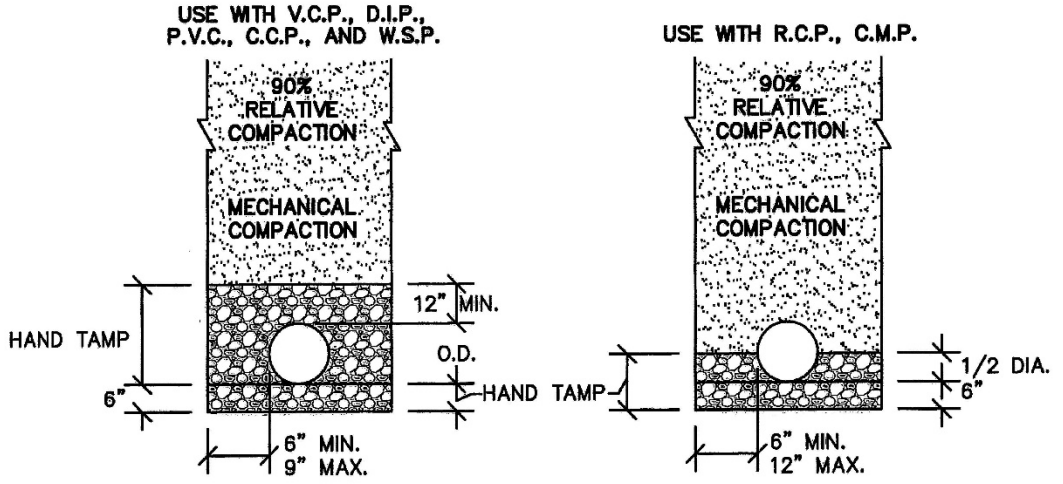
(PREVIOUS CITY DETAILS A-16 AND A-17 ARE NO LONGER IN USE)

May 1, 2017

TRENCH PAVING DETAIL



PIPE BEDDING



Revision	Date	Approved
Drawn : QT	Date : 02-25-05	
Checked : RK	Scale : NTS	

APPROVED BY:

ASSISTANT PUBLIC WORKS DIRECTOR

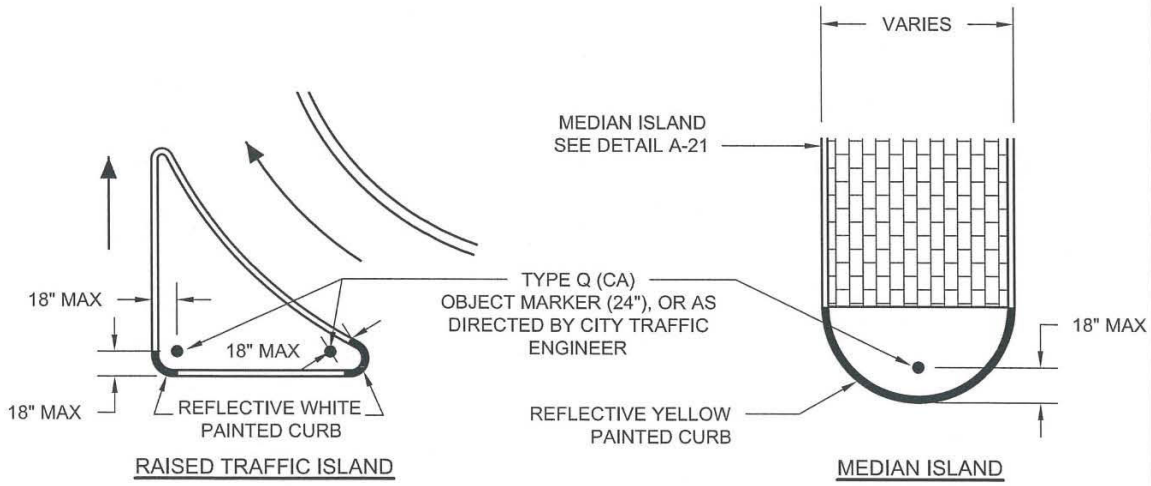
02-25-05 DATE | 03-31-07 EXP. | 27089 R.C.E. NO.

REGISTERED PROFESSIONAL ENGINEER TIMOTHY Y. TAM No. 27089 EXP. 03-31-07 STATE OF CALIFORNIA

CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

TRENCH PAVING, BACKFILL AND PIPE BEDDING SECTIONS

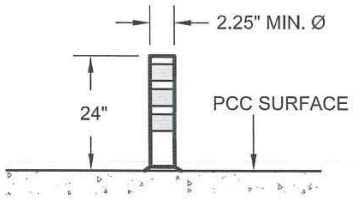
FILE NO. A-18



MARKER POSITION

NOTES:

1. INSTALL OBJECT MARKER AND R4-7 SIGN ONLY WHEN REQUIRED BY CITY TRAFFIC ENGINEER.
2. TOP AND VERTICAL FACE OF MEDIAN CURB SHALL RECEIVE TWO COATS OF REFLECTIVE YELLOW PAINT.
3. TOP AND VERTICAL FACE OF RAISED TRAFFIC ISLAND CURB SHALL RECEIVE TWO COATS OF REFLECTIVE WHITE PAINT.
4. USE BUNDY ADHESIVE PAD OR CITY-APPROVED ADHESIVE MATERIAL TO ATTACH OBJECT MARKER TO THE SURFACE.



TYPE Q (CA) MARKER INSTALLATION

Revision	Date	Approved
Drawn: TE	Date: 02-28-17	
Checked: AB	Scale: NTS	

APPROVED BY: Jacqueline Ca Solomon

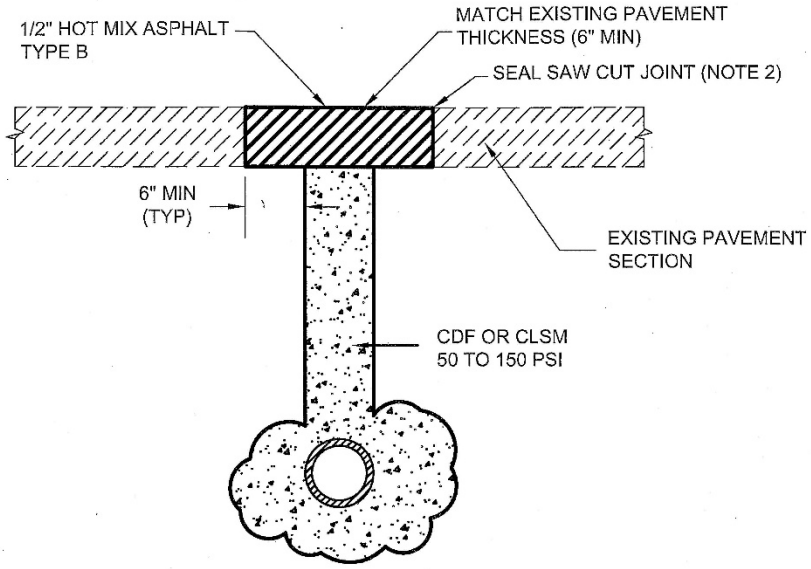
3/3/2017 DATE — 12-31-17 EXP. — 57093 R.C.E. NO.

REGISTERED PROFESSIONAL ENGINEER — JACQUELINE ANDREWS SOLOMON — No. 57093 — CIVIL — STATE OF CALIFORNIA

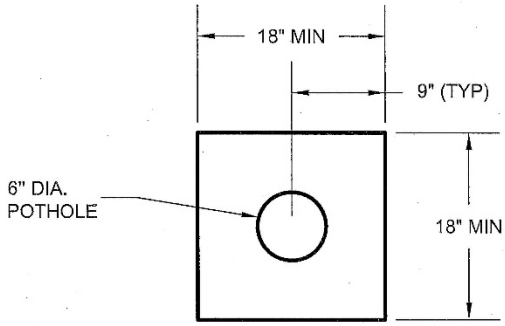
CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

OBJECT MARKERS

FILE NO. A-19



ELEVATION



PLAN VIEW

CDF - CONTROLLED DENSITY FILL
CLSM - CONTROLLED LOW-STRENGTH MATERIAL

CDF OR CLSM SHALL CONSIST OF THE FOLLOWING:

MATERIAL	VOLUME
CEMENT (1 SACK)	0.48
FLYASH	1.57
WATER	4.81
3/8 " PEAGRAVEL	6.93
SAND	9.84
ENTRAINED AIR	3.37
TOTAL	27.00

NOTES:

1. FOR EXPLORATORY POTHOLE WITHIN SIDEWALK, FULL PCC PANEL SHALL BE REMOVED AND REPLACED TO NEAREST SCORE JOINTS, OR AS DIRECTED BY CITY ENGINEER.
2. USE CRACK TREATMENT MATERIAL PER STANDARD SPECIFICATIONS.

Revision	Date	Approved
Drawn : HN	Date : 05-13-14	
Checked : LA	Scale : NTS	

REGISTERED PROFESSIONAL ENGINEER — CAROLINE ANDREWS — No. 57093 — CIVIL — STATE OF CALIFORNIA

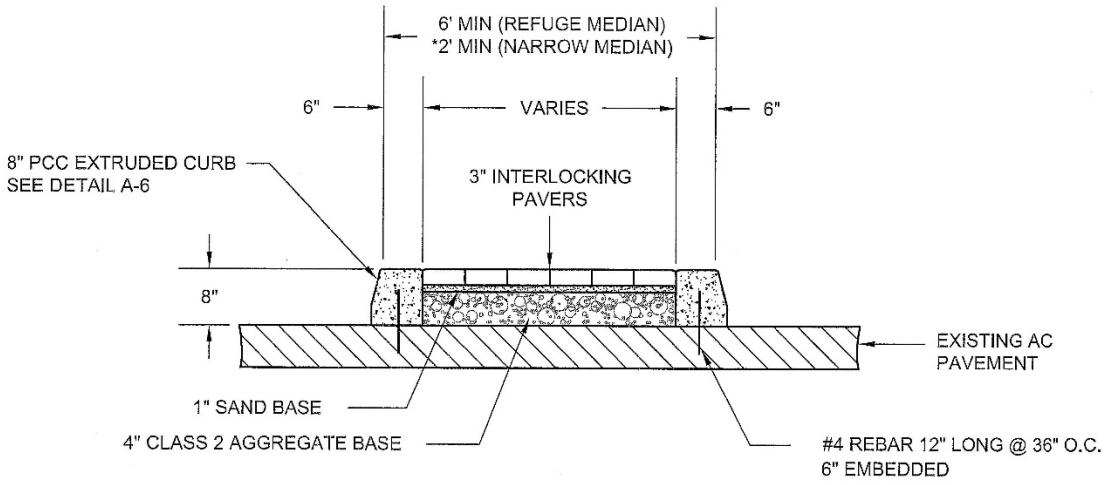
APPROVED BY: Jacqueline A. Solomon

5/14/2014 DATE — 12-31-15 EXP. — 57093 R.C.E. NO.

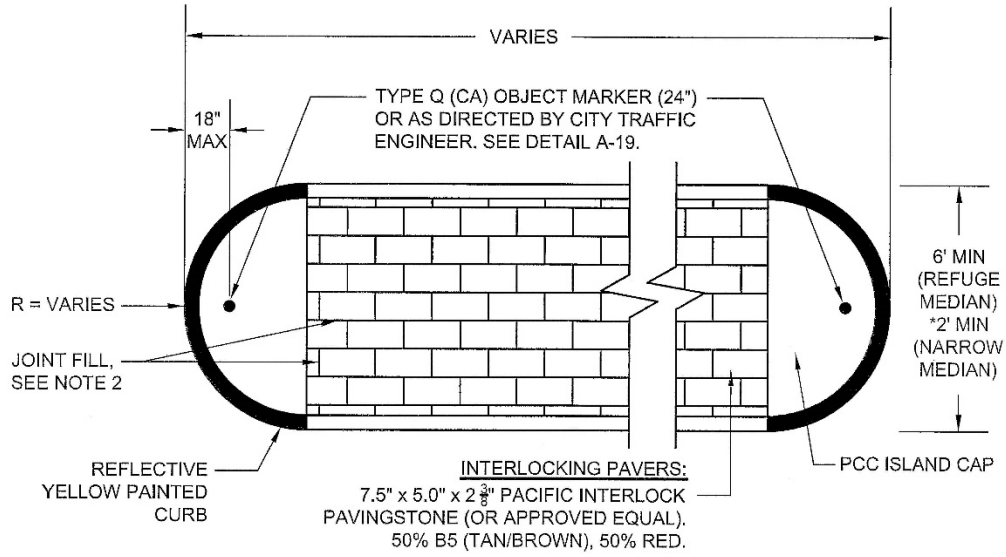
CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

EXPLORATORY POTHOLE RESTORATION

FILE NO. A-20



CROSS SECTION



PLAN

NOTE:

1. TOP AND VERTICAL FACE OF MEDIAN CURB SHALL RECEIVE TWO COATS OF REFLECTIVE YELLOW PAINT.
2. POLYMERIC SAND SHALL BE ADDED IN JOINTS OF PAVERS.

* NARROW MEDIAN ISLANDS ONLY APPLICABLE AS PART OF NEIGHBORHOOD TRAFFIC MANAGEMENT PROGRAM (NTMP) IMPROVEMENTS.

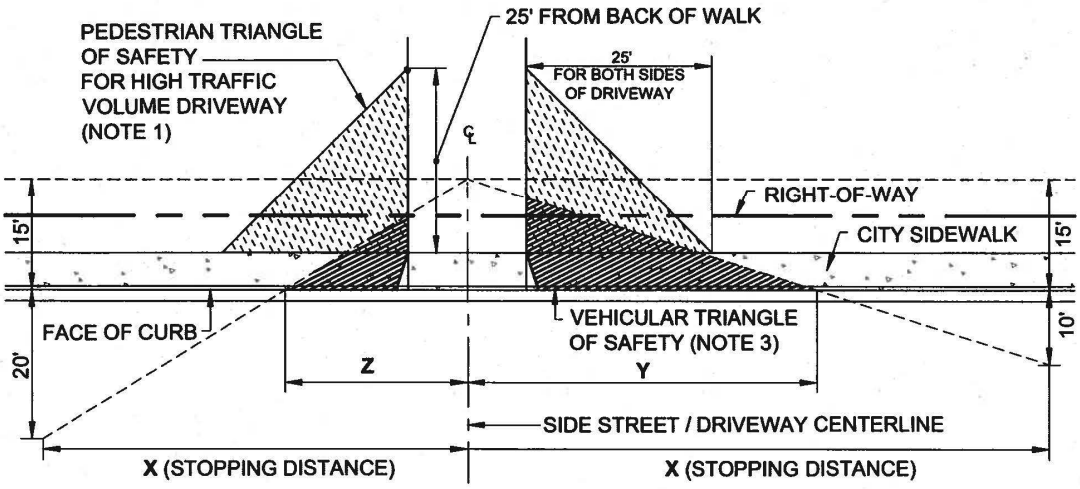
Revision	Date	Approved
Drawn: MG	Date: 04-10-17	
Checked: AB	Scale: NTS	

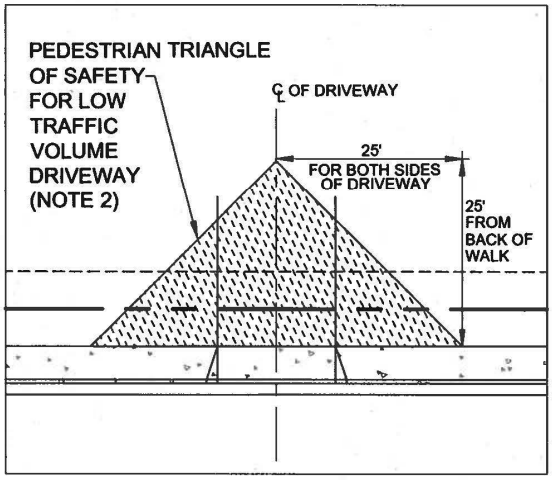
APPROVED BY: No. 57093 — Jacqueline Colstrom — 4/10/17 DATE — 12-31-17 EXP. — 57093 R.C.E. NO.

CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

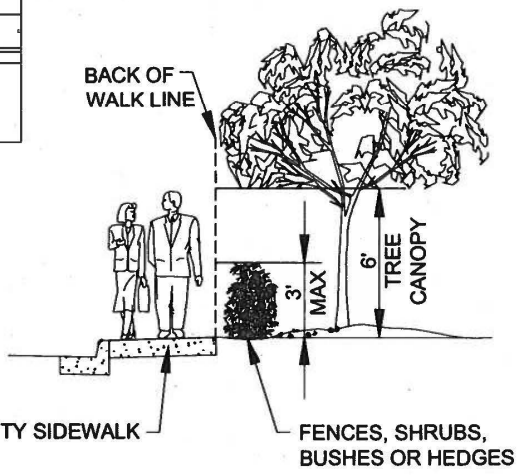
MEDIAN ISLAND
HARDSCAPED

FILE NO. A-21





SPEED (MPH)	STOPPING DISTANCE (FT)	Y (FT)	Z (FT)
25	150	90	65
30	200	120	85
35	250	150	110
40	300	180	130



NOTES:

1. TO BE APPLIED AT COMMERCIAL/RETAIL AREAS, AND RESIDENTIAL AREAS WITH MORE THAN 20 UNITS
2. TO BE APPLIED AT RESIDENTIAL AREAS WITH 20 UNITS OR LESS
3. VEHICULAR TRIANGLE OF SAFETY APPLIES FOR ALL DRIVEWAYS

Revision	Date	Approved
Drawn: TE	Date: 04-16-2019	
Checked: SF	Scale: NTS	

APPROVED BY:

Jacqueline Casolowon

4/17/2019 DATE

12-31-2019 EXP.

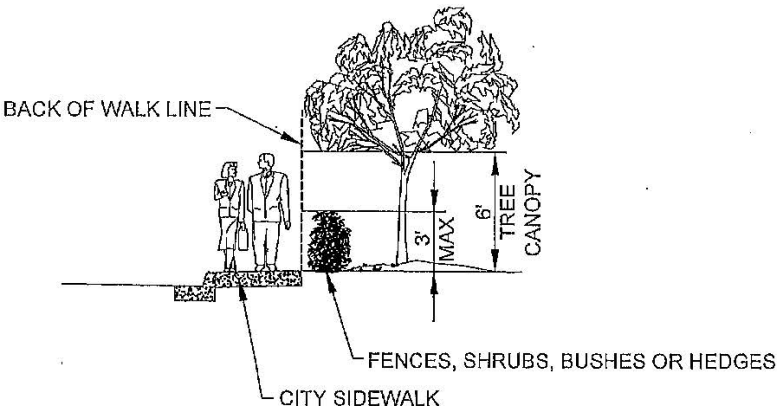
57093 R.C.E. NO.

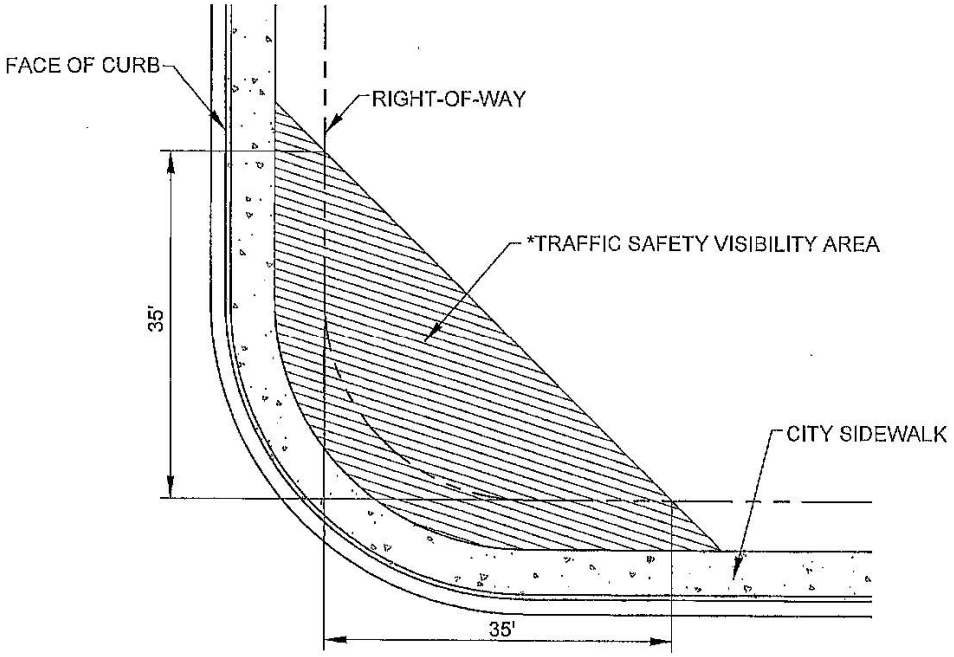
REGISTERED PROFESSIONAL ENGINEER JACQUELINE ANDREA CASOLOWON No. 57093 CIVIL STATE OF CALIFORNIA

CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

SIDE STREET / DRIVEWAY
PEDESTRIAN & VEHICULAR
TRIANGLE OF SAFETY

FILE NO. A-22

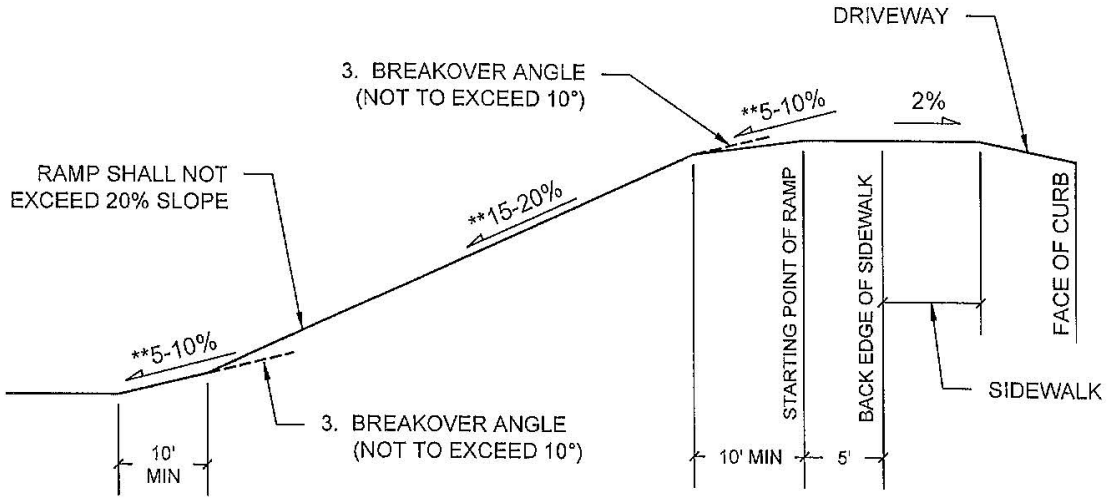




*MOUNTAIN VIEW CITY CODE CHAPTER 36 ZONING
SEC. 36.34.10m CORNER TREATMENT STANDARD
FOR LANDSCAPING AND FENCING

			CITY OF MOUNTAIN VIEW PUBLIC WORKS DEPARTMENT STANDARD DETAIL
Revision	Date	Approved	
Drawn: TET	Date: 08-25-2016		
Checked: DGW	Scale: NTS		
APPROVED BY:			CORNER / INTERSECTION VISIBILITY TRAFFIC SAFETY VISIBILITY AREA
9/2/2016 DATE	12-31-2017 EXP.	57093 R.C.E. NO.	FILE NO. A-23

REGISTERED PROFESSIONAL ENGINEER — CATHERINE CA SHANNON — No. 57093 — CIVIL — STATE OF CALIFORNIA



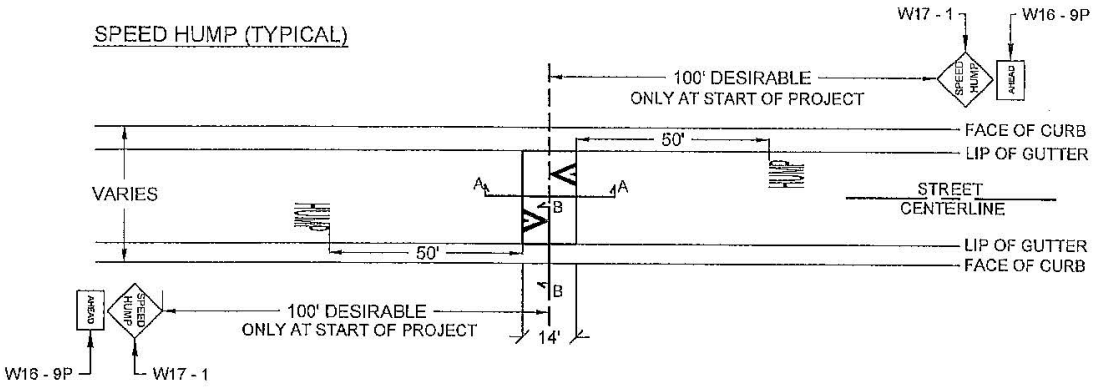
NOTES:

** THE SLOPE RANGE IS A GUIDE AND DOES NOT MEAN USING MAX SLOPE IN EVERY CASE.

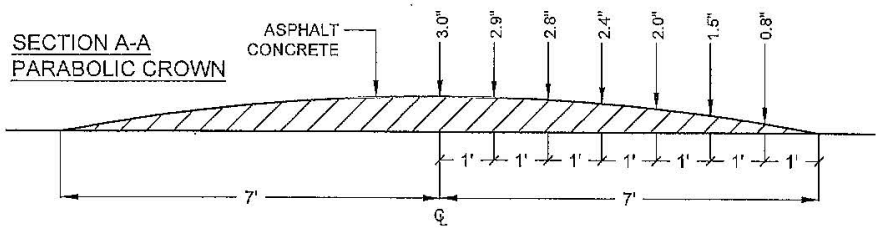
1. A DISTANCE OF 5 FEET SHALL BE MAINTAINED AT THE SAME SLOPE AS THE SIDEWALK FROM THE BACK EDGE OF THE SIDEWALK TO THE STARTING POINT OF THE RAMP.
2. THE FIRST AND LAST 10 FEET OF THE SLOPE GRADE (TRANSITION LENGTH) SHALL NOT EXCEED 10 PERCENT.
3. THE REMAINING PORTION OF THE RAMP SHALL NOT HAVE A SLOPE GREATER THAN 20 PERCENT AND THE BREAKOVER ANGLE SHALL NOT EXCEED 10 DEGREES.
4. MINIMUM RAMP WIDTH (TWO-WAY) FOR ABOVE AND BELOW GROUND PARKING FACILITIES) SHALL BE 22 FEET.
5. THE SLOPE OF ALL PARKING AREAS SHALL NOT EXCEED 7 PERCENT.

			CITY OF MOUNTAIN VIEW PUBLIC WORKS DEPARTMENT STANDARD DETAIL
Revision	Date	Approved	
Drawn: TE	Date: 08-25-16		
Checked: DG	Scale: NTS		
APPROVED BY: No. 57093 Jacqueline C. Solomon 9/2/2016 (DATE) 12-31-17 (EXP) 57093 (R.C.E. NO.)			UNDERGROUND GARAGE DRIVEWAY RAMP FILE NO. A-24

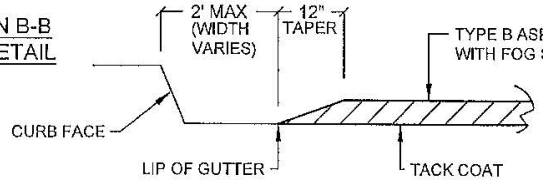
SPEED HUMP (TYPICAL)



SECTION A-A PARABOLIC CROWN

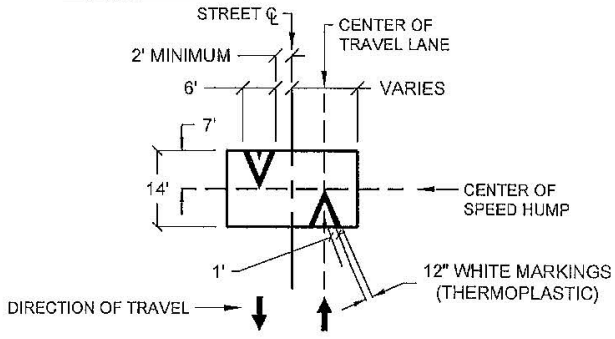


SECTION B-B CURB DETAIL

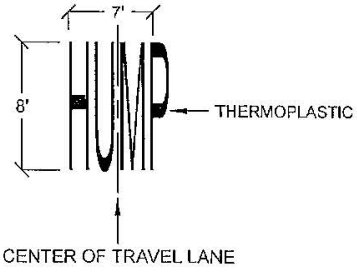


NOTE:
STRIPING, SIGNING, AND TRAFFIC MARKINGS SHALL NOT BE INSTALLED UNTIL APPROVAL IS GRANTED BY THE ENGINEER.

STRIPING DETAIL



PAVEMENT MARKING DETAIL



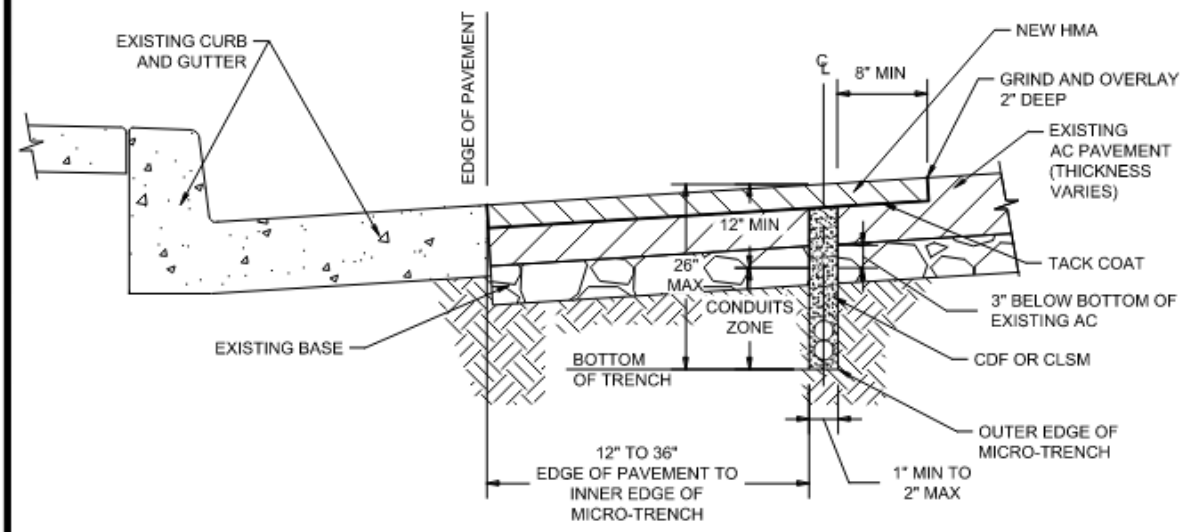
Revision	Date	Approved
Drawn: TE	Date: 08-25-2016	
Checked: DG / LS	Scale: NTS	

APPROVED BY: No. 57093
Jacqueline C. Solomon
9/2/2016
DATE
12/31/2017
EXP.
57093
R.C.E. NO.

CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

SPEED HUMP

FILE NO. A-25



GENERAL NOTES

1. MICRO-TRENCHING SHALL ONLY BE USED TO INSTALL TELECOMMUNICATION CONDUITS AND AS APPROVED BY THE ENGINEER.
2. MICRO-TRENCHING SHALL NOT BE ALLOWED IN SIDEWALKS, CURBS, GUTTERS, AND DRIVEWAYS.
3. MICRO-TRENCHING SHALL NOT BE ALLOWED IN SIGNALIZED INTERSECTIONS UNLESS APPROVED BY THE ENGINEER.
4. THE CONTRACTOR SHALL IDENTIFY ALL EXISTING UTILITIES, INCLUDING SERVICE CONNECTIONS IN THE FIELD. THE CONTRACTOR SHALL POTHOLE ALL CROSSING UTILITIES AND PARALLEL UTILITIES WITHIN 24-INCHES OF THE PROPOSED ALIGNMENT TO A DEPTH OF 6-INCHES BELOW THE BOTTOM OF THE MICRO-TRENCH.
5. CONTRACTOR SHALL SUBMIT THE FOLLOWING ITEMS TO THE ENGINEER FOR APPROVAL:
   A. A DETAILED SITE PLAN THAT INCLUDES THE DISTANCES OF MICRO-TRENCHING AND EDGES OF GRIND AND OVERLAY TO EDGE OF PAVEMENT.
   B. A MICRO-TRENCH DETAIL THAT INCLUDES DIMENSIONS OF PROPOSED MICRO-TRENCH, DEPTH AND SIZE OF CONDUIT(S).
   C. A DETAIL OF LATERAL SERVICES THAT INCLUDES THE CONDUIT FROM THE MICRO-TRENCH MAINLINE TO THE JUNCTION/PULL BOX. INCLUDE SPECIFIC INFORMATION OF CONDUIT SIZE AND DEPTH, AND EXCAVATION METHOD BELOW THE EXISTING SIDEWALK AND CURB AND GUTTER.

LIMITS OF REMOVALS, TRENCH WIDTH, AND LOCATION

6. THE MICRO-TRENCH SHALL BE CONSTRUCTED WITH CONTINUOUS UNIFORM STRAIGHT AND NEAT EDGES.
7. MICRO-TRENCH ALIGNMENTS SHALL CONSIST OF RUNS PARALLEL TO THE CENTERLINE OF THE STREET. STREET CROSSING IS ALLOWED PROVIDED THE ALIGNMENT IS PERPENDICULAR TO THE STREET CENTERLINE TO THE EXTENT POSSIBLE. MICRO-TRENCHING IS ALLOWED ALONG CURB RETURNS.
8. THE EDGE OF THE MICRO-TRENCH SHALL BE A MINIMUM OF 12-INCHES AND A MAXIMUM OF 36-INCHES FROM THE EXISTING EDGE OF PAVEMENT.

Revision	Date	Approved

Drawn : TE Date : 12-07-2022

Checked : RG Scale : NTS

APPROVED BY: 2022.12.08 16:55:58 -08'00'

DATE

REGISTERED PROFESSIONAL ENGINEER EDWARD ARAM GRAVETTE C 60299 STATE OF CALIFORNIA CIVIL

CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

MICRO-TRENCHING
(SHEET 1 OF 2)

FILE NO. A-26A

LIMITS OF REMOVALS, TRENCH WIDTH, AND LOCATION (CONTINUED)

9. MICRO-TRENCHING MAY BE PERMITTED UPON THE ENGINEER'S DISCRETION ON SPECIAL PAVEMENTS SUCH AS DECORATIVE ASPHALT PAVING, AND THROUGH EXISTING IMPROVEMENTS SUCH AS PERPENDICULAR TO SPEED BUMPS. SPECIAL PAVEMENTS AND EXISTING IMPROVEMENTS SHALL BE RESTORED IN KIND AS APPROVED BY THE ENGINEER. HOWEVER, MICRO-TRENCHING THROUGH EXISTING CURB, GUTTER, VALLEY GUTTER, BUS PAD, SIDEWALK, FLOATING CURB EXTENSION, BUS ISLAND, RAISED CROSSWALK, ISLAND, MINI-ROUNDABOUT, OR SIMILAR ELEMENTS IS PROHIBITED.

10. UP TO TWO (2) VERTICALLY STACKED CONDUITS CAN BE PLACED WITHIN A MICRO-TRENCH.

11. CONDUITS MAY ONLY BE INSTALLED IN THE CONDUITS ZONE. THE TOP OF THE CONDUITS ZONE SHALL BE AT A MINIMUM OF 12-INCHES BELOW THE EXISTING PAVEMENT SURFACE, OR 3-INCHES BELOW THE BOTTOM OF THE EXISTING AC PAVEMENT, WHICHEVER IS DEEPER. THE BOTTOM OF THE CONDUIT ZONE SHALL BE AT A MAXIMUM DEPTH OF 26-INCHES FROM THE EXISTING PAVEMENT SURFACE.

12. ANCHORS / SPACERS SHALL BE PLACED AT A MAXIMUM OF 10-FEET APART ALONG THE ALIGNMENT TO ENSURE THE CONDUIT DOES NOT RISE FROM THE BOTTOM OF THE MICRO-TRENCH AND DOES NOT TOUCH THE WALLS OF THE MICRO-TRENCH DURING INSTALLATION.

BACKFILL

13. ALL MICRO-TRENCHES SHALL BE COMPLETELY BACKFILLED WITH CONTROLLED DENSITY FILL (CDF) OR CONTROLLED LOW-STRENGTH MATERIAL (CLSM) 50-150 PSI TO FINISH GRADE BY THE END OF THE WORK DAY. REFER TO CITY STANDARD DETAIL A-20 FOR MIX DESIGN.

GRIND AND RESURFACE SECTION

14. COMMENCEMENT OF SURFACE PREPARATION SUCH AS GRINDING / CHIPPING FOR ASPHALT CONCRETE PAVING REPLACEMENT WILL OCCUR NO SOONER THAN 48 HOURS AFTER SLURRY BACKFILL OF TRENCH. FIELD CONDITIONS OR MATERIAL USED MAY NECESSITATE A LONGER WAIT AS DETERMINED BY THE INSPECTOR.

15. AS SOON AS BACKFILL HAS CURED AND NOT EXCEEDING 30 CALENDAR DAYS, ASPHALT CONCRETE SHALL BE GROUND AND OVERLAID AS FOLLOWS:

    A. EXISTING AC AND SLURRY BACKFILL SHALL BE GROUND DOWN 2-INCHES, FROM THE EDGE OF PAVEMENT TO 8-INCHES PAST THE OUTER EDGE OF THE MICRO-TRENCH, AND RESURFACED WITH HOT MIX ASPHALT (HMA) AND BINDER.

    B. TACK COAT ALL EDGES IMMEDIATELY BEFORE AC IS PLACED.

    C. WHERE ANGULAR CROSSING OR ANY LENGTH-WISE CUTS OF A BIKE LANE OCCUR BY MICRO-TRENCHING, THE OVERLAY LIMITS SHALL EXTEND THE FULL WIDTH OF THE BIKE LANE. PERPENDICULAR CROSSINGS MAY RECEIVE TYPICAL OVERLAY WIDTH PER NOTE 15A ABOVE. PAVEMENT MARKING SHALL BE RESTORED IN KIND. WHERE NO BIKE LANE MARKING EXIST, CONTRACTOR SHALL CONSULT WITH ENGINEER TO DETERMINE LOCATION OF ANY PLANNED BIKE LANES SO THAT IMPACT OF PAVEMENT SURFACE MAY BE AVOIDED.

    D. PAVEMENT SHALL BE LEVEL WITH ADJACENT ROADWAY ELEVATIONS AND SHALL PROVIDE A SMOOTH SURFACE PER CITY STANDARD PROVISIONS AND SUBJECT TO ACCEPTANCE BY THE INSPECTOR.

VAULTS AND SERVICE CONNECTIONS

16. CONNECTION TO SERVICE LATERALS, JUNCTION BOXES, ETC., SHALL BE DONE SUCH THAT CURB AND GUTTER IS NOT DISTURBED, SETTLED OR DAMAGED. THE CONTRACTOR SHALL RESTORE DISTURBED OR DAMAGED CURB AND GUTTER TO THE ORIGINAL CONDITION IN A MANNER SATISFACTORY TO THE ENGINEER. REMOVAL LIMITS OF SIDEWALK SHALL FOLLOW APPLICABLE STANDARDS AND REQUIREMENTS AS APPROVED BY THE ENGINEER.

17. THE USE OF HYDRO-JETTING IS NOT PERMITTED. TRENCHLESS METHODS SHALL NOT CREATE A VOID TWO TIMES GREATER THAN CONDUIT. VOID SHALL BE COMPACTED AND BACKFILLED WITH APPROVED CLSM.

18. EACH MICRO-TRENCH SHALL BE IDENTIFIED WITH A METAL IDENTIFICATION TAG LISTING THE OWNER, YEAR OF CONSTRUCTION, AND INCLUDE THE WORDS "NOT A SURVEY POINT". IF THE WORK IS MORE THAN 50 FEET IN LENGTH, PLACE THE TAG NEAR EACH END OF THE MICRO-TRENCH AND AT INTERVALS NOT TO EXCEED 50 FEET.

19. TRACER WIRE SHALL BE INSTALLED ALONG ENTIRE LENGTH OF CONDUIT RUN.

Revision	Date	Approved

Drawn : TE Date : 12-07-2022

Checked : RG Scale : NTS

APPROVED BY:

REGISTERED PROFESSIONAL ENGINEER EDWARD ARANAS C 60299 CIVIL STATE OF CALIFORNIA

2022.12.08 16:56:32 -08'00'

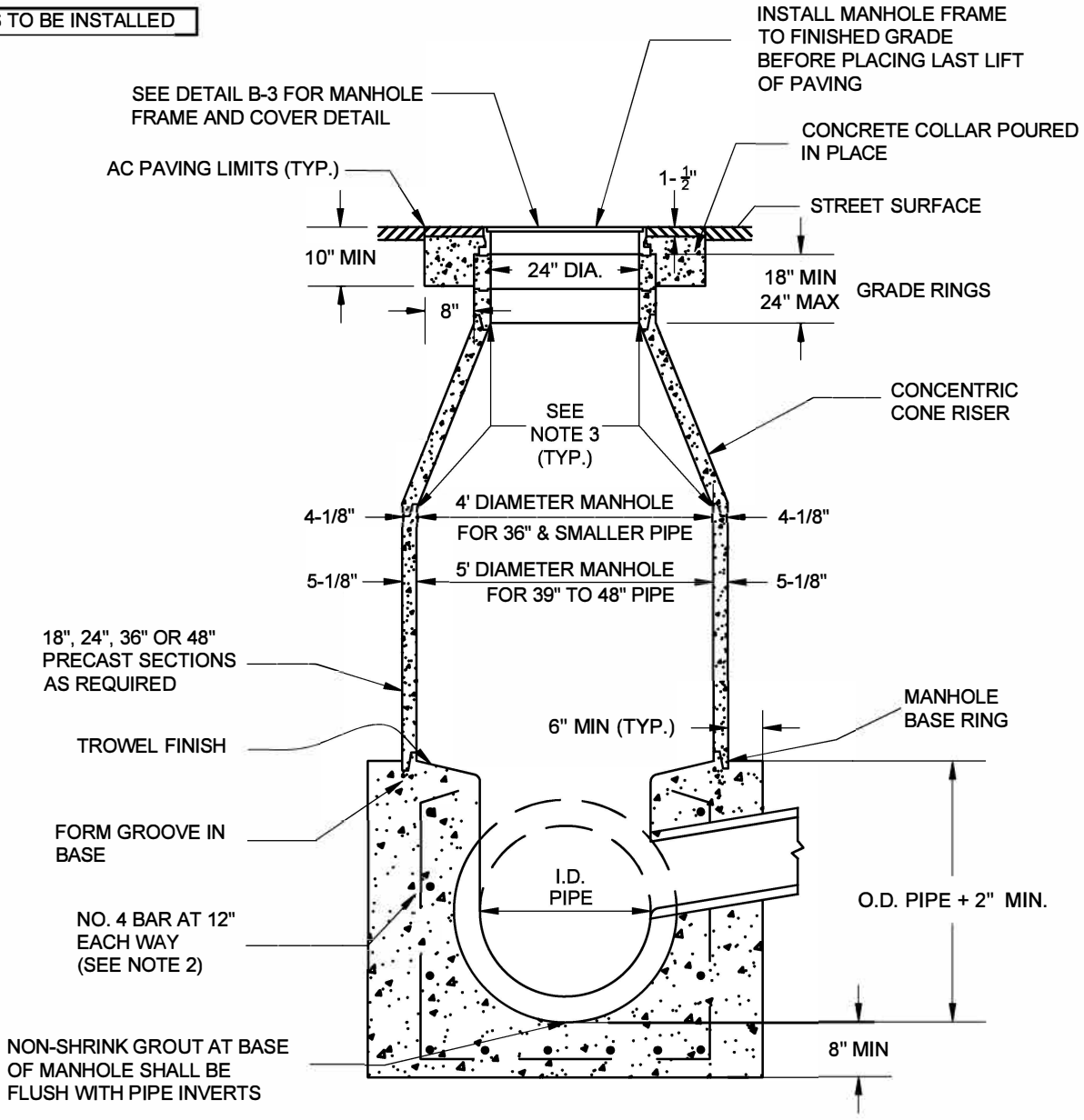
DATE

CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

MICRO-TRENCHING
(SHEET 2 OF 2)

FILE NO. A-26B

NO STEPS TO BE INSTALLED



NOTES:

1. LAY PIPE THROUGH BOTTOM OF MANHOLES. AFTER CONCRETE IN BASE HAS SET, KNOCK OUT PORTION OF PIPE INDICATED WITH DASHED LINES.
2. MANHOLE BASE REINFORCING IS NOT REQUIRED FOR 36" DIAMETER OR SMALLER PIPE.
3. INSTALL RAM-NEK JOINT TAPE OR APPROVED EQUAL AT ALL JOINTS.
4. MORTAR ALL JOINTS WITH A SMOOTH FINISH.
5. INVERT OF INCOMING PIPE SHOULD BE AT SPRINGLINE OR ABOVE; OR MATCH CROWNS

Revision	Date	Approved

Drawn : AR
Date : 07-21-26
Checked : TT
Scale : NTS

APPROVED BY:

ASSISTANT PUBLIC WORKS DIRECTOR

08-21-2026 DATE
06-30-28 EXP.
60299 R.C.E. NO.

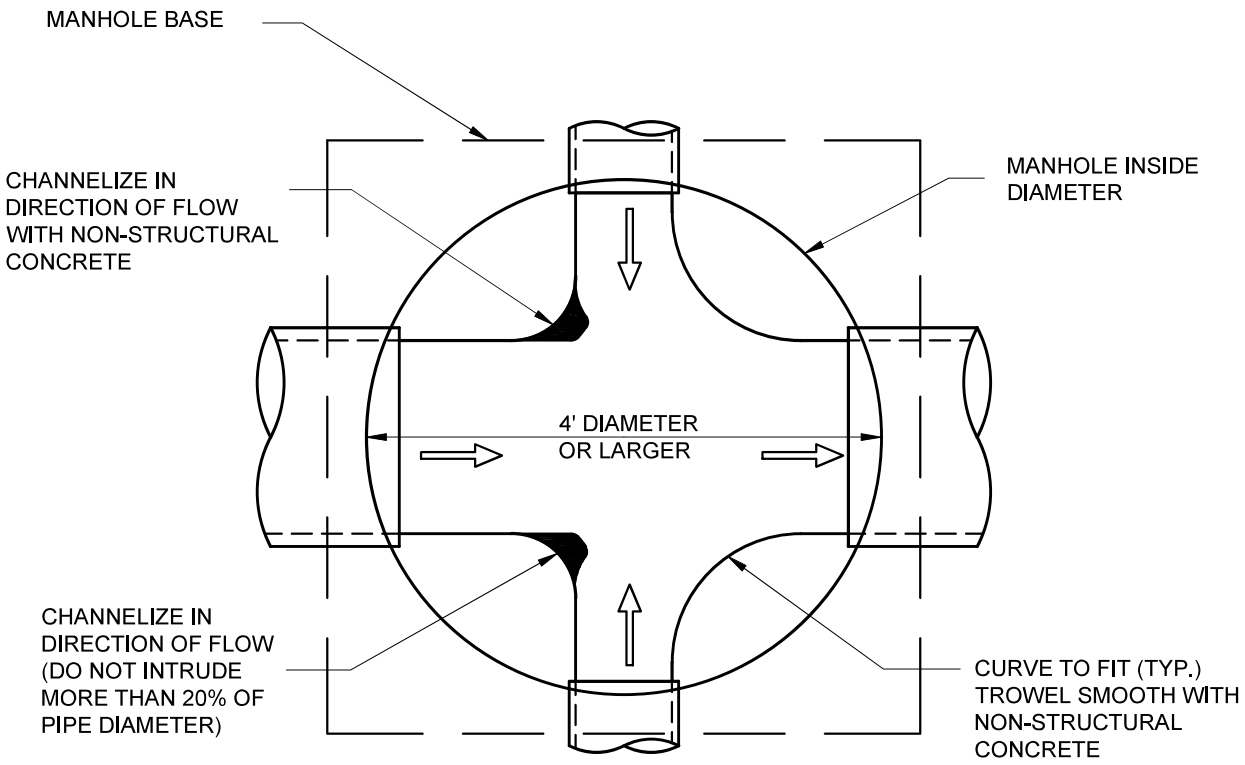
REGISTERED PROFESSIONAL ENGINEER EDWARD T. RANDOLPH C 60299 STATE OF CALIFORNIA CIVIL

CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

STORM DRAIN MANHOLE

FOR PIPE 48" DIAMETER AND LESS

FILE NO. B-1



TYPICAL MANHOLE WITH BRANCHES

Revision	Date	Approved
Drawn : AR	Date : 07-21-26	
Checked : TT	Scale : NTS	

APPROVED BY:

ASSISTANT PUBLIC WORKS DIRECTOR

08-21-2026 DATE | 06-30-28 EXP. | 60299 R.C.E. NO.

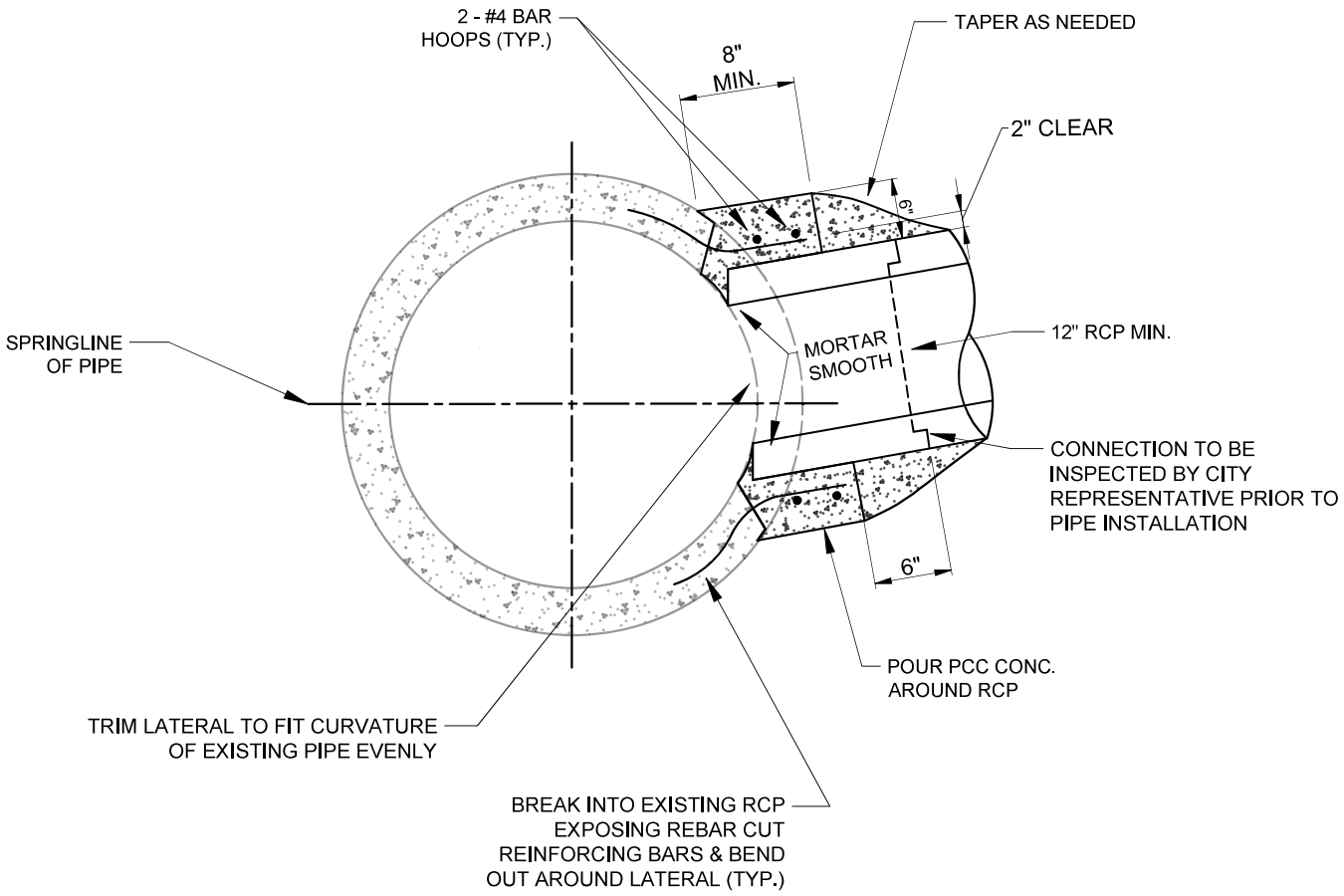
REGISTERED PROFESSIONAL ENGINEER EDWARD ARANGUREN C 60299 STATE OF CALIFORNIA

CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

STORM

MANHOLE BASE WITH BRANCHES

FILE NO. B-2



NOTE:

1. INSIDE DIAMETER OF LATERAL SHALL NOT BE LARGER THAN HALF OF INSIDE DIAMETER OF MAIN PIPE.
2. CONNECTION TO MAIN SHALL BE MADE AT A 2% - 5% SLOPE.

			CITY OF MOUNTAIN VIEW PUBLIC WORKS DEPARTMENT STANDARD DETAIL
Revision	Date	Approved	
Drawn : GT	Date : 7/27/26		
Checked :	Scale : NTS		STORM DRAIN LATERAL PIPE COLLAR CONNECTION

APPROVED BY:

REGISTERED PROFESSIONAL ENGINEER
EDWARD GRAY
C 60299
CIVIL
STATE OF CALIFORNIA

08-21-2026	06/30/2028	60299
DATE	EXP.	R.C.E. NO.

FILE NO. B-2A

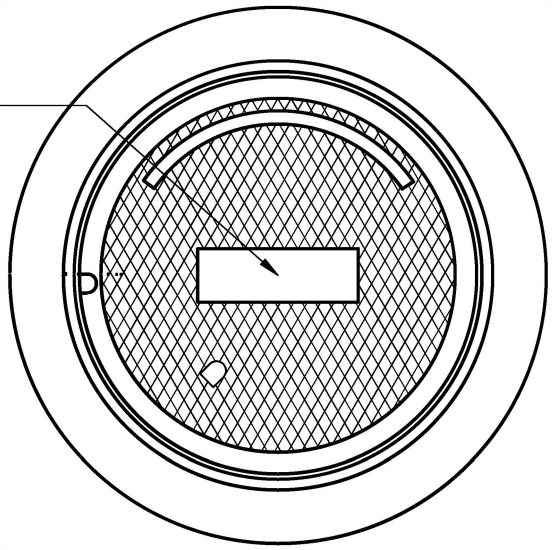
FOR MANHOLES IN PUBLIC RIGHT-OF-WAY
OR PUBLIC EASEMENT:

CITY OF
MOUNTAIN VIEW
STORM

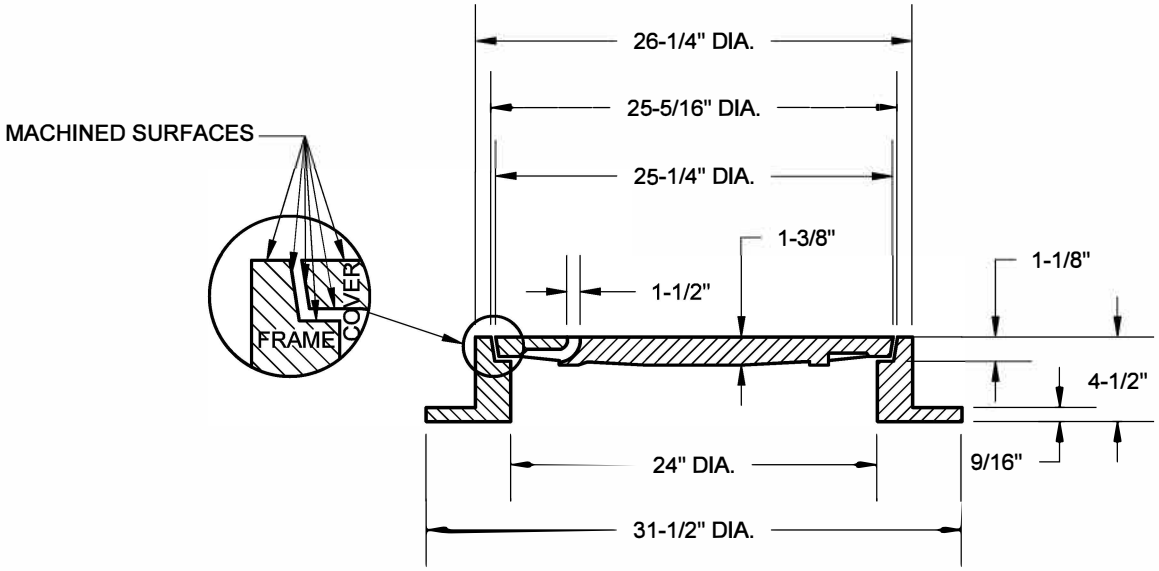
OR

FOR MANHOLES IN OTHER LOCATIONS:

STORM



PLAN - FRAME & COVER



SECTION - FRAME & COVER

NOTES:

1. WHEN THERE IS A NEED TO RAISE MANHOLE COVERS TO MEET NEW GRADE, ADDITIONAL MANHOLE RINGS MAY BE ADDED IN ACCORDANCE WITH PROJECT TECHNICAL SPECIFICATIONS WITH A MAXIMUM OF THREE (3) TOTAL RINGS TOTAL.
2. FRAME AND COVER SHALL BE PHOENIX IRON WORKS #P-1090 OR APPROVED EQUAL.

Revision	Date	Approved
Drawn : AR	Date : 07-21-26	
Checked : TT	Scale : NTS	

APPROVED BY:

ASSISTANT PUBLIC WORKS DIRECTOR

08-21-2026 DATE | 06-30-28 EXP. | 60299 R.C.E. NO.

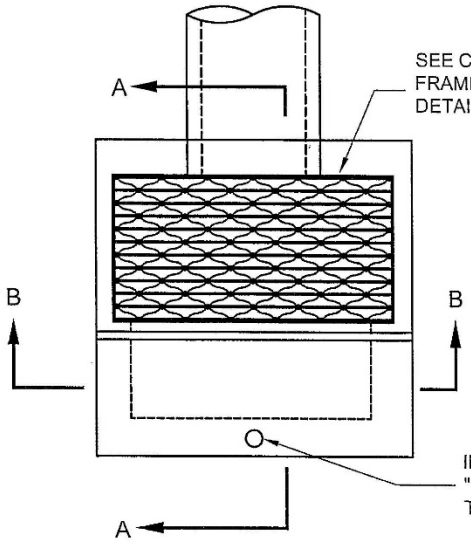
REGISTERED PROFESSIONAL ENGINEER EDWARD TRANG C 60299 STATE OF CALIFORNIA

CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

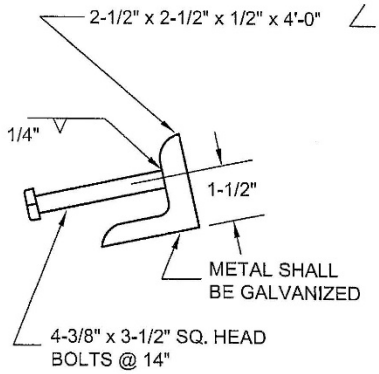
STORM

MANHOLE FRAME & COVER

FILE NO. B-3



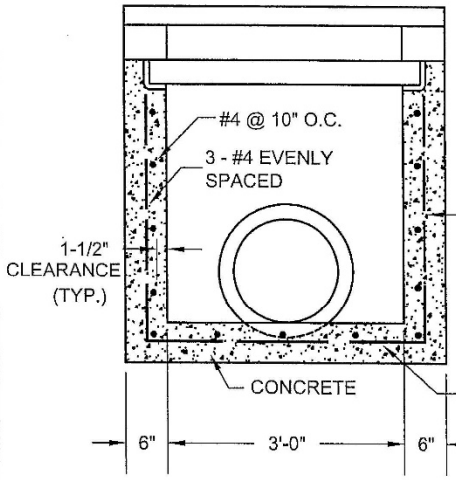
PLAN



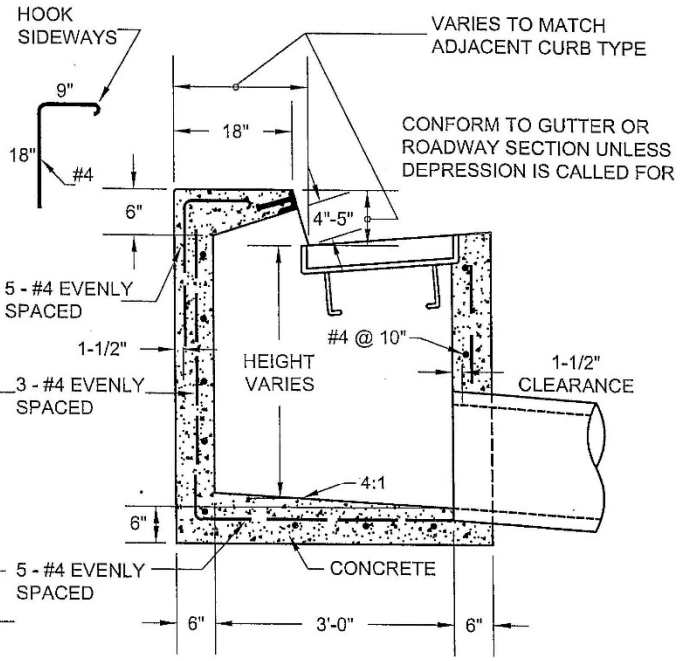
ANGLE ANCHOR

NOTE: WHERE INLET IS LOCATED WITHIN A RETURN, ANGLE ANCHOR SHALL BE CURVED TO MATCH FACE OF CURB RADIUS.

NOTE: REINFORCING STEEL SHALL BE REQUIRED IN WALLS OF DROP INLETS WHICH ARE GREATER THAN 6' IN DEPTH. BOTTOM REBAR MAT IS REQUIRED REGARDLESS OF HEIGHT OF WALLS.



SECTION B-B



SECTION A-A

Revision	Date	Approved
Drawn: QT	Date: 08-11-16	
Checked: LA	Scale: STORM	

REGISTERED PROFESSIONAL ENGINEER JACQUELINE ANDREWS No. 57093 CIVIL STATE OF CALIFORNIA

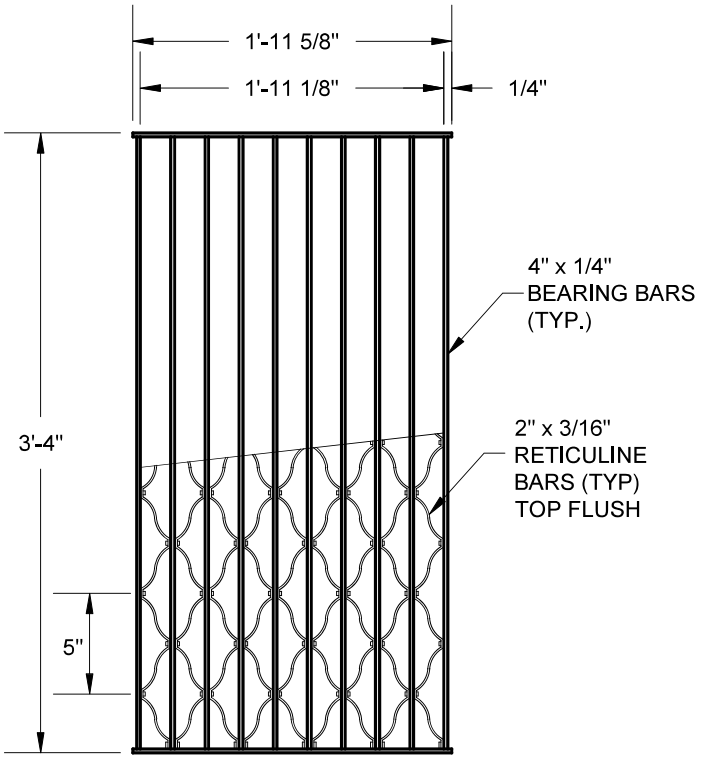
APPROVED BY: Jacqueline C. Solomon

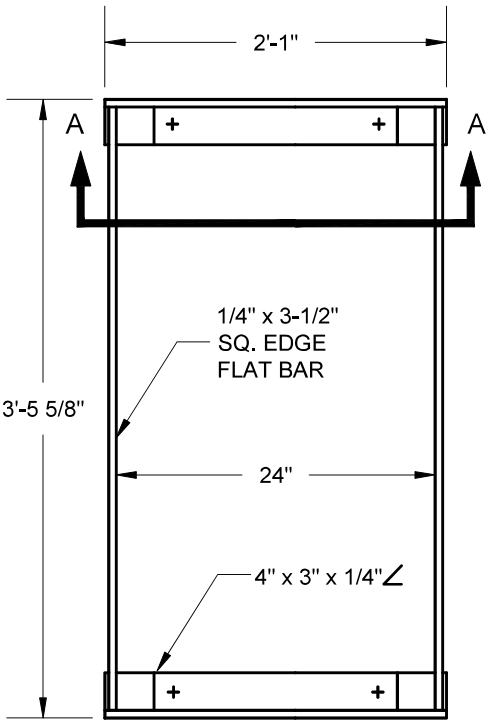
08-11-16 DATE | 12-31-17 EXP. | 57093 R.C.E. NO.

CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

STORM
CURB INLET

FILE NO. B-4

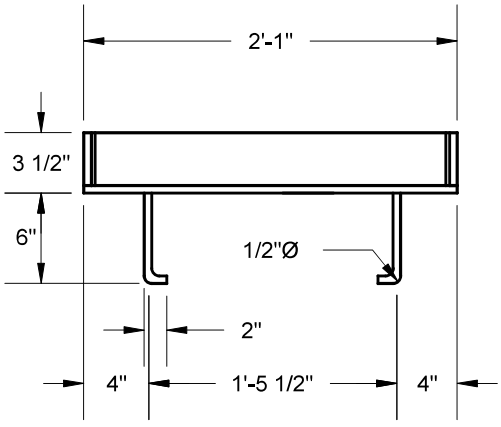




PLAN

NOTES

1. HINGED GRATE ONLY WHEN SPECIFIED.
2. PLACE GRATE BARS PARALLEL TO FLOW.
3. ALL MISCELLANEOUS IRON & STEEL INCLUDING 3/8"Ø RIVETS PLACED AT 5" O.C. TO BE GALVANIZED AFTER FABRICATION.
4. FRAME TO BE CONAC CALTRANS TYPE 24 FRAME OR WRITTEN APPROVED EQUAL.
   GRATE TO BE CONAC NO. 24-10SG OR WRITTEN APPROVED EQUAL.
5. INSTALL ALUMINUM DISK "NO DUMPING - DRAINS TO BAY" ON TOP OF CURB.
6. EXISTING STORM FRAMES AND GRATES ARE OF VARIOUS SIZES. FOR RETROFITS, CONTRACTOR SHALL FIELD VERIFY DIMENSIONS AND PROVIDE RETICULINE GRATES WITH SNUG FIT.
7. GRATES MUST FIT INTO THEIR FRAMES WITHOUT ROCKING.



SECTION A-A

Revision	Date	Approved
Drawn : AR	Date : 07-21-26	
Checked : TT	Scale : NTS	

APPROVED BY:

ASSISTANT PUBLIC WORKS DIRECTOR

08-21-2026 DATE | 06-30-28 EXP. | 60299 R.C.E. NO.

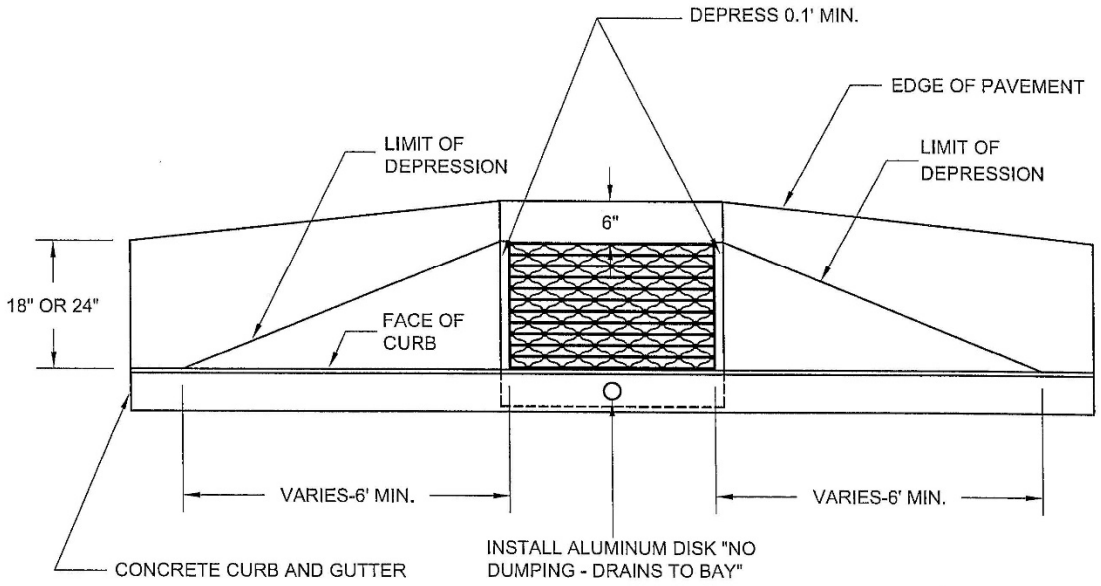
REGISTERED PROFESSIONAL ENGINEER EDWARD A. RANGEL C 60299 STATE OF CALIFORNIA Civil

CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

STORM

CURB INLET FRAME AND BICYCLE SAFE GRATE

FILE NO. B-5



Revision	Date	Approved
Drawn : QT	Date : 08-11-16	
Checked : LA	Scale : NTS	

APPROVED BY: Jacqueline Casselman

08-11-16 DATE | 12-31-17 EXP. | 57093 R.C.E. NO.

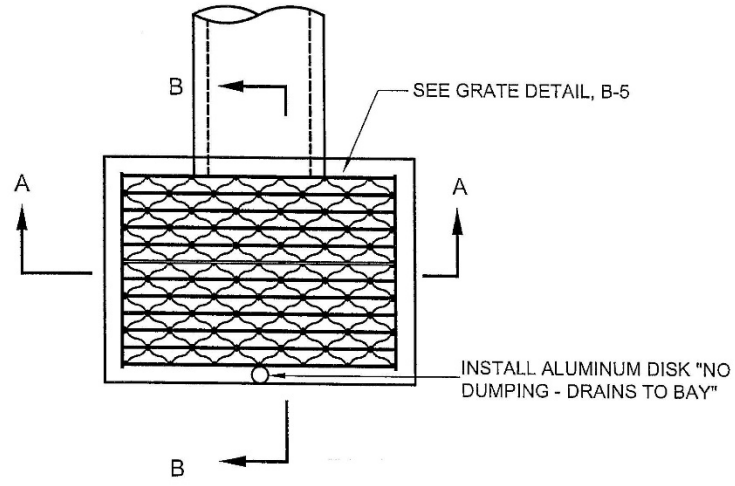
REGISTERED PROFESSIONAL ENGINEER JACQUELINE ANDREWS CASSELMAN No. 57093 CIVIL STATE OF CALIFORNIA

CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

STORM

GUTTER DEPRESSION

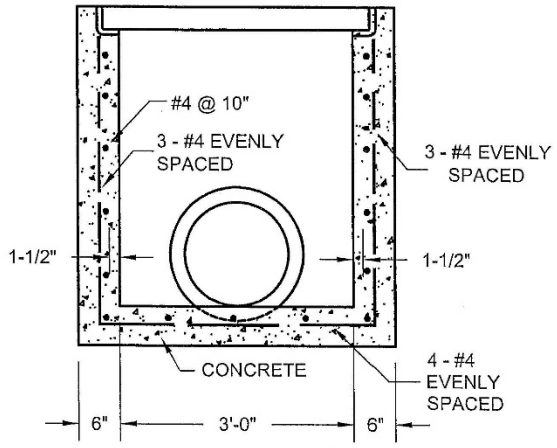
FILE NO. B-6



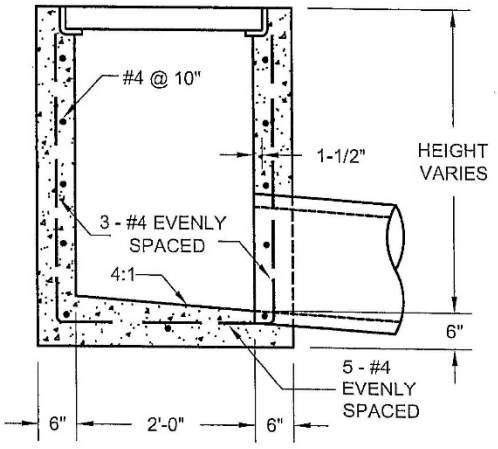
PLAN

NOTE:

REINFORCING STEEL SHALL BE REQUIRED IN WALLS OF DROP INLETS WHICH ARE GREATER THAN 6' IN DEPTH. BOTTOM REBAR MAT IS REQUIRED REGARDLESS OF HEIGHT OF WALLS.



SECTION A-A



SECTION B-B

NOTE:

THIS DETAIL IS TO BE USED WHERE THERE ARE NO CURB AND GUTTER.

Revision	Date	Approved
Drawn: QT	Date: 08-11-16	
Checked: LA	Scale: NTS	

APPROVED BY: Jacqueline A. Solomon

08-11-16 DATE

12-31-17 EXP.

57093 R.C.E. NO.

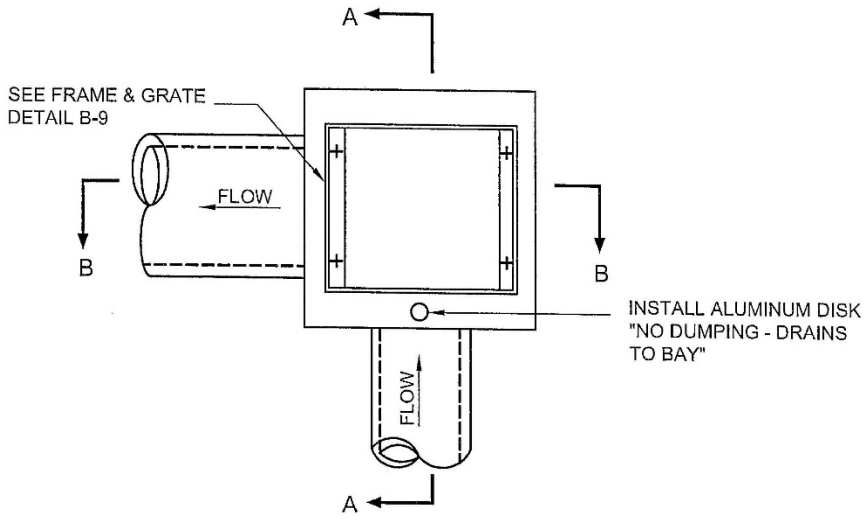
REGISTERED PROFESSIONAL ENGINEER JACQUELINE ANDREWS SOLOMON No. 57093 CIVIL STATE OF CALIFORNIA

CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

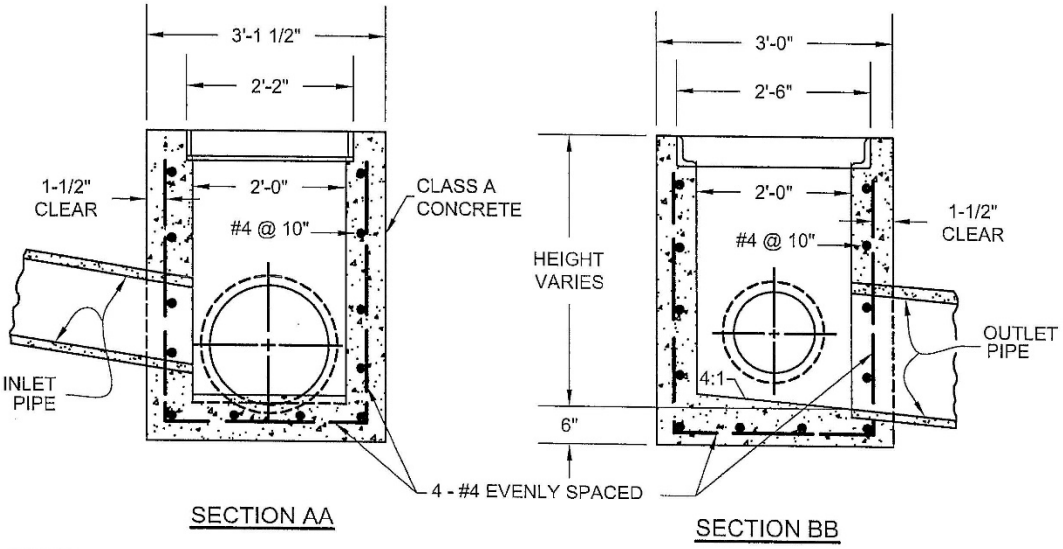
STORM

AREA DRAIN INLET

FILE NO. B-7



PLAN



SECTION AA

SECTION BB

NOTES:

1. MAX. OUTLET PIPE 24" DIAMETER
2. MIN. OUTLET PIPE 12" DIAMETER
3. SET CROWN OF INLET PIPE AT SAME ELEVATION AS CROWN OF OUTLET PIPE
4. REINFORCING STEEL SHALL BE REQUIRED FOR WALLS GREATER THAN 6' IN DEPTH. BOTTOM REBAR MAT IS REQUIRED REGARDLESS OF HEIGHT OF WALLS.
5. CHRISTY U23 CATCH BASIN (2' x 2' WITH 6" WALLS) OR AN APPROVED EQUAL.
6. SEE DETAIL B-9.

Revision	Date	Approved
Drawn: QT	Date: 08-11-16	
Checked: LA	Scale: NTS	

APPROVED BY: No. 57093 — REGISTERED PROFESSIONAL ENGINEER — CIVIL — STATE OF CALIFORNIA

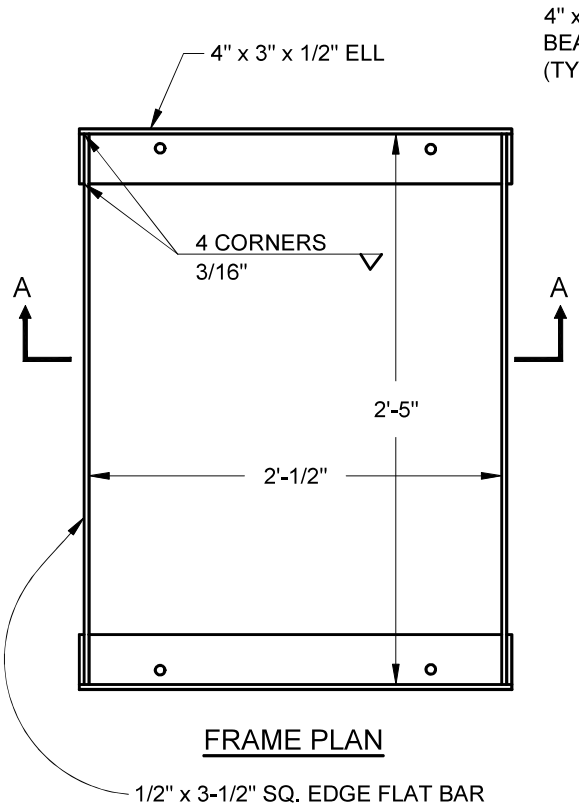
08-11-16 DATE | 12-31-17 EXP. | 57093 R.C.E. NO.

CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

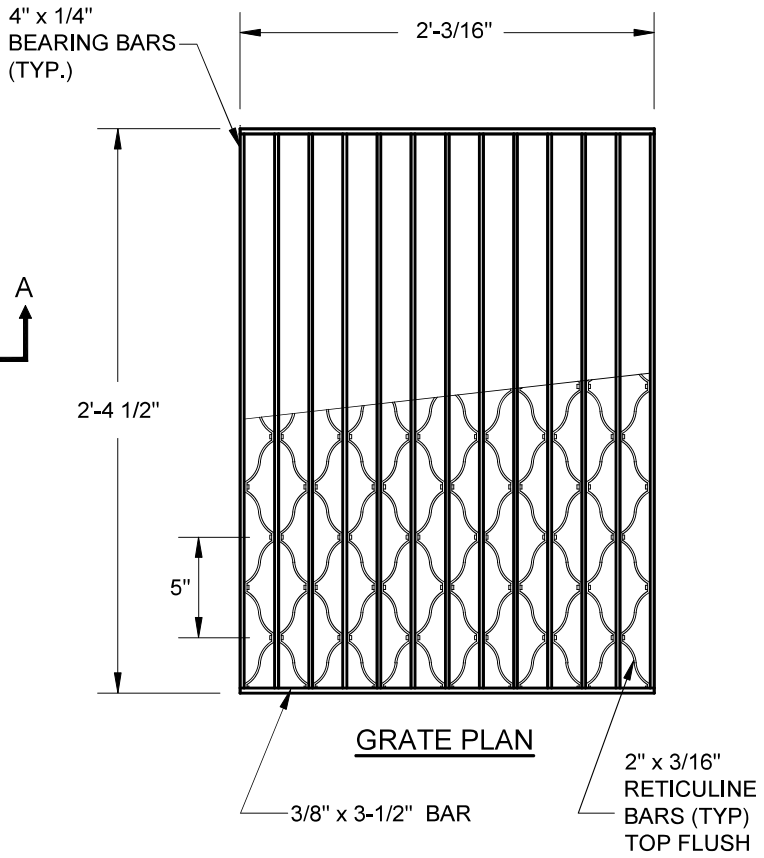
PROPERTY LINE STORM DRAIN INLET

AND CLEAN-OUT

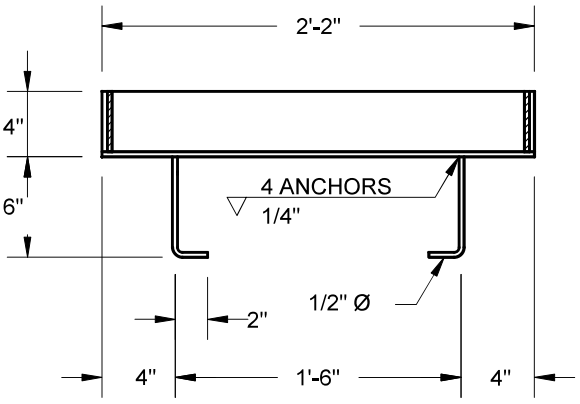
FILE NO. B-8



FRAME PLAN



GRATE PLAN



SECTION A-A

NOTES

1. FRAME AND GRATE TO BE MADE OF CARBON STEEL.
2. ALL SURFACES TO BE GALVANIZED AFTER FABRICATION.
3. PLACE GRATE BEARING BARS PARALLEL TO CENTERLINE OF OUTLET PIPE.
4. FASTEN GRATE TO FRAME AT CORNERS WITH REMOVABLE CLIPS.
5. INSTALL ALUMINUM DISK "NO DUMPING - DRAINS TO BAY".
6. CONTRACTOR SHALL FIELD VERIFY DIMENSIONS AND FURNISH CUSTOMIZED RETICULINE GRATES TO FIT EXISTING STORM FRAMES AND GRATES WITHOUT ROCKING.
7. SEE DETAIL B-8.

Revision	Date	Approved

Drawn : AR Date : 07-21-26

Checked : TT Scale : NTS

APPROVED BY:

ASSISTANT PUBLIC WORKS DIRECTOR

08-21-2026 DATE | 06-30-28 EXP. | 60299 R.C.E. NO.

REGISTERED PROFESSIONAL ENGINEER EDWARD ANTHONY RANGEL C 60299 STATE OF CALIFORNIA

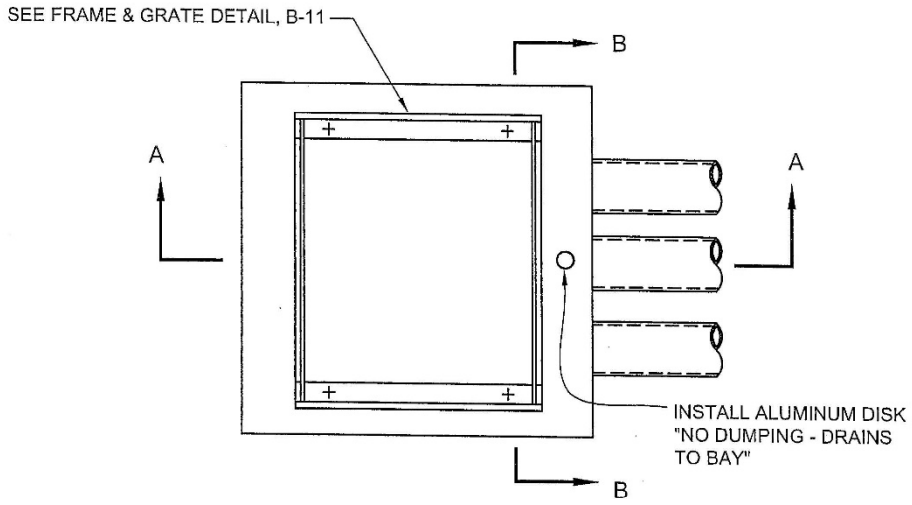
CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

FRAME & GRATE

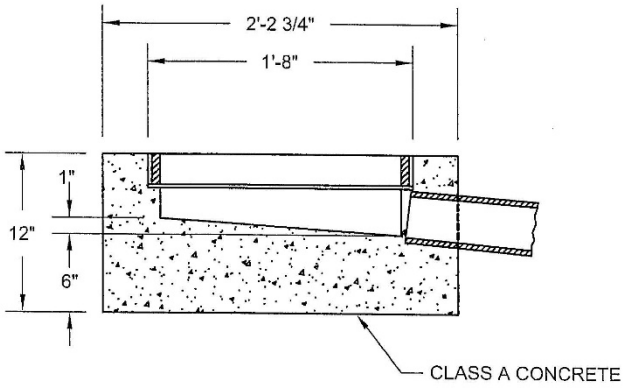
FOR PROPERTY LINE

STORM DRAIN INLET & CLEAN-OUT

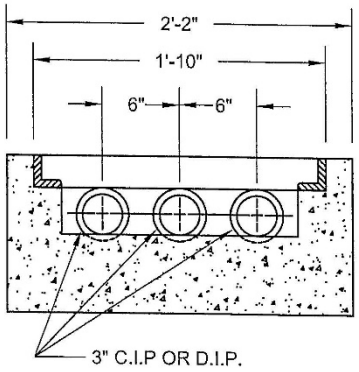
FILE NO. B-9



PLAN



SECTION A-A



SECTION B-B

NOTE:

1. DRAINS TO BE MAINTAINED BY DEVELOPER / PROPERTY OWNER.
2. SEE DETAILS B-11 AND B-12.

Revision	Date	Approved
Drawn : QT	Date : 08-11-16	
Checked :	Scale : NTS	

REGISTERED PROFESSIONAL ENGINEER — JACQUELINE ANDREWS SOLOMON — No. 57093 — CIVIL — STATE OF CALIFORNIA

APPROVED BY: Jacqueline A Solomon

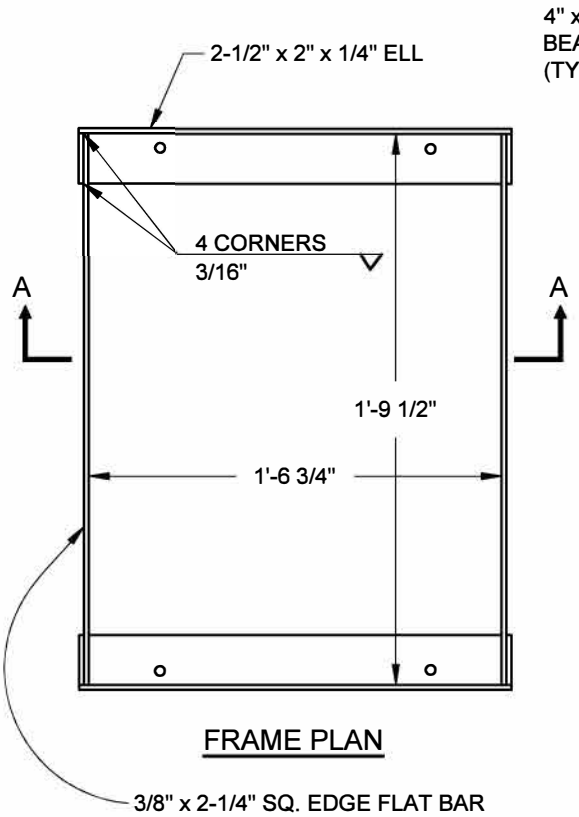
08-11-16 DATE | 12-31-17 EXP. | 57093 R.C.E. NO.

CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

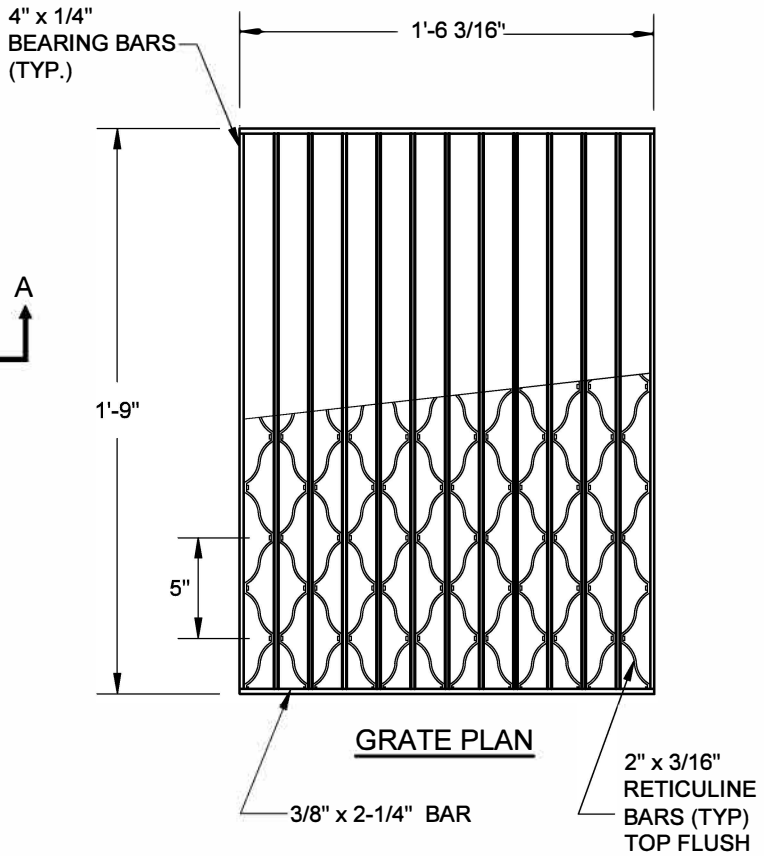
STORM

CURB DRAIN

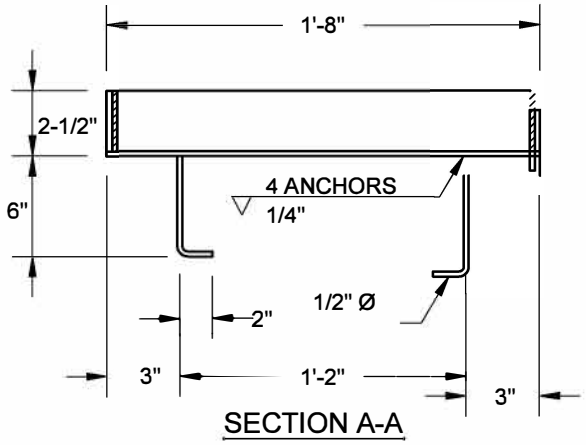
FILE NO. B-10



FRAME PLAN



GRATE PLAN



SECTION A-A

NOTES

1. FRAME AND GRATE TO BE MADE OF CARBON STEEL.
2. ALL SURFACES TO BE GALVANIZED AFTER FABRICATION.
3. PLACE GRATE BEARING BARS PARALLEL TO CENTERLINE OF OUTLET PIPE.
4. FASTEN GRATE TO FRAME AT CORNERS WITH REMOVABLE CLIPS.
5. INSTALL ALUMINUM DISK "NO DUMPING - DRAINS TO BAY".
6. CONTRACTOR SHALL FIELD VERIFY DIMENSIONS AND FURNISH CUSTOMIZED RETICULINE GRATES TO FIT EXISTING STORM FRAMES AND GRATES WITHOUT ROCKING.
7. SEE DETAILS B-10 AND B-12.

Revision	Date	Approved

Drawn : AR | Date : 07-21-26

Checked : TT | Scale : NTS

APPROVED BY:

ASSISTANT PUBLIC WORKS DIRECTOR

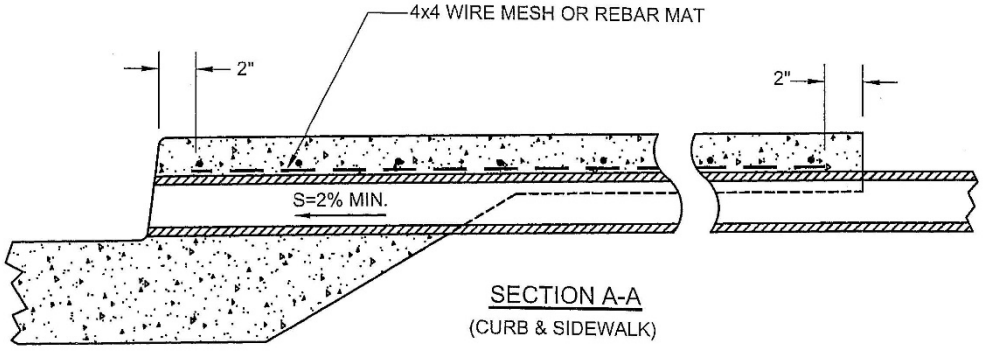
08-21-2026 DATE | 06-30-28 EXP. | 60299 R.C.E. NO.

REGISTERED PROFESSIONAL ENGINEER EDWARD ARANGUREN C 60299 STATE OF CALIFORNIA

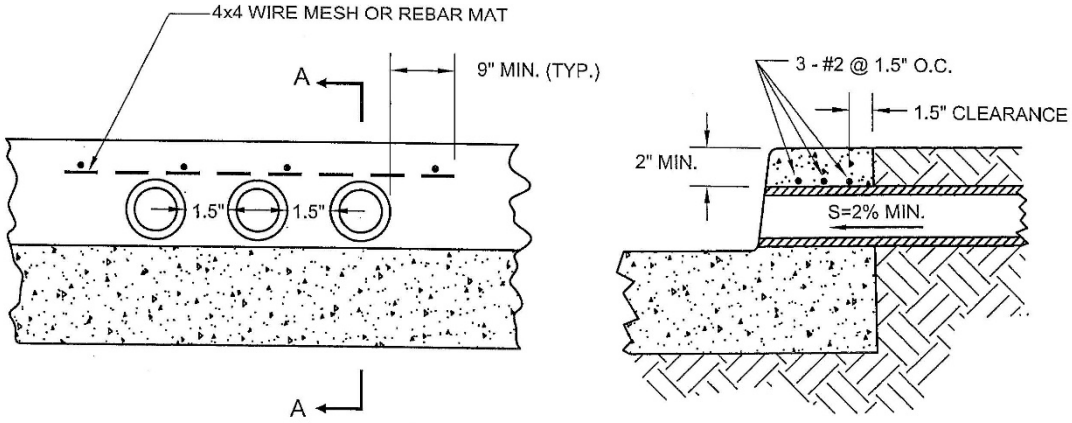
CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

STORM FRAME & GRATE
FOR FACE OF CURB DRAIN INLET

FILE NO. B-11



SECTION A-A
(CURB & SIDEWALK)



SECTION A-A
(CURB ONLY)

NOTES:

1. 0.5" MIN. BETWEEN PIPE FL AND GUTTER FL
2. PIPE SHALL BE 3" C.I.P. OR D.I.P.
3. MIN. OF TWO PIPES AND MAX. OF THREE PIPES.
4. SEE DETAIL B-10.

Revision	Date	Approved
Drawn : QT	Date : 08-11-16	
Checked : LA	Scale : NTS	

APPROVED BY: No. 57093 REGISTERED PROFESSIONAL ENGINEER JACQUELINE ANDREWS CAZALOMON CIVIL STATE OF CALIFORNIA

Jacqueline Cazalomon

08-11-16 DATE | 12-31-17 EXP. | 57093 R.C.E. NO.

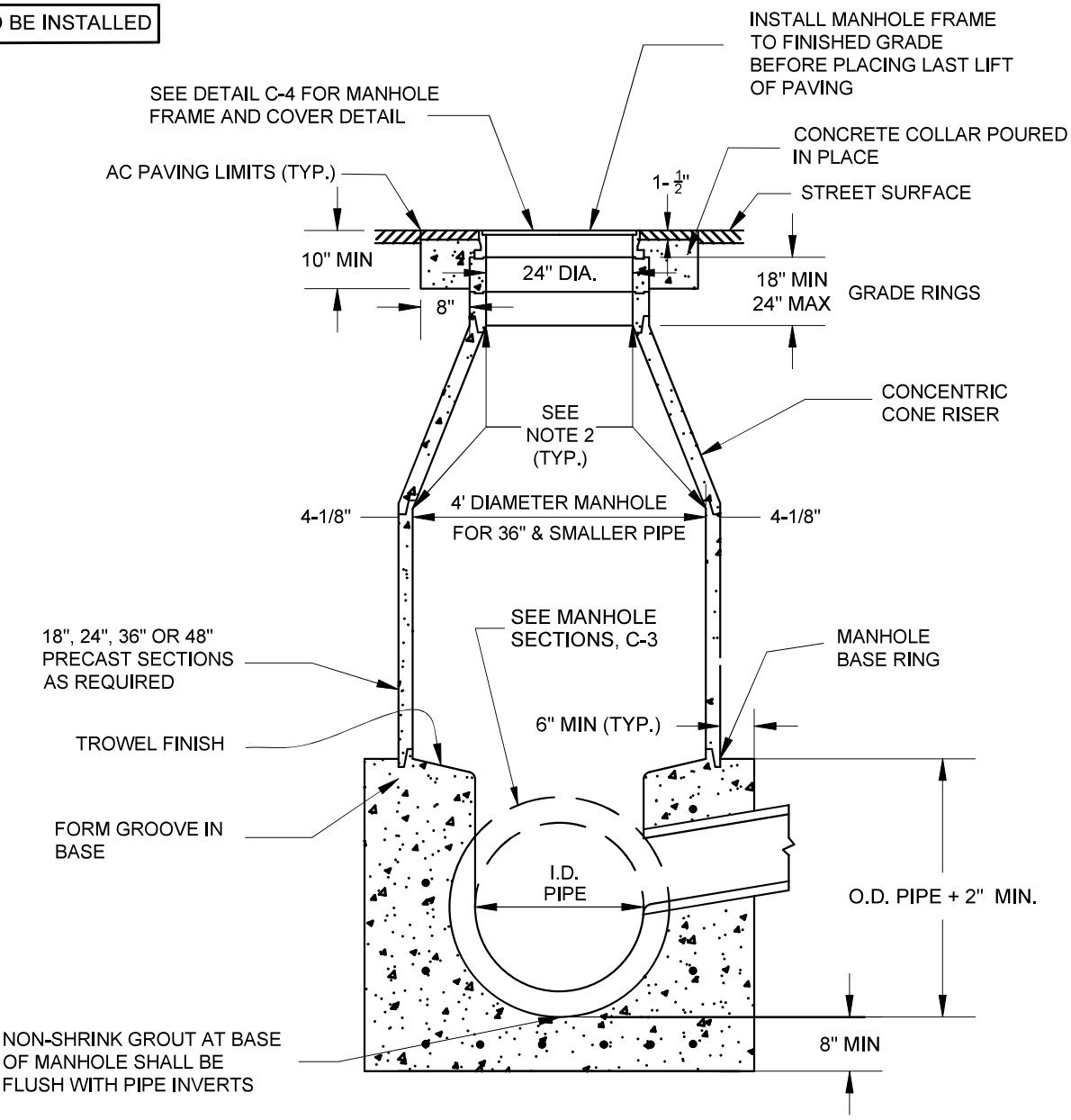
CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

STORM

FACE OF CURB OUTLET

FILE NO. B-12

NO STEP TO BE INSTALLED



NOTES:

1. LAY PIPE THROUGH BOTTOM OF MANHOLES. AFTER CONCRETE IN BASE HAS SET, REMOVE PORTION OF PIPE INDICATED WITH DASHED LINES.
2. INSTALL RAM-NEK JOINT TAPE OR APPROVED EQUAL AT ALL JOINTS.
3. MORTAR ALL JOINTS WITH A SMOOTH FINISH.
4. INVERT OF INCOMING PIPE SHOULD BE AT SPRINGLINE OR ABOVE; OR MATCH CROWNS.

Revision	Date	Approved

Drawn : AR
Date : 07-21-26
Checked : TT
Scale : NTS

APPROVED BY:

ASSISTANT PUBLIC WORKS DIRECTOR

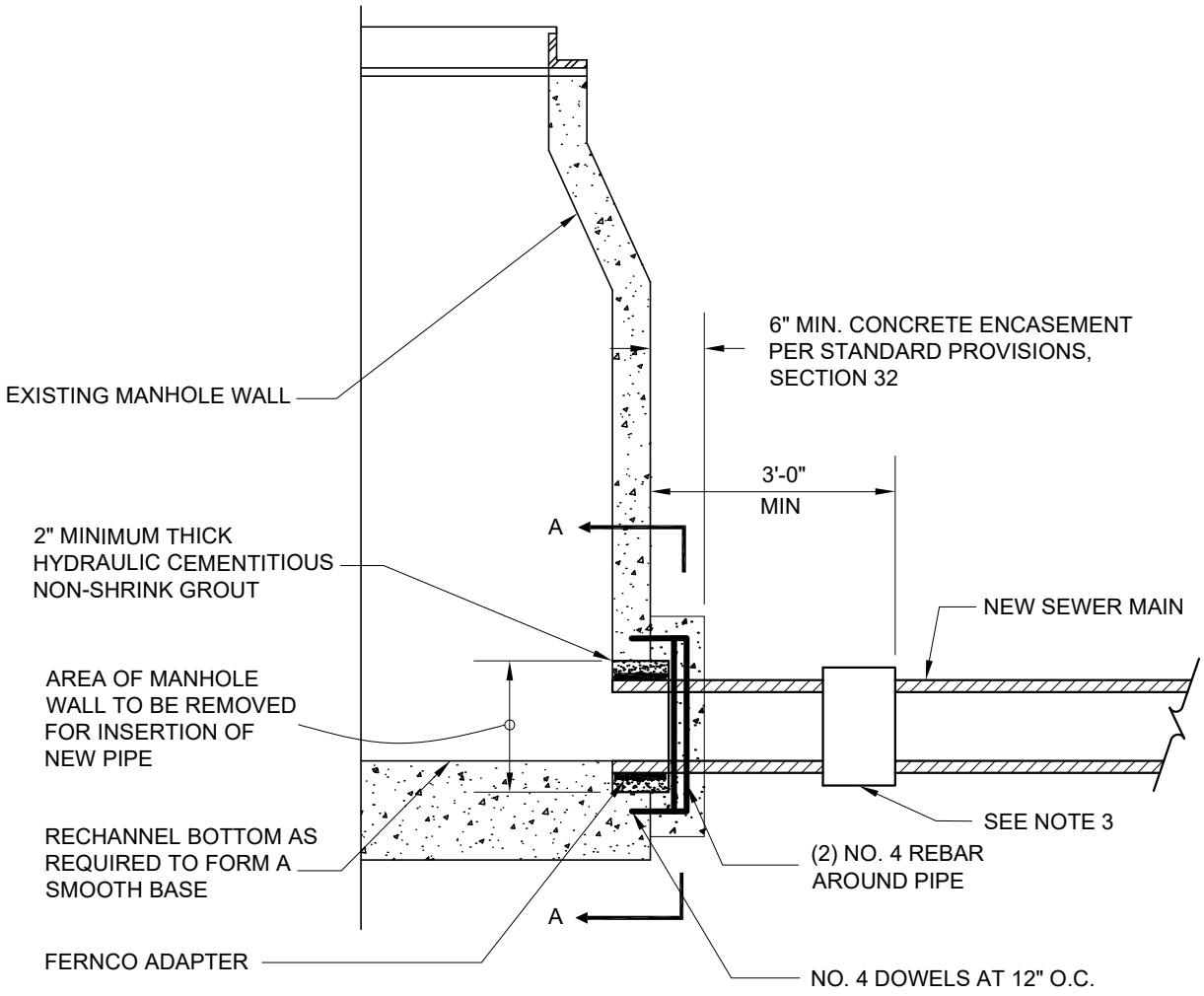
08-21-2026 DATE | 06-30-28 EXP. | 60299 R.C.E. NO.

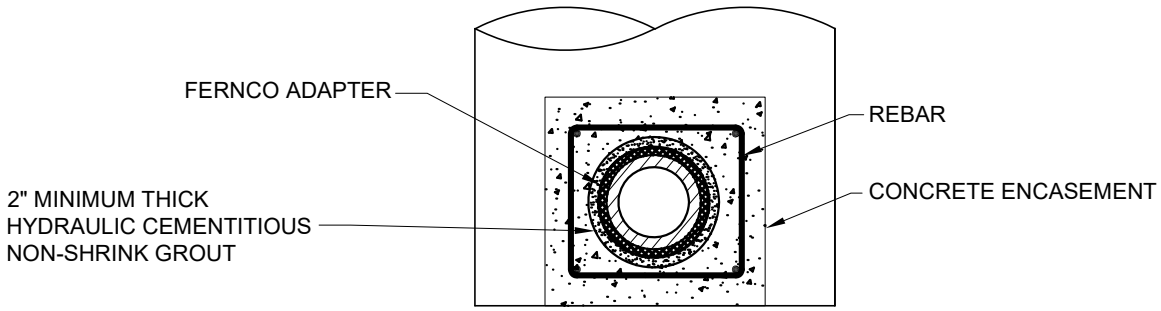
REGISTERED PROFESSIONAL ENGINEER EDWARD A RANKIN C 60299 CIVIL STATE OF CALIFORNIA

CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

SANITARY SEWER MANHOLE
FOR 36" AND SMALLER DIAMETER PIPES

FILE NO. C-1





A - A

NOTES:

1. NEW PIPE INVERT SHALL BE FLUSHED WITH BASE OF MANHOLE
2. MAKE SMOOTH GROUT FINISH AROUND PIPE END AND INTERIOR WALL. GROUT END OF DOWELS THAT PENETRATE MANHOLE INTERIOR.
3. USE FULL PIPE SECTION WHEN CONNECTING TO MANHOLE. IF JOINT TO EXISTING PIPE IS NECESSARY OR REQUIRED BY CITY, USE ELECTRO FUSION COUPLING, FLEX COUPLING WITH SHEAR BAND, OR PVC REPAIR COUPLING.

Revision	Date	Approved

Drawn : AR
Date : 07-21-26
Checked : TT
Scale : NTS

APPROVED BY:

ASSISTANT PUBLIC WORKS DIRECTOR

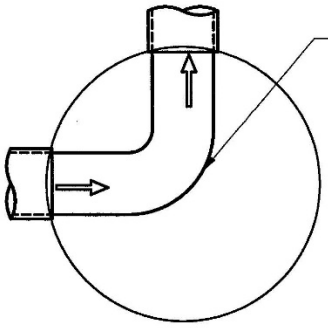
08-21-2026 DATE | 06-30-28 EXP. | 60299 R.C.E. NO.

REGISTERED PROFESSIONAL ENGINEER EDWARD ARANGO C 60299 CIVIL STATE OF CALIFORNIA

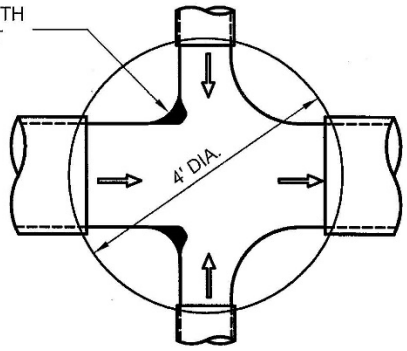
CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

NEW SEWER MAIN CONNECTION TO EXISTING MANHOLE

FILE NO. C-2



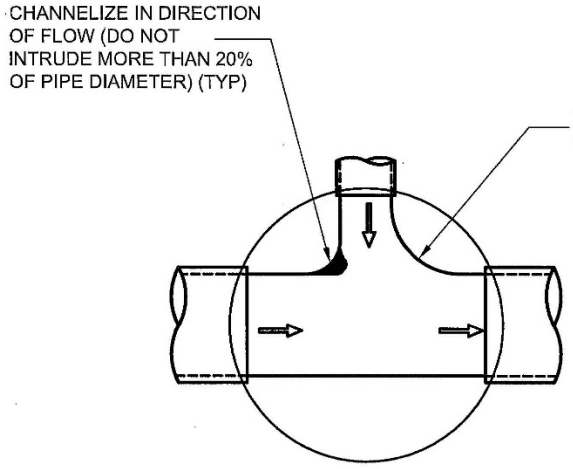
TYPICAL CURVED MANHOLE



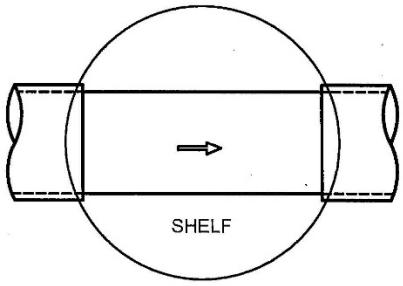
TYPICAL MANHOLE
WITH 2 BRANCHES

NOTE:

THE TOP HALF OF THE PIPE SHALL BE REMOVED TO THE CONTOUR OF THE INSIDE OF MANHOLE & THE BROKEN EDGES SHALL BE PLASTERED SMOOTH WITH CEMENT GROUT TYPICAL FOR ALL MANHOLE AS SPECIFIED.



TYPICAL MANHOLE
WITH 1 BRANCH



TYPICAL STRAIGHT
THROUGH MANHOLE

Revision	Date	Approved
Drawn : QT	Date : 11-22-13	
Checked : LA	Scale : NTS	

APPROVED BY:

Jacqueline CA Solomon

ASSISTANT PUBLIC WORKS DIRECTOR

01-08-14 DATE | 12-31-2015 EXP. | 57093 R.C.E. NO.

CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

SANITARY SEWER
MANHOLE SECTIONS

FILE NO. C-3

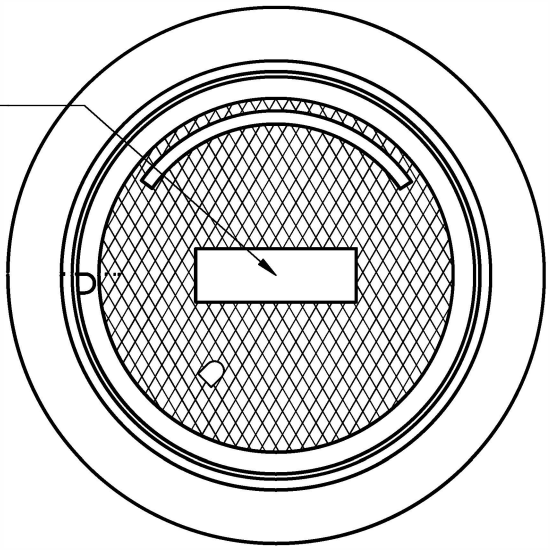
FOR MANHOLES IN PUBLIC RIGHT-OF-WAY
OR PUBLIC EASEMENT:

CITY OF
MOUNTAIN VIEW
SANITARY SEWER

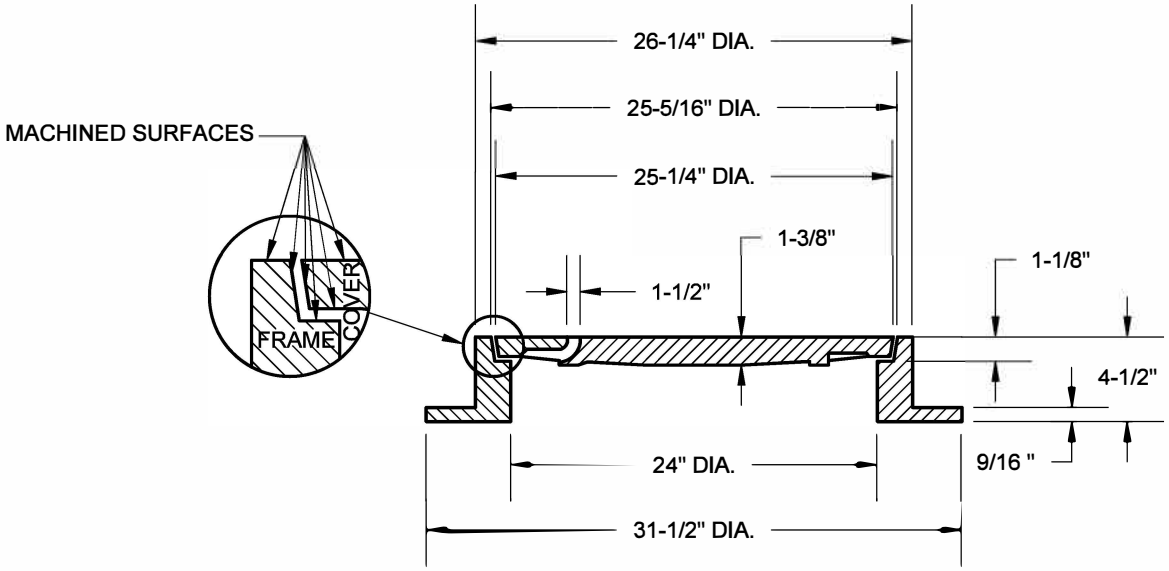
OR

FOR MANHOLES IN OTHER LOCATIONS:

SANITARY SEWER



PLAN - FRAME & COVER



SECTION - FRAME & COVER

NOTES:

1. WHEN THERE IS A NEED TO RAISE MANHOLE COVERS TO MEET NEW GRADE, ADDITIONAL MANHOLE RINGS MAY BE ADDED IN ACCORDANCE WITH PROJECT TECHNICAL SPECIFICATIONS
2. FRAME AND COVER SHALL BE PHOENIX IRON WORKS #P-1090 OR APPROVED EQUAL.

Revision	Date	Approved
Drawn : AR	Date : 07-21-26	
Checked : TT	Scale : NTS	

APPROVED BY:

ASSISTANT PUBLIC WORKS DIRECTOR

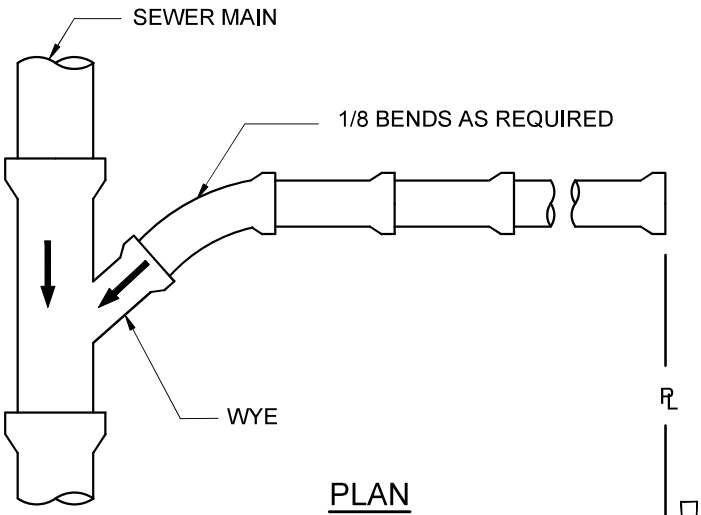
08-21-2026 DATE | 06-30-28 EXP. | 60299 R.C.E. NO.

REGISTERED PROFESSIONAL ENGINEER EDWARD A RAYNOR C 60299 CIVIL STATE OF CALIFORNIA

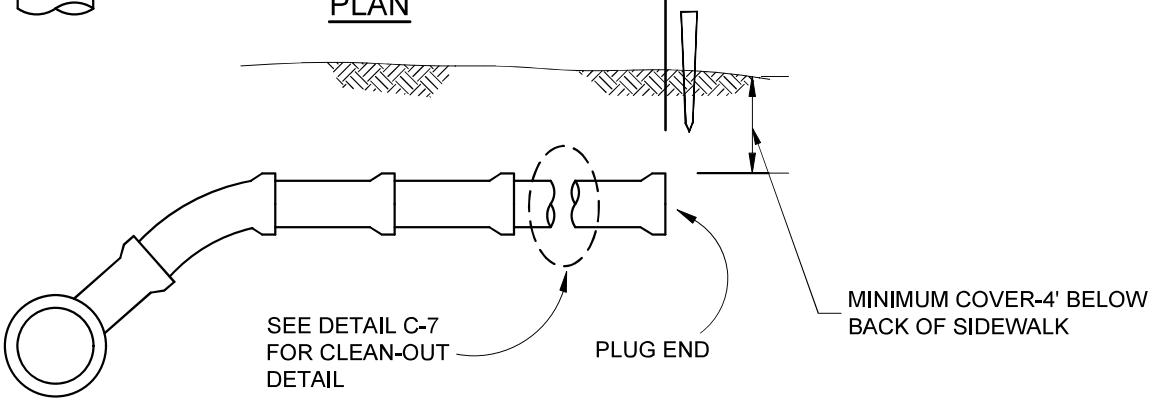
CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

SANITARY SEWER MANHOLE
FRAME AND COVER

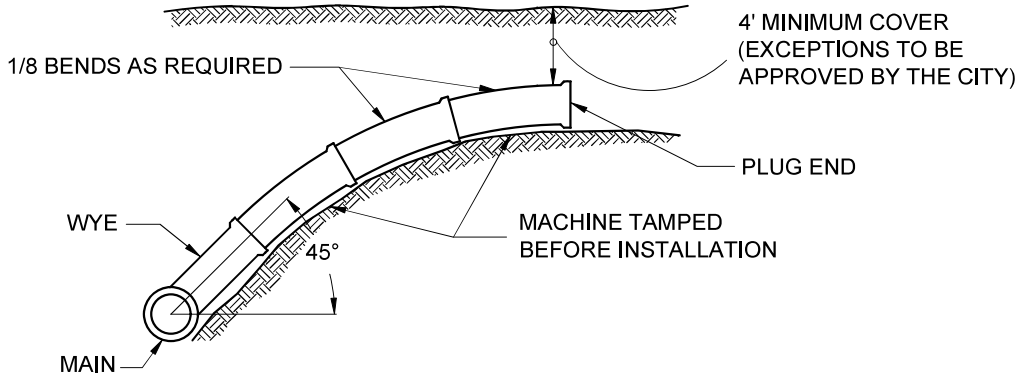
FILE NO. C-4



PLAN



ELEVATION



NOTES:

1. PVC (SDR 26), HDPE (SDR17), OR APPROVED EQUAL.
2. STAMP "S" IN CURB FACE TO SHOW LOCATION OF LATERAL.
   IN LOCATIONS WHERE THE CURB CAN NOT BE STAMPED, A 2" x 2" x 3' REDWOOD STAKE SHALL BE SET 6" ABOVE GROUND IF PROJECTION IS NOT DANGEROUS OR OBJECTIONABLE.
3. MINIMUM SLOPE OF LATERAL SHALL BE 1/4" PER 12" OR 2%.

DEEP SEWER RISER

DEEP SEWER RISER SHALL BE CONSTRUCTED WHEN DEPTH OR SEWER FLOW LINE EXCEEDS 10' BELOW CROWN OF STREET.

Revision	Date	Approved

Drawn : AR
Date : 07-21-26
Checked : TT
Scale : NTS

APPROVED BY:

ASSISTANT PUBLIC WORKS DIRECTOR

08-21-2026 DATE | 06-30-28 EXP. | 60299 R.C.E. NO.

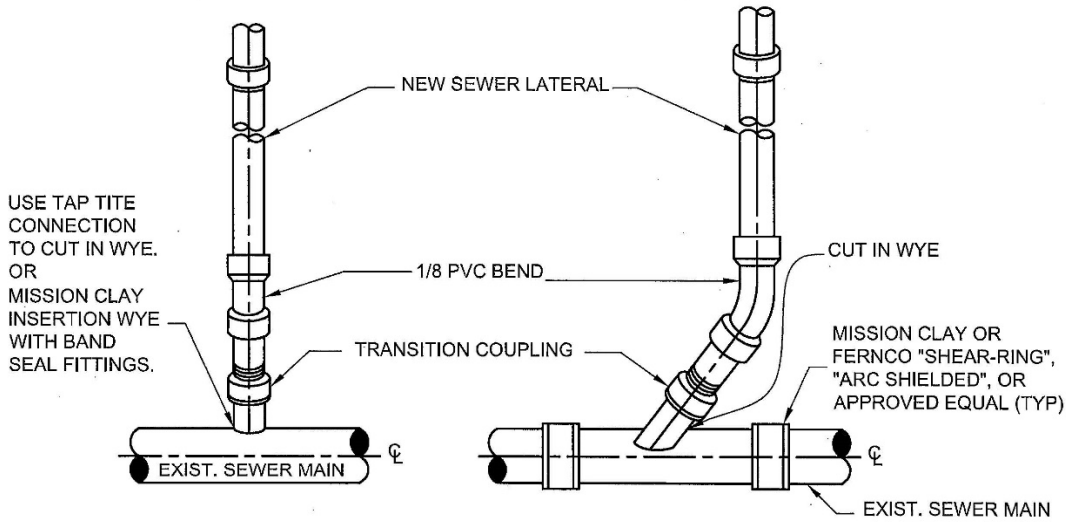
REGISTERED PROFESSIONAL ENGINEER EDWARD ARANGO C 60299 CIVIL STATE OF CALIFORNIA

CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

SEWER LATERAL AND

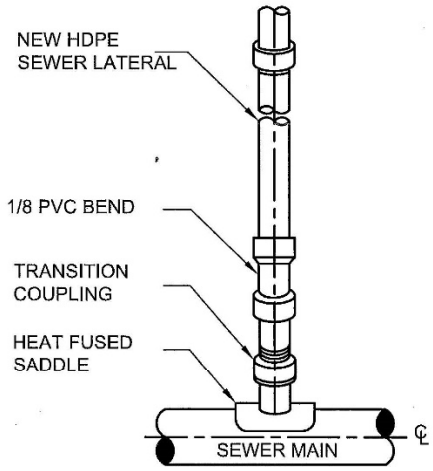
DEEP SEWER RISER

FILE NO. C-5



DETAIL A:
NEW LATERAL INTO EXIST. SEWER MAIN

DETAIL B:
NEW LATERAL INTO EXIST. SEWER MAIN



DETAIL C:
NEW HDPE LATERAL INTO HDPE SEWER MAIN

NOTES:

1. ONLY NEW HDPE LATERAL TO HDPE MAIN IS FUSED.
2. USE TAPTITE CONNECTIONS FOR NEW < 8" Ø LATERALS TO EXIST. MAIN.
3. WYE CONNECTION CAN BE USED FOR EXIST SEWER MAIN ≤ 15" Ø OR UPON ENGINEERS APPROVAL.

Revision	Date	Approved
Drawn: HN	Date: 11-22-13	
Checked: LA	Scale: NTS	

APPROVED BY: Jacqueline CA Solomon

REGISTERED PROFESSIONAL ENGINEER — JACQUELINE ANDREWS SOLOMON — No. 57093 — CIVIL — STATE OF CALIFORNIA

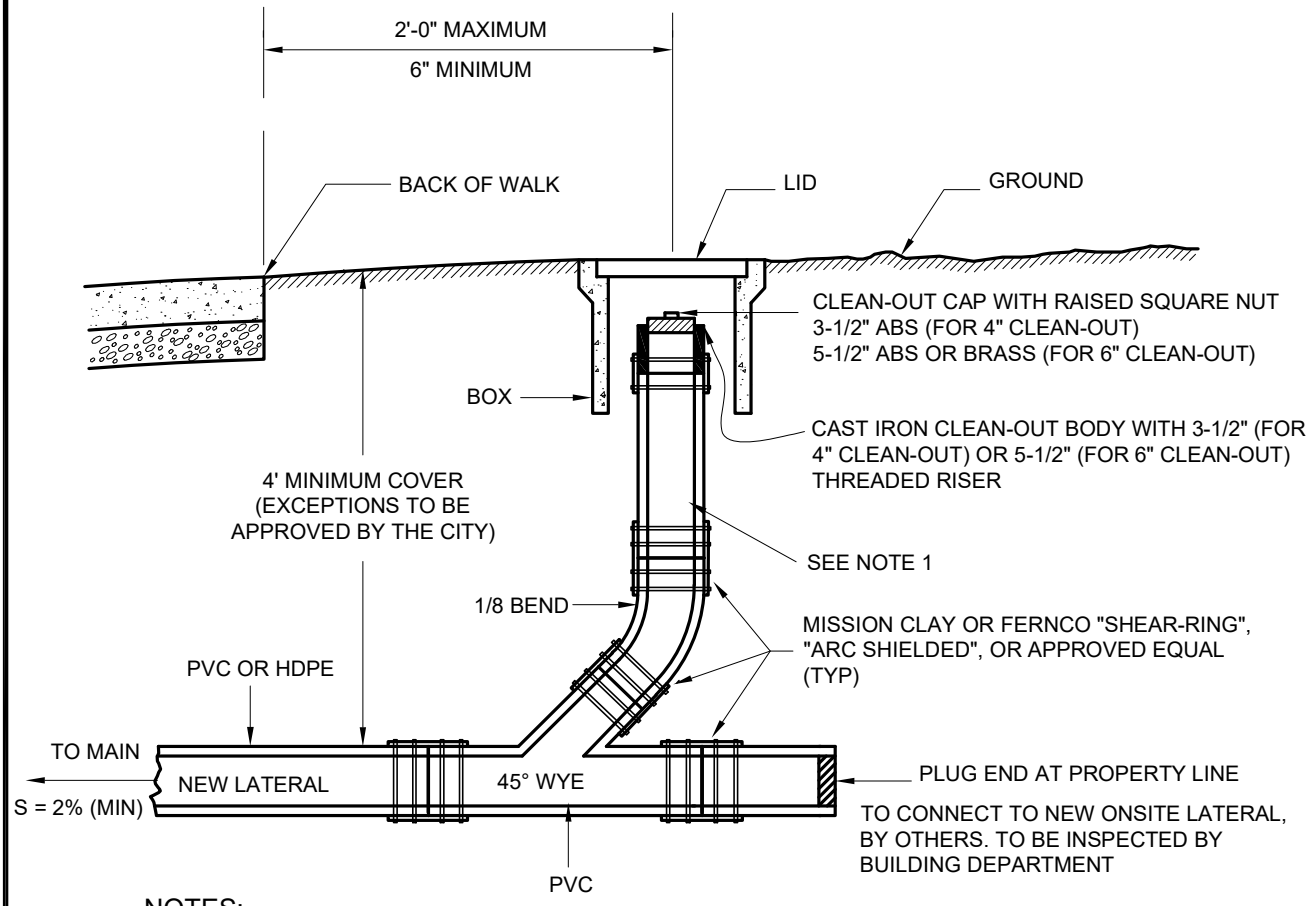
01-08-14 DATE | 12-31-15 EXP | 57093 R.C.E. NO.

CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

SEWER LATERAL CONNECTIONS

TO SEWER MAINS

FILE NO. C-6



NOTES:

1. ALL NEW PIPING SHALL BE PVC (SDR 26), HDPE (SDR 17), OR APPROVED EQUAL UNLESS OTHERWISE NOTED. PIPE TO BE SAME I.D. AND MATERIAL AS LATERAL.
2. WHERE THERE ARE NO FRONTAGE IMPROVEMENTS, INSTALL CLEAN-OUT AT PROPERTY LINE.
3. ALL CLEAN-OUT BOXES SHALL BE CHRISTY CONCRETE PRODUCTS MANUFACTURED BY OLDCASTLE PRECAST, INC. WITH THE FOLLOWING MODEL NUMBERS:

	4" RISER		6" RISER	
	NON-TRAFFIC	TRAFFIC	NON-TRAFFIC	TRAFFIC
BOX	F08	G05T	G05T	G05T
LID	F08C	G05C	G05C	G05C

4. LIDS SHALL BE MARKED "SEWER".
5. STAMP OR GRIND FACE OF CURB WITH "S" WHERE LATERAL PASSES UNDER CURB, IF NOT PRESENT.
6. PLUG END AT PROPERTY LINE IF THERE IS NO ON-SITE LATERAL.
7. 1/8 BEND MAY BE PART OF 45° WYE IF APPROVED BY CITY.

Revision	Date	Approved
Drawn : AR	Date : 07-21-26	
Checked : TT	Scale : NTS	

APPROVED BY:

ASSISTANT PUBLIC WORKS DIRECTOR

08-21-2026 DATE | 06-30-28 EXP. | 60299 R.C.E. NO.

REGISTERED PROFESSIONAL ENGINEER EDWARD ARAKELIAN C 60299 STATE OF CALIFORNIA CIVIL

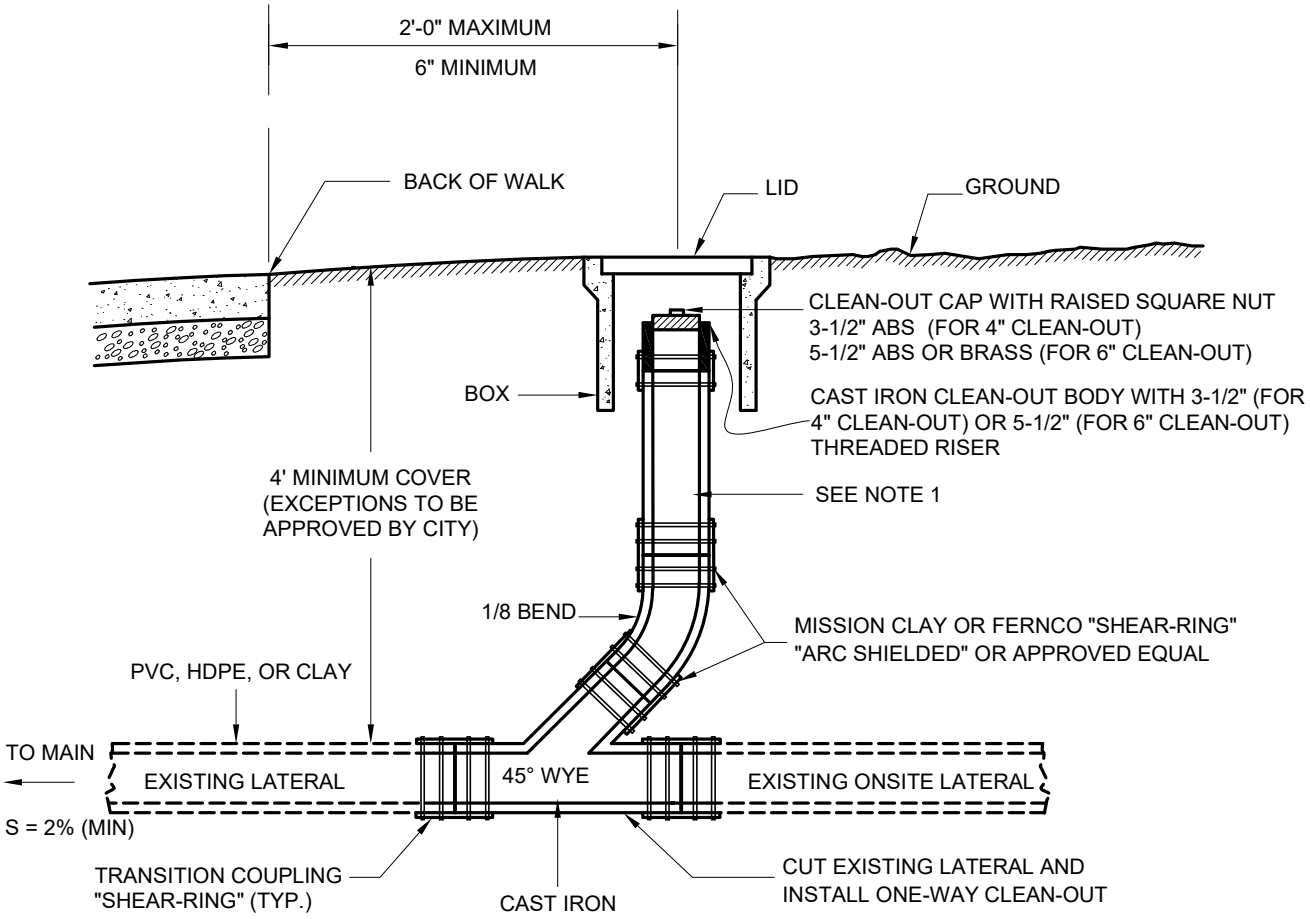
CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

SEWER LATERAL CLEAN-OUT

NEW

4" AND 6" LATERALS

FILE NO. C-7



NOTES:

1. ALL NEW PIPING SHALL BE PVC (SDR 26), HDPE (SDR 17), OR APPROVED EQUAL UNLESS OTHERWISE NOTED. PIPE TO BE SAME I.D. AND MATERIAL AS LATERAL. CLEAN-OUT SIZE SHALL MATCH DOWN STREAM LATERAL.
2. WHERE THERE ARE NO FRONTAGE IMPROVEMENTS, INSTALL CLEAN-OUT AT PROPERTY LINE.
3. ALL CLEAN-OUT BOXES SHALL BE CHRISTY CONCRETE PRODUCTS MANUFACTURED BY OLDCASTLE PRECAST, INC. WITH THE FOLLOWING MODEL NUMBERS:

	4" RISER		6" RISER	
	NON-TRAFFIC	TRAFFIC	NON-TRAFFIC	TRAFFIC
BOX	F08	G05T	G05T	G05T
LID	F08C	G05C	G05C	G05C

4. LIDS SHALL BE MARKED "SEWER".
5. STAMP OR GRIND FACE OF CURB WITH "S" WHERE LATERAL PASSES UNDER CURB, IF NOT PRESENT.
6. 1/8 BEND MAY BE PART OF 45° WYE IF APPROVED BY CITY.

Revision	Date	Approved
Drawn : AR	Date : 07-21-26	
Checked : TT	Scale : NTS	

APPROVED BY:

ASSISTANT PUBLIC WORKS DIRECTOR

08-21-2026 DATE | 06-30-28 EXP. | 60299 R.C.E. NO.

REGISTERED PROFESSIONAL ENGINEER EDWARD ARANGO C 60299 CIVIL STATE OF CALIFORNIA

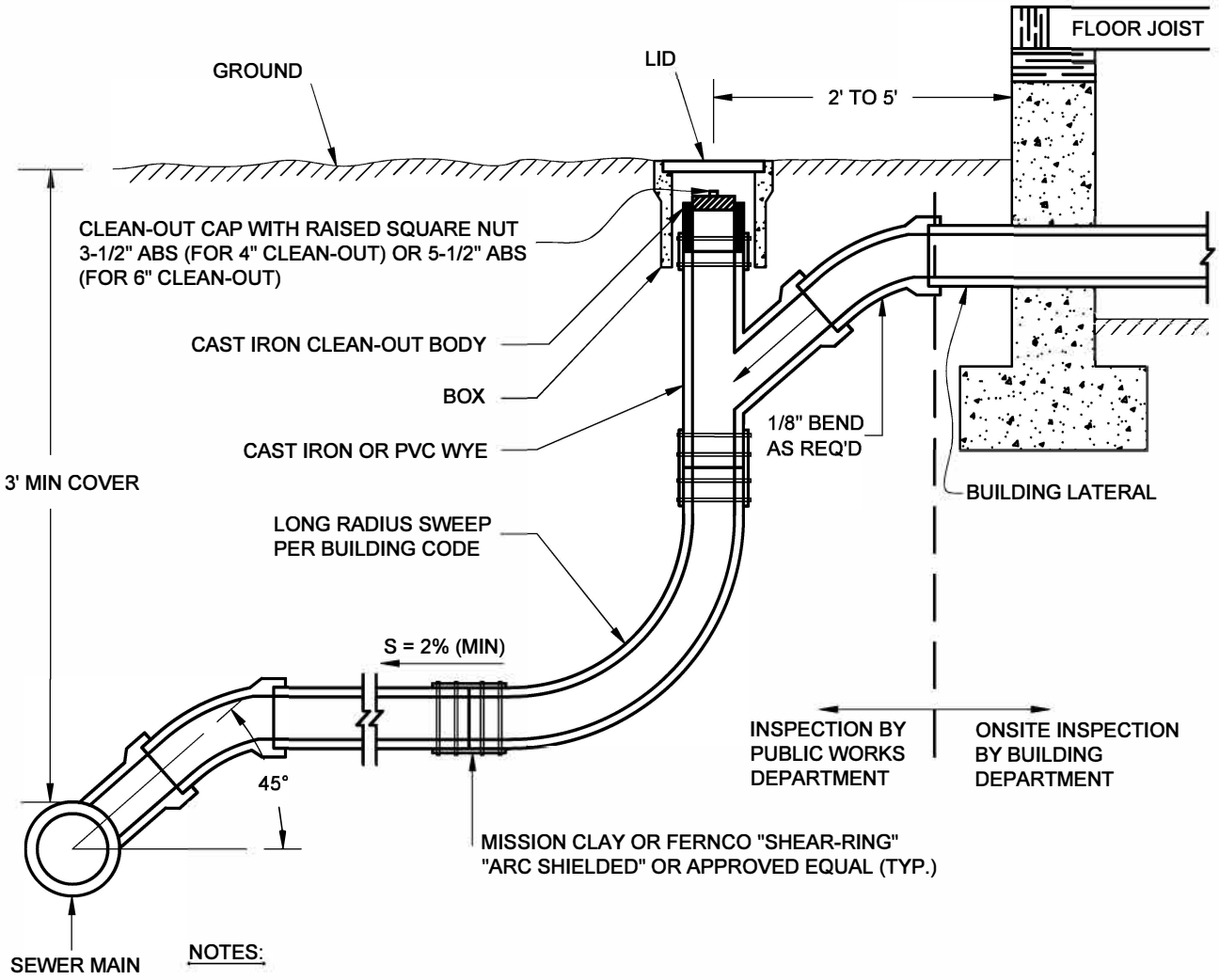
CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

SEWER LATERAL CLEAN-OUT

EXISTING

4" AND 6" LATERALS

FILE NO. C-8



NOTES:

1. DETAIL APPLIES TO TOWNHOUSE TYPE CONDOMINIUMS AND COMMON GREEN DEVELOPMENTS WITH PRIVATE SEWERS.
2. ALL CLEAN-OUT BOXES SHALL BE CHRISTY CONCRETE PRODUCTS MANUFACTURED BY OLDCASTLE PRECAST, INC. WITH THE FOLLOWING MODEL NUMBERS:

	4" RISER		6" RISER	
	NON-TRAFFIC	TRAFFIC	NON-TRAFFIC	TRAFFIC
BOX	F08	G05T	G05T	G05T
LID	F08R	G05C	G05C	G05C

3. LIDS SHALL BE MARKED "SEWER"
4. STAMP OR GRIND FACE OR TOP OF CURB WITH "S" WHERE LATERAL PASSES UNDER CURB, IF NOT PRESENT.

Revision	Date	Approved

Drawn: AR | Date: 07-21-26
Checked: TT | Scale: NTS

APPROVED BY:

ASSISTANT PUBLIC WORKS DIRECTOR

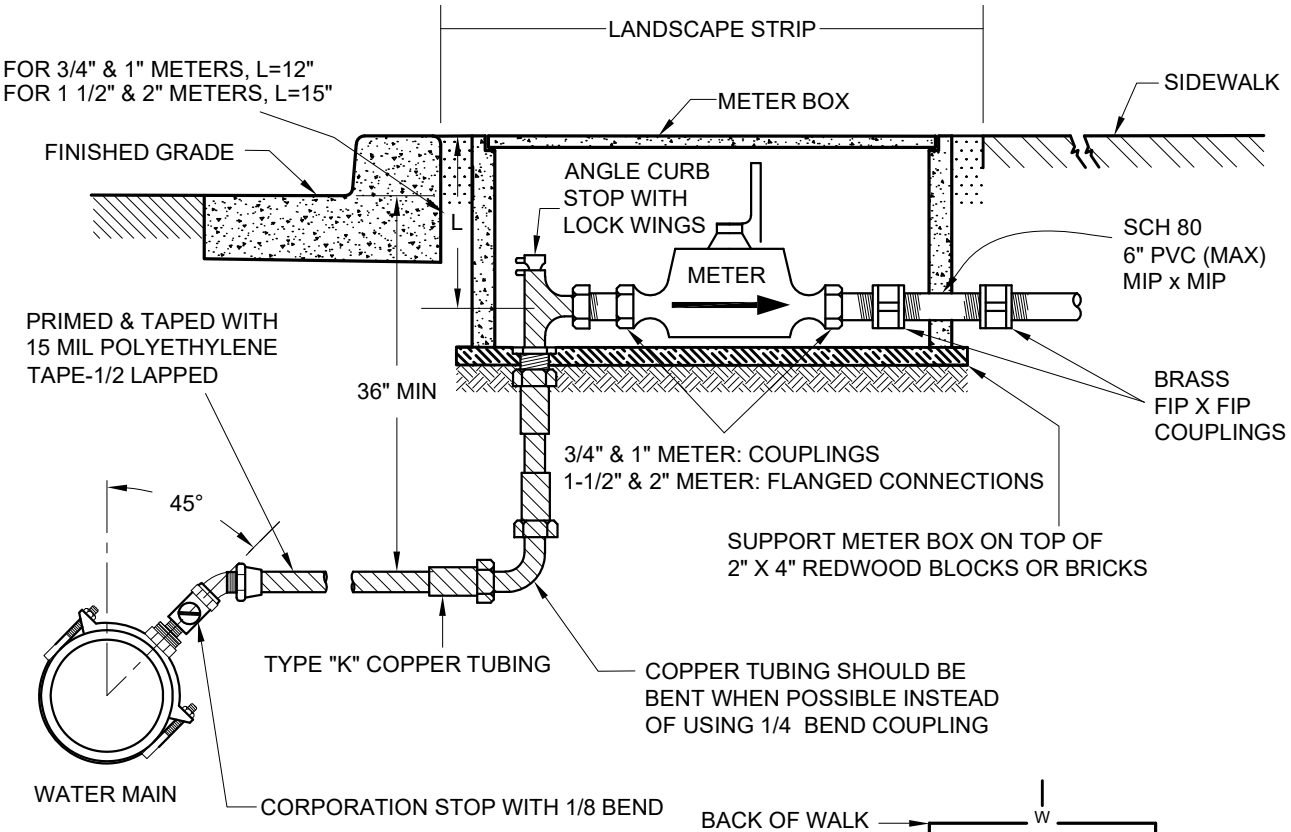
08-21-2026 DATE | 06-30-28 EXP. | 60299 R.C.E. NO.

REGISTERED PROFESSIONAL ENGINEER EDWARD A. RAY C 60299 STATE OF CALIFORNIA

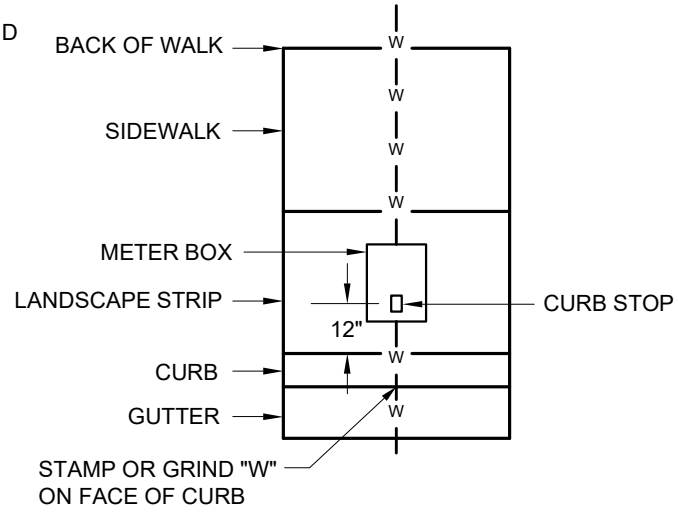
CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

SEWER SERVICE CONNECTION
FOR COMMON GREEN DEVELOPMENTS
4" AND 6" LATERALS

FILE NO. C-9



MAIN TYPE	SERVICE CONNECTION TYPE
D.I.P. & C.I.P.	STAINLESS STEEL FULL CIRCLE CLAMP WITH THREADED CORPORATION STOP TO BE USED ON ALL 1" AND 2" SERVICES. 7-1/2" WIDE BAND FOR 1" TAPS 12-1/2" WIDE BAND FOR 2" TAPS
A.C.P.	STAINLESS STEEL DOUBLE STRAP BRONZE BODY SERVICE CLAMP WITH THREADED CORPORATION STOP.
P.V.C.	SERVICE SADDLES FORD S-90 OR AS APPROVED BY ENGINEER.



LOCATE ALL METERS IN LANDSCAPE STRIP

NOTE:

1. INSTALL 1/4" PLYWOOD TO BLOCK PIPE PENETRATIONS INTO METER BOX.
2. CLEAN METER BOX OF DEBRIS. NO EARTH-TO-METER CONTACT. METER BOX LID SHALL BE AT GRADE WITH SIDEWALK
3. SEE STANDARD DETAIL D-31 FOR CATHODIC PROTECTION REQUIREMENTS, WHEN REQUIRED BY ENGINEER BASED ON LOCATION.
4. FOR NEW CONSTRUCTION, SERVICE SIZE AND WATER METER SIZE SHALL BE EQUAL.
5. FOR MONOLITHIC SIDEWALKS, LOCATE METER BEHIND WALK. CURB STOP SHALL BE NO MORE THAN 12" FROM BACK OF WALK.

Revision	Date	Approved

Drawn : AR
Date : 07-21-26
Checked : TT
Scale : NTS

APPROVED BY:

ASSISTANT PUBLIC WORKS DIRECTOR

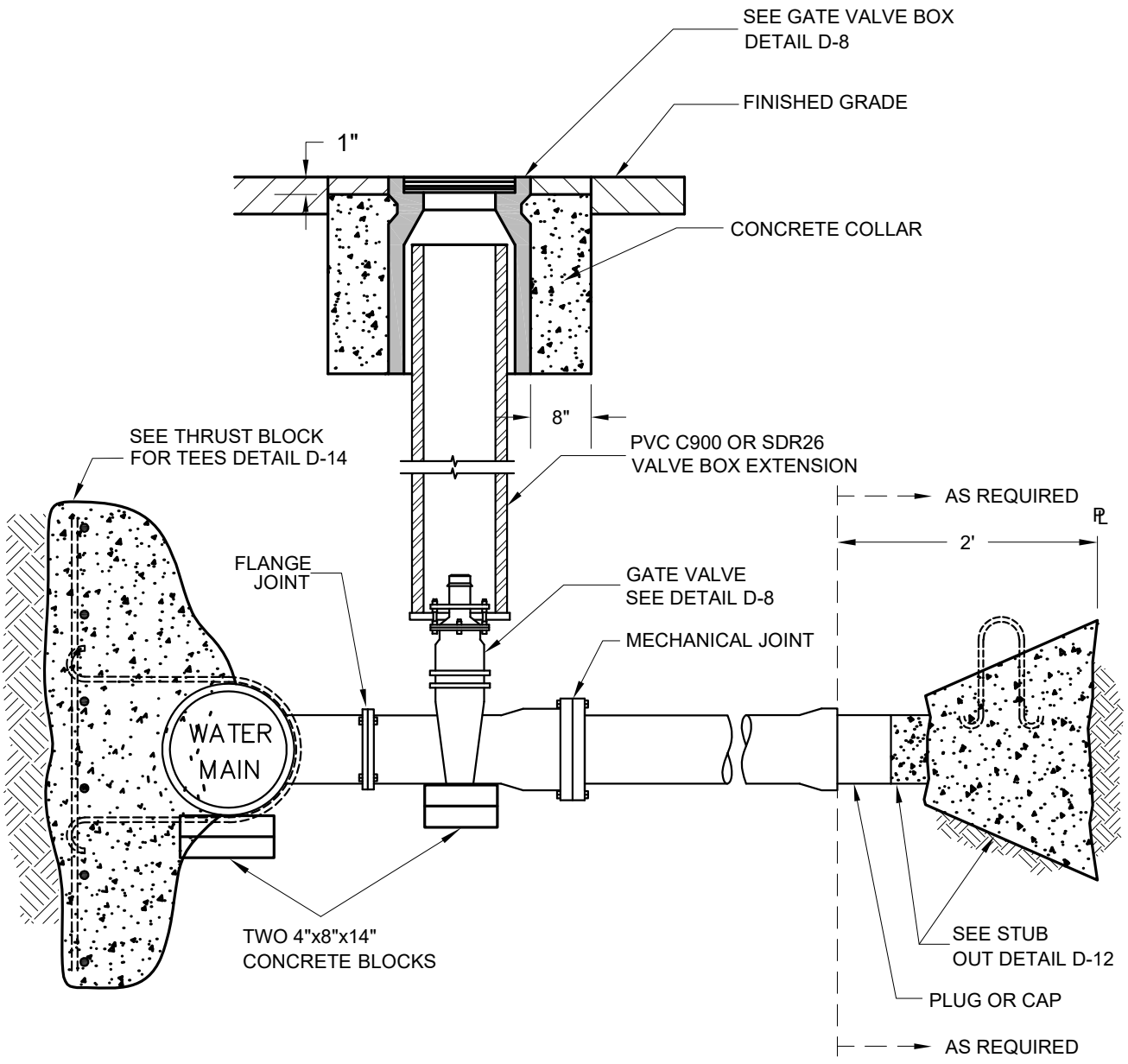
08-21-2026 DATE | 06-30-28 EXP. | 60299 R.C.E. NO.

REGISTERED PROFESSIONAL ENGINEER EDWARD ARANDA C 60299 CIVIL STATE OF CALIFORNIA

CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

1" AND 2" WATER SERVICES
WITH
3/4", 1", 1-1/2", AND 2" WATER METERS

FILE NO. D-1



NOTES:

1. CONCRETE GATE VALVE ANCHOR REQUIRED WHEN VALVE IS NOT CONNECTED BY FLANGE JOINT TO MAIN TEE.
2. WATER SERVICES TO BE AT GRADE OF WATER MAIN.
3. SERVICE RUN SHALL BE D.I.P. OR P.V.C.
4. TRACER WIRE SHALL BE INSTALLED FROM THE MAIN TO WITHIN THE METER BOX.

Revision	Date	Approved

Drawn : AR
Date : 07-21-26
Checked : TT
Scale : NTS

APPROVED BY:

ASSISTANT PUBLIC WORKS DIRECTOR

08-21-2026 DATE | 06-30-28 EXP. | 60299 R.C.E. NO.

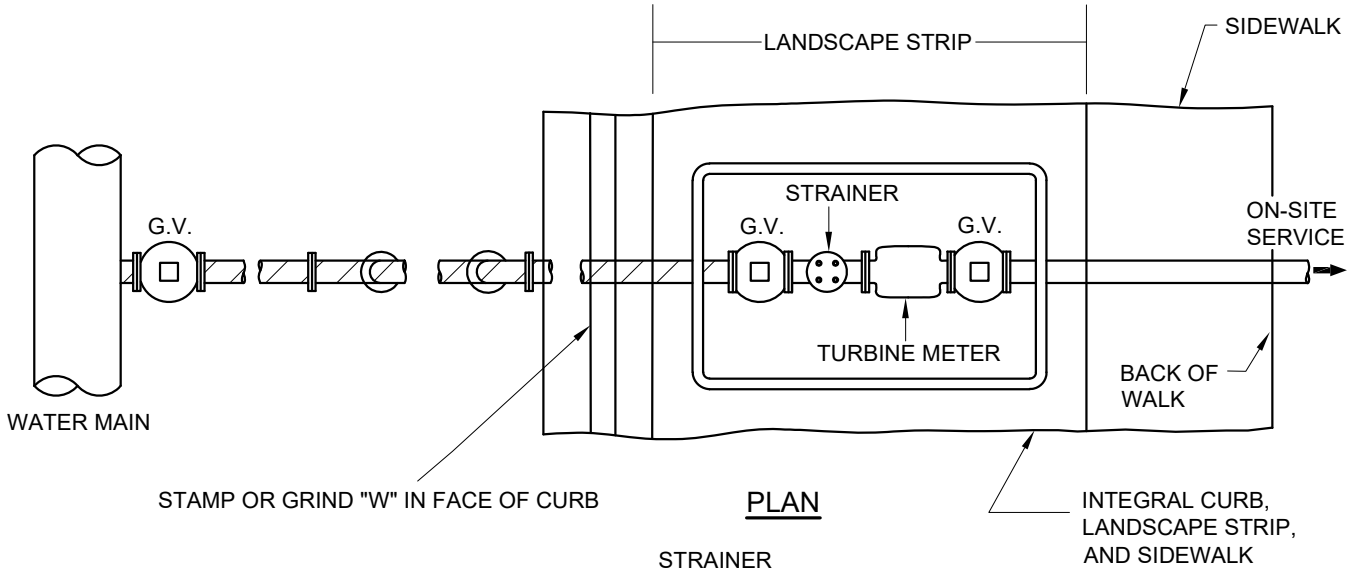
REGISTERED PROFESSIONAL ENGINEER EDWARD A. RANGEL C 60299 CIVIL STATE OF CALIFORNIA

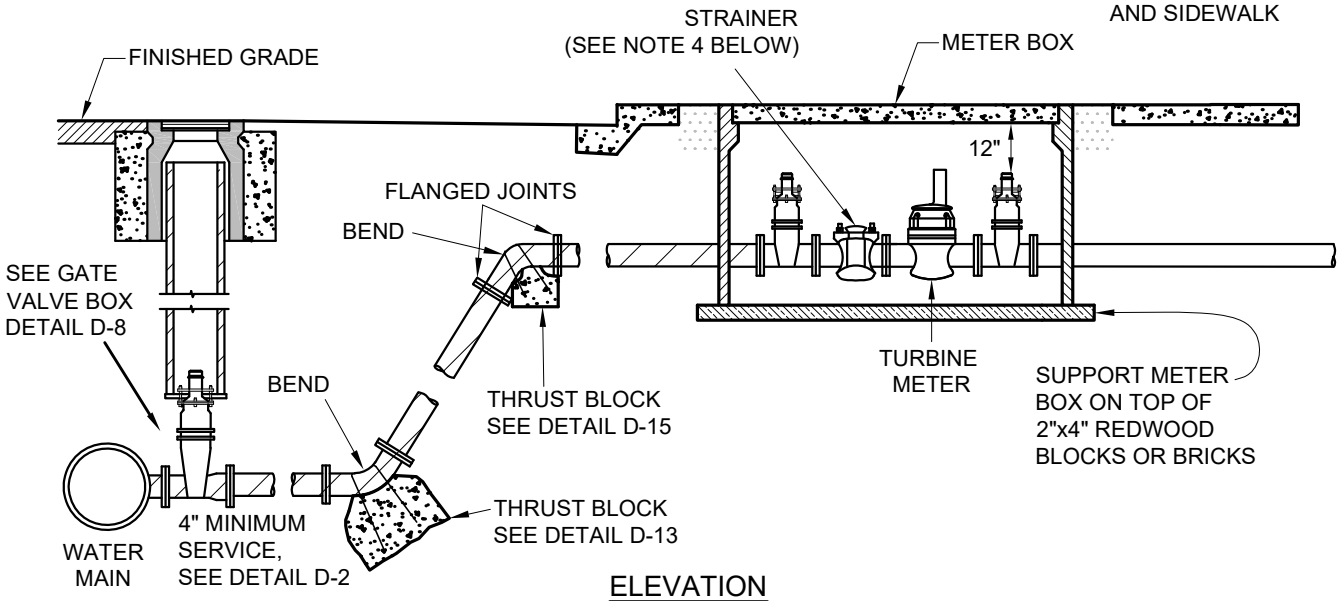
CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

WATER AND FIRE SERVICE 4" OR LARGER

WITH 3" OR LARGER METERS

FILE NO. D-2





NOTES:

1. THE METER AND METER BOX MAY BE ROTATED 90° TO COMPENSATE FOR SPACE REQUIREMENTS.
2. ALL JOINTS SHALL BE FLANGED TYPE, OR MECHANICAL TYPE JOINTS WITH RETAINER GLANDS. COAT BOLTS, NUTS AND RETAINER GLANDS WITH MASTIC COATING SOLUTION.
3. WRAP ALL METER PIPE, FITTINGS AND VALVES WITH 8 MIL POLYETHYLENE.
4. INSTALL STRAINER BEFORE METER.
5. LOCATION OF METER AND BACKFLOW TO BE DETERMINED BY CITY ENGINEER.
6. INSTALL 1/4 " PLYWOOD TO BLOCK PIPE PENETRATIONS INTO METER BOX.
7. CLEAN METER BOX OF DEBRIS. NO EARTH TO METER CONTACT.
8. SEE STANDARD DETAIL D-31A FOR CATHODIC PROTECTION REQUIREMENTS, WHEN REQUIRED BY ENGINEER BASED ON LOCATION.
9. TRACER WIRE SHALL BE INSTALLED FROM THE MAIN TO WITHIN THE METER BOX.
10. BENDS SHALL OCCUR PRIOR TO THE CURB AND GUTTER.

Revision	Date	Approved
Drawn : AR	Date : 07-21-26	
Checked : TT	Scale : NTS	

APPROVED BY:

ASSISTANT PUBLIC WORKS DIRECTOR

08-21-2026 DATE | 06-30-28 EXP. | 60299 R.C.E. NO.

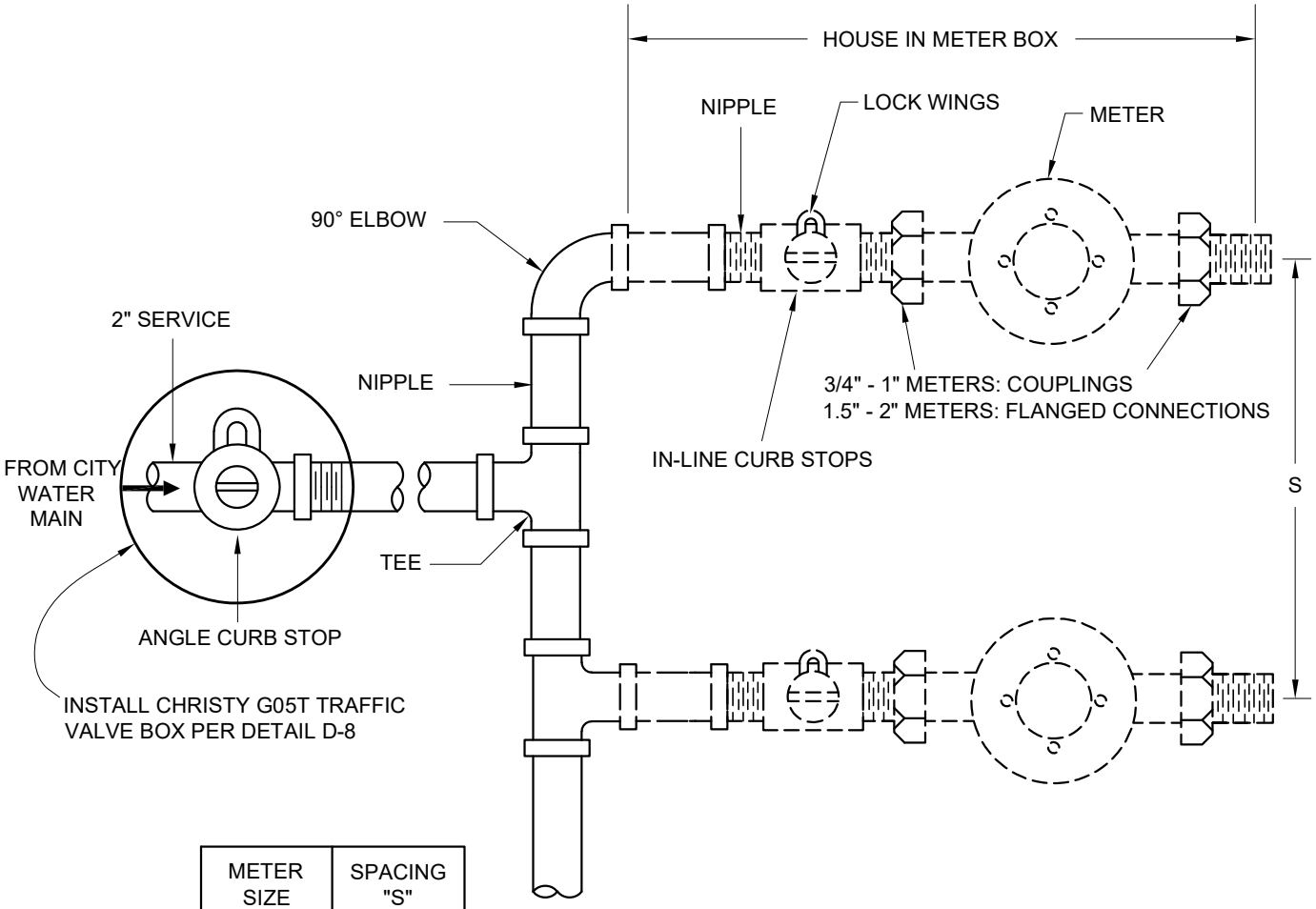
REGISTERED PROFESSIONAL ENGINEER EDWARD A. RANGEL C 60299 STATE OF CALIFORNIA

CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

3" OR LARGER WATER METER

TURBINE TYPE

FILE NO. D-3



METER SIZE	SPACING "S"
3/4"	24"
1"	24"
1 1/2"	28"

SINGLE SERVICE CONNECTING TWO METERS
(ADDITIONAL SERVICES MAYBE APPROVED BY CITY ENGINEER)

NOTES:

1. ALL MANIFOLD NIPPLES, FITTINGS, AND PIPE MATERIALS SHALL BE BRASS WITH I.P. THREADS.
2. USE SEPARATE BOX FOR EACH METER. INSTALL SERVICE PER DETAIL D-1
3. FINAL PIPE CONFIGURATION TO BE DETERMINED BY CITY ENGINEER.
4. ALL REDUCTIONS SHALL OCCUR BETWEEN THE 2" ANGLE CURB STOP AND IN-LINE CURB STOPS

Revision	Date	Approved

Drawn : AR
Date : 07-21-26
Checked : TT
Scale : NTS

APPROVED BY:

ASSISTANT PUBLIC WORKS DIRECTOR

08-21-2026 DATE | 06-30-28 EXP. | 60299 R.C.E. NO.

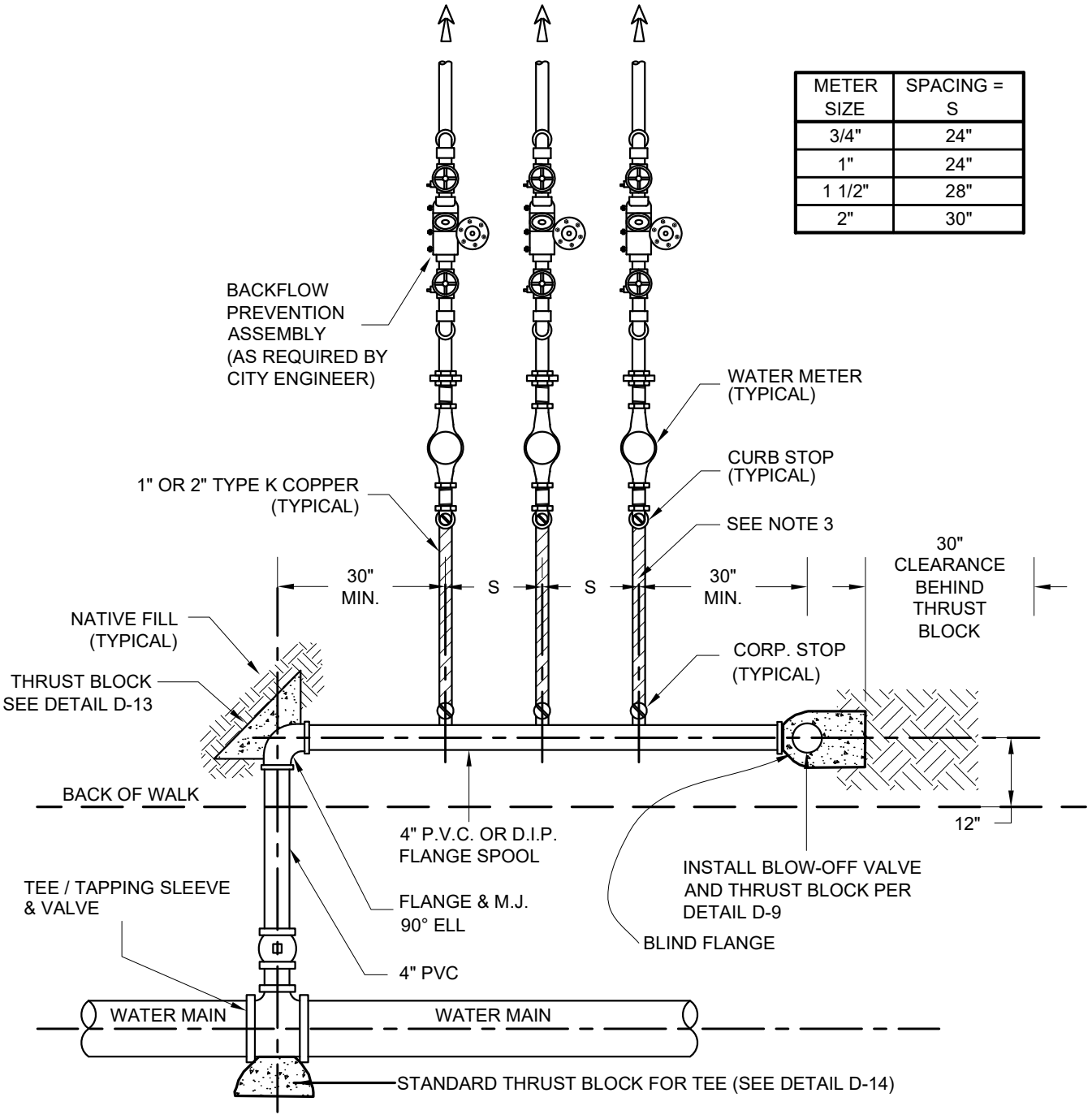
REGISTERED PROFESSIONAL ENGINEER EDWARD A. RANGEL C 60299 STATE OF CALIFORNIA

CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

MULTIPLE WATER METER INSTALLATION

2" SERVICE AND MANIFOLD

FILE NO. D-3A



METER SIZE	SPACING = S
3/4"	24"
1"	24"
1 1/2"	28"
2"	30"

NOTES:

1. USE OF THIS DETAIL AND FINAL PIPE CONFIGURATION REQUIRE APPROVAL OF CITY ENGINEER.
2. WHEN IRRIGATION SERVICE IS USED, IT SHALL BE LAST SERVICE.
3. PRIME & TAPE PIPE WITH 15 MIL POLYETHYLENE TAPE - 1/2 LAPPED (TYPICAL).
4. STAMP OR GRIND "W" AT FACE OF CURB.
5. SEE DETAIL D-1 FOR WATER METER SERVICE INSTALLATION DETAILS.

Revision	Date	Approved
Drawn : AR	Date : 07-21-26	
Checked : TT	Scale : NTS	

APPROVED BY:

ASSISTANT PUBLIC WORKS DIRECTOR

08-21-2026 DATE | 06-30-28 EXP. | 60299 R.C.E. NO.

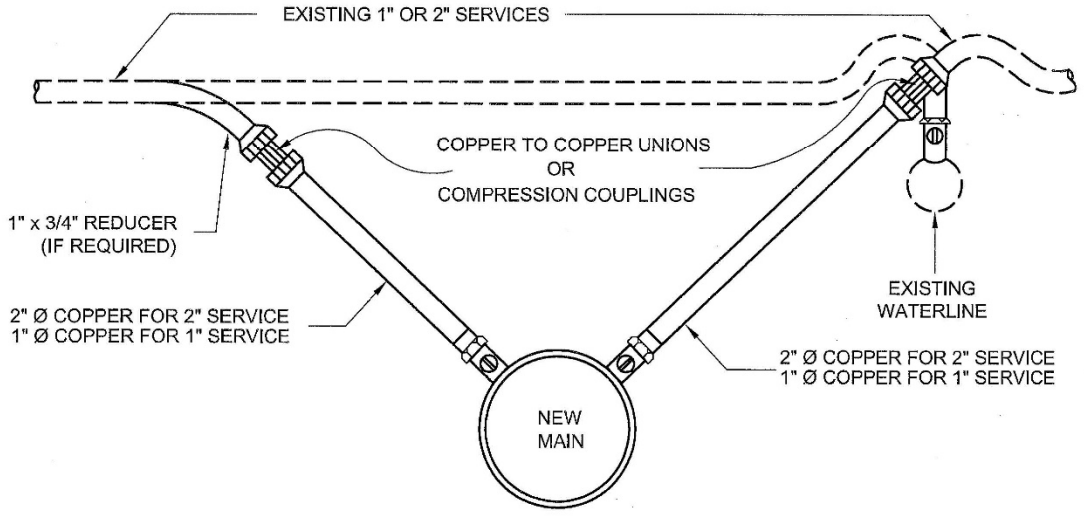
REGISTERED PROFESSIONAL ENGINEER EDWARD A. RANGEL C 60299 STATE OF CALIFORNIA CIVIL

CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

MULTIPLE WATER METER INSTALLATION

4" SERVICE AND MANIFOLD

FILE NO. D-3B



Revision	Date	Approved
Drawn : QT	Date : 10-31-14	
Checked : LA	Scale : NTS	

APPROVED BY: Jacqueline CA Solomon

10/31/14 DATE

12-31-15 EXP.

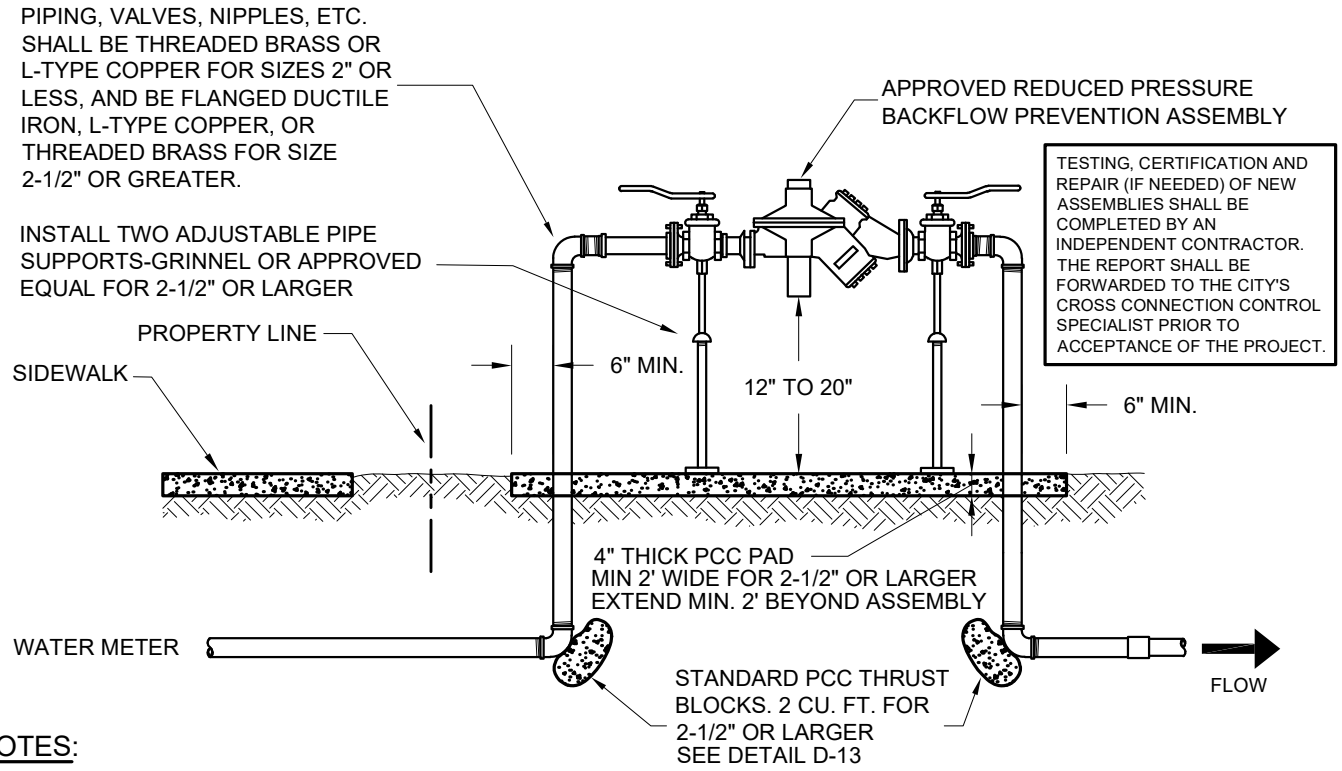
57093 R.C.E. NO.

CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

TRANSFER SERVICE

(USED WHEN REPLACING MAIN AND NOT SERVICES)

FILE NO. D-4



NOTES:

1. REDUCED PRESSURE BACKFLOW PREVENTION ASSEMBLIES SHALL BE REQUIRED FOR ANY USE WHERE TOXIC MATERIALS ARE USED OR WHERE POSITIVE PROTECTION FOR THE PUBLIC WATER SUPPLY IS REQUIRED. TYPICAL APPLICATIONS INCLUDE: HOSPITALS, MEDICAL AND DENTAL LABORATORIES, MORTUARIES, INDUSTRIAL PLANTS, DRY CLEANERS, LANDSCAPE IRRIGATION, OR AS DETERMINED BY THE CITY.
2. APPROVED REDUCED PRESSURE BACKFLOW PREVENTION ASSEMBLIES SHALL BE LISTED IN THE LATEST EDITION OF THE CITY STANDARD PROVISIONS.
3. BACKFLOW PREVENTION ASSEMBLIES SHALL BE INSTALLED ADJACENT TO AND ON PROPERTY SIDE OF SIDEWALK WHERE APPLICABLE. THE ASSEMBLY SHALL BE INSTALLED AS CLOSE AS POSSIBLE TO THE WATER METER.
4. ALL ASSEMBLIES 3/4" TO 2" WILL HAVE FULL PORT DOMESTIC BALL VALVES, WITH THREADED ENDS. 3" AND LARGER ASSEMBLIES WILL HAVE RESILIENT SEATED GATE VALVES, WITH FLANGED ENDS.
5. PRESSURE DIFFERENTIAL VALVE IS TO BE AT LEAST 12" ABOVE GRADE TO A MAXIMUM OF 20".
6. NO CONNECTION BETWEEN THE BACKFLOW PREVENTION ASSEMBLY AND WATER METER WILL BE PERMITTED. BACKFLOW PREVENTION ASSEMBLIES SMALLER THAN 2.5" SHALL BE PLACED DIRECTLY BEHIND THE WATER METERS, UNLESS THERE IS A CONFLICT WITH OTHER UTILITIES, DRIVEWAYS OR SIDEWALKS. BACKFLOW PREVENTION ASSEMBLIES 2.5" OR LARGER SHALL BE PLACED AS CLOSE TO THE METER AS POSSIBLE, UNLESS AN EXEMPTION IS GRANTED BY THE PUBLIC SERVICES DEPARTMENT. IF AN EXEMPTION IS GRANTED, THE BACK FLOW PREVENTION ASSEMBLY SHALL BE SCREENED WITH LANDSCAPING AND THE TRENCHES SHALL BE LEFT OPEN SO THAT THE CITY CAN VERIFY THAT THERE ARE NO CONNECTIONS BETWEEN THE BACKFLOW PREVENTION ASSEMBLY AND THE METER. THE CITY RESERVES THE RIGHT TO TEST THE SYSTEM TO ENSURE THAT THESE REQUIREMENTS ARE MET.
7. WHERE A BACKFLOW PREVENTION ASSEMBLY IS INSTALLED MORE THAN 1' BEHIND THE WATER OR IRRIGATION METER, THE PIPING BETWEEN THE BACKFLOW PREVENTION ASSEMBLY AND THE METER SHALL BE ENCASED IN CONTROLLED DENSITY FILL (CDF).
8. A 2' MINIMUM CLEARANCE SHALL BE REQUIRED AROUND BACKFLOW PREVENTION ASSEMBLY

Revision	Date	Approved
Drawn : AR	Date : 07-21-26	
Checked : TT	Scale : NTS	

REGISTERED PROFESSIONAL ENGINEER EDWARD A. ARANGO C 60299 STATE OF CALIFORNIA Civil

APPROVED BY:

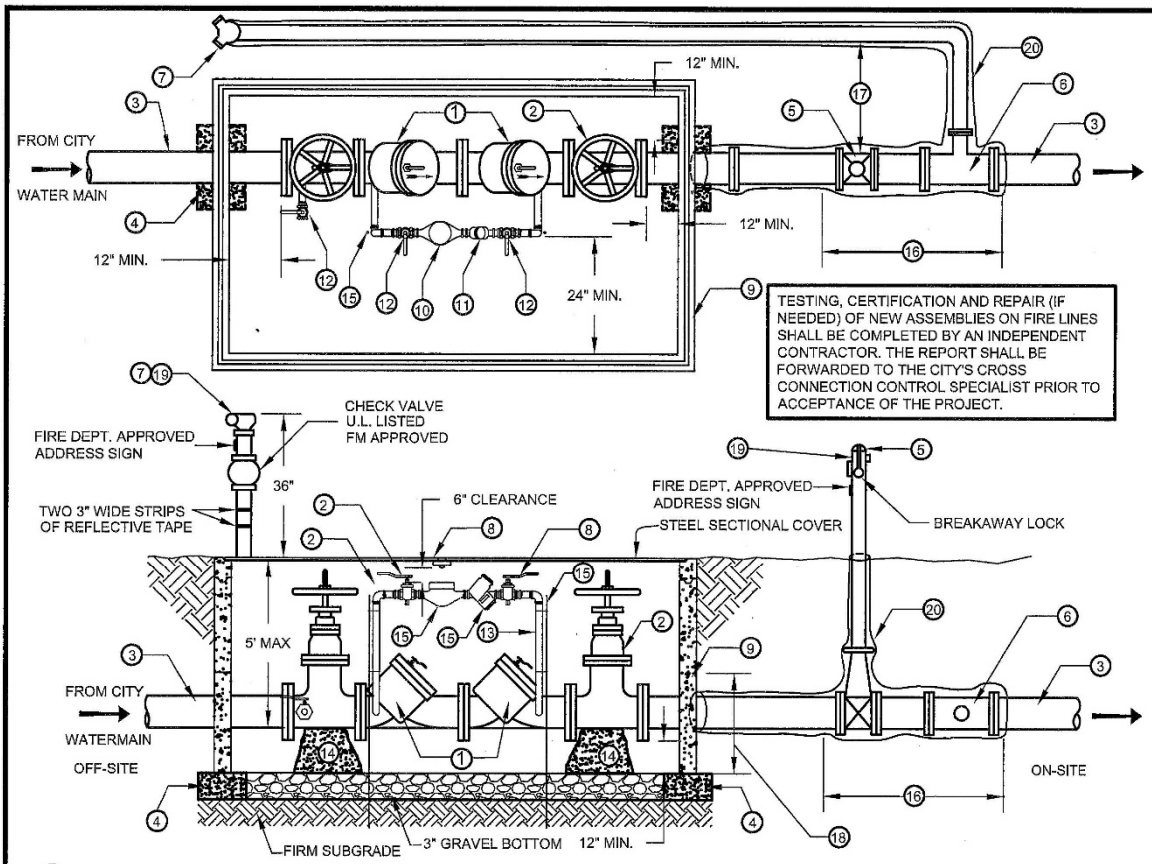
ASSISTANT PUBLIC WORKS DIRECTOR

08-21-2026 DATE | 06-30-28 EXP. | 60299 R.C.E. NO.

CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

REDUCED PRESSURE BACKFLOW PREVENTION ASSEMBLY

FILE NO. D-5



1. DOUBLE CHECK DETECTOR ASSEMBLY (DCDA) PER CITY APPROVED MATERIAL LIST, OR CITY APPROVED EQUAL. APPROVED ASSEMBLY SHALL BE PURCHASED AND INSTALLED AS A WHOLE UNIT WITH GATE VALVES, BY-PASS METER, BY-PASS BACKFLOW PREVENTER, AND BALL VALVES. METER SHALL READ IN CUBIC FEET.
2. OUTSIDE SCREW & YOKE (OS & Y) GATE VALVES SHALL BE ELECTRONICALLY MONITORED BY FIRE SPRINKLER MONITORING SYSTEM. CHAIN AND LOCK PER FIRE DEPT. STANDARD.
3. PVC CLASS 150 (MIN.) C-900 OR DIP FOR ON-SITE; PVC CLASS 200 (MIN.) C-900 OR DIP FOR OFF-SITE.
4. BASE SUPPORT: BRICK, CONCRETE OR BASE ROCK COMPACTED TO 95%.
5. POST INDICATOR VALVE (PIV) - U.L. LISTED.
6. TEE FOR FIRE DEPARTMENT CONNECTION.
7. FIRE DEPARTMENT CONNECTION (FDC),(2-2 1/2" INLETS WITH CLAPPER). FINISHED LOCATION 5' MAX. BEHIND RIGHT-OF-WAY, 3' ABOVE FINISH GRADE.
8. METER "READ HOLE COVER", 7" x 14" - CENTERED OVER METER.
9. PRE-CAST CONCRETE SECTIONAL VAULT MAINTAIN MINIMUM CLEARANCES.
10. WATER METER AS PROVIDED BY ASSEMBLY MANUFACTURER - SHALL READ IN CUBIC FEET.
11. DOUBLE CHECK VALVE AS PROVIDED BY ASSEMBLY MANUFACTURER.
12. RESILIENT SEAT BALL VALVE AS PROVIDED BY ASSEMBLY MANUFACTURER.
13. 3/4" RED BRASS THREADED NIPPLES (LENGTH VARIES).
14. POUR IN PLACE CONCRETE SUPPORT.
15. 3/4" REBAR SUPPORT, 24" INTO GROUND.
16. FIRE PIT SHALL BE INSTALLED ON THE ADDRESS SIDE OF THE BUILDING UNLESS OTHERWISE APPROVED BY FIRE DEPT. AND PUBLIC WORKS DEPT.
17. MINIMUM 18" CLEARANCE BETWEEN PIV AND FDC.
18. NOTCHED OPENING EACH END OF VAULT CENTERED 21" FROM INSIDE (SIZE VARIES). TOP OF OPENING TO BE CURVED.
19. ALL WEATHER EXPOSED SURFACES OF THE FDC AND PIV TO BE PAINTED RED (TYP.). MAINTAIN MIN - 3' CLEARANCE AROUND PIV AND FDC.
20. ALL FERROUS BURIED PIPES TO BE WRAPPED WITH 8-MIL POLYETHYLENE AND SECURED WITH 10-MIL POLY TAPE. ALL NUTS & BOLTS SHALL BE STAINLESS STEEL AND MASTIC COATED.

Revision	Date	Approved
Drawn: QT	Date: 10-31-14	
Checked: LA	Scale: NTS	

APPROVED BY: Jacqueline A. Solomon

10/31/14 DATE | 12-31-15 EXP. | 57093 R.C.E. NO.

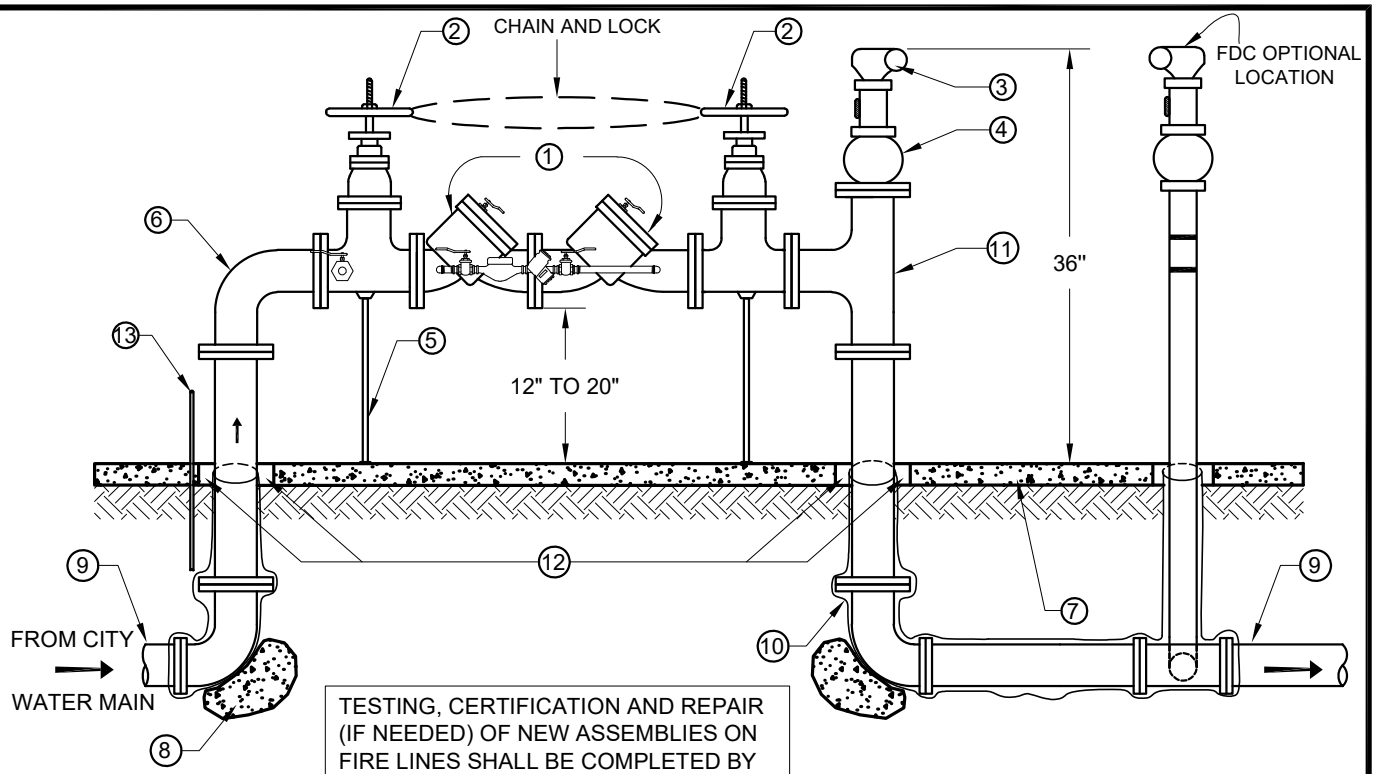
CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

DOUBLE CHECK DETECTOR ASSEMBLY

(BELOW GRADE)

THIS DETAIL IS NOT FOR NEW CONSTRUCTION

FILE NO. D-5A



TESTING, CERTIFICATION AND REPAIR (IF NEEDED) OF NEW ASSEMBLIES ON FIRE LINES SHALL BE COMPLETED BY AN INDEPENDENT CONTRACTOR. THE REPORT SHALL BE FORWARDED TO THE CITY'S CROSS CONNECTION CONTROL SPECIALIST PRIOR TO ACCEPTANCE OF THE PROJECT.

NOTES:

1. DETECTOR, PIPE SIZE, AND FDC LOCATION TO BE APPROVED BY FIRE DEPARTMENT. DOUBLE CHECK DETECTOR ASSEMBLY (DCDA) SHALL BE PURCHASED AND INSTALLED AS A WHOLE UNIT WITH GATE VALVES, BY-PASS METER, BY-PASS BACKFLOW PREVENTOR, AND BALL VALVES. METER SHALL READ IN CUBIC FEET.
2. OUTSIDE SCREW & YOKE (OS & Y) GATE VALVES SHALL BE ELECTRONICALLY MONITORED BY FIRE SPRINKLER MONITORING SYSTEM. CHAIN AND LOCK PER FIRE DEPT. STANDARD.
3. FIRE DEPARTMENT CONNECTION (FDC) (2-2 1/2" INLETS WITH CLAPPERS) SHALL FACE STREET FRONTAGE. FINISHED LOCATION 5' MAX BEHIND R/W. 3' MIN CLEARANCE AROUND BACKFLOW AND FDC. ALL WEATHER EXPOSED SURFACES OF THE FDC TO BE PAINTED RED. CONFIRM FDC LOCATION WITH FIRE INSPECTOR PRIOR TO INSTALLATION.
4. WAFER CHECK VALVE - U.L. LISTED, FM APPROVED.
5. INSTALL TWO ADJUSTABLE PIPE SUPPORTS (GRINNELL OR APPROVED EQUAL) UNDER GATE VALVE.
6. EXPOSED PIPING AND FITTINGS SHALL BE FLANGED DUCTILE IRON.
7. 4" THICK P.C.C. PAD - EXTEND PAD MINIMUM 2' BEYOND ASSEMBLY (ALL AROUND).
8. STANDARD P.C.C. THRUST BLOCKS - 2 CU FT FOR 3" & 4" DIA. PIPE. REFER TO DETAIL D-13.
9. PVC DR18 (MIN.) C900 OR DIP FOR ON-SITE; PVC DR14 (MIN.) C900 OR DIP FOR OFF-SITE.
10. ALL FERROUS BURIED PIPES TO BE WRAPPED WITH 8-MIL POLYETHYLENE AND SECURE WITH 10-MIL POLY TAPE. ALL NUTS AND BOLTS SHALL BE STAINLESS STEEL AND MASTIC COATED.
11. MOUNT APPROVED STREET SIGN ON FDC ASSEMBLY FACING STREET FRONTAGE WITH STAINLESS STEEL STRAPS AND SCREWS.
12. 2" ANNULAR SPACE BETWEEN PIPE AND CONCRETE. FILL IN 2" SPACE WITH SAND.
13. 1" PVC CONDUIT FOR TAMPER SWITCH - ELEC. TO BLDG. ASR.

Revision	Date	Approved
Drawn : AR	Date : 07-21-26	
Checked : TT	Scale : NTS	

APPROVED BY:

ASSISTANT PUBLIC WORKS DIRECTOR

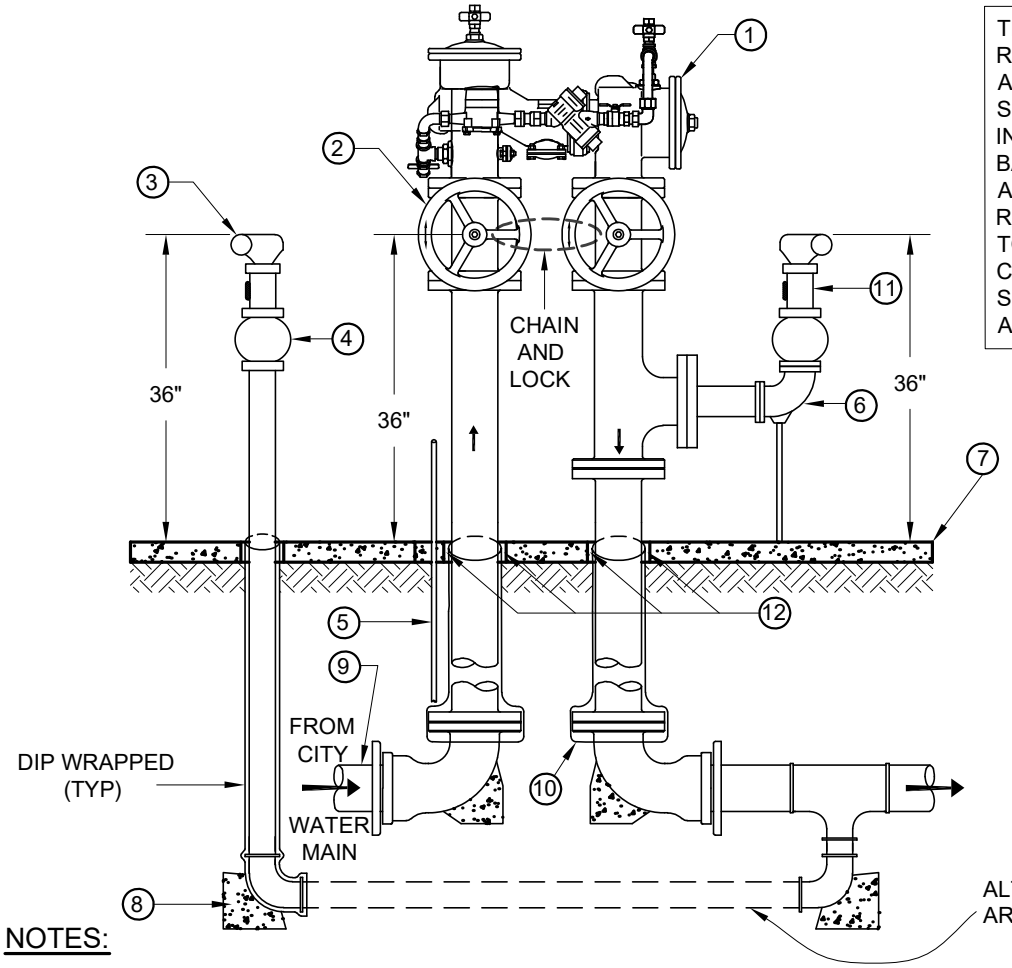
08-21-2026 (DATE) | 06-30-28 (EXP.) | 60299 (R.C.E. NO.)

REGISTERED PROFESSIONAL ENGINEER — EDWARD A. RANGEL — C 60299 — STATE OF CALIFORNIA

CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

FIRE DOUBLE CHECK DETECTOR ASSEMBLY (ABOVE GRADE)

FILE NO. D-5B



TESTING, CERTIFICATION AND REPAIR (IF NEEDED) OF NEW ASSEMBLIES ON FIRE LINES SHALL BE COMPLETED BY AN INDEPENDENT AWWA CERTIFIED BACKFLOW PREVENTION ASSEMBLY TESTER. THE REPORT SHALL BE FORWARDED TO THE CITY'S CROSS CONNECTION CONTROL SPECIALIST PRIOR TO ACCEPTANCE OF THE PROJECT.

NOTES:

1. DETECTOR, PIPE SIZE, AND FDC LOCATION TO BE APPROVED BY FIRE DEPARTMENT. DOUBLE CHECK DETECTOR ASSEMBLY (DCDA) SHALL BE PURCHASED AND INSTALLED AS A WHOLE UNIT WITH GATE VALVES, BY-PASS METER, BY-PASS BACKFLOW PREVENTOR, AND BALL VALVES. METER SHALL READ IN CUBIC FEET.
2. OUTSIDE SCREW & YOKE (OS & Y) GATE VALVES SHALL BE ELECTRONICALLY MONITORED BY FIRE SPRINKLER MONITORING SYSTEM. CHAIN AND LOCK PER FIRE DEPT. STANDARD.
3. FIRE DEPARTMENT CONNECTION (FDC) (2-2 1/2" INLETS WITH CLAPPERS) SHALL FACE STREET FRONTAGE. FINISHED LOCATION 5' MAX BEHIND R/W. 3' MIN CLEARANCE AROUND BACKFLOW AND FDC. ALL WEATHER EXPOSED SURFACES OF THE FDC TO BE PAINTED RED. CONFIRM FDC LOCATION WITH FIRE INSPECTOR PRIOR TO INSTALLATION.
4. WAFER CHECK VALVE - U.L. LISTED, FM APPROVED.
5. 1" PVC CONDUIT FOR TAMPER SWITCH - ELEC. TO BLDG. ASR.
6. EXPOSED PIPING AND FITTINGS SHALL BE FLANGED DUCTILE IRON.
7. 4" THICK P.C.C. PAD - EXTEND PAD MINIMUM 2' BEYOND ASSEMBLY (ALL AROUND).
8. STANDARD P.C.C. THRUST BLOCKS - 2 CU FT FOR 3" & 4" DIA. PIPE. REFER TO DETAIL D-13.
9. PVC DR18 (MIN.) C900 OR DIP FOR ON-SITE; PVC DR14 (MIN.) C900 OR DIP FOR OFF-SITE.
10. ALL FERROUS BURIED PIPES TO BE WRAPPED WITH 8-MIL POLYETHYLENE AND SECURE WITH 10-MIL POLY TAPE. ALL NUTS AND BOLTS SHALL BE STAINLESS STEEL AND MASTIC COATED.
11. MOUNT APPROVED STREET SIGN ON FDC ASSEMBLY FACING STREET FRONTAGE WITH STAINLESS STEEL STRAPS AND SCREWS.
12. 2" ANNULAR SPACE BETWEEN PIPE AND CONCRETE. FILL IN 2" SPACE WITH SAND.

Revision	Date	Approved

Drawn : AR
Date : 07-21-26
Checked : TT
Scale : NTS

APPROVED BY:

ASSISTANT PUBLIC WORKS DIRECTOR

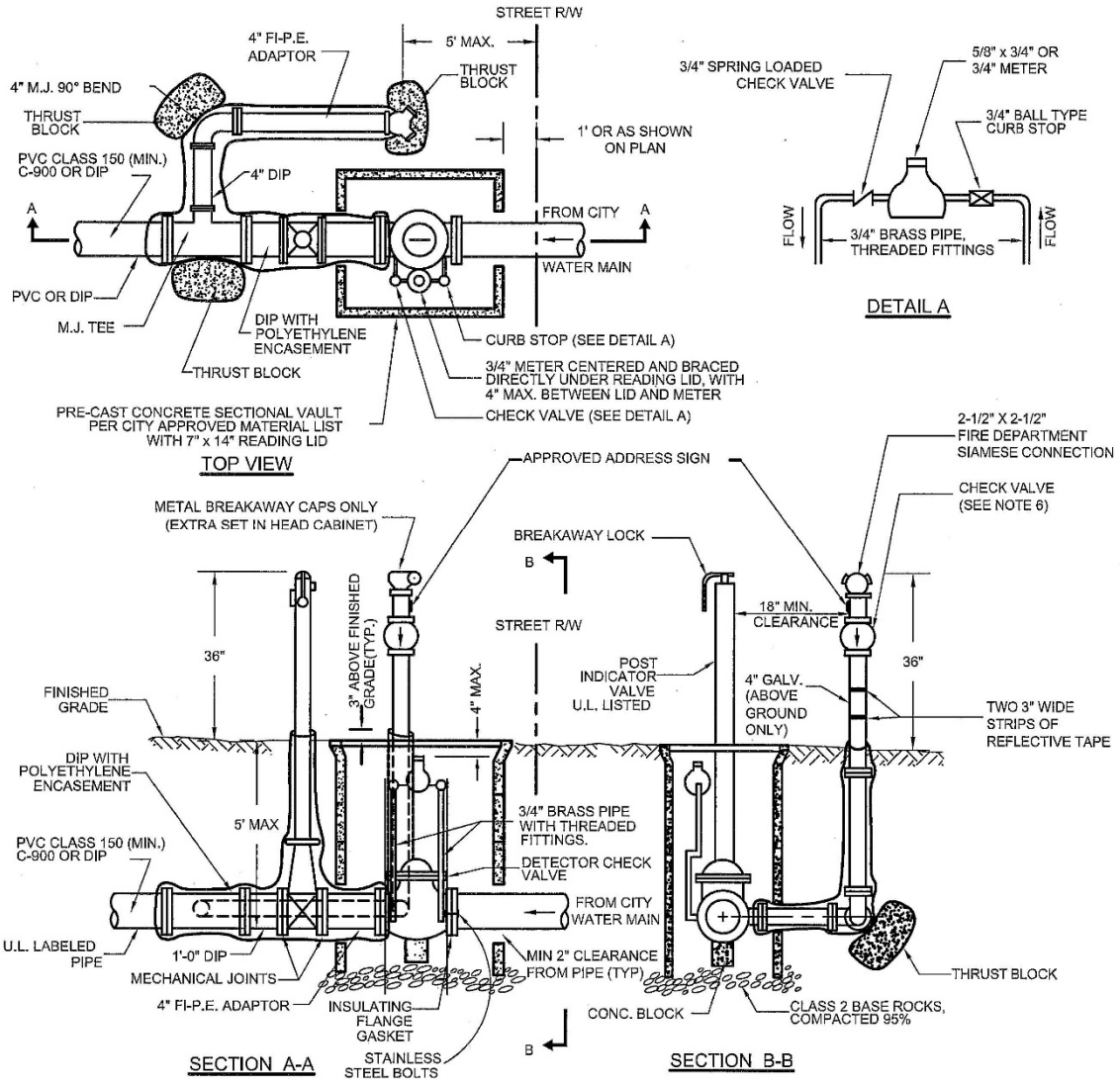
08-21-2026 (DATE) | 06-30-28 (EXP.) | 60299 (R.C.E. NO.)

REGISTERED PROFESSIONAL ENGINEER EDWARD A. RANGEL C 60299 STATE OF CALIFORNIA

CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

FIRE DOUBLE CHECK DETECTOR ASSEMBLY (ABOVE GRADE - COMPACT)

FILE NO. D-5C



NOTES:

1. METER TO BE 5/8" x 3/4" OR 3/4", ALL BRONZE, STRAIGHT READER IN CUBIC FEET.
2. ALL WEATHER EXPOSED SURFACES OF THE FDC AND PIV TO BE PAINTED RED. MAINTAIN MIN MIN - 3' CLEARANCE AROUND PIV AND FDC.
3. ALL PROVISIONS FOR THRUST AND ANCHORAGE TO BE INCLUDED.
4. ALL FERROUS BURIED PIPES TO BE WRAPPED WITH 8-MIL POLYETHYLENE AND SECURED WITH 10-MIL POLY TAPE. ALL NUTS AND BOLTS SHALL BE STAINLESS STEEL AND MASTIC COATED.
5. SECURE DETECTOR METER AND PIPING TO 3/4" REBAR SUPPORTS, 24" INTO GROUND.
6. ABOVE GROUND CHECK VALVE SHALL BE U.L. LISTED, FM APPROVED.
7. FIRE PIT SHALL BE INSTALLED ON THE ADDRESS SIDE OF THE BUILDING UNLESS OTHERWISE APPROVED BY FIRE DEPARTMENT AND PUBLIC WORKS DEPARTMENT.

Revision	Date	Approved
Drawn: QT	Date: 10-31-14	
Checked: LA	Scale: NTS	

REGISTERED PROFESSIONAL ENGINEER — JACQUELINE ANDREWS SOLOMON — No. 57093 — CIVIL — STATE OF CALIFORNIA

APPROVED BY: Jacqueline A Solomon

10/31/14 DATE — 12-31-15 EXP. — 57093 R.C.E. NO.

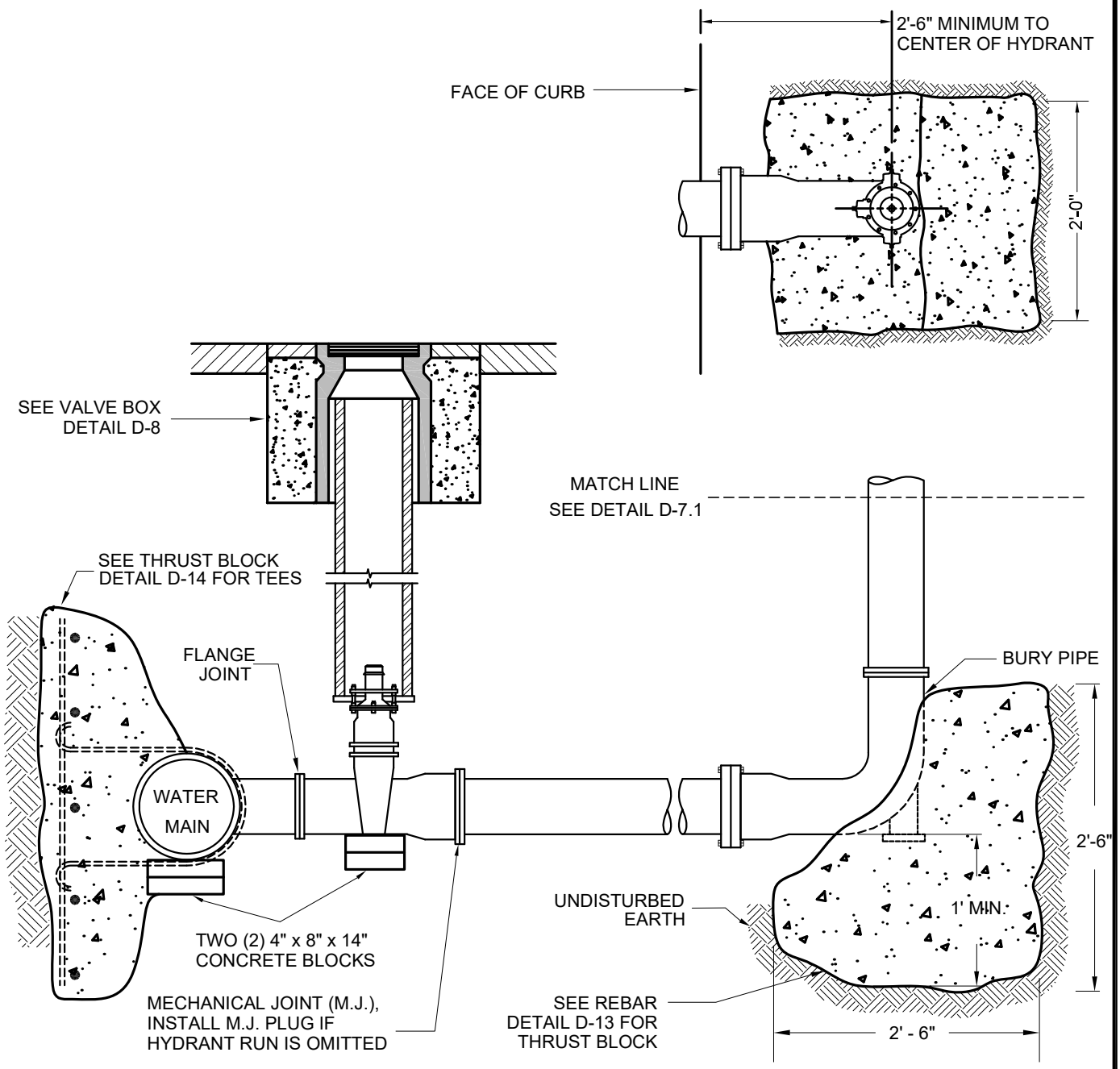
CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

DETECTOR CHECK VALVE

(BELOW GRADE)

THIS DETAIL IS NOT FOR NEW CONSTRUCTION

FILE NO. D-6



NOTES:

1. FLANGE, BOLTS & NUTS SHALL BE KEPT CLEAR OF CONCRETE

2. GATE VALVE ANCHOR REQUIRED WHEN VALVE IS NOT CONNECTED BY FLANGE JOINT TO MAIN TEE

Revision	Date	Approved

Drawn : AR
Date : 07-21-26
Checked : TT
Scale : NTS

APPROVED BY:

ASSISTANT PUBLIC WORKS DIRECTOR

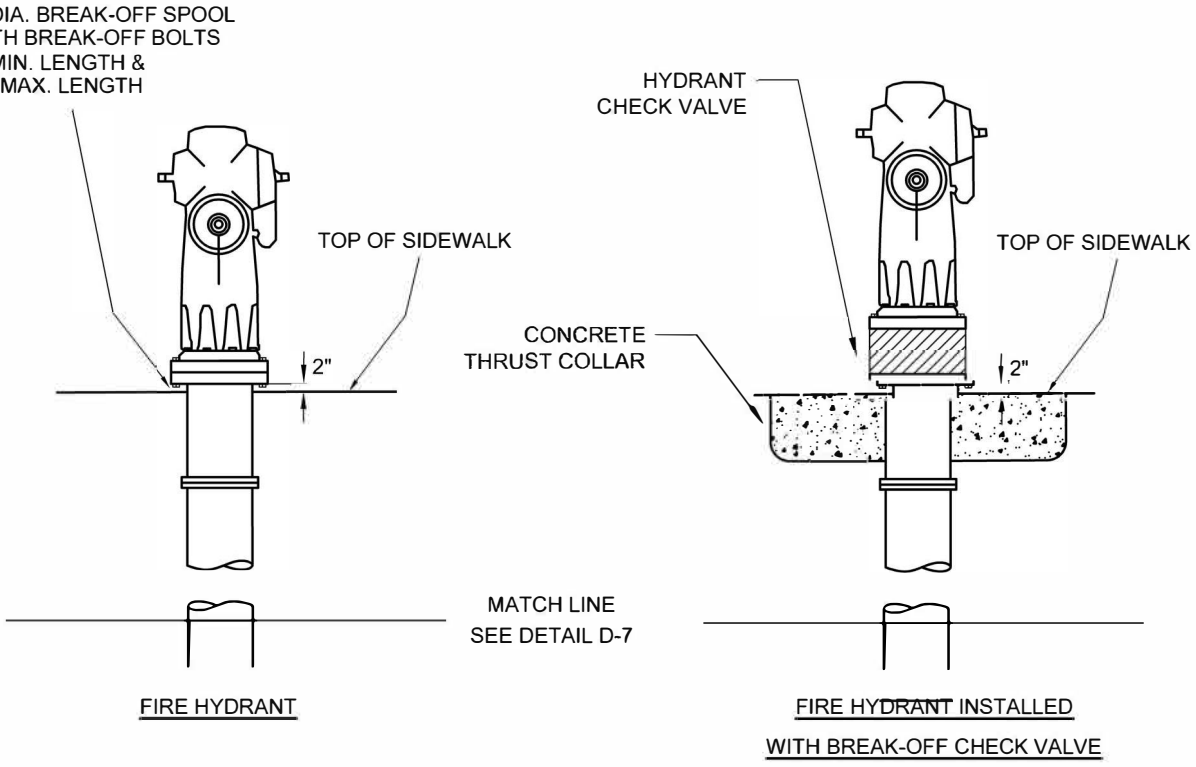
08-21-2026 DATE | 06-30-28 EXP. | 60299 R.C.E. NO.

REGISTERED PROFESSIONAL ENGINEER
EDWARD A. RANGEL
C 60299
Civil
STATE OF CALIFORNIA

CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

FIRE HYDRANT
SHEET 1 OF 2

FILE NO. D-7



FIRE HYDRANT

FIRE HYDRANT INSTALLED
WITH BREAK-OFF CHECK VALVE

NOTES:

1. INSTALL BREAK-OFF CHECK VALVE IF HYDRANT IS WITHIN 8 FEET OF DRIVEWAY OR AS REQUIRED BY CITY ENGINEER
2. INSTALL CONCRETE THRUST COLLAR PER MANUFACTURERS SPECIFICATIONS
3. FIRE HYDRANTS ARE TO BE PAINTED WITH RUST PREVENTIVE PAINT (BRIGHT SILVER)

Revision	Date	Approved
Drawn : GT	Date : 07-21-26	
Checked : TT	Scale : NTS	

APPROVED BY:

ASSISTANT PUBLIC WORKS DIRECTOR

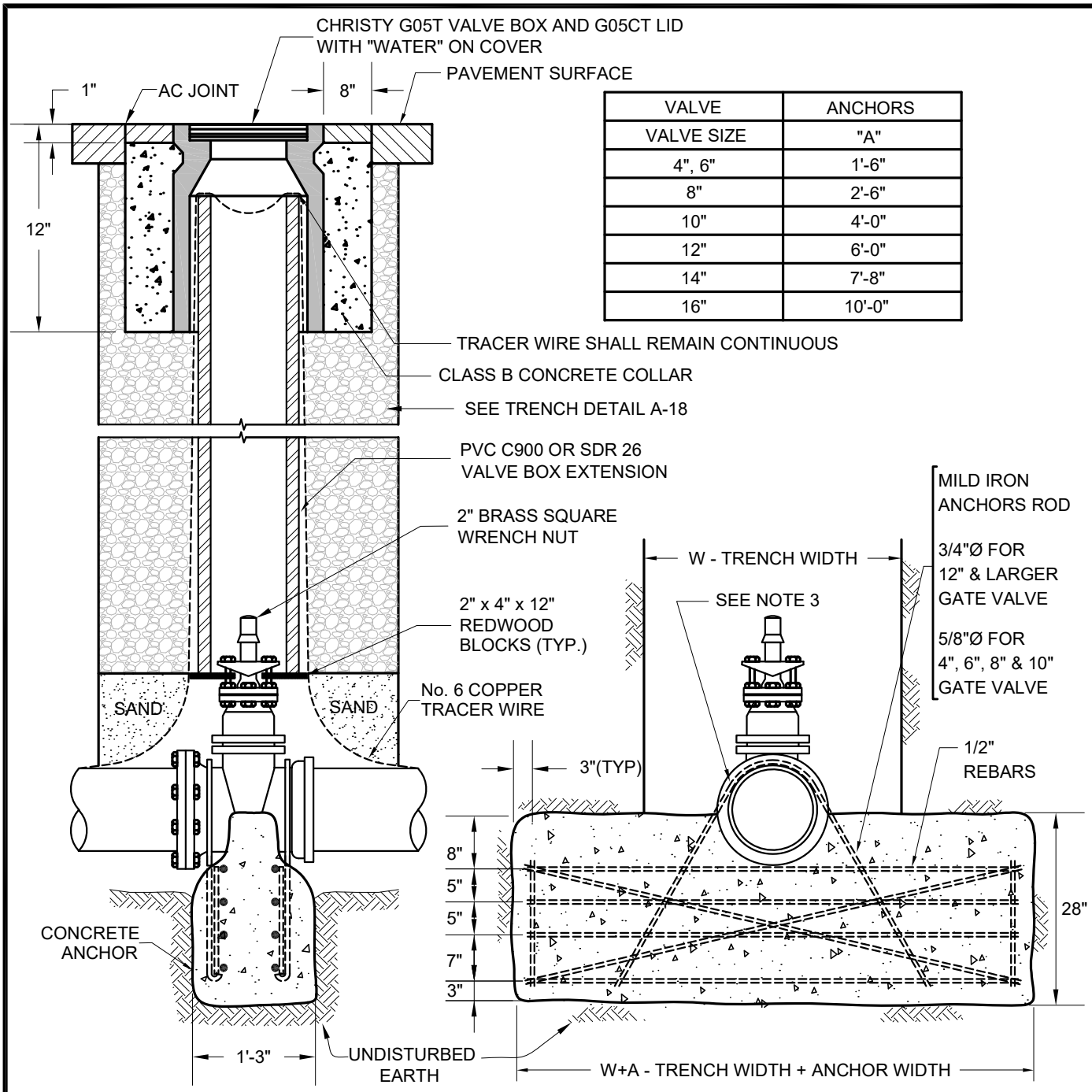
08-21-2026 DATE | 06-30-28 EXP. | 60299 R.C.E. NO.

REGISTERED PROFESSIONAL ENGINEER EDWARD ARANGO C 60299 STATE OF CALIFORNIA CIVIL

CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

FIRE HYDRANT
SHEET 2 OF 2

FILE NO. D-7.1



VALVE	ANCHORS
VALVE SIZE	"A"
4", 6"	1'-6"
8"	2'-6"
10"	4'-0"
12"	6'-0"
14"	7'-8"
16"	10'-0"

NOTES:

1. WHEN THERE IS A NEED TO RAISE VALVE COVER TO MEET NEW GRADE, ONLY ONE ADDITIONAL RING MAY BE ADDED.
2. FLANGES, BOLTS, AND NUTS SHALL BE KEPT CLEAR OF CONCRETE.
3. COAT EXPOSED PORTIONS OF ANCHOR RODS WITH A MASTIC COATING SOLUTION AND WRAP IN 10 MIL POLYETHYLENE TAPE.

Revision	Date	Approved
Drawn : AR	Date : 07-21-26	
Checked : TT	Scale : NTS	

APPROVED BY:

ASSISTANT PUBLIC WORKS DIRECTOR

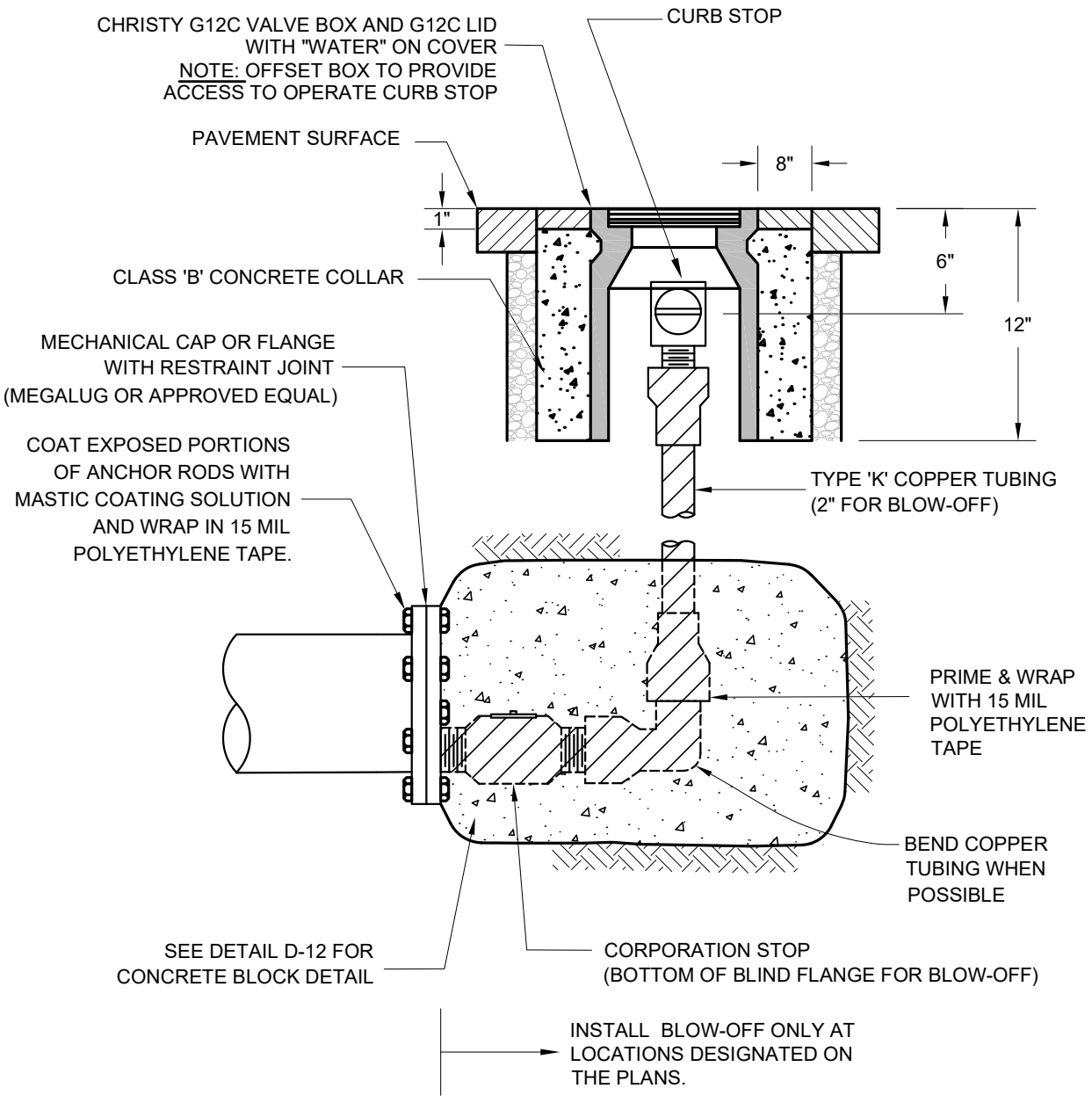
08-21-2026 DATE | 06-30-28 EXP. | 60299 R.C.E. NO.

REGISTERED PROFESSIONAL ENGINEER EDWARD A. RANGEL C 60299 STATE OF CALIFORNIA CIVIL

CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

GATE VALVE BOX AND ANCHOR

FILE NO. D-8



Revision	Date	Approved

Drawn : AR
Date : 07-21-26
Checked : TT
Scale : NTS

APPROVED BY:

ASSISTANT PUBLIC WORKS DIRECTOR

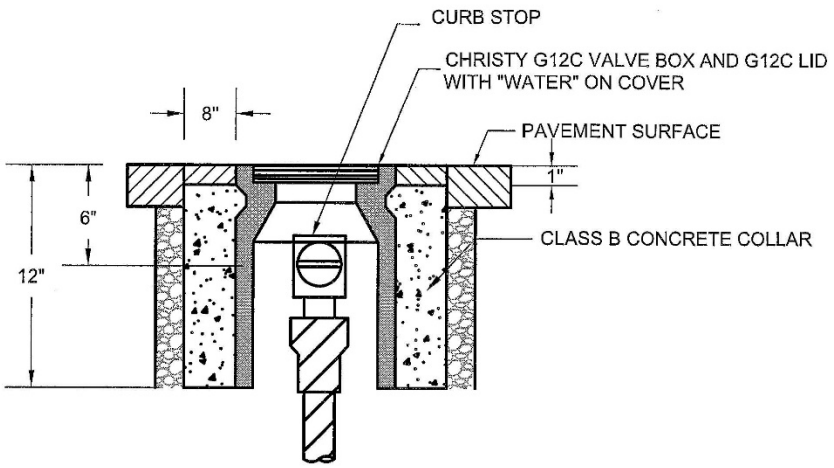
08-21-2026 DATE | 06-30-28 EXP. | 60299 R.C.E. NO.

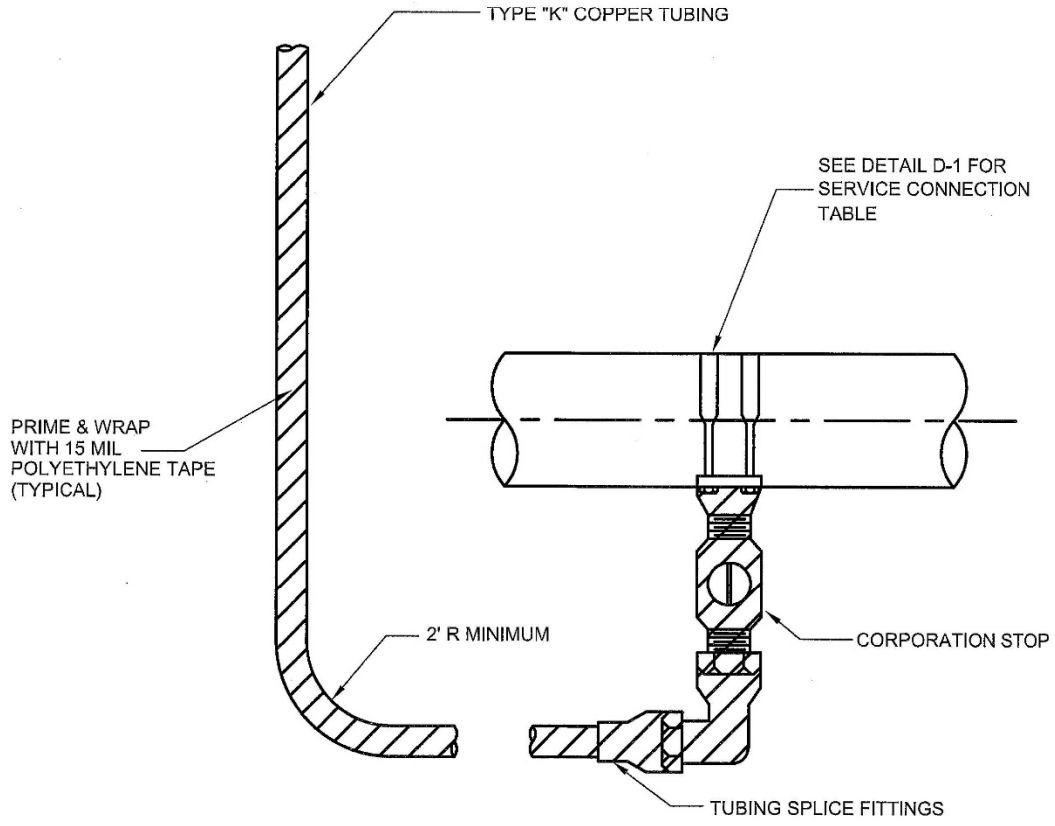
REGISTERED PROFESSIONAL ENGINEER
EDWARD A. ARANGUREN
C 60299
CIVIL
STATE OF CALIFORNIA

CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

BLOW-OFF AT END OF MAIN

FILE NO. D-9





Revision	Date	Approved
Drawn : QT	Date : 10-31-14	
Checked : LA	Scale : NTS	

APPROVED BY: Jacqueline Casolomon

10/31/14
DATE

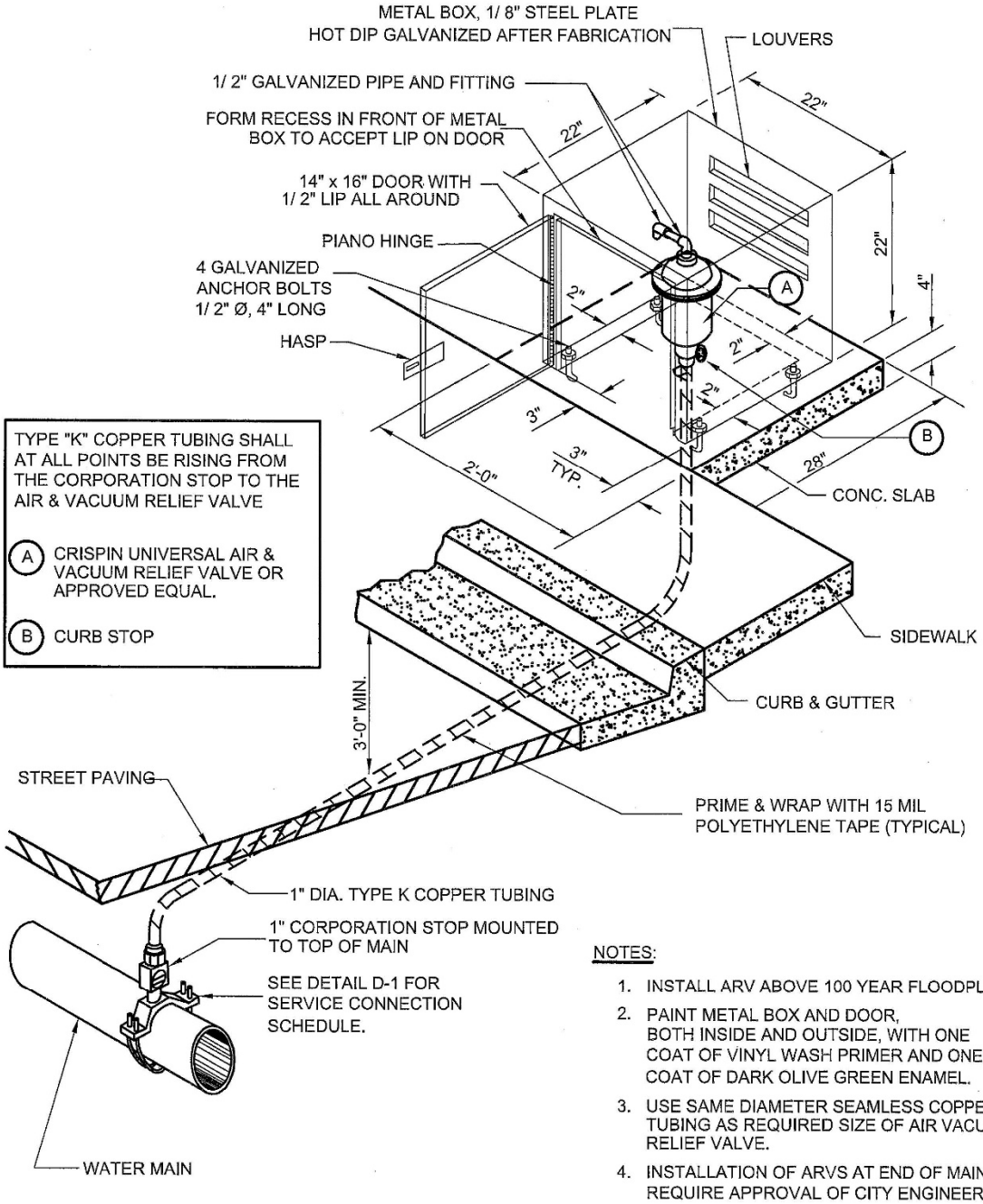
12-31-15
EXP.

57093
R.C.E. NO.

CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

2" BLOW-OFF VALVE

FILE NO. D-10



TYPE "K" COPPER TUBING SHALL AT ALL POINTS BE RISING FROM THE CORPORATION STOP TO THE AIR & VACUUM RELIEF VALVE

(A) CRISPIN UNIVERSAL AIR & VACUUM RELIEF VALVE OR APPROVED EQUAL.

(B) CURB STOP

NOTES:

1. INSTALL ARV ABOVE 100 YEAR FLOODPLAIN
2. PAINT METAL BOX AND DOOR, BOTH INSIDE AND OUTSIDE, WITH ONE COAT OF VINYL WASH PRIMER AND ONE COAT OF DARK OLIVE GREEN ENAMEL.
3. USE SAME DIAMETER SEAMLESS COPPER TUBING AS REQUIRED SIZE OF AIR VACUUM RELIEF VALVE.
4. INSTALLATION OF ARVS AT END OF MAINS REQUIRE APPROVAL OF CITY ENGINEER.

Revision	Date	Approved

Drawn: QT Date: 10-31-14

Checked: LA Scale: NTS

APPROVED BY: Jacqueline A. Solomon

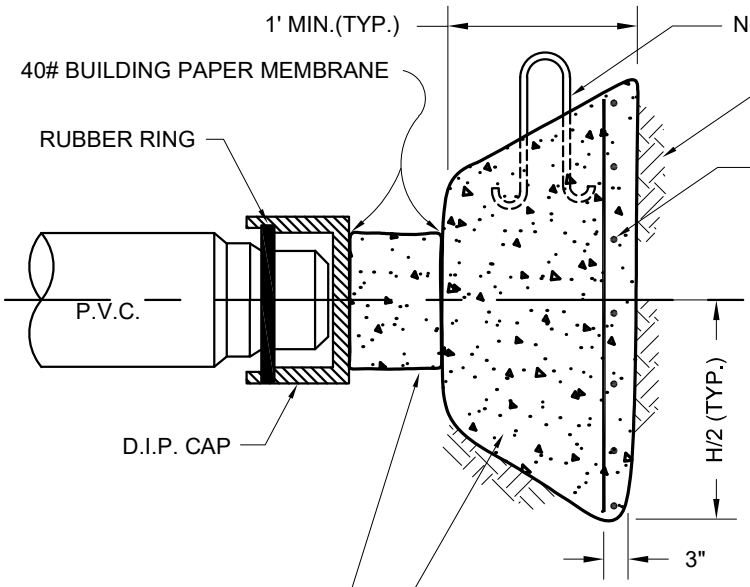
10/31/14 DATE — 12-31-15 EXP. — 57093 R.C.E. NO.

REGISTERED PROFESSIONAL ENGINEER JACQUELINE ANDREWS SOLOMON No. 57093 CIVIL STATE OF CALIFORNIA

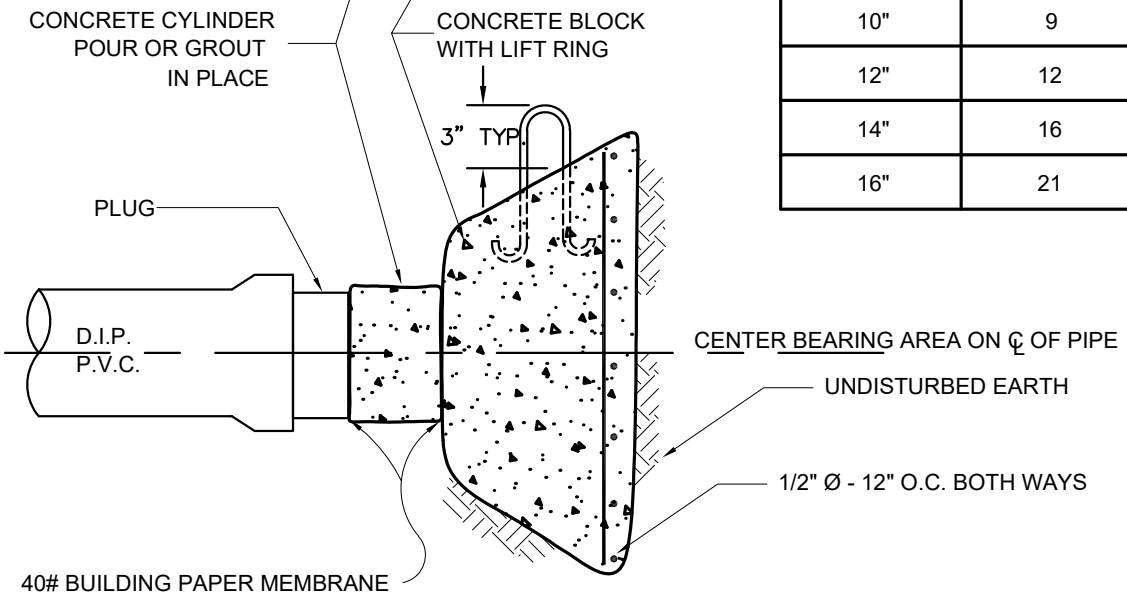
CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

AIR RELIEF VALVE

FILE NO. D-11



BLOCKING FOR PIPE STUB-OUT		
PIPE SIZE	BEARING (SF.)	L x H
4", 6"	3	1'-9" x 1'-9"
8"	5	2'-3" x 2'-3"
10"	9	3'-0" x 3'-0"
12"	12	3'-5" x 3'-5"
14"	16	4'-0" x 4'-0"
16"	21	4'-7" x 4'-7"



Revision	Date	Approved

Drawn : AR
Date : 07-21-26
Checked : TT
Scale : NTS

APPROVED BY:

ASSISTANT PUBLIC WORKS DIRECTOR

08-21-2026 DATE | 06-30-28 EXP. | 60299 R.C.E. NO.

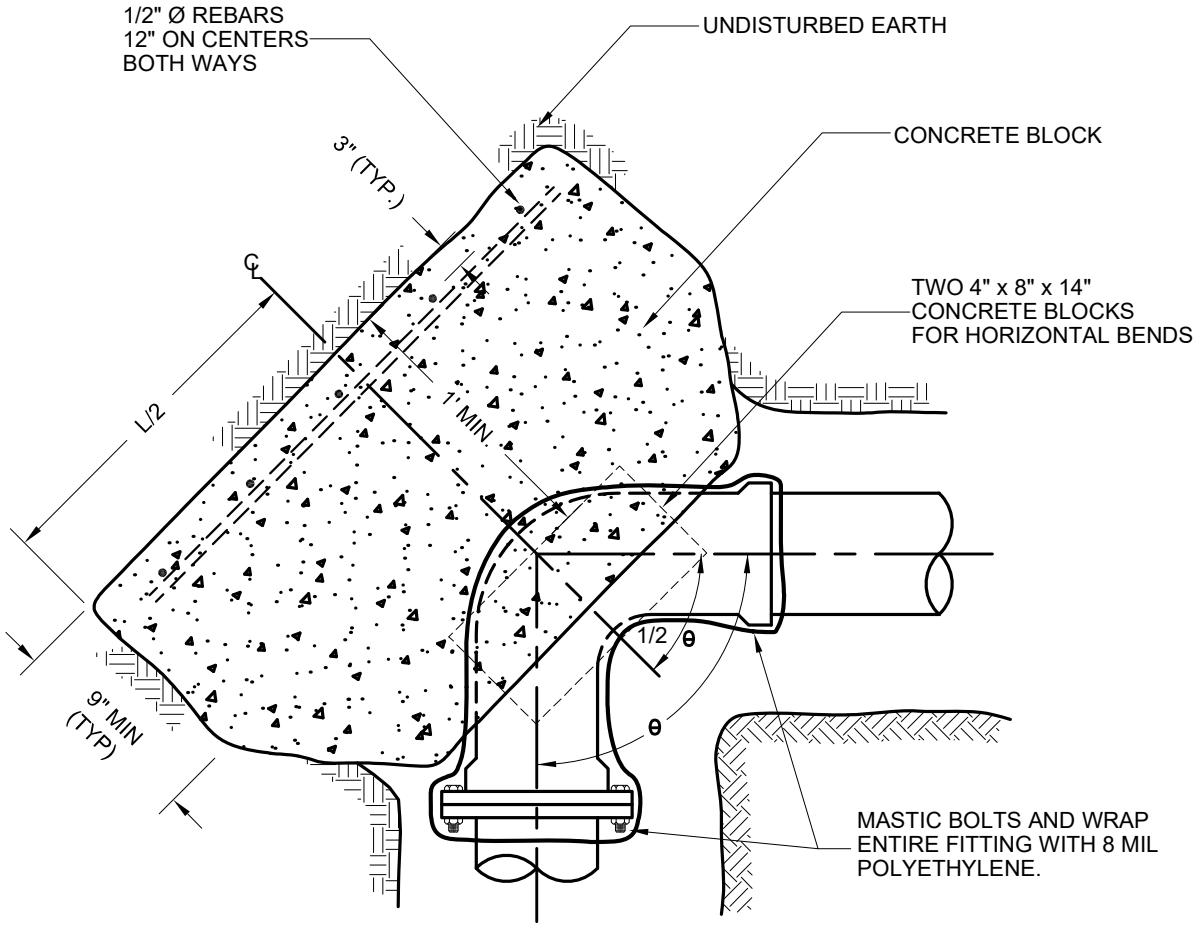
REGISTERED PROFESSIONAL ENGINEER EDWARD A. RANGEL C 60299 STATE OF CALIFORNIA Civil

CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

P.V.C. AND D.I.P STUB-OUT

FILE NO. D-12

H = HEIGHT
L = WIDTH



NOTE:

1. FLANGES, BOLTS, AND NUTS SHALL BE KEPT CLEAR OF CONCRETE
2. CENTER BEARING AREA ON PIPE CENTERLINE AND FORCE LINE

PIPE SIZE	REQUIRED AREA - SQ. FT.					DIMENSIONS - L x H				
	5 5/8°	11 1/4°	22 1/2°	45°	90°	5 5/8°	11 1/4°	22 1/2°	45°	90°
4", 6"	1	1	2	3	5	1'-0" x 1'-0"	1'-0" x 1'-0"	1'-5" x 1'-5"	1'-9" x 1'-9"	2'-3" x 2'-3"
8"	1	1	2	4	8	1'-0" x 1'-0"	1'-0" x 1'-0"	1'-5" x 1'-5"	2'-0" x 2'-0"	2'-10" x 2'-10"
10"	1	2	4	7	12	1'-0" x 1'-0"	1'-5" x 1'-5"	2'-0" x 2'-0"	2'-8" x 2'-8"	3'-5" x 3'-5"
12"	1	3	5	9	17	1'-0" x 1'-0"	1'-9" x 1'-9"	2'-3" x 2'-3"	3'-0" x 3'-0"	4'-2" x 4'-2"
14"	2	3	7	13	23	1'-5" x 1'-5"	1'-9" x 1'-9"	2'-8" x 2'-8"	3'-6" x 3'-6"	4'-10" x 4'-10"
16"	2	4	8	16	29	1'-5" x 1'-5"	2'-0" x 2'-0"	2'-10" x 2'-10"	4'-0" x 4'-0"	5'-5" x 5'-5"

Revision	Date	Approved
Drawn : AR	Date : 07-21-26	
Checked : TT	Scale : NTS	

APPROVED BY:

ASSISTANT PUBLIC WORKS DIRECTOR

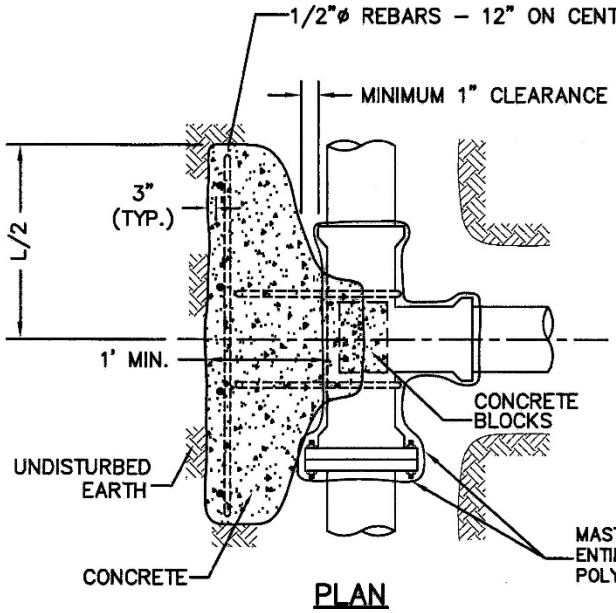
08-21-2026 DATE | 06-30-28 EXP. | 60299 R.C.E. NO.

REGISTERED PROFESSIONAL ENGINEER EDWARD A. RANGEL C 60299 STATE OF CALIFORNIA

CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

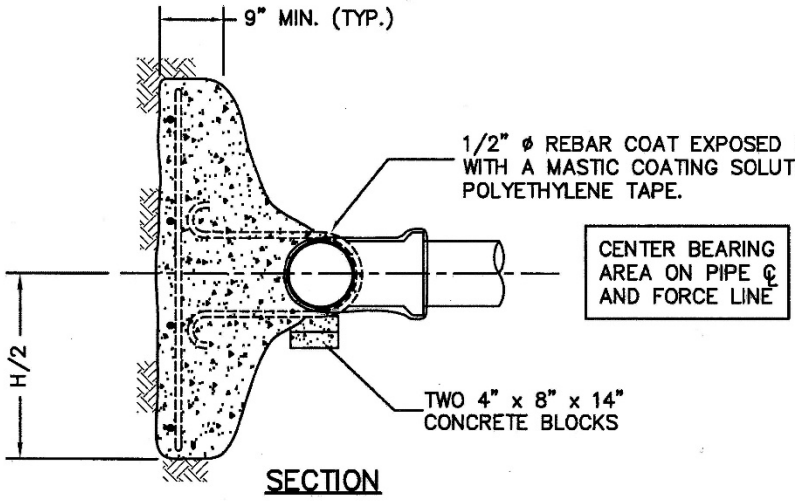
THRUST BLOCK
FOR
HORIZONTAL AND VERTICAL DOWNWARD BENDS

FILE NO. D-13



PLAN

BLOCKING FOR PIPE TEES		
SIDE OUTLET PIPE SIZE	BEARING (S.F.)	L x H
3" & 4"	2	1'–5" x 1'–5"
6"	3	1'–9" x 1'–9"
8"	5	2'–3" x 2'–3"
10"	9	3'–0" x 3'–0"
12"	12	3'–5" x 3'–5"
14"	16	4'–0" x 4'–0"
16"	21	4'–7" x 4'–7"



SECTION

NOTE:

FLANGES, BOLTS, AND NUTS SHALL BE KEPT CLEAR OF CONCRETE.

Revision	Date	Approved
Drawn : QT	Date : 02-25-05	
Checked : RK	Scale : NTS	

APPROVED BY:

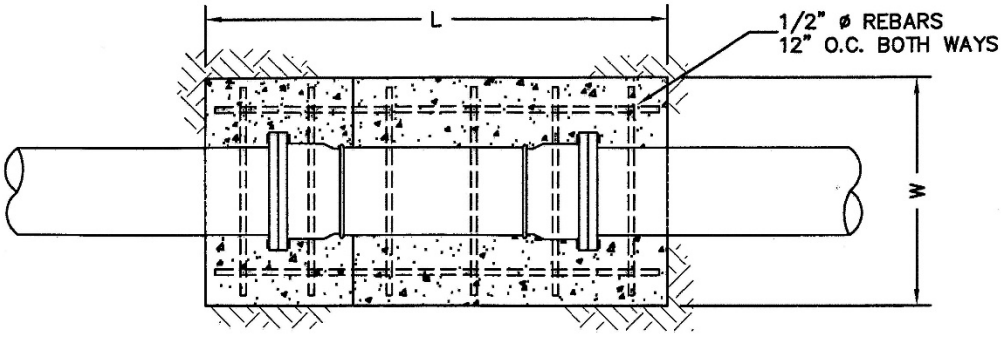
ASSISTANT PUBLIC WORKS DIRECTOR

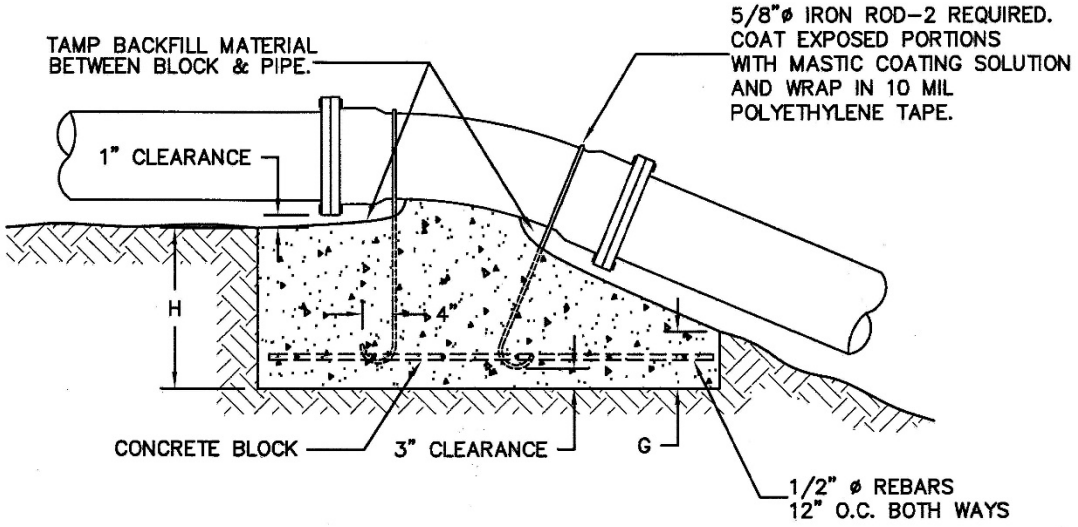
02-25-05 DATE | 03-31-07 EXP. | 27089 R.C.E. NO.

CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

STANDARD THRUST BLOCK FOR TEES

FILE NO. D-14





THRUST BLOCK DIMENSION–UPWARD THRUST												
PIPE SIZE	11 1/4° BEND				22 1/2° BEND				45° BEND			
	L	W	H	G	L	W	H	G	L	W	H	G
6"	2'0"	2'0"	1'0"	9"	2'0"	2'0"	2'0"	1'0"	3'0"	2'0"	2'0"	6"
8"	2'0"	2'0"	1'0"	9"	3'0"	2'0"	2'0"	1'0"	4'6"	2'0"	3'0"	6"
10"	3'0"	2'0"	2'0"	1'8"	4'0"	2'0"	2'0"	1'0"	6'0"	2'0"	3'8"	6"
12"	3'0"	2'0"	2'0"	1'8"	6'0"	2'0"	2'0"	1'0"	7'0"	2'6"	4'0"	6"

NOTE:

FLANGES, NUTS AND BOLTS SHALL BE KEEP CLEAR OF CONCRETE.

Revision	Date	Approved
Drawn : QT	Date : 02-25-05	
Checked : RK	Scale : NTS	

APPROVED BY:

ASSISTANT PUBLIC WORKS DIRECTOR

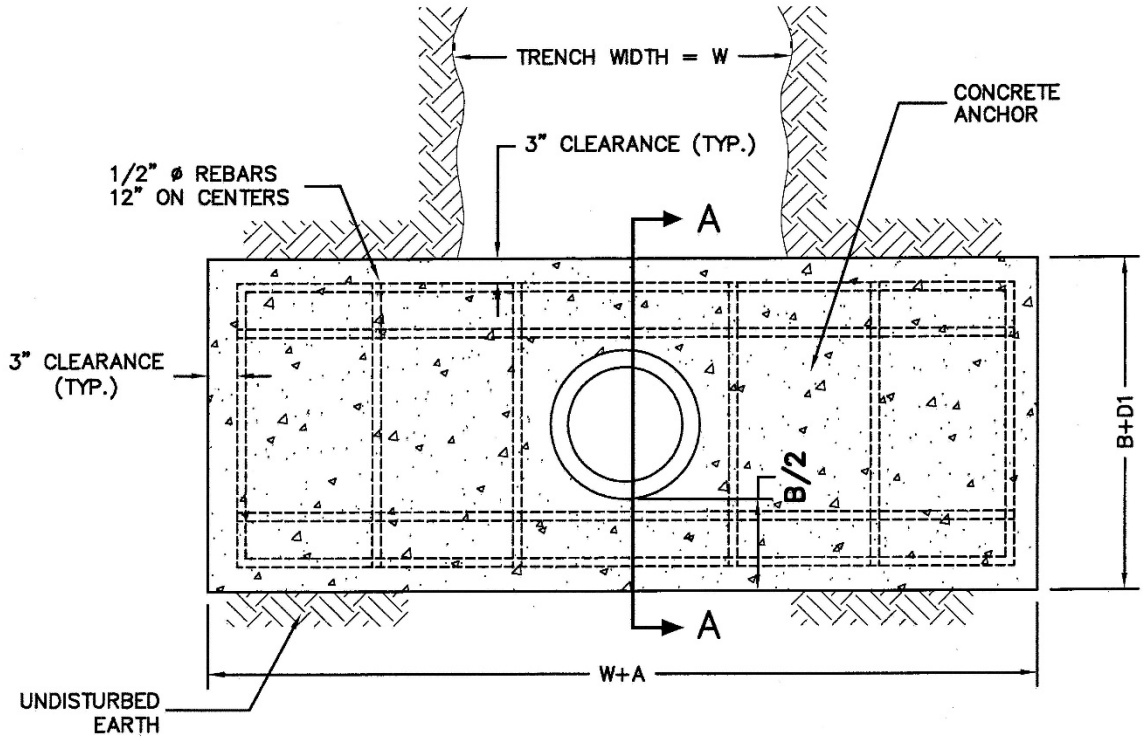
02-25-05 DATE | 03-31-07 EXP. | 27089 R.C.E. NO.

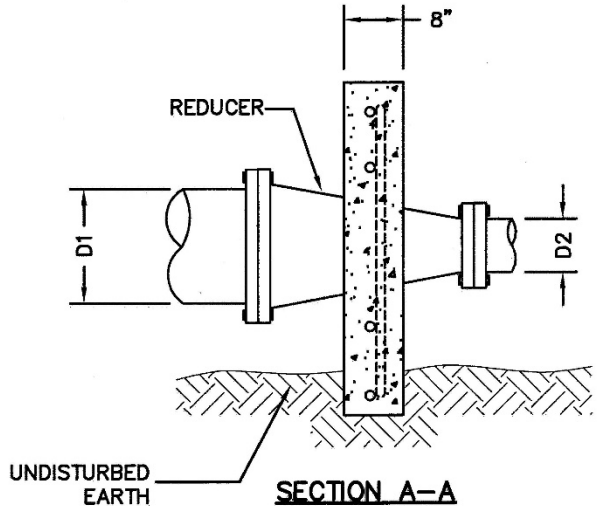
REGISTERED PROFESSIONAL ENGINEER TIMOTHY K. NG No. 27089 EXP. 03-31-07 STATE OF CALIFORNIA

CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

STANDARD ANCHOR FOR UPWARD THRUST

FILE NO. D-15





SECTION A–A

ANCHORS FOR REDUCER		
REDUCER SIZE D1 x D2	A	B
12"x10"	2'–0"	2'–0"
12"x 8"	2'–6"	2'–0"
12"x 6"	3'–2"	2'–0"
8" x 6"	2'–0"	1'–4"
8" x 4"	2'–10"	1'–4"
6" x 4"	1'–4"	1'–4"

NOTE:

REDUCER ANCHOR IS REQUIRED ONLY WHEN LARGER CONNECTION JOINT IS OTHER THAN FLANGED

Revision	Date	Approved
Drawn : QT	Date : 02-25-05	
Checked : RK	Scale : NTS	

APPROVED BY:

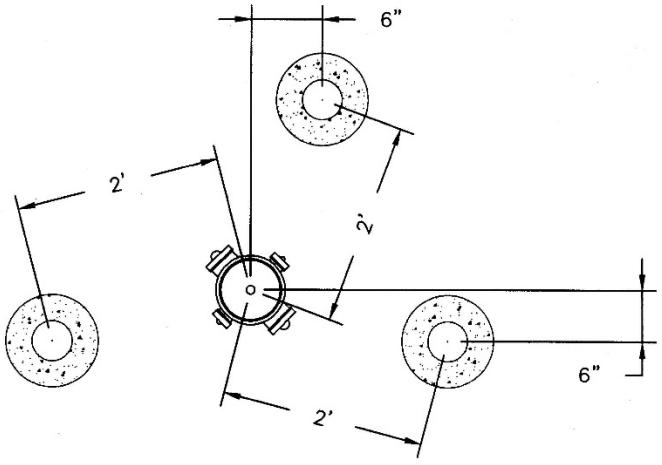
ASSISTANT PUBLIC WORK DIRECTOR

02-25-05 DATE | 05-31-07 EXP. | 27089 R.C.E. NO.

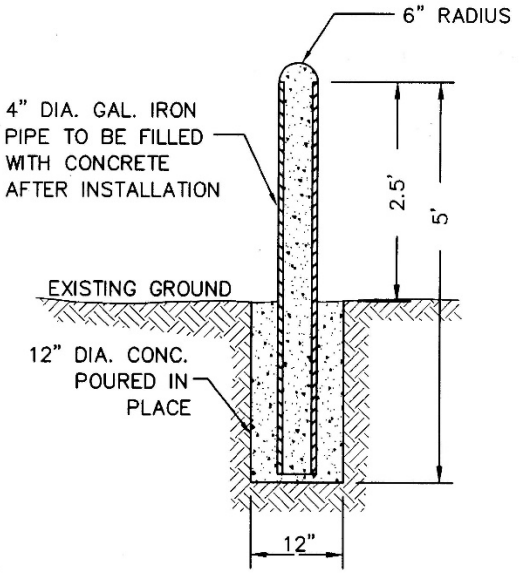
CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

STANDARD REDUCER ANCHOR

FILE NO. D–16



POST LOCATIONS



NOTE:

THE 4" IRON PIPE SHALL BE COATED WITH ZINC CHROMATE PRIMER BEFORE INSTALLATION.

Revision	Date	Approved
Drawn : QT	Date : 06-22-99	
Checked : RK	Scale : NTS	

APPROVED BY: _____
ASSISTANT PUBLIC WORKS DIRECTOR

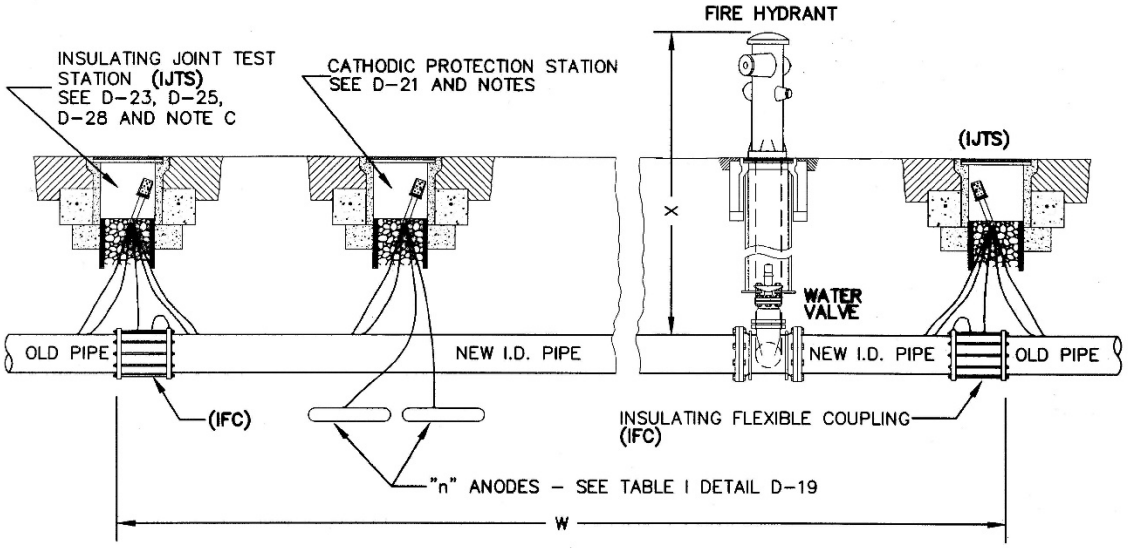
06-29-99 DATE | 03-31-01 EXP. | 27089 R.C.E. NO.

REGISTERED PROFESSIONAL ENGINEER TIMOTHY Y. QUAN No. 27089 EXP. 03-31-01 STATE OF CALIFORNIA

CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

FIRE HYDRANT GUARD POST

FILE NO. D-17



NOTES: TYPICAL CATHODIC PROTECTION SYSTEM

A. POLYETHYLENE ENCASED D.I. PIPE AND FITTINGS WITH BONDED JOINTS. (SEE D-26 FOR BONDING REQUIREMENTS).

B. DETERMINE ANODE TEST STATION (ATS) REQUIREMENTS BY THE FOLLOWING STEPS:

STEP 1: DETERMINE LENGTH (L) BY THE FOLLOWING FORMULA:

$$L = W + N (X + 5)$$

WHERE N = NUMBER OF FIRE HYDRANTS
X & W = DEFINED AS SHOWN ABOVE

STEP 2: DETERMINE SOIL RESISTIVITY OF SOIL AT PROPOSED ATS.

STEP 3: DETERMINE THE NUMBER OF "n" OF ANODES TO BE INSTALLED FROM TABLE I, D-19

C. INSULATING FITTING NOT REQUIRED FOR CONNECTION TO EXISTING NON-METALLIC PIPE. PROVIDE 2-WIRE TEST STATION AT D.I. PIPE ENDS PER D-25 WHERE INSULATING FITTINGS ARE NOT REQUIRED.

Revision	Date	Approved
Drawn : QT	Date : 05-23-99	
Checked : RK	Scale : NTS	

APPROVED BY: _____ ASSISTANT PUBLIC WORKS DIRECTOR

06-29-99 DATE

REGISTERED PROFESSIONAL ENGINEER TIMOTHY Y. LE No. 27089 EXP. 03-31-01 STATE OF CALIFORNIA

EXP. 27089 R.C.E. NO.

CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

STANDARD CATHODIC PROTECTION SYSTEM DUCTILE IRON PIPE

FILE NO. D-18

TABLE I:

NEW DUCTILE IRON PIPE LINES
ANODE REQUIREMENTS FOR WRAPPED PIPE
(WITH KNOWN SOIL RESISTIVITY)

SIZE OF PIPE D (INCHES)	PIPE LENGTH (FEET)	NUMBER "n" OF ANODES REQUIRED SOIL RESISTIVITY (Ohm-m)				
		LESS THAN 10	11 TO 30	31 TO 50	51 TO 70	71 TO 120
4	50	1	1	1	1	1
	100	1	1	1	1	2
	150	1	1	2	2	3
	200	1	1	2	2	3
	250	2	2 (1)	2	3	4
	300	2	2	3	3	5
6	50	1	1	1	1	1
	100	1	1	1	2	2
	150	2 (1)	2 (1)	2	2	3
	200	2 (1)	2	2	3	4
	250	2 (1)	2	3	4	5
	300	3 (1)	2	3	4	6
8	50	1	1	1	1	2
	100	1	1	2	2	3
	150	1	2 (1)	2	3	4
	200	2 (1)	2	3	4	5
	250	3 (1)	3 (2)	4	5	7
	300	3 (1)	3	4	6	8
12	50	1 (1)	1 (1)	1 (1)	2 (2)	3 (3)
	100	2 (1)	2 (2)	2 (2)	4 (3)	5 (5)
	150	3 (1)	3 (2)	4 (3)	5 (4)	8 (8)
	200	3 (1)	3 (3)	5 (4)	7 (6)	10 (9)
	250	4 (2)	4 (3)	5 (5)	8 (7)	13 (12)
	300	5 (2)	5 (4)	7 (6)	10 (8)	16 (14)

NOTES:

1. USE 20-POUND MAGNESIUM ANODES PER STANDARD DETAILS (SEE D-37). THE VALUES IN BRACKETS INDICATES THE NUMBER OF 60-POUND ANODES WHICH ARE REQUIRED IN LIEU OF 20-POUND ANODES.
2. IF SOIL RESISTIVITY IS NOT DETERMINED FOR THE LOCATION, USE MAGNESIUM ANODES FOR 71 TO 120 OHM-M SOIL RESISTIVITY.
3. TABULAR VALUES ARE BASED ON POLYETHYLENE ENCASED PIPE AND FITTINGS, BONDED FOR CONTINUITY AND OTHER ELECTRICALLY INSULATED METAL PIPES.

Revision	Date	Approved
Drawn : QT	Date : 05-23-99	
Checked : RK	Scale : NTS	

REGISTERED PROFESSIONAL ENGINEER TIMOTHY Y. CHOI No. 27089 EXP. 03-31-01 STATE OF CALIFORNIA

APPROVED BY:

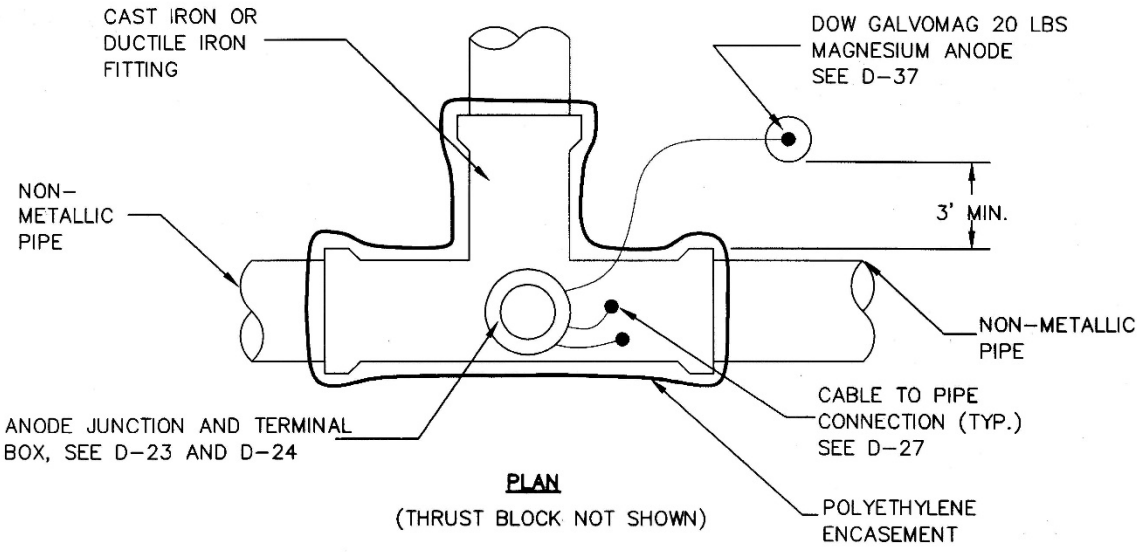
ASSISTANT PUBLIC WORKS DIRECTOR

06-29-99 DATE | 03-31-01 EXP. | 27089 R.C.E. NO.

CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

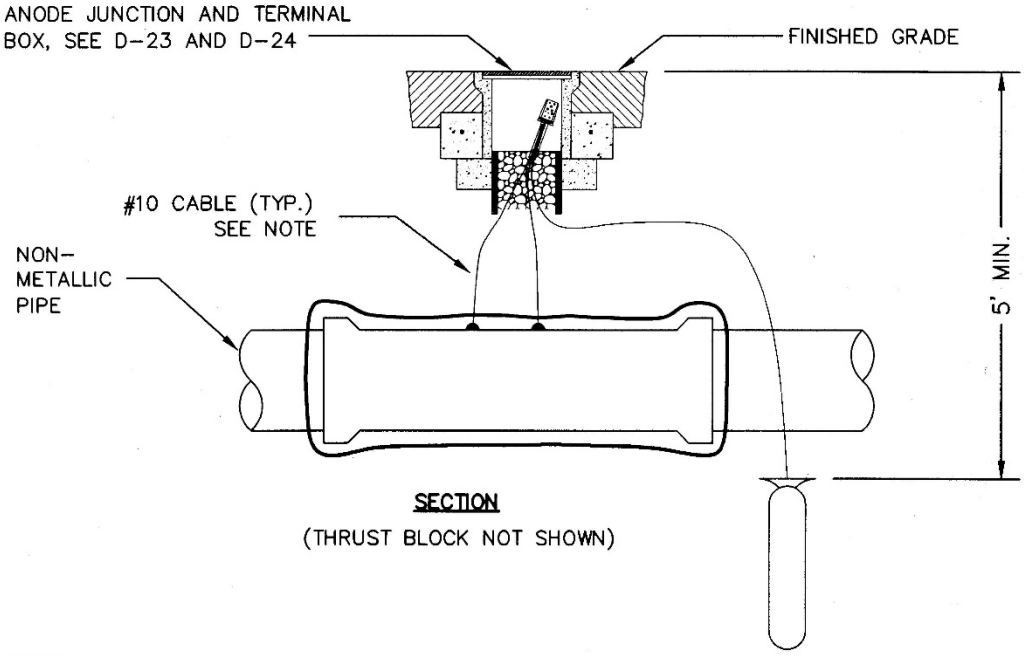
STANDARD DUCTILE IRON PIPE ANODE REQUIREMENTS (TABLE I)

FILE NO. D-19



PLAN

(THRUST BLOCK NOT SHOWN)



SECTION

(THRUST BLOCK NOT SHOWN)

NOTE:
PROVIDE 2-#10 TYPE CP CABLES FROM EACH FITTING AND BOND ALL METAL ELEMENTS PER D-26

Revision	Date	Approved	
Drawn : QT	Date : 05-24-99		
Checked : RK	Scale : NTS		
APPROVED BY			

REGISTERED PROFESSIONAL ENGINEER TIMOTHY Y. OTA No. 27089 EXP. 03-31-01 STATE OF CALIFORNIA

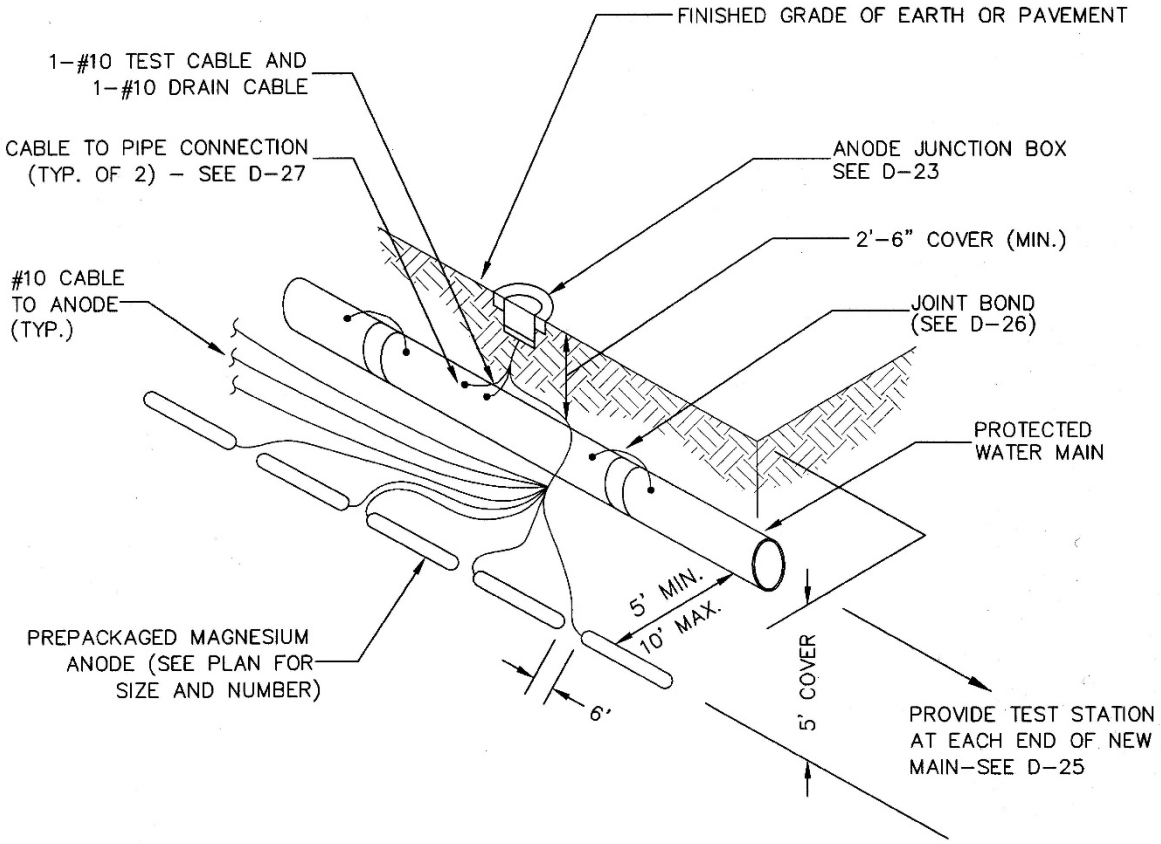
ASSISTANT PUBLIC WORKS DIRECTOR

06-29-99 DATE | 03-31-01 EXP. | 27089 R.C.E. NO.

CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

STANDARD DUCTILE IRON AND CAST IRON FITTINGS CATHODIC PROTECTION FOR NON-METALLIC PIPE

FILE NO. D-20



Revision	Date	Approved
Drawn : QT	Date : 05-15-99	
Checked : RK	Scale : NTS	

APPROVED BY: _____
ASSISTANT PUBLIC WORKS DIRECTOR

REGISTERED PROFESSIONAL ENGINEER
TIMOTHY Y. TYE
No. 27089
EXP. 03-31-01
STATE OF CALIFORNIA

06-29-99 DATE | 03-31-01 EXP | 27089 R.C.E. NO.

CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

STANDARD CATHODIC PROTECTION STATION ANODE INSTALLATION

FILE NO. D–21

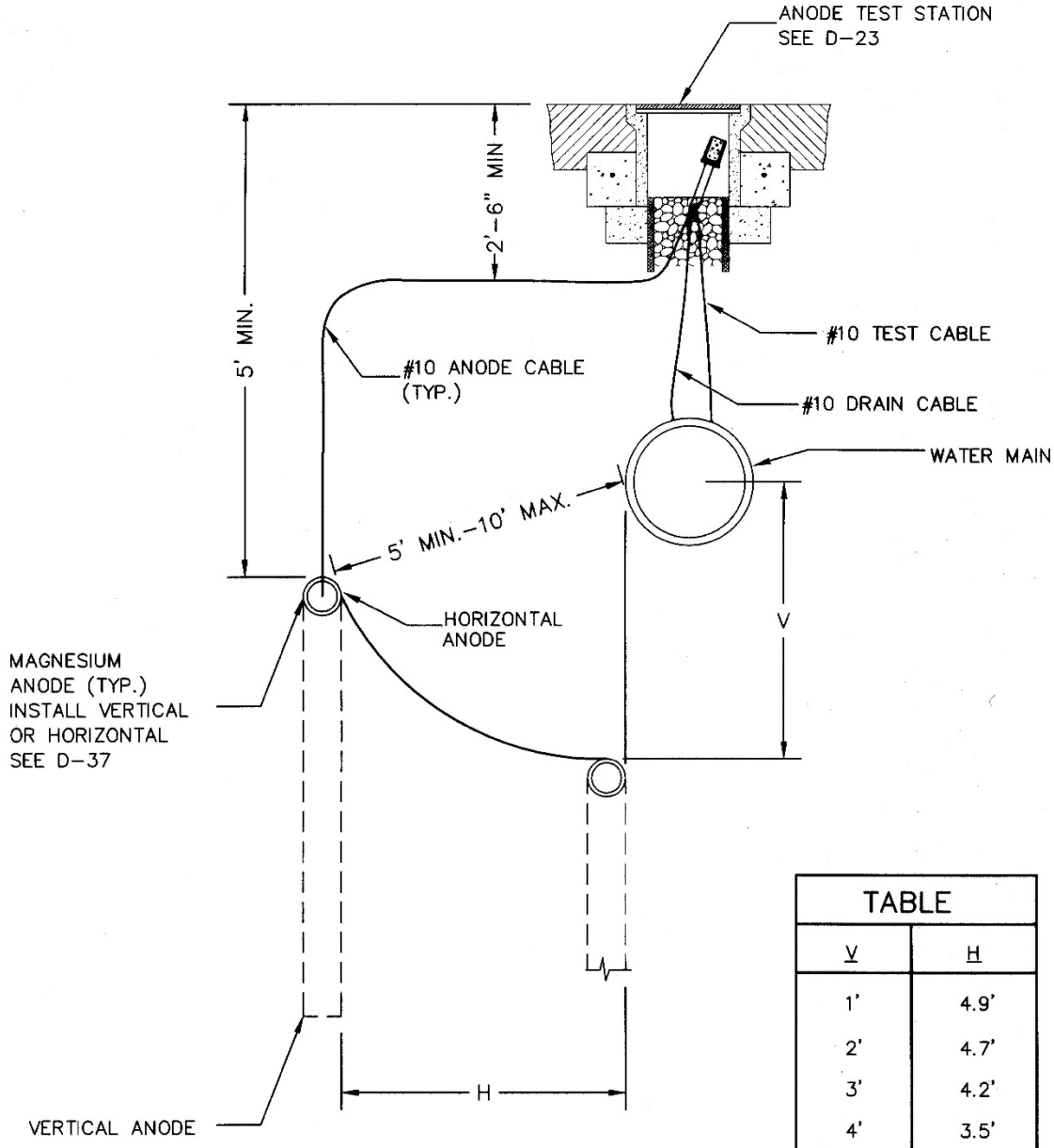


TABLE	
V	H
1'	4.9'
2'	4.7'
3'	4.2'
4'	3.5'
5'	2.4'
6'	0'

NOTE: ANODES MUST BE AT LEAST 5' FROM PIPE (SEE TABLE). VERTICAL INSTALLATION METHOD REQUIRES 10' O.C. BETWEEN ANODES.

Revision	Date	Approved
Drawn : QT	Date : 05-19-99	
Checked : RK	Scale : NTS	

APPROVED BY: ASSISTANT PUBLIC WORKS DIRECTOR

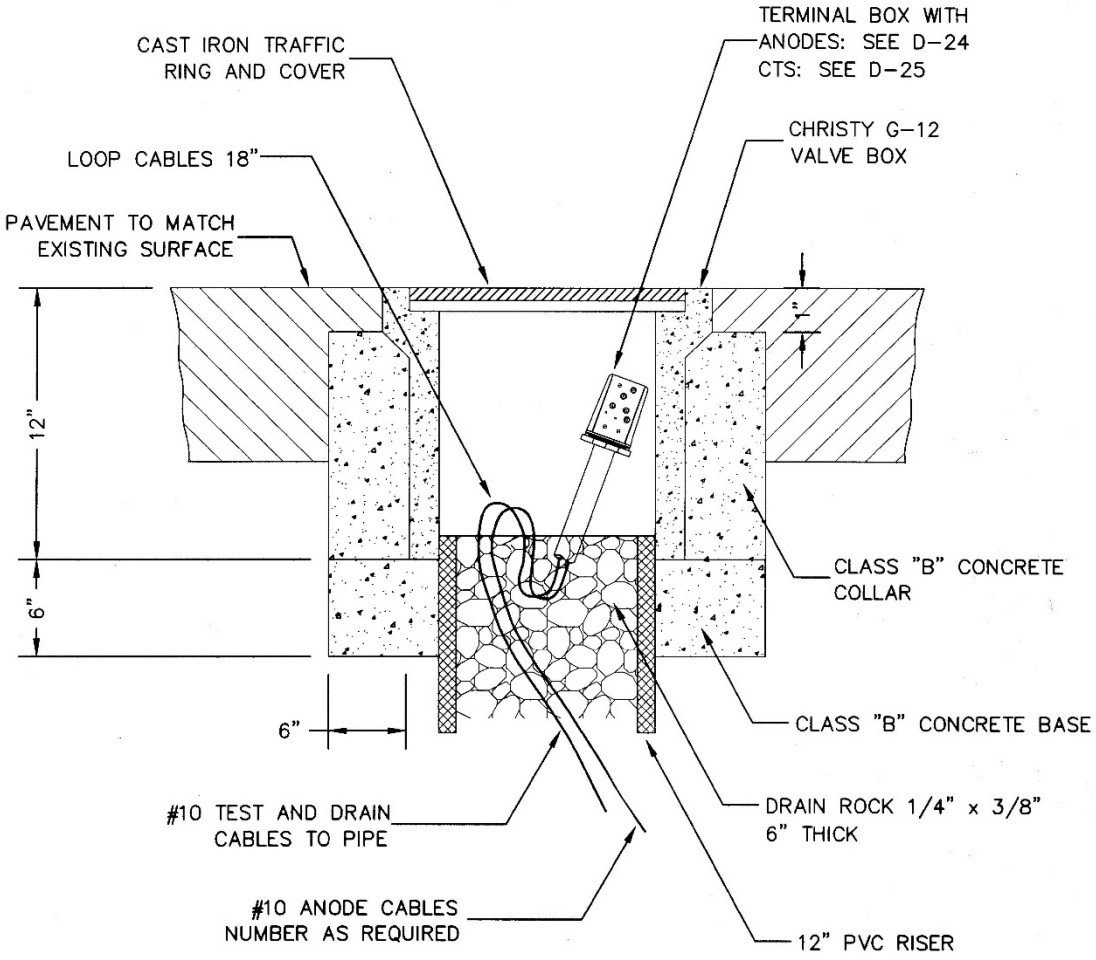
REGISTERED PROFESSIONAL ENGINEER TIMOTHY Y. QUE No. 27089 EXP. 03-31-01 STATE OF CALIFORNIA

06-29-99 DATE | 03-31-01 EXP. | 27089 R.C.E. NO.

CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

STANDARD ALTERNATIVE ANODE INSTALLATION

FILE NO. D-22



Revision	Date	Approved
Drawn : QT	Date : 05-26-99	
Checked : RK	Scale : NTS	

APPROVED BY: ASSISTANT PUBLIC WORKS DIRECTOR

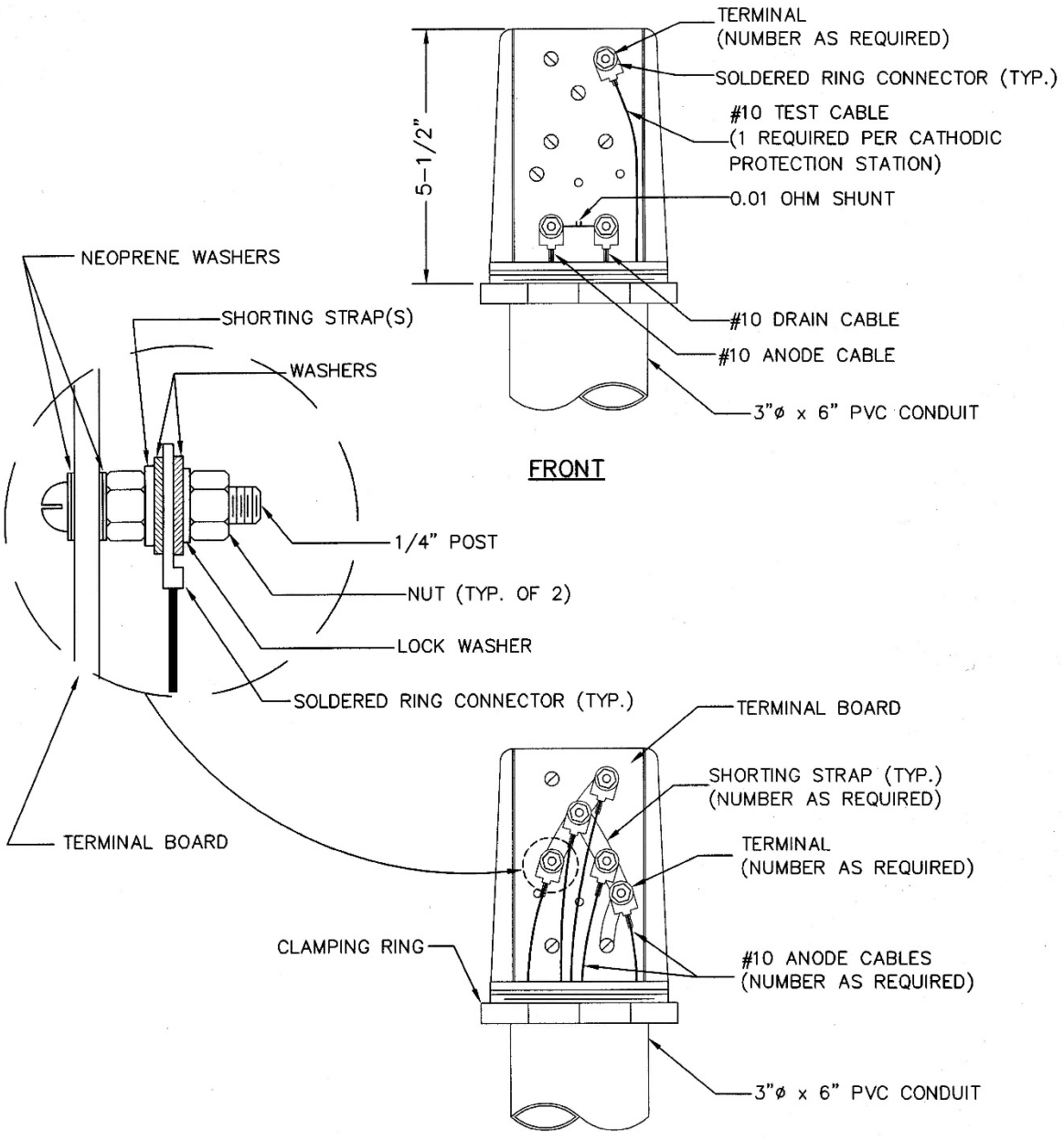
REGISTERED PROFESSIONAL ENGINEER TIMOTHY Y. TOM No. 27089 EXP. 03-31-01 STATE OF CALIFORNIA

06-29-99 DATE | 03-31-01 EXP. | 27089 R.C.E. NO.

CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

STANDARD TEST AND ANODE JUNCTION BOX

FILE NO. D-23



Revision	Date	Approved
Drawn : QT	Date : 05-21-99	
Checked : RK	Scale : NTS	

APPROVED BY

ASSISTANT PUBLIC WORKS DIRECTOR

06-29-99
DATE

03-31-01
EXP.

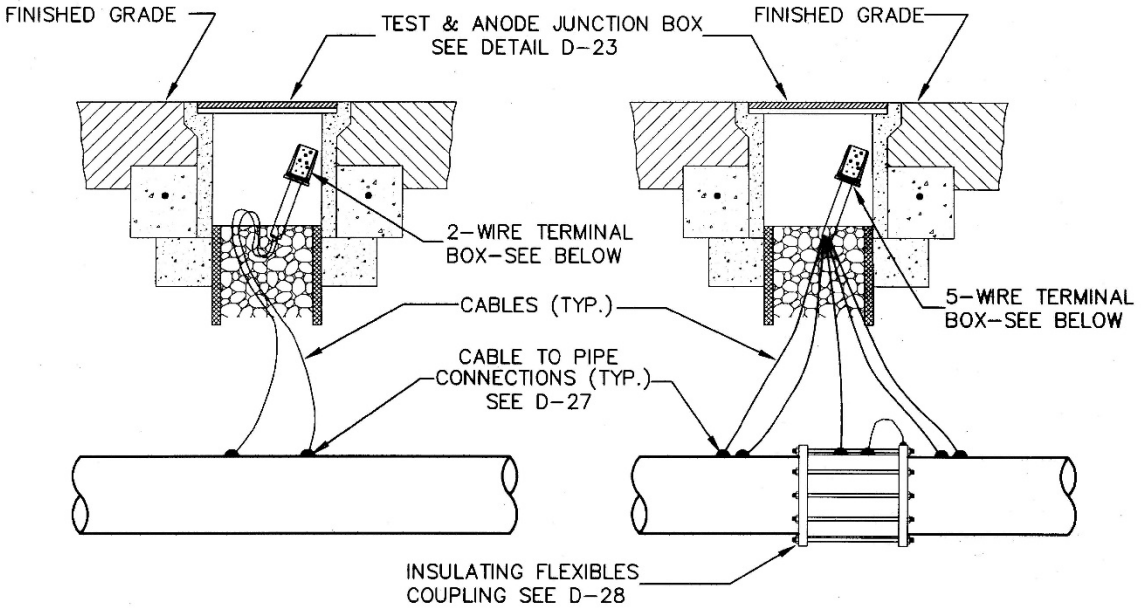
27089
R.C.E. NO.

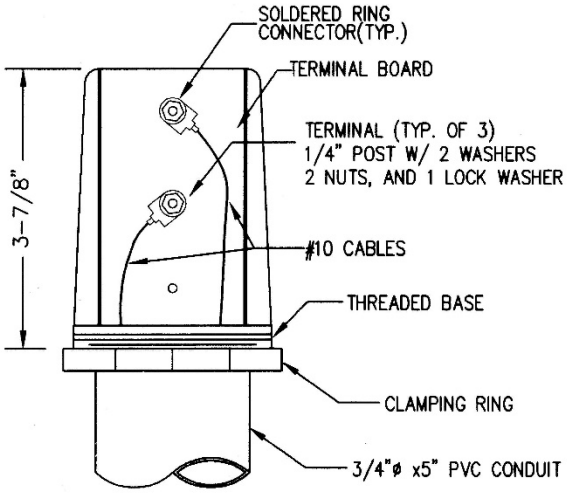
REGISTERED PROFESSIONAL ENGINEER
TIMOTHY Y. O'GLEE
No. 27089
EXP. 03-31-01
STATE OF CALIFORNIA

CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

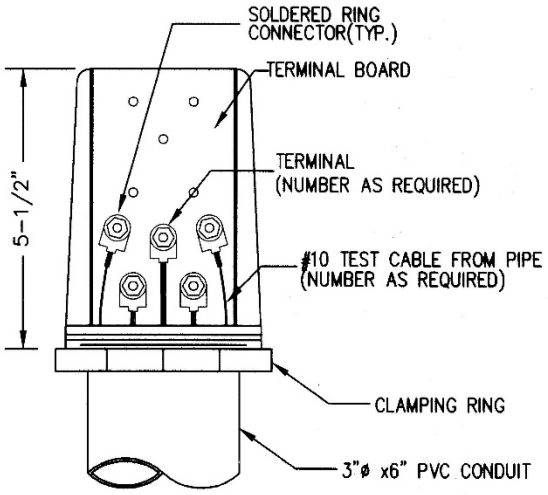
STANDARD ANODE TERMINAL BOX
(COVER NOT SHOWN)

FILE NO. D-24





2-WIRE TERMINAL BOX



5-WIRE TERMINAL BOX

Revision	Date	Approved
Drawn : QT	Date : 05-21-99	
Checked : RK	Scale : NTS	

APPROVED BY: ASSISTANT PUBLIC WORKS DIRECTOR

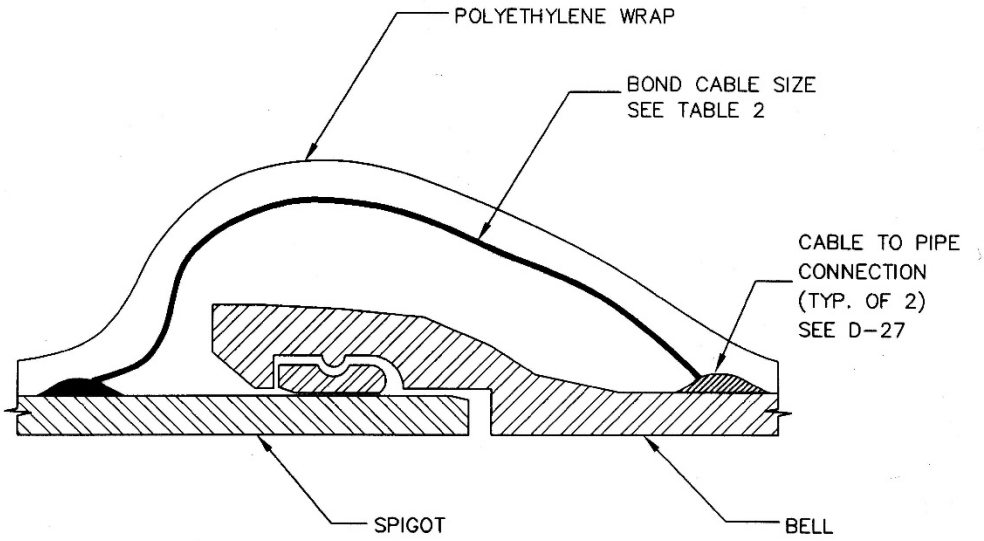
REGISTERED PROFESSIONAL ENGINEER TIMOTHY Y. QUIVE No. 27089 EXP. 03-31-01 STATE OF CALIFORNIA

06-29-99 DATE | 03-31-01 EXP. | 27089 R.C.E. NO.

CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

STANDARD TEST STATION & TERMINAL BOX (BOX COVERS NOT SHOWN)

FILE NO. D-25



NOTE:

BOND DETAIL IS USED FOR MECHANICAL AND PUSH-ON JOINTS

TABLE 2

PIPE SIZE (INCHES)	BOND SIZE (AWG No.)
4 TO 10	#6
12 TO 16	#4
20 TO 24	#2
30 TO 42	#1

Revision	Date	Approved
Drawn : QT	Date : 05-18-99	
Checked : RK	Scale : NTS	

APPROVED BY: _____ ASSISTANT PUBLIC WORKS DIRECTOR

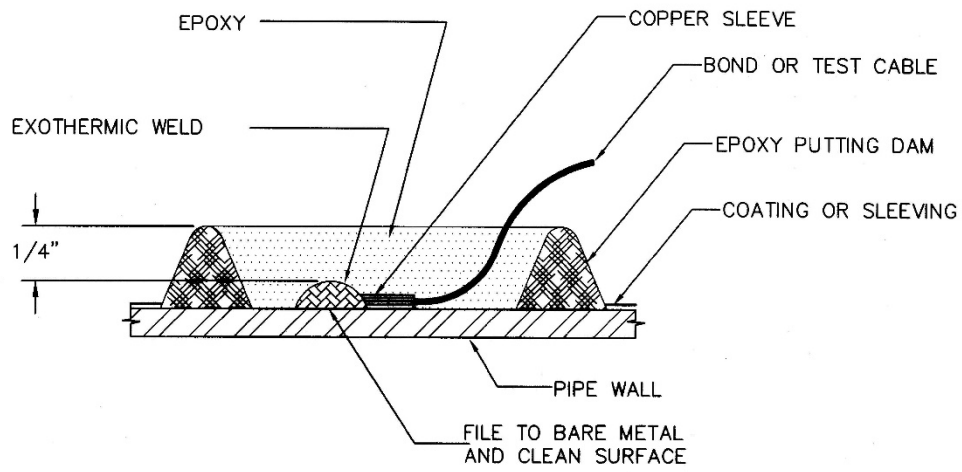
REGISTERED PROFESSIONAL ENGINEER TIMOTHY Y. LO No. 27089 EXP. 03-31-01 CIVIL STATE OF CALIFORNIA

06-29-99 DATE | 03-31-01 EXP. | 27089 R.C.E. NO.

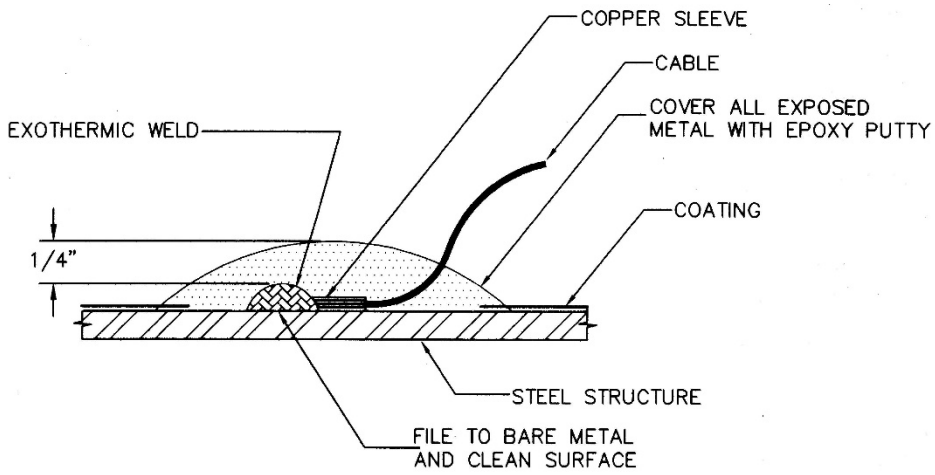
CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

STANDARD JOINT BOND FOR DUCTILE IRON PIPE

FILE NO. D-26



BELOW GROUND



ABOVE GROUND AND
VERTICAL WELDS

Revision	Date	Approved
Drawn : QT	Date : 05-27-99	
Checked : RK	Scale : NTS	

APPROVED BY:

REGISTERED PROFESSIONAL ENGINEER TIMOTHY Y. O'TT No. 27089 EXP. 03-31-01 STATE OF CALIFORNIA

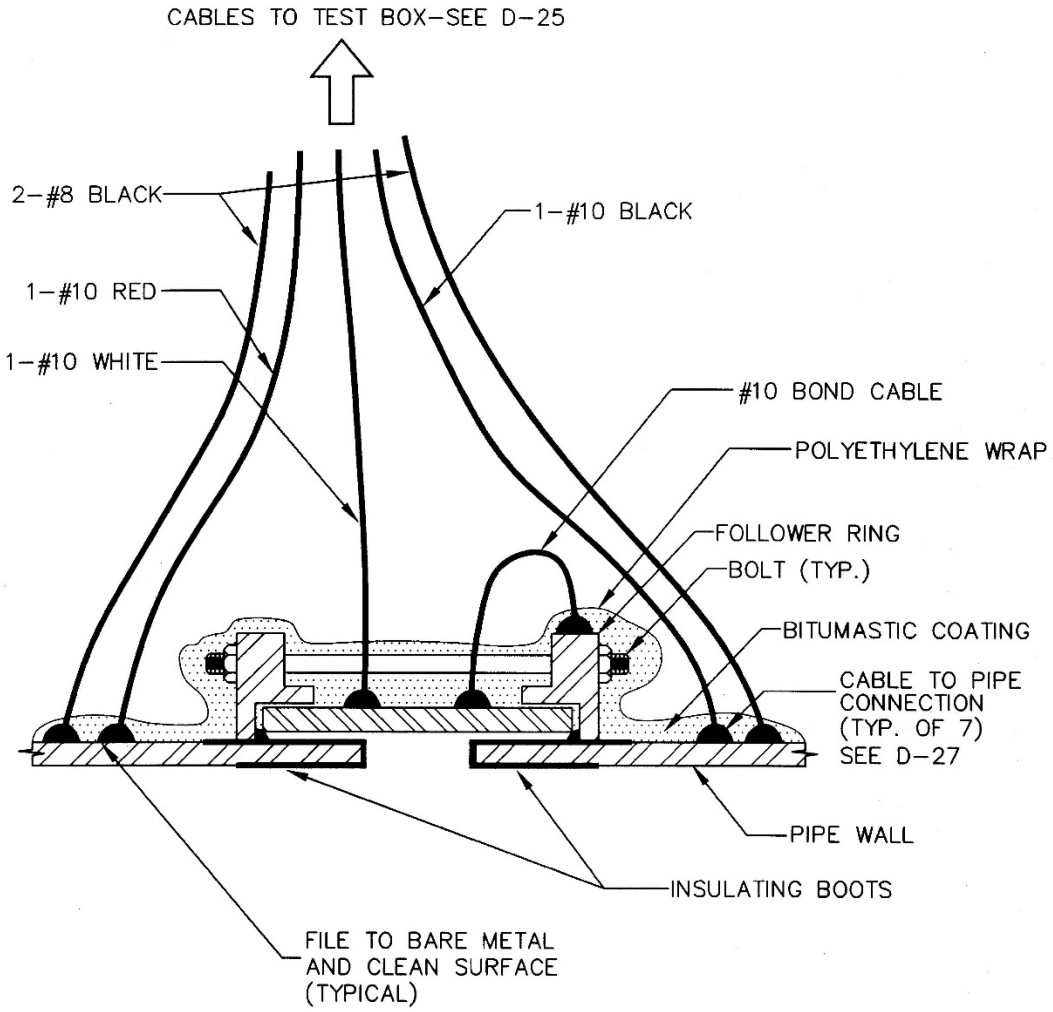
ASSISTANT PUBLIC WORKS DIRECTOR

06-29-99 DATE | 03-31-01 EXP. | 27089 R.C.E. NO.

CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

STANDARD CABLE TO PIPE CONNECTION

FILE NO. D-27



Revision	Date	Approved
Drawn : QT	Date : 05-18-99	
Checked : RK	Scale : NTS	

APPROVED BY:

REGISTERED PROFESSIONAL ENGINEER TIMOTHY J. TYLER No. 27089 EXP. 03-31-01 STATE OF CALIFORNIA

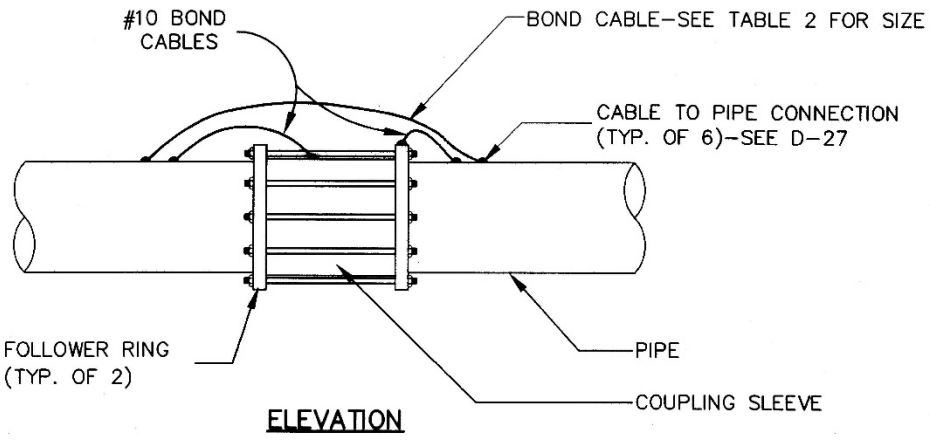
ASSISTANT PUBLIC WORKS DIRECTOR

06-29-99	03-31-01	27089
DATE	EXP.	R.C.E. NO.

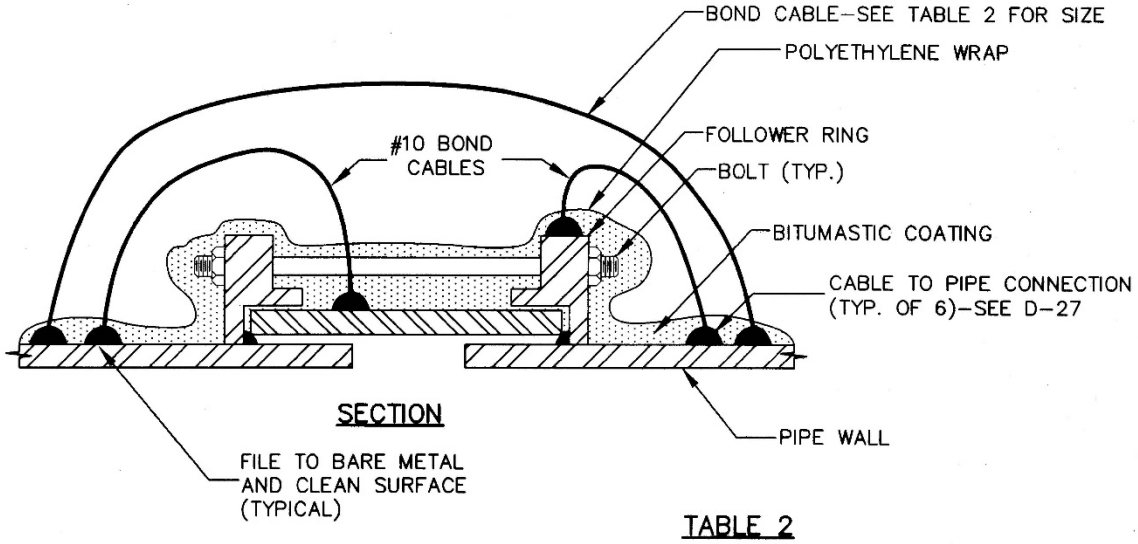
CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

STANDARD
INSULATING FLEXIBLE COUPLING SECTION

FILE NO. D–28



ELEVATION



SECTION

TABLE 2

BOND SIZE

PIPE SIZE (INCHES)	BOND SIZE (AWG No.)
4 TO 10	#6
12 TO 16	#4
20 TO 24	#2
30 TO 42	#1

Revision	Date	Approved
Drawn : QT	Date : 05-15-99	
Checked : RK	Scale : NTS	

APPROVED BY: REGISTERED PROFESSIONAL ENGINEER TIMOTHY Y. O'LEARY No. 27089 EXP. 03-31-01 STATE OF CALIFORNIA

ASSISTANT PUBLIC WORKS DIRECTOR

06-29-99 DATE | 03-31-01 EXP. | 27089 R.C.E. NO.

CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

STANDARD FLEXIBLE COUPLING BOND

FILE NO. D–29

TABLE II:

NEW COPPER SERVICE LINES
ANODE REQUIREMENTS FOR WRAPPED PIPE
(WITH KNOWN SOIL RESISTIVITY)

SIZE OF SERVICE (INCHES)	SOIL RESISTIVITY (Ohm-m)				
	LESS THAN 10	11 TO 30	31 TO 50	51 TO 70	71 TO 120
1/2 & 5/8	1 # 12	1 # 12	1 # 12	1 # 17	1 # 17
1, 3/4 & 1-1/4	1 # 12	1 # 12	1 # 17	1 # 17	1 # 17
1-1/2 & 2	1 # 12	1 # 17	1 # 17	1 # 17	1 # 17
2-1/2 & 3	1 # 17	1 # 17	1 # 17	1 # 17	2 # 17

NOTES:

1. USE MAGNESIUM ANODES PER STANDARD DETAILS FOR VALUES BELOW DOUBLE LINE, AND ZINC ANODES PER STANDARD DETAILS FOR VALUES ABOVE DOUBLE LINES.

2. IF SOIL RESISTIVITY IS NOT DETERMINED FOR THE LOCATION, USE (1) 17# MAGNESIUM ANODE FOR SERVICES 1-1/2" AND SMALLER, AND (2) 17# MAGNESIUM ANODES FOR SERVICES LARGER THAN 2" AND UP TO 50 FEET LONG.

3. TABULAR VALUES ARE BASED ON 50 FEET OF SERVICE LINE OR LESS. FOR SERVICE LINES FROM 50 FEET TO 100 FEET LONG, USE 2 TIMES THE TABULAR VALUE.

Revision	Date	Approved
Drawn : QT	Date : 05-15-99	
Checked : RK	Scale : NTS	

APPROVED BY: _____
ASSISTANT PUBLIC WORKS DIRECTOR

REGISTERED PROFESSIONAL ENGINEER TIMOTHY Y. O'CONNELL No. 27089 EXP. 03-31-01 STATE OF CALIFORNIA

06-29-99 DATE | 03-31-01 EXP. | 27089 R.C.E. NO.

CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

STANDARD COPPER SERVICE LINE
ANODE REQUIREMENTS
CORROSION CONTROL DETAILS
(TABLE II)

FILE NO. D-30

NOTES: 1. SEE STANDARD DETAIL D-1 FOR LOCATION PLAN.

2. FIELD APPLY BITUMASTIC 50 ON ALL BARE METAL AND COVER WITH POLYETHYLENE ENCASEMENT IN ACCORDANCE WITH AWWA STANDARD C105.

3. USE CLAMP FOR COUPLING TYPE METER. ATTACH SHUNT TO SERVICE WITH SOLDER TYPE TERMINAL RING TO BOLT FOR FLANGED METERS.

Revision	Date	Approved
Drawn : QT	Date : 02-25-05	
Checked : RK	Scale : NTS	

APPROVED BY: _____
ASSISTANT PUBLIC WORKS DIRECTOR

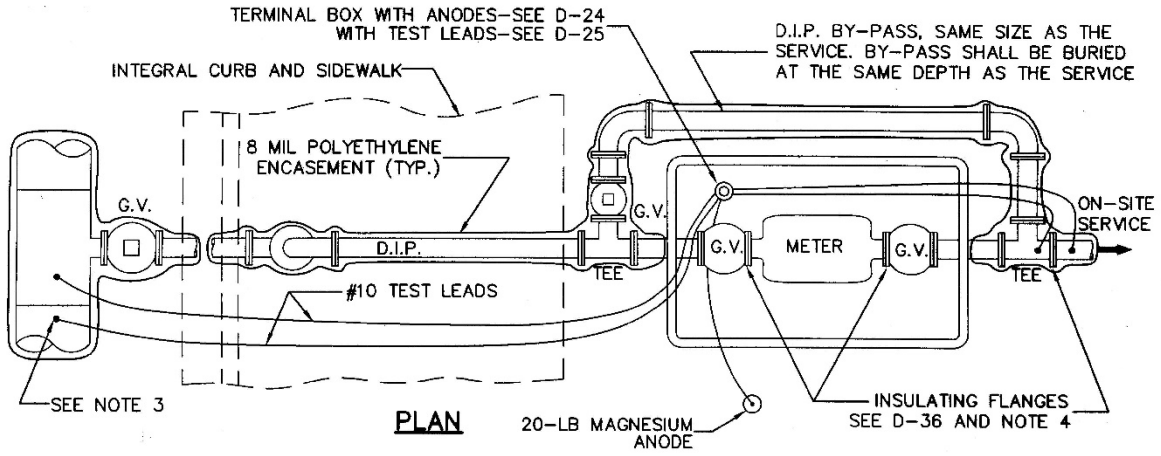
02-25-05 DATE | 03-31-07 EXP. | 27089 R.C.E. NO.

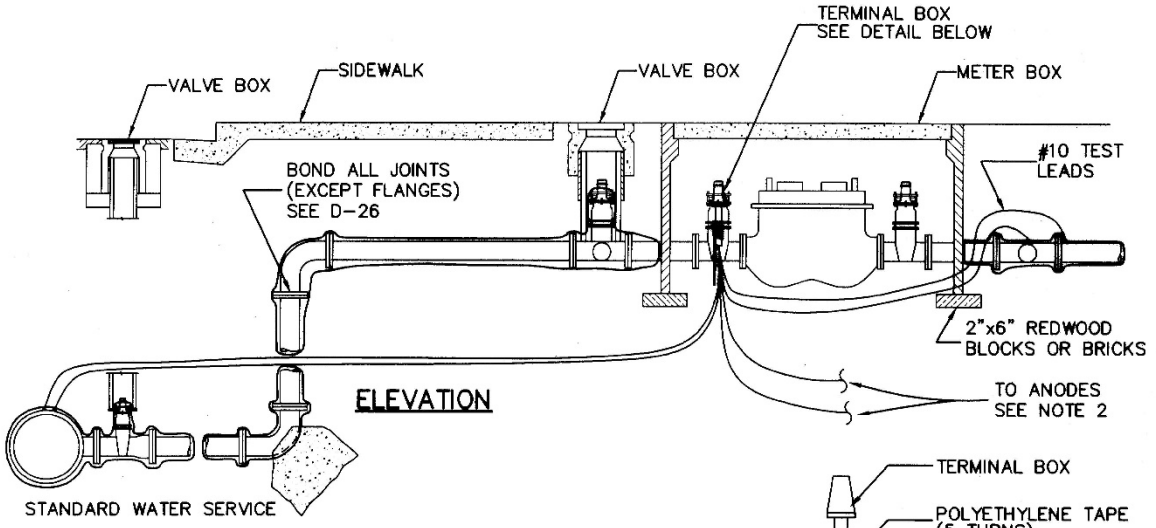
REGISTERED PROFESSIONAL ENGINEER TIMOTHY A. KOSTER No. 27089 EXP. 03-31-07 STATE OF CALIFORNIA

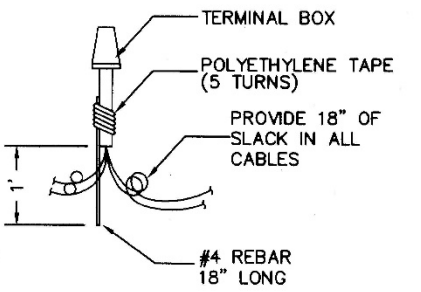
CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

STANDARD 2" OR SMALLER COPPER SERVICE INSTALLATION - D.I.P. MAIN CORROSION CONTROL DETAILS

FILE NO. D-31







NOTES:

1. FOR METER INSTALLATION SEE STANDARD D–3
2. PROVIDE 2–WIRE TEST STATION FOR SERVICES WHICH ARE ATTACHED TO OLD A/C OR C.I. PIPE. PROVIDE CATHODIC PROTECTION IN ACCORDANCE WITH PLANS AND STANDARD D–18 FOR NEW DUCTILE IRON PIPE.
3. CONNECT TEST LEAD TO SERVICE PIPE IF WATER MAIN IS A.C.
4. ADD INSULATED FLANGES TO ISOLATE METER ONLY IF THE INSTALLATION DOES NOT REQUIRE CATHODIC PROTECTION.

Revision	Date	Approved
Drawn : QT	Date : 05-18-99	
Checked : RK	Scale : NTS	

APPROVED BY: ASSISTANT PUBLIC WORKS DIRECTOR

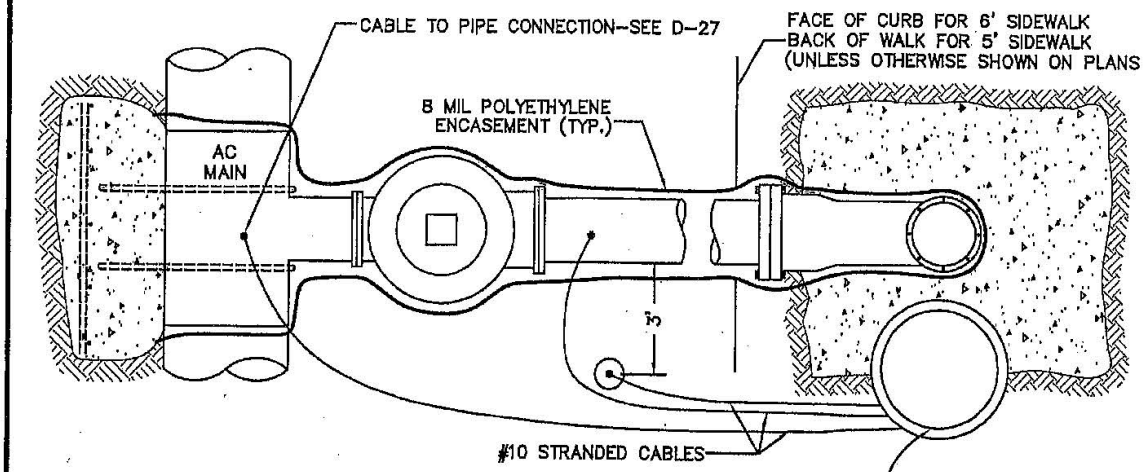
REGISTERED PROFESSIONAL ENGINEER TIMOTHY Y. TYLE No. 27089 EXP. 03-31-01 STATE OF CALIFORNIA

06-29-99 DATE | 03-31-01 EXP. | 27089 R.C.E. NO.

CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

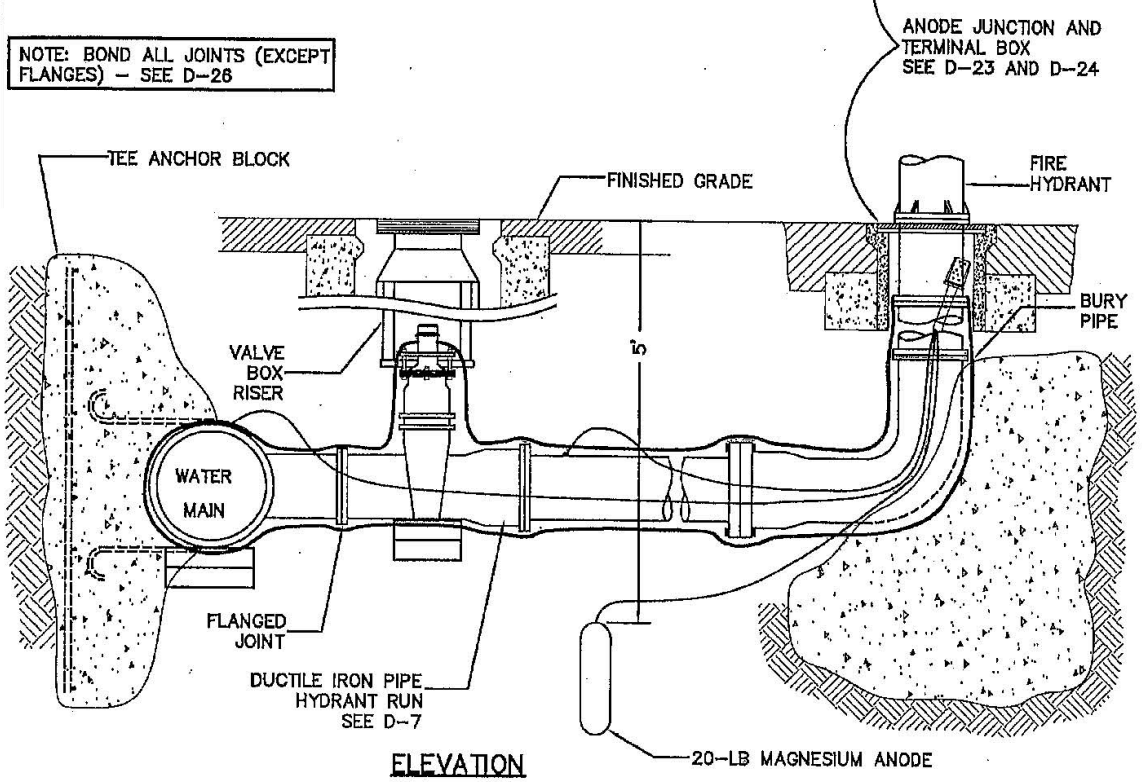
STANDARD 4" OR LARGER METER INSTALLATION CORROSION CONTROL DETAILS

FILE NO. D–31A



PLAN

NOTE: BOND ALL JOINTS (EXCEPT FLANGES) – SEE D–26



ELEVATION

Revision	Date	Approved	
Drawn : QT	Date : 02-25-05		
Checked : RK	Scale :NTS		
APPROVED BY:			

REGISTERED PROFESSIONAL ENGINEER TIMOTHY Y. LEE No. 27089 EXP. 03-31-07 STATE OF CALIFORNIA

ASSISTANT PUBLIC WORKS DIRECTOR

02-25-05 DATE | 03-31-07 EXP. | 27089 R.C.E. NO.

CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

STANDARD FIRE HYDRANT INSTALLATION
CORROSION CONTROL DETAILS –ACP MAINS

FILE NO. D–31B

NOTES: 1. SEE STANDARD DETAIL D-1 FOR LOCATION PLAN.

2. FIELD APPLY BITUMASTIC 50 ON ALL BARE METAL AND COVER WITH POLYETHYLENE ENCASEMENT IN ACCORDANCE WITH AWWA STANDARD C105.

3. USE CLAMP FOR COUPLING TYPE METER. ATTACH SHUNT TO SERVICE WITH SOLDER TYPE TERMINAL RING TO BOLT FOR FLANGED METERS.

Revision	Date	Approved
Drawn : QT	Date : 02-25-05	
Checked : RK	Scale : NTS	

APPROVED BY:

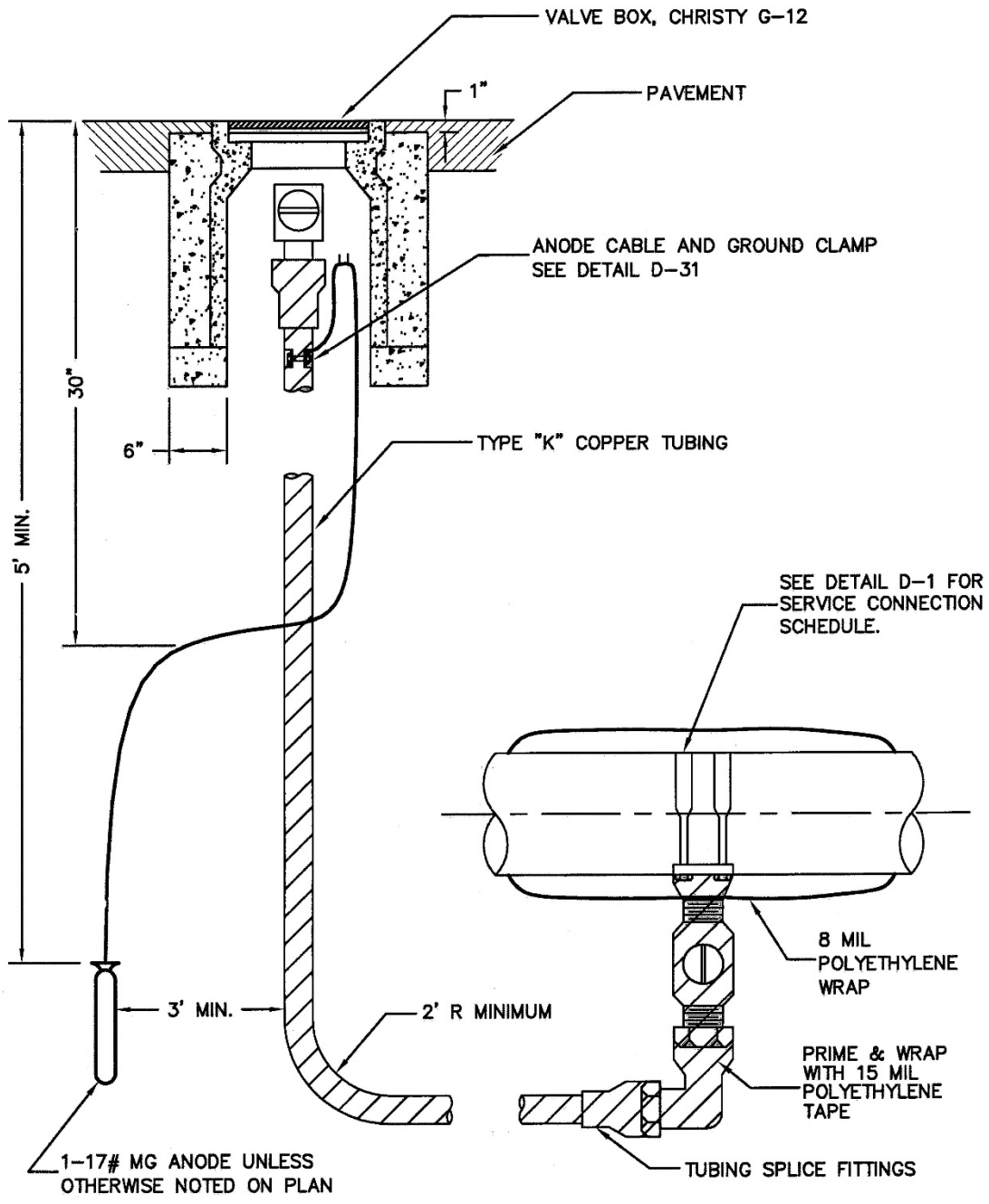
ASSISTANT PUBLIC WORKS DIRECTOR

02-25-05 DATE | 03-31-07 EXP. | 27089 R.C.E. NO.

CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

STANDARD 2" OR SMALLER COPPER SERVICE INSTALLATION-ACP MAINS CORROSION CONTROL DETAILS

FILE NO. D-32



Revision	Date	Approved
Drawn : QT	Date : 02-25-05	
Checked : RK	Scale : NTS	

APPROVED BY:

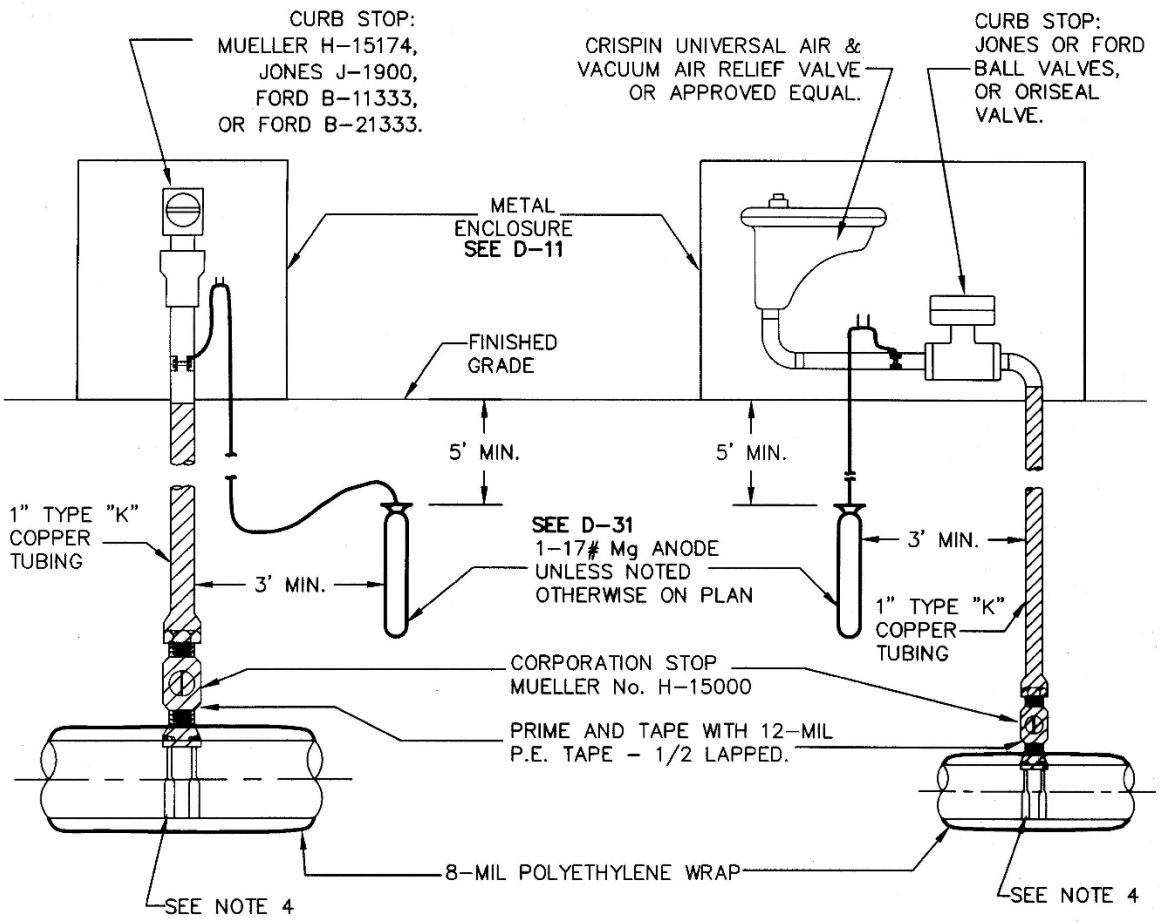
ASSISTANT PUBLIC WORKS DIRECTOR

02-25-05 DATE | 03-31-07 EXP. | 27089 R.C.E. NO.

CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

2" STANDARD BLOW-OFF VALVE CATHODIC PROTECTION

FILE NO. D-33



MANUAL AIR RELIEF VALVE **AUTOMATIC AIR & VACUUM VALVE**

NOTES:

1. CONNECTION TO WATER MAIN SHALL CONFORM TO STANDARD DETAILS AND SPECIFICATIONS.
2. USE SAME DIAMETER SEAMLESS COPPER TUBING AS REQUIRED SIZE OF AIR & VACUUM RELIEF VALVE.
3. AIR RELIEF VALVE AND CURB STOP SHALL BE PLACED IN BOX SUCH THAT THE WALL OF THE BOX WILL NOT INTERFERE WITH THE INSTALLATION AND REMOVAL OF THE VALVES.
4. FOR A/C : DOUBLE STRAP SERVICE CLAMP.
   FOR PVC : SERVICE SADDLE APPROVED BY ENGINEER.
   FOR DIP, CIP : SEE DETAILS IN D-31

Revision	Date	Approved
Drawn : QT	Date : 05-20-99	
Checked : RK	Scale : NTS	

REGISTERED PROFESSIONAL ENGINEER TIMOTHY L. O'CONNOR No. 27089 EXP. 03-31-01 STATE OF CALIFORNIA

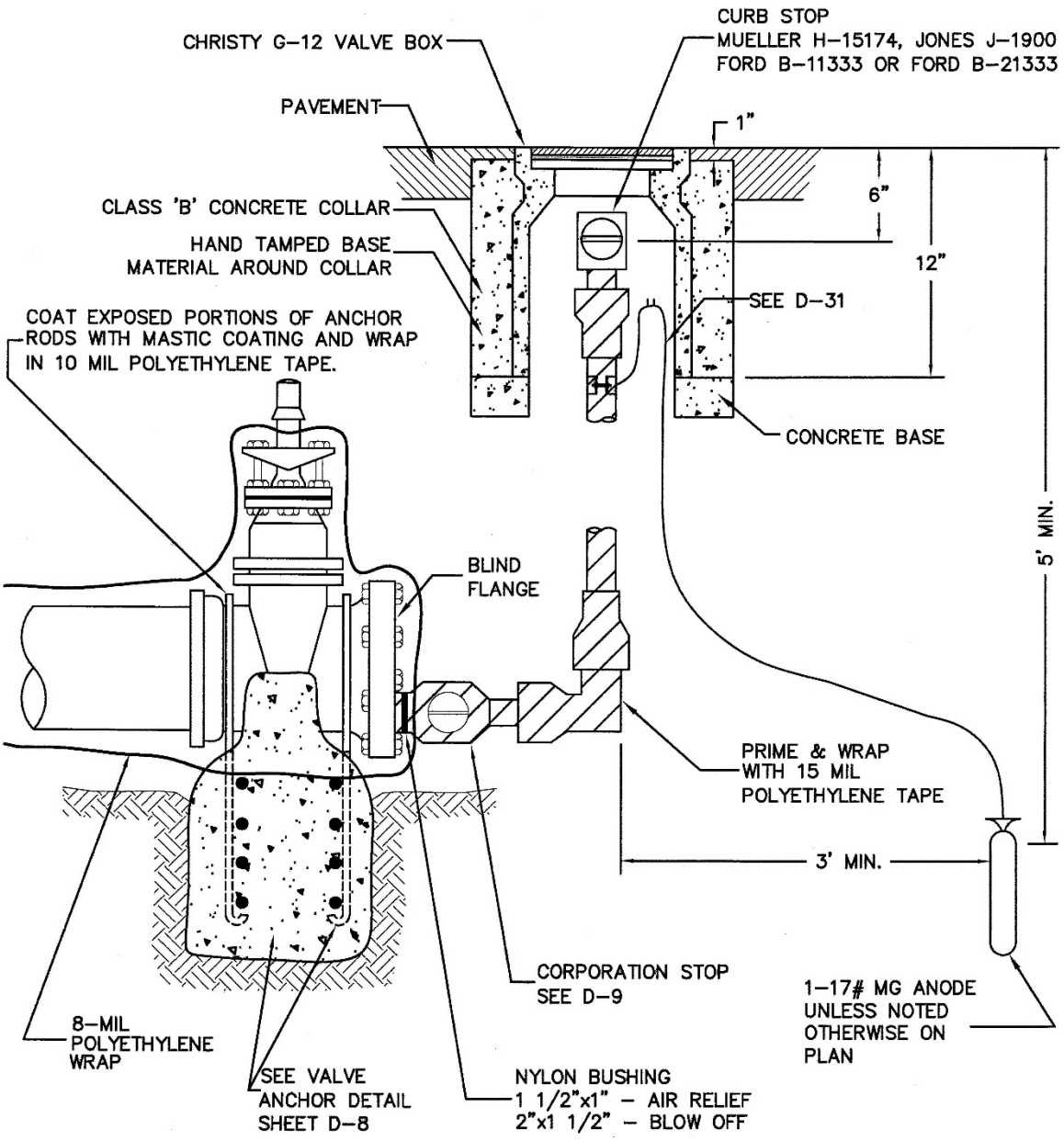
APPROVED BY: _____
ASSISTANT PUBLIC WORKS DIRECTOR

06-29-99 DATE | 03-31-01 EXP. | 27089 R.C.E. NO.

CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

STANDARD AIR RELIEF VALVE
CATHODIC PROTECTION

FILE NO. D-34



NOTE:

INSTALL AIR RELIEF OR BLOW-OFF ONLY AT LOCATIONS DESIGNATED ON THE PLANS.

Revision	Date	Approved
Drawn : QT	Date : 02-25-05	
Checked : RK	Scale : NTS	

APPROVED BY:

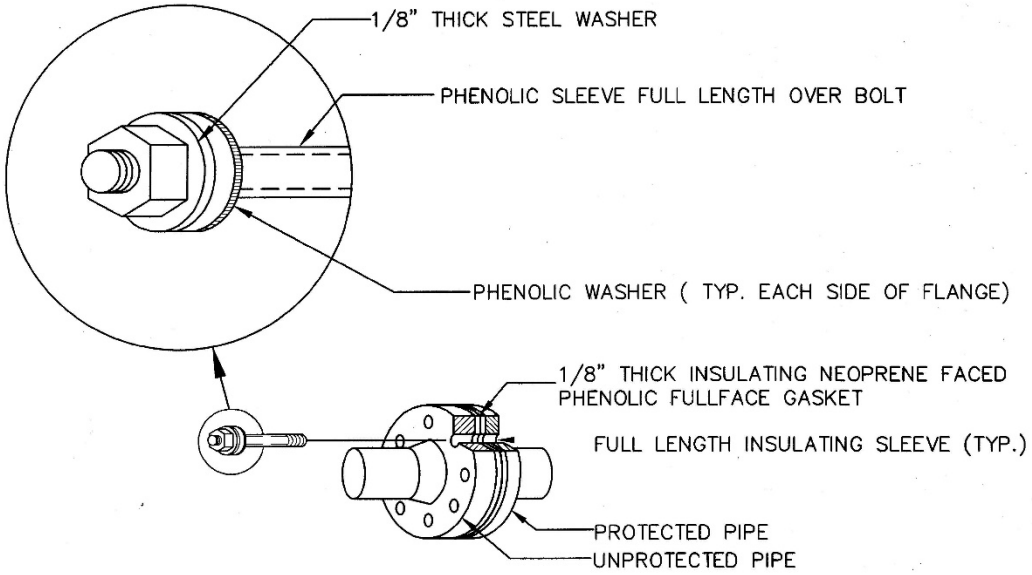
ASSISTANT PUBLIC WORKS DIRECTOR

02-25-05 DATE | 03-31-07 EXP. | 27089 R.C.E. NO.

CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

STANDARD BLIND FLANGED GATE VALVE AT END OF MAIN CATHODIC PROTECTION

FILE NO. D-35



INSULATING FLANGE

Revision	Date	Approved
Drawn : QT	Date : 05-22-99	
Checked : RK	Scale : NTS	

REGISTERED PROFESSIONAL ENGINEER TIMOTHY Y. LO No. 27089 EXP. 03-31-01 STATE OF CALIFORNIA

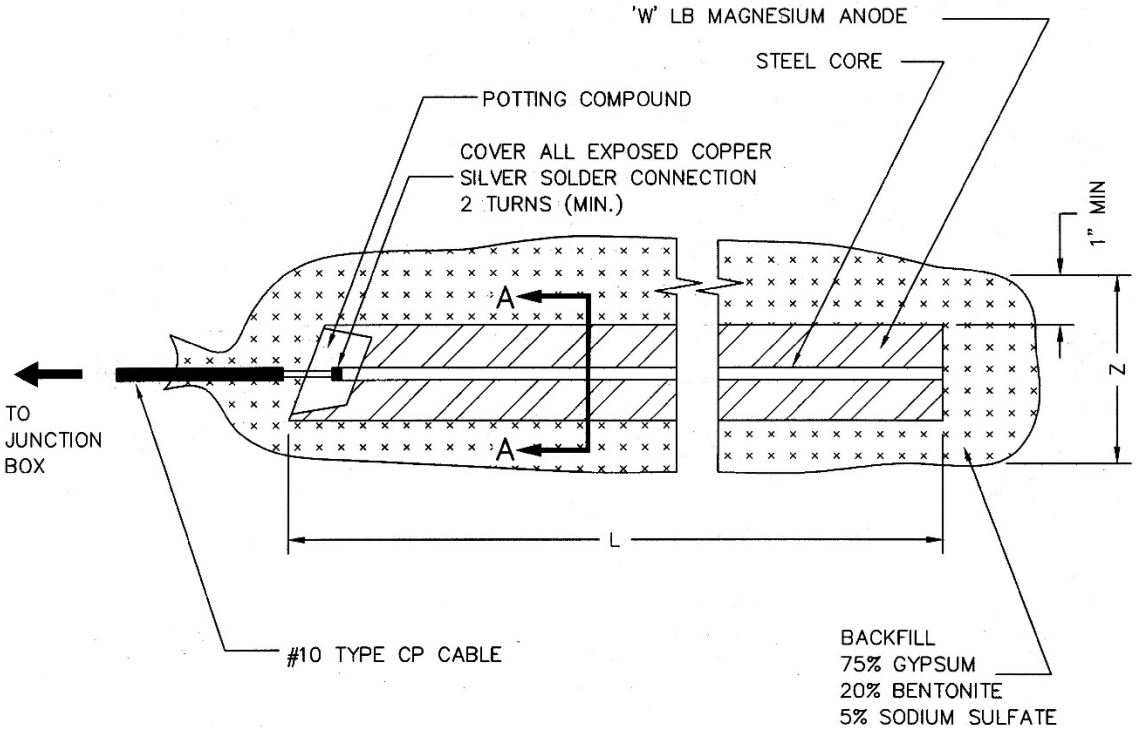
APPROVED BY: _____
ASSISTANT PUBLIC WORKS DIRECTOR

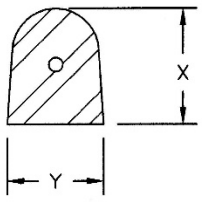
06-29-99 DATE | 03-31-01 EXP. | 27089 R.C.E. NO.

CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

STANDARD INSULATING FLANGE

FILE NO. D-36





SECTION A–A

W (LB)	17	60	20
X (IN)	3	4 1/2	3
Y (IN)	2 3/4	4 3/4	2 3/4
Z (IN)	5	7	5
L (IN)	50	59 3/4	59 3/4

Revision	Date	Approved
Drawn : QT	Date : 05-22-99	
Checked : RK	Scale : NTS	

APPROVED BY: _____
ASSISTANT PUBLIC WORKS DIRECTOR

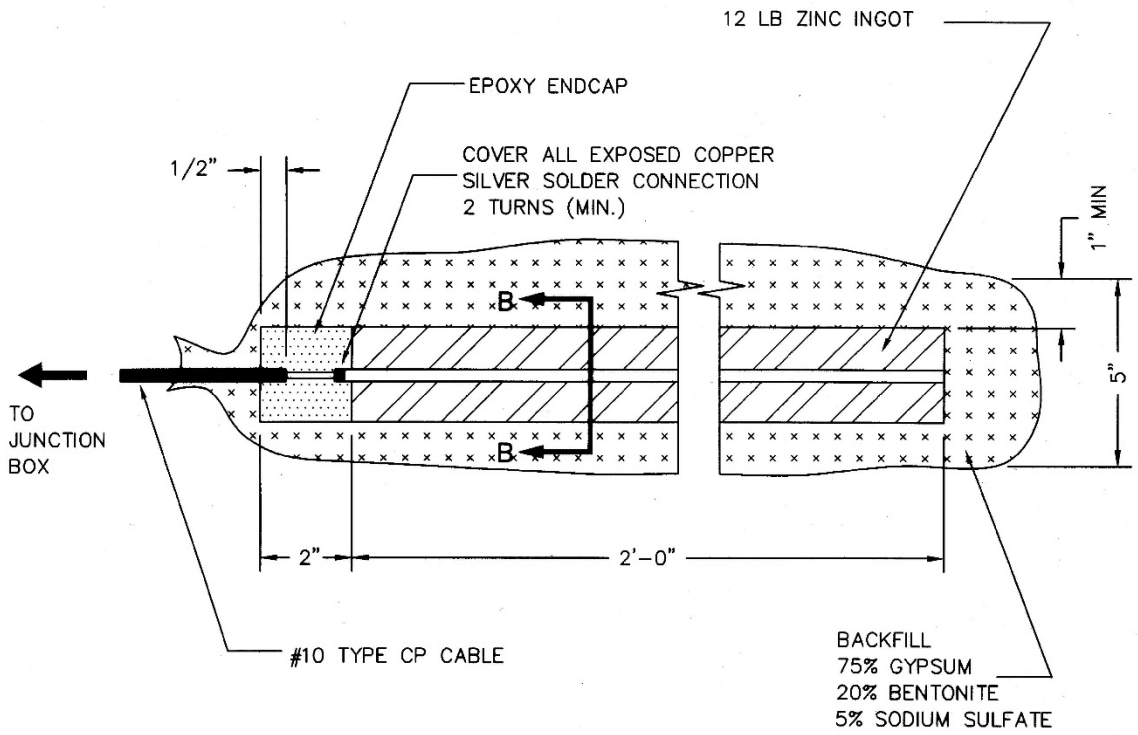
REGISTERED PROFESSIONAL ENGINEER
TIMOTHY Y. O
No. 27089
EXP. 03-31-01
STATE OF CALIFORNIA
CIVIL

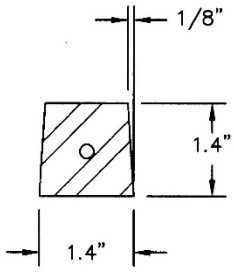
06-29-99 DATE | 03-31-01 EXP. | 27089 R.C.E. NO.

CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

STANDARD MAGNESIUM ANODE

FILE NO. D–37





SECTION B-B

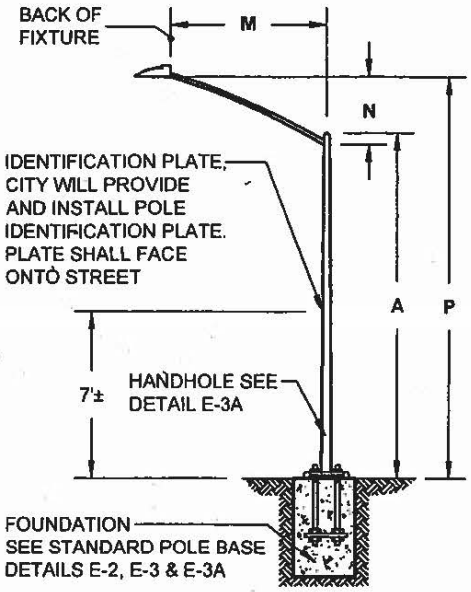
			CITY OF MOUNTAIN VIEW **DEPARTMENT OF PUBLIC WORKS** **STANDARD DETAIL**
Revision	Date	Approved	
Drawn : QT	Date : 05-18-99		
Checked : RK	Scale : NTS		**STANDARD 12-LB ZINC ANODE**
APPROVED BY:			

REGISTERED PROFESSIONAL ENGINEER TIMOTHY Y. DO No. 27089 EXP. 03-31-01 STATE OF CALIFORNIA CIVIL

ASSISTANT PUBLIC WORKS DIRECTOR

06-29-99 DATE | 03-31-01 EXP. | 27089 R.C.E. NO.

FILE NO. D-38



ELEVATION-TYPE 15

POLE TYPE	POLE DATA			
	A HEIGHT	MIN. O.D.		WALL THICKNESS
		BASE	TOP	
15	30'-0"	8"	3-11/16"	0.1196"

LUMINAIRE MAST ARM DATA				
M PROJECTED LENGTH	N RISE	MIN. O.D. AT POLE	NOMINAL THICKNESS	P - MOUNTING HEIGHT
				TYPE 15
6'-0"	2'-0"±	3-1/4"	0.1196"	31'-6"±
8'-0"	2'-6"±	3-1/2"		32'-0"±
10'-0"	3'-3"±	3-7/8"		32'-9"±
12'-0"	4'-3"±	3-7/8"		33'-9"±
15'-0"	4'-9"±	4-1/4"		34'-3"±

LED STREETLIGHT FIXTURE: LEOTEK EC-SERIES, GE ERS1-SERIES, OR APPROVED EQUAL.

STREET LIGHT DESIGN CRITERIA				
LAND USE AND/OR STREET CLASSIFICATION	MINIMUM MAST ARM LENGTH (FT)	LEDs		
		WATTAGE (W)	LUMENS* (Lm)	VOLTAGE (V)
RESIDENTIAL	8	≤35	2,500-3,000	120-277
COMMERCIAL	12	≤75	6,500-7,000	120-277
INDUSTRIAL	12	≤75	6,500-7,000	120-277
ARTERIAL	12-15	≤95	8,000-9,000	120-277
SIGNALIZED INTERSECTIONS	SEE TABLE ON STANDARD DETAIL E-1B			
MID-BLOCK CROSSWALKS				

*MINIMUM REQUIRED AT INSTALLATION

NOTES:

1. HANDHOLE SHALL BE LOCATED ON DOWNSTREAM SIDE OF TRAFFIC.
2. POLE AND MAST ARM MUST BE UNPAINTED GALVANIZED STEEL.
3. SEE CURRENT CALTRANS STANDARD PLANS FOR LUMINAIRE MAST ARM CONNECTION DETAIL.
4. LUMINAIRES MUST BE LIGHT EMITTING DIODE (LED) WITH 4000K TO 4500K COLOR TEMPERATURE.
5. LEDs MUST PROVIDE ILLUMINATING ENGINEERING SOCIETY (IES) TYPE II DISTRIBUTION UNLESS OTHERWISE NOTED ON THE PLANS.
6. EACH STREETLIGHT MUST HAVE AN INDIVIDUAL AND INDEPENDENT PHOTO CELL.
7. NON-SIGNALIZED INTERSECTIONS SHALL REFER TO "LAND USE AND/OR STREET CLASSIFICATION" IN TABLE ABOVE.
8. SEE CITY STANDARD DESIGN CRITERIA FOR STREET LIGHT PLACEMENT.

Revision	Date	Approved
Drawn: TE	Date: 6/13/2018	
Checked: AB	Scale: NTS	

APPROVED BY: No. 57093 — REGISTERED PROFESSIONAL ENGINEER — JACQUELINE C.A. SOLOMON — CIVIL — STATE OF CALIFORNIA

7/10/18 (DATE) — 12-31-2019 (EXP.) — 57093 (R.C.E. NO.)

CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

STANDARD ELECTROLIER

FILE NO. E-1A

SIGNALIZED INTERSECTIONS & MID-BLOCK CROSSWALKS*				
FUNCTIONAL CLASSIFICATION	MAINTAINED ILLUMINATION AT PAVEMENT WITHIN CROSSWALK AREA BASED ON FUNCTIONAL CLASSIFICATION (Lux/fc)**			E_{avg}/E_{min}
	HIGH	MEDIUM	LOW***	
MAJOR / MAJOR	34.0/3.4	26.0/2.6	18.0/1.8	3.0
MAJOR / COLLECTOR	29.0/2.9	22.0/2.2	15.0/1.5	3.0
MAJOR / LOCAL	26.0/2.6	20.0/2.0	13.0/1.3	3.0
COLLECTOR / COLLECTOR	24.0/2.4	18.0/1.8	12.0/1.2	4.0
COLLECTOR / LOCAL	21.0/2.1	16.0/1.6	10.0/1.0	4.0
LOCAL / LOCAL	18.0/1.8	14.0/1.4	8.0/0.8	6.0

* THE ILLUMINANCE LEVEL IN A MID-BLOCK CROSSWALK AREA SHOULD AT LEAST BE EQUAL TO THAT PROVIDED AT THE INTERSECTION OF TWO MAJOR STREETS.

** THE RANGE OF ILLUMINATION BETWEEN HIGH & LOW IS FOR ALL NEW INSTALLATIONS AT THE TIME OF ACCEPTANCE. DETERIORATION OF ILLUMINATION IS EXPECTED WITH TIME.

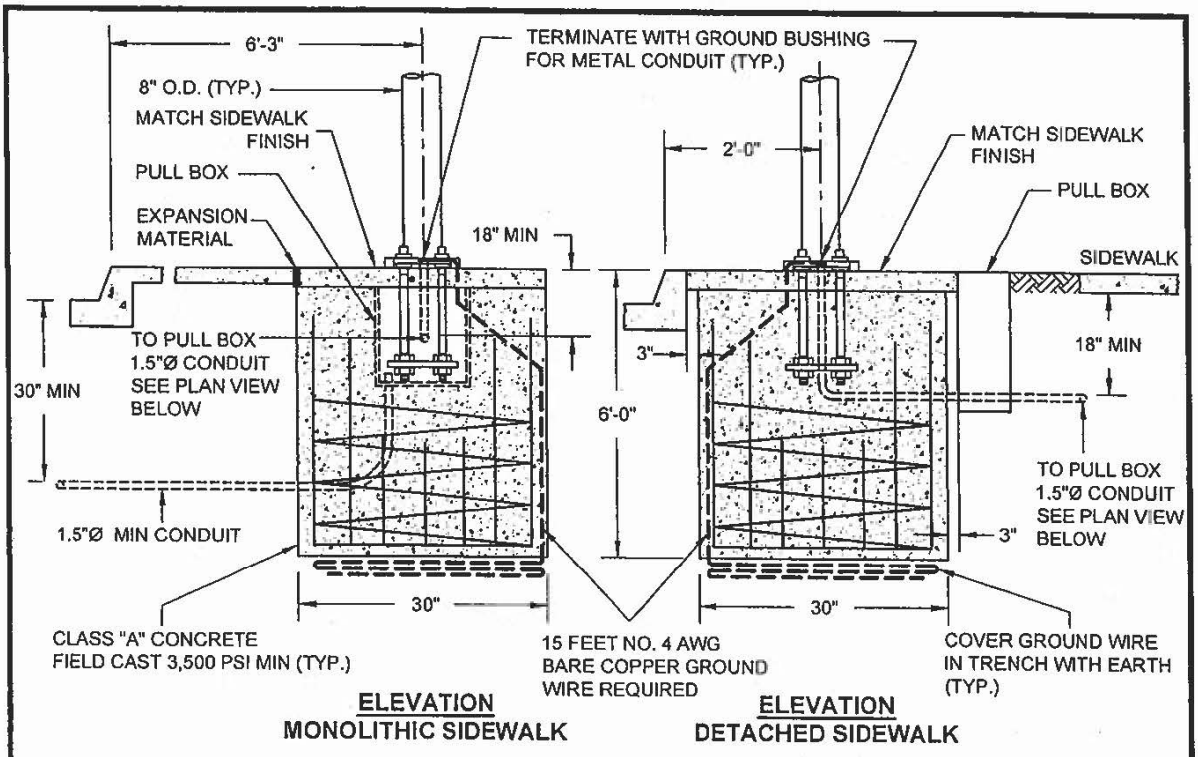
*** MINIMUM REQUIRED AT TIME OF INSTALLATION

E_{avg}/E_{min} = UNIFORMITY RATIO

E_{avg} = AVERAGE HORIZONTAL ILLUMINANCE AT WALKWAY/BIKEWAY

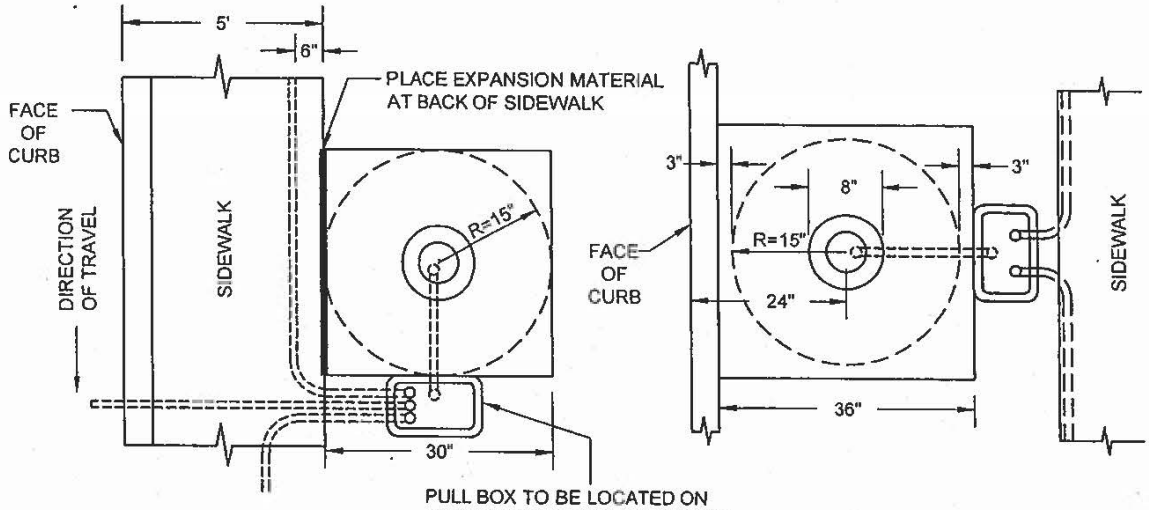
E_{min} = MINIMUM HORIZONTAL ILLUMINATION AT WALKWAY/BIKEWAY

		CITY OF MOUNTAIN VIEW PUBLIC WORKS DEPARTMENT STANDARD DETAIL
Revision / Date / Approved		
Drawn: TE	Date: 6/13/2018	
Checked: AB	Scale: NTS	ILLUMINATION LEVELS AT SIGNALIZED INTERSECTIONS & MID-BLOCK CROSSWALKS
APPROVED BY: C No. 57093 Jacqueline A Solomon 7/16/18 — 12-31-2019 — 57093 DATE — EXP. — R.C.E. NO.		FILE NO. E-1B



ELEVATION
MONOLITHIC SIDEWALK

ELEVATION
DETACHED SIDEWALK



PLAN
MONOLITHIC SIDEWALK

PLAN
DETACHED SIDEWALK

NOTE: FOR MONOLITHIC SIDEWALK WIDER THAN 6 FEET (MEASURED FROM BACK OF CURB), BASE LOCATION SHALL FOLLOW DETACHED SIDEWALK DETAIL.

Revision	Date	Approved
Drawn: TE	Date: 08-23-2016	
Checked: AB	Scale: NTS	

REGISTERED PROFESSIONAL ENGINEER — JACQUELINE ANDREWS SOLOMON — No. 57093 — STATE OF CALIFORNIA — CIVIL

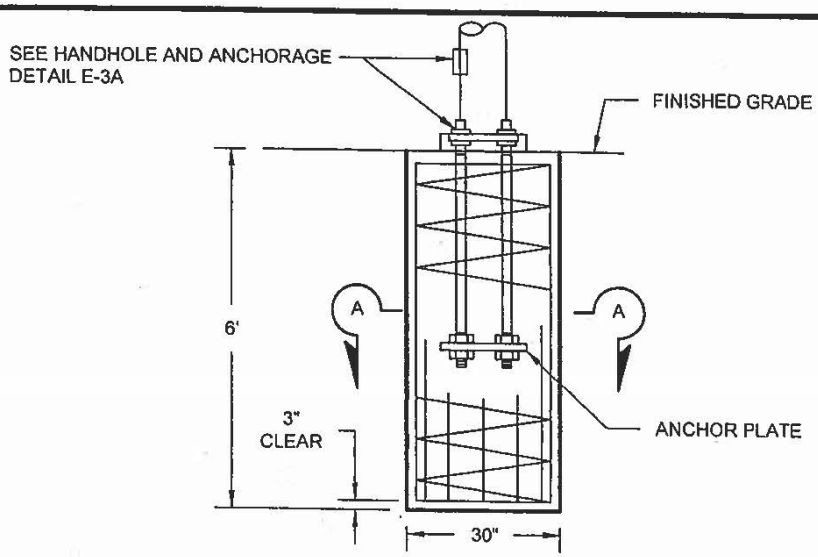
APPROVED BY: Jacqueline Cd Solomon

9/2/2016 (DATE) — 09-30-2017 (EXP.) — 57093 (R.C.E. NO.)

CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

STANDARD POLE BASE
(SHEET 1 OF 3)

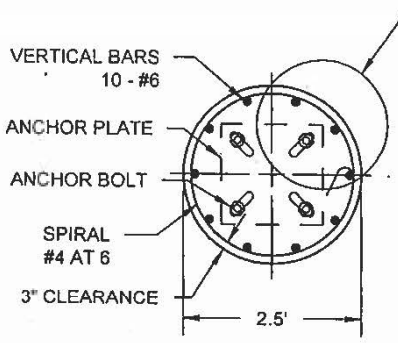
FILE NO. E-2



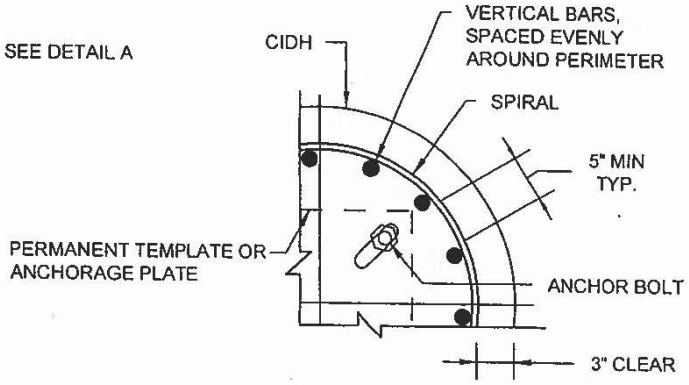
ELEVATION

FOR POLES TO BE INSTALLED ON EXISTING FOUNDATION:
VERIFY BOLT CIRCLES, ANCHOR BOLT SIZES, AND DEPENDENT DIMENSIONS FOR POLES TO BE INSTALLED ON EXISTING FOUNDATIONS BEFORE FABRICATING THE POLES.

CAST-IN-DRILLED-HOLE (CIDH) PILE FOUNDATION, REINFORCED PILE

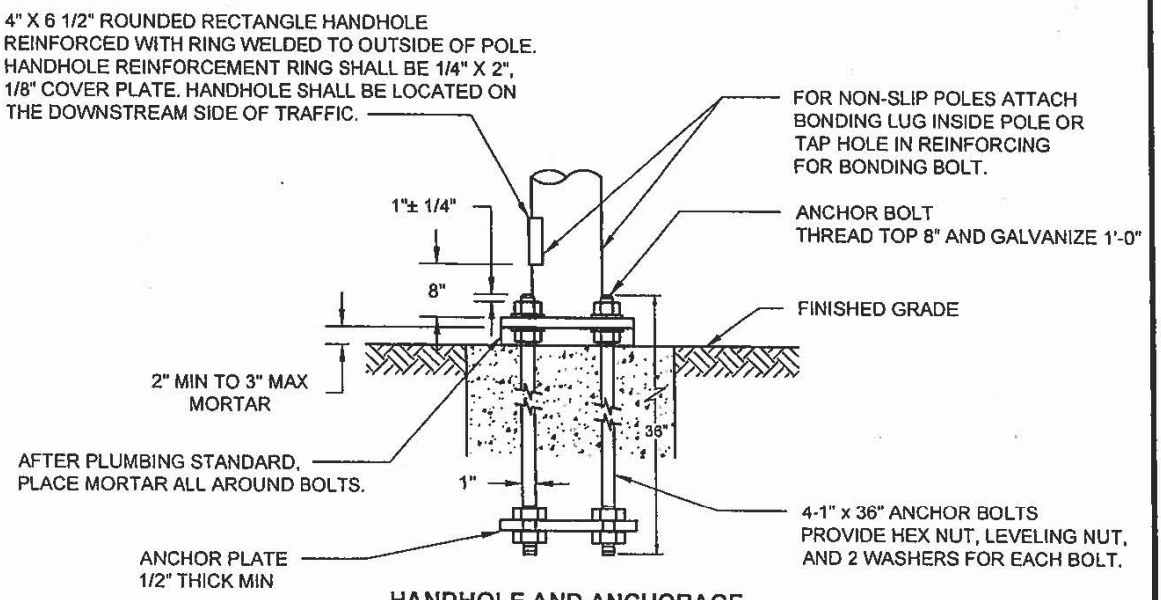


SECTION A-A

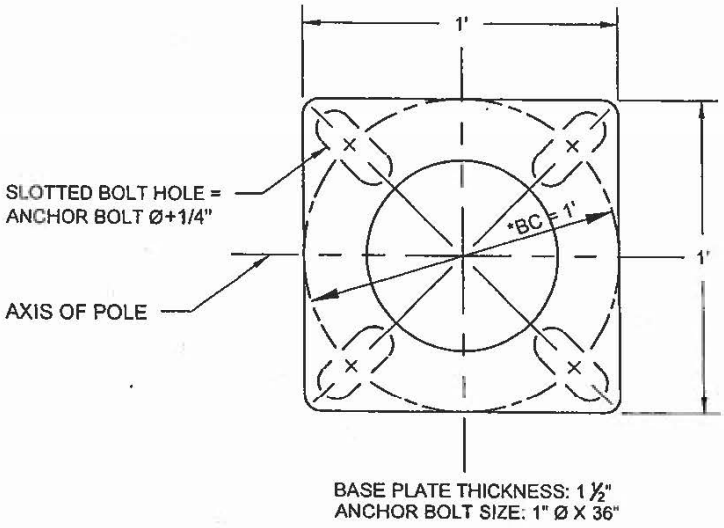


DETAIL A

Revision	Date	Approved	CITY OF MOUNTAIN VIEW PUBLIC WORKS DEPARTMENT STANDARD DETAIL
Drawn: TE	Date: 08-24-2016		
Checked: AB	Scale: NTS		STANDARD POLE BASE (SHEET 2 OF 3)
APPROVED BY: Jacqueline A. Solomon	No. 57093		
9/2/2016 DATE	12-31-2017 EXP.	57093 R.C.E. NO.	FILE NO. E-3



HANDHOLE AND ANCHORAGE



SLOTTED BASE PLATE

*BC = BOLT CIRCLE

Revision	Date	Approved
Drawn: TE	Date: 08-23-2016	
Checked: AB	Scale: NTS	

APPROVED BY: No. 57093 Jacqueline A Andrews

9/2/2016 DATE — 12-31-2017 EXP. — 57093 R.C.E. NO.

REGISTERED PROFESSIONAL ENGINEER JACQUELINE ANDREWS No. 57093 CIVIL STATE OF CALIFORNIA

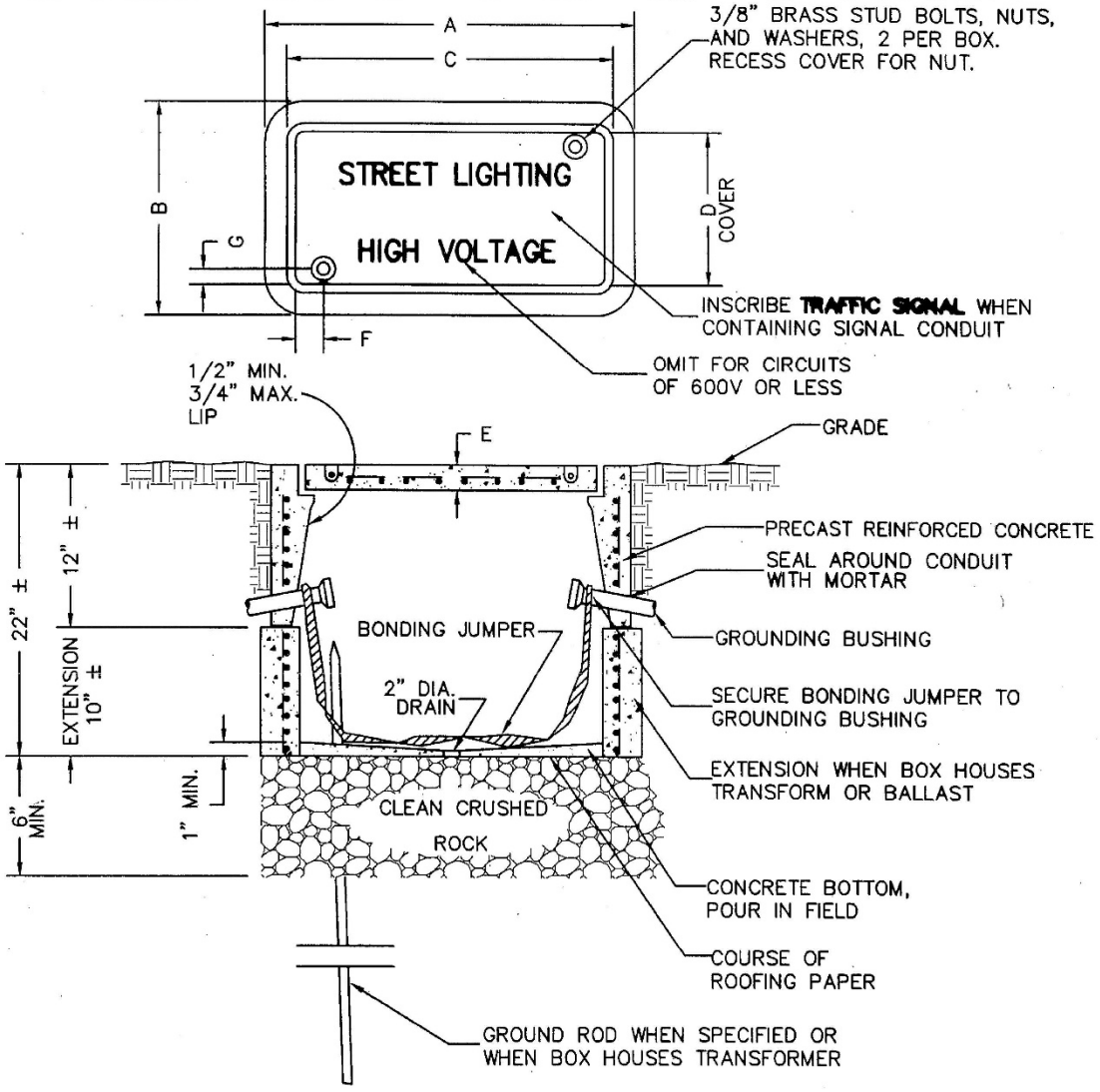
CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

STANDARD POLE BASE

(SHEET 3 OF 3)

FILE NO. E-3A

PULL BOX	CHRISTY No.	BOX		COVER				
		A	B	C	D	E	F	G
No. 3-1/2	N9	19-3/4"	14-1/4"	15-1/4"	10"	1-3/4"		
No. 5	N16	25-1/4"	15-3/4"	20-5/8"	10-1/2"	2"	2-1/2"	1-3/4"



NOTE:

No. 3-1/2 & 5 PULL BOX WITH HOLD-DOWN BOLTS OR APPROVED EQUAL

Revision	Date	Approved
Drawn : QT	Date : 05-05-99	
Checked : RK	Scale : NTS	

APPROVED BY

REGISTERED PROFESSIONAL ENGINEER TIMOTHY Y. TO No. 27089 EXP. 03-31-01 STATE OF CALIFORNIA

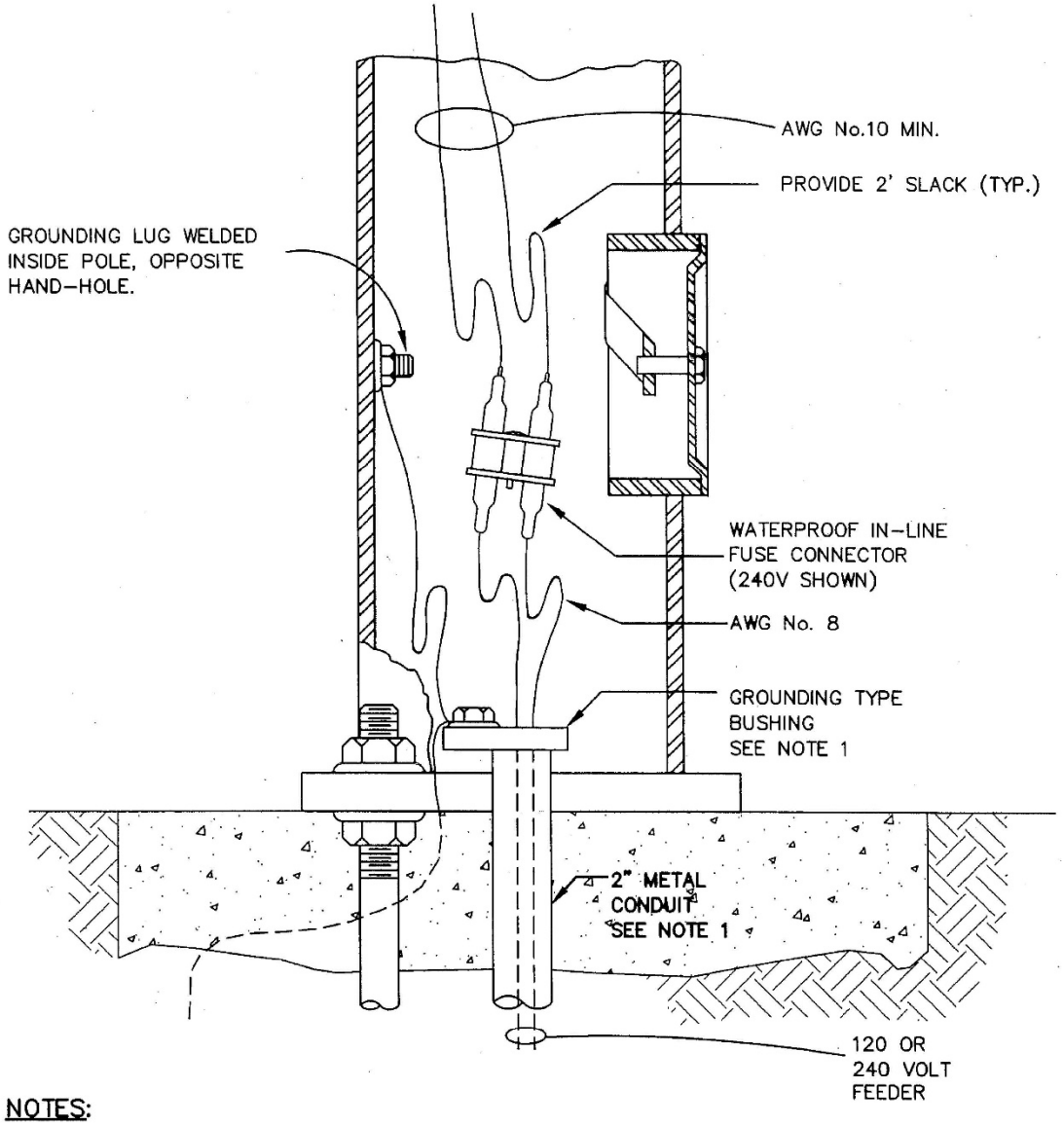
ASSISTANT PUBLIC WORKS DIRECTOR

06-29-99 DATE | 03-31-01 EXP. | 27089 R.C.E. NO.

CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

STANDARD PULL BOX

FILE NO. E-4



NOTES:

1. GROUNDING TYPE BUSHING IS NOT REQUIRED FOR PLASTIC CONDUIT. FOR PLASTIC CONDUIT, SPLICE GROUND WIRE IN ELECTROLIER TO GROUND WIRE IN CONDUIT.

Revision	Date	Approved
Drawn : QT	Date : 05-02-99	
Checked : RK	Scale : NTS	

APPROVED BY: ASSISTANT PUBLIC WORKS DIRECTOR

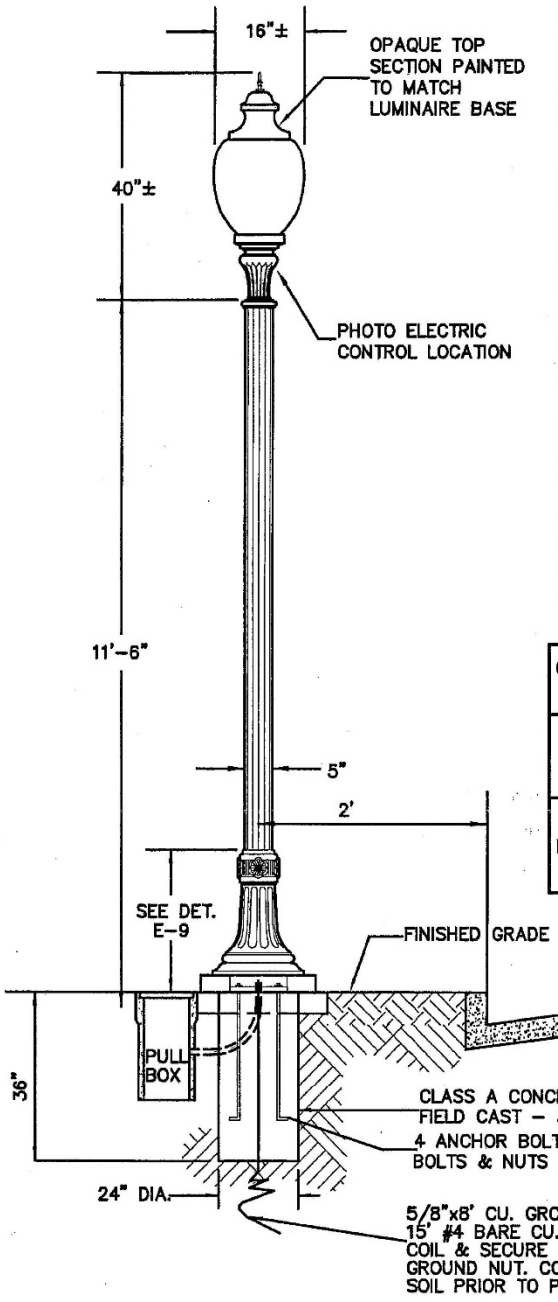
REGISTERED PROFESSIONAL ENGINEER TIMOTHY Y. LO No. 27089 EXP. 03-31-01 CIVIL STATE OF CALIFORNIA

06-29-99	03-31-01	27089
DATE	EXP.	R.C.E. NO.

CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

STREET LIGHT FUSE AND GROUND CONNECTION

FILE NO. E-5



LUMINAIRE
16"± ø x 40"± TALL WITH CLEAR TECTURED ACRYLIC ACORN GLOBE, CAST ALUMINUM LUMINAIRE BASE AND BRASS FINIAL; LUMINAIRE FURNISHED WITH HPS LAMP, H.I.D. 120V BALLAST, PORCELAIN MOGUL BASE SOCKET, BOROCILICATE GLASS REFRACTOR, AND A PHOTOELECTRIC CONTROL AT THE BASE.

POST
ONE–PIECE CAST ALUMINUM CONSTRUCTION CONSISTING OF A TAPERED AND FLUTED BASE WITH HEXAGONAL BOTTOM, A ø5" FLUTED SHAFT WITH A 3" TENON FOR CROSSARM OR LUMINAIRE MOUNTING, AND A HAND–HOLE AT THE BASE FOR ANCHORAGE AND WIRING ACCESS.

FINISH
ENTIRE POST AND LUMINAIRE BASE TO HAVE A "BLACK" POWDER COAT FINISH UNLESS SPECIFIED OTHERWISE.

HARDWARE
ALL HARDWARE TO BE STAINLESS STEEL AND ALL EXTERIOR HARDWARE TO BE TAMPER RESISTANT.

MANUFACTURERS
PRODUCTS TO BE MANUFACTURED BY ANTIQUE LAMPS, INC., WESTERN LIGHTING STANDARDS OR OTHER APPROVED EQUAL MANUFACTURERS.

COMPONENT	ANTIQUE LAMP, INC.	WESTERN LIGHTING STANDARDS
POST	NY11'–6"F5MOD/ 17MODPT18–CA/BK	WPBBH11'6"EF50–COLOR
LUMINAIRE	AA25ABFMOD/BK– SXXX/120–X–PEC	FXS2PT30–COLOR

Revision	Date	Approved
Drawn : QT	Date : 02-25-05	
Checked : RK	Scale : NTS	

REGISTERED PROFESSIONAL ENGINEER TIMOTHY Y. LEE No. 27089 EXP. 03-31-07 STATE OF CALIFORNIA

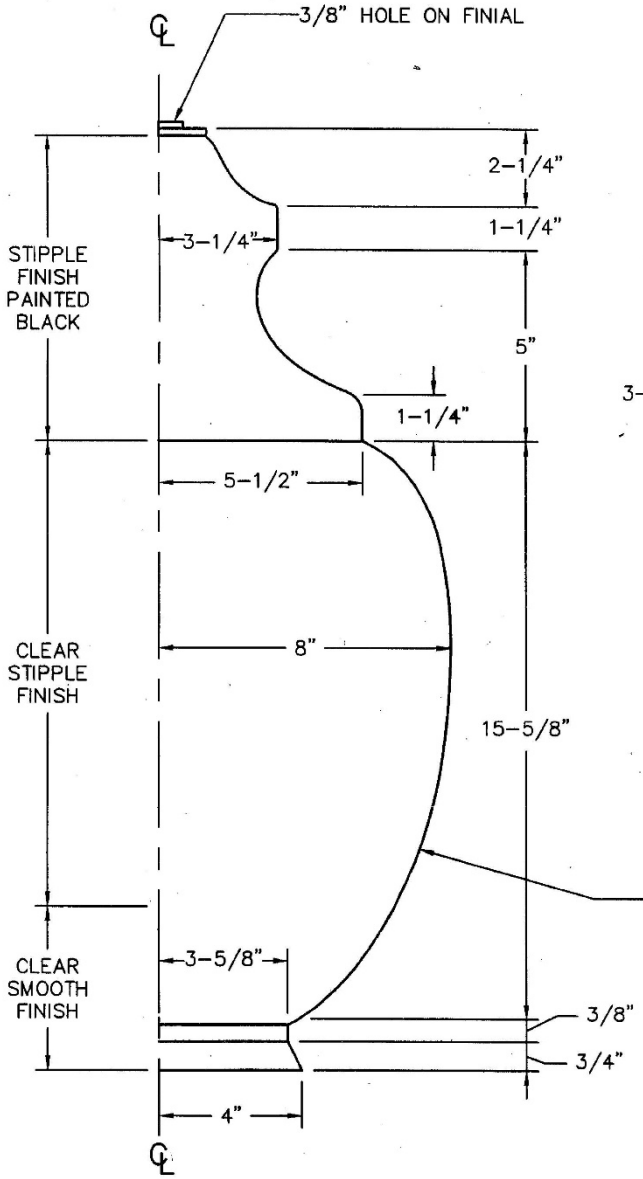
APPROVED BY: _____
ASSISTANT PUBLIC WORKS DIRECTOR

02-25-05 DATE | 03-31-07 EXP. | 27089 R.C.E. NO.

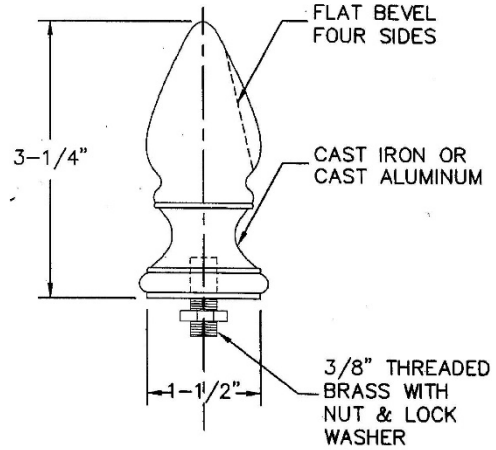
CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

TYPE B STREETLIGHT DETAILS

FILE NO. E–6



GLOBE DETAIL
(HALF SECTION)



FINIAL DETAIL

Revision	Date	Approved	
Drawn : QT	Date : 05-12-99		
Checked : RK	Scale : NTS		
APPROVED BY:			

REGISTERED PROFESSIONAL ENGINEER
TIMOTHY Y. TO
No. 27089
EXP. 03-31-01
CIVIL
STATE OF CALIFORNIA

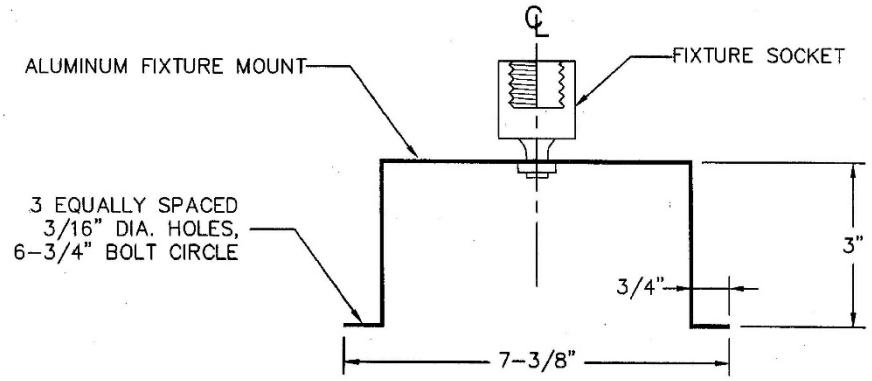
ASSISTANT PUBLIC WORKS DIRECTOR

06-29-99 DATE | 03-31-01 EXP. | 27089 R.C.E. NO.

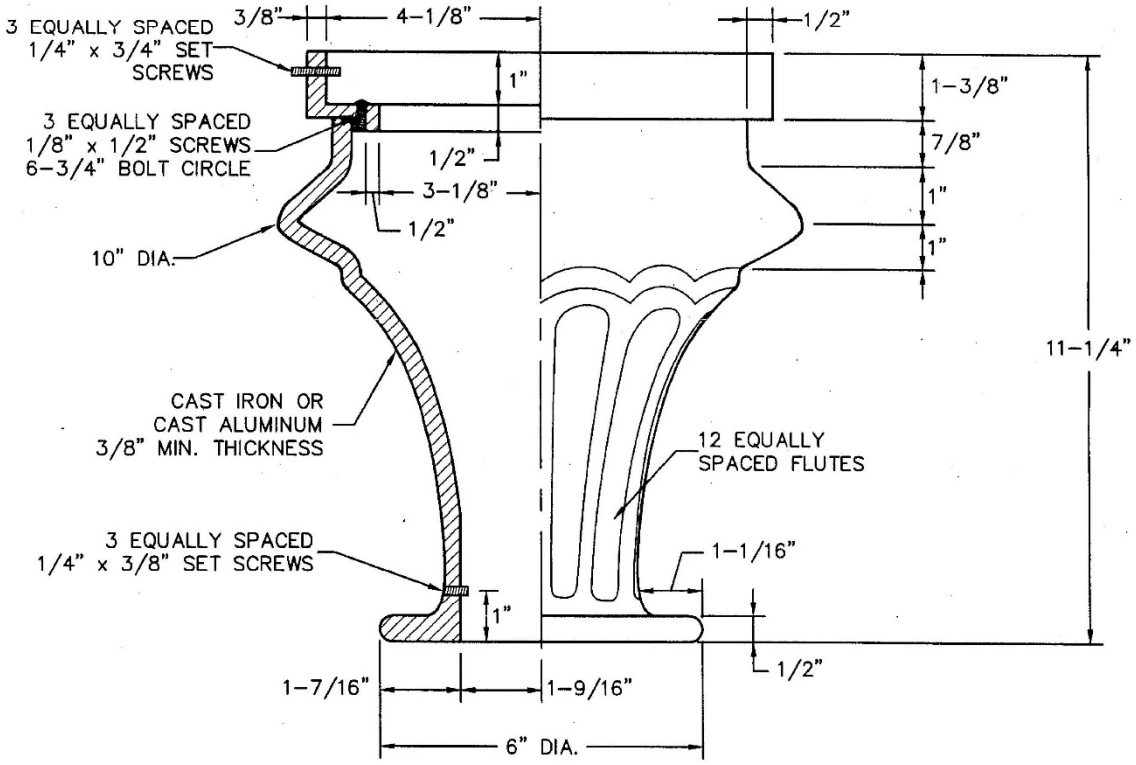
CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

TYPE "B" STREETLIGHT
GLOBE AND FINIAL DETAILS

FILE NO. E-7



FIXTURE DETAIL



GLOBE HOLDER DETAIL

Revision	Date	Approved
Drawn : QT	Date : 05-18-99	
Checked : RK	Scale : NTS	

APPROVED BY: _____
ASSISTANT PUBLIC WORKS DIRECTOR

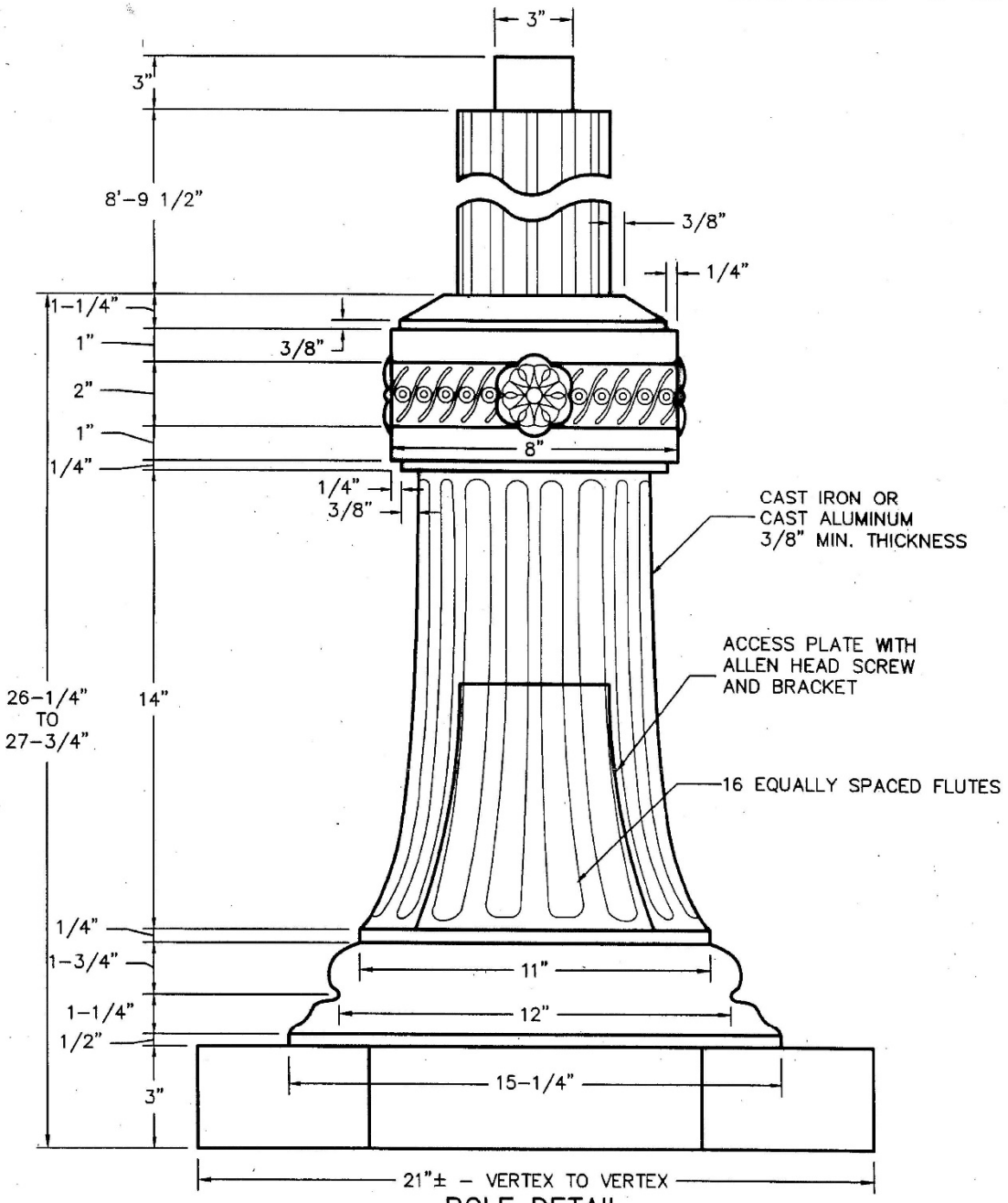
06-29-99 DATE | 03-31-01 EXP. | 27089 R.C.E. NO.

REGISTERED PROFESSIONAL ENGINEER
TIMOTHY Y. QI
No. 27089
EXP. 03-31-01
CIVIL
STATE OF CALIFORNIA

CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

TYPE "B" STREETLIGHT
FIXTURE & GLOBE HOLDER DETAILS

FILE NO. E-8



POLE DETAIL

Revision	Date	Approved
Drawn : QT	Date : 05-18-99	
Checked : RK	Scale : NTS	

APPROVED BY:

REGISTERED PROFESSIONAL ENGINEER
TIMOTHY Y. TO
No. 27089
EXP. 03-31-01
CIVIL
STATE OF CALIFORNIA

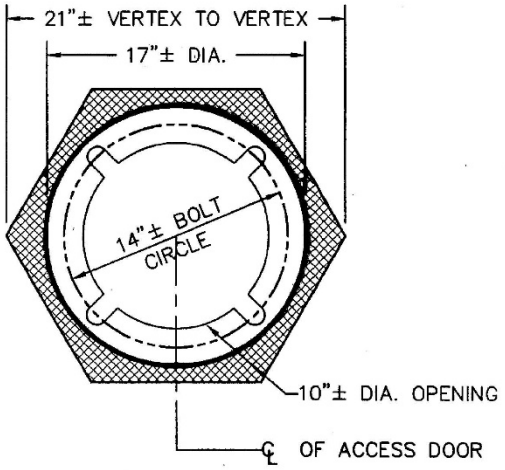
ASSISTANT PUBLIC WORKS DIRECTOR

06-29-99 DATE | 03-31-01 EXP. | 27089 R.C.E. NO.

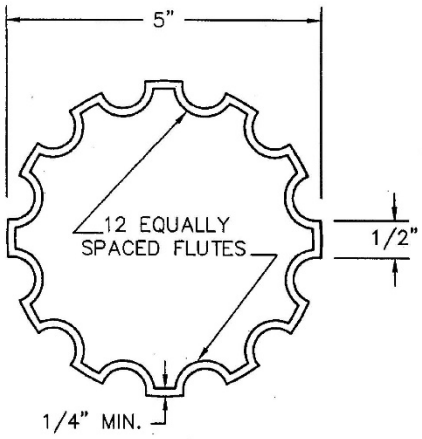
CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

TYPE "B" STREETLIGHT
POLE DETAILS

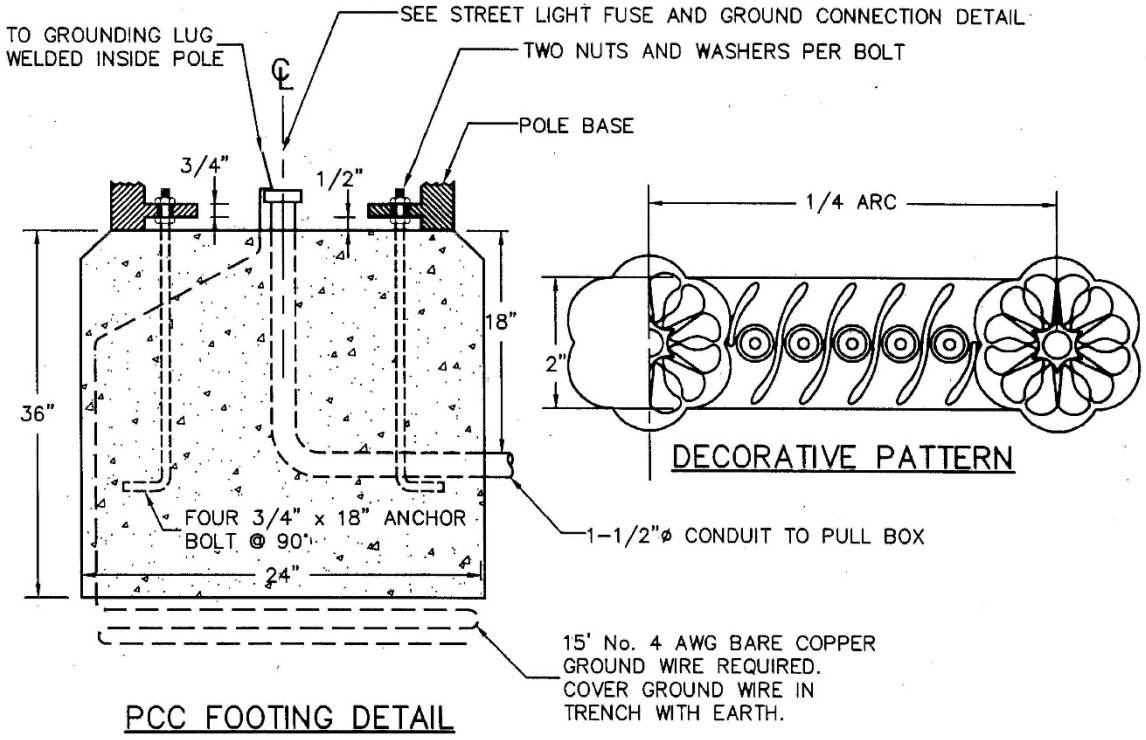
FILE NO. E-9



BASE DETAIL



5" DIA. COLUMN DETAIL



DECORATIVE PATTERN

PCC FOOTING DETAIL

Revision	Date	Approved	
Drawn : QT	Date : 05-15-99		
Checked : RK	Scale : NTS		
APPROVED BY:			

REGISTERED PROFESSIONAL ENGINEER TIMOTHY Y. LO No. 27089 EXP. 03-31-01 CIVIL STATE OF CALIFORNIA

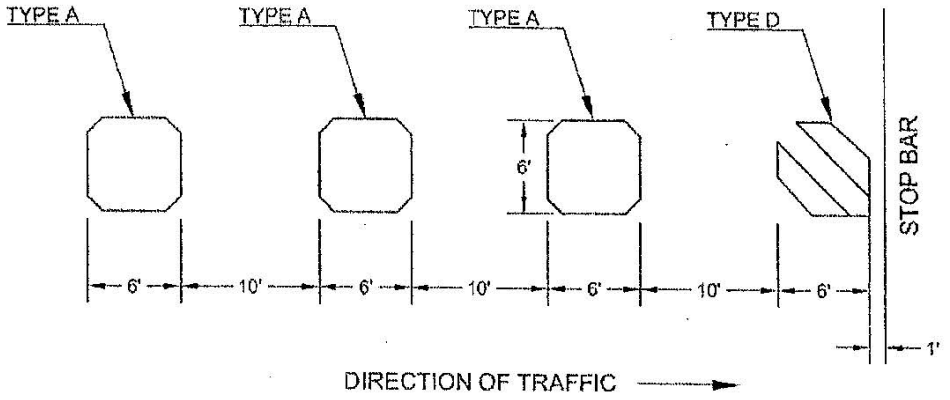
ASSISTANT PUBLIC WORKS DIRECTOR

06-29-99 DATE | 03-31-01 EXP. | 27089 R.C.E. NO.

CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

TYPE "B" STREETLIGHT
MISCELLANEOUS DETAILS

FILE NO. E-10



NOTES:

1. SEE STATE OF CALIFORNIA, DEPARTMENT OF TRANSPORTATION (CALTRANS) STANDARD PLANS, PAGES ES-5A AND ES-5B, FOR INSTALLATION, SAWCUT, AND WINDING DETAILS.
2. USE FOUR (4) LOOPS FOR LEFT TURNS.
3. USE FOUR (4) LOOPS FOR STRAIGHT THROUGH.
4. LOOPS TO BE CUT IN A 6'x6' QUAD CONFIGURATION. LOOP MARKS SHALL BE VERIFIED BY CITY TRAFFIC STAFF (72 HOURS ADVANCE NOTIFICATION REQUIRED) UNLESS OTHERWISE NOTED.
5. DETECTOR LOOPS SHALL BE TYPE "D" AND "A" AS SHOWN. DETECTOR LOOP WIRE SHALL BE TYPE 1. LEAD IN CABLE SHALL CONFORM TO TYPE B.
6. EACH INDIVIDUAL LOOP WILL HAVE ITS WIRING BROUGHT INTO PROPER PULLBOX FOR CONNECTION TO TYPE B DETECTOR LEAD IN CABLE (DLC). LOOP WIRING IN STREET SHALL ENTER A (G5 BOX) DETECTOR HANDHOLE AT THE LIP OF GUTTER. DETECTOR HANDHOLE SHALL BE INSTALLED IF NOT EXISTING FOR ALL NEW LOOP INSTALLATIONS.
7. SEALANT SHALL BE HOT MELT RUBBERIZED ASPHALT. FINISHED PRODUCT MUST BE AT A MINIMUM STREET LEVEL OR ABOVE.
8. ANY TRAFFIC LOOP WIRE CONNECTION(S) TO BE LAID DOWN IN SIGNAL CABINET SHALL BE SOLDERED. DLC SHIELD CONDUCTORS ARE NOT TO BE BONDED TO THE GROUND, BUT WRAPPED AROUND AND SECURED TO RESPECTIVE OWNER. THEY ARE NOT TO BE SHORTER THAN SIX INCHES (6").
9. ACCEPTABLE TESTING RESULTS FOR EACH INDIVIDUAL LOOP PAIR SHALL BE 126 MICRO-HENRIES INDUCTANCE AND INFINITE MEG-OHMS TO GROUND. NO LOOP WIRING IS TO BE CONNECTED UNTIL TESTED AND APPROVED BY THE CITY'S TRAFFIC SIGNAL MAINTENANCE CONTRACTOR (72 HOURS ADVANCE NOTIFICATION REQUIRED).

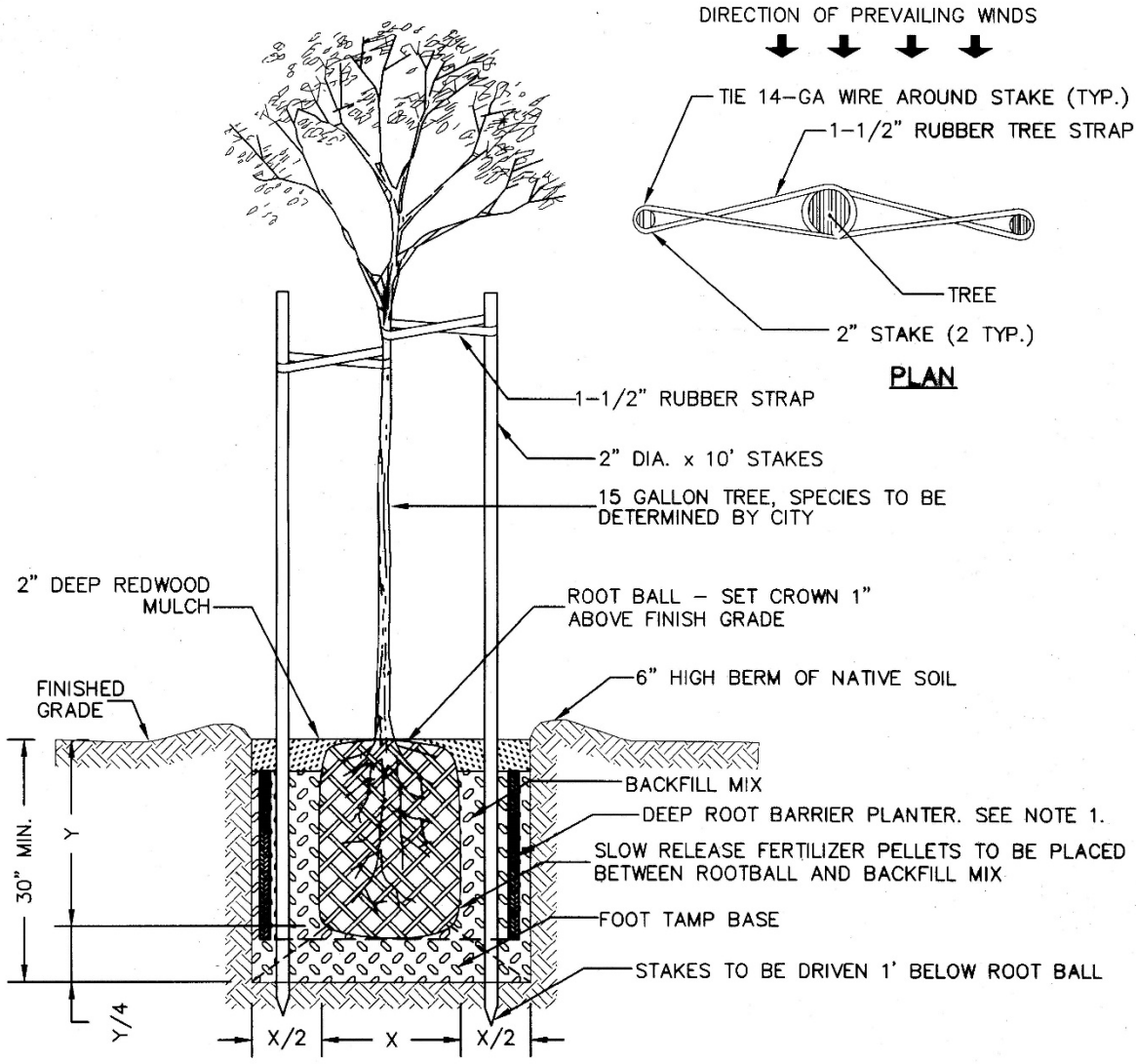
Revision	Date	Approved
Drawn: TE	Date: 03-20-2017	
Checked: AB	Scale: NTS	

APPROVED BY: Jacqueline A. Solomon
3/22/17 DATE — 12-31-2017 EXP. — 57093 R.C.E. NO.

CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

TRAFFIC SIGNAL DETECTOR LOOPS

FILE NO. E-11



NOTE:

1. FOR TREES PLANTED WITHIN 6' OF A PERMANENT STRUCTURE (DRIVEWAY, SIDEWALK, CURB, ETC.,) INSTALL A DEEP ROOT BARRIER PLANTER No. 22-29-18P OR APPROVED EQUAL.
2. FOR TREES PLANTED IN A NON-IRRIGATED AREA OR WHERE HAND WATERING IS NECESSARY, INSTALL-AT THE PERIMETER-A 4"x30" P.V.C. DRAIN PIPE WITH 4" SLOAN GRATE 1" ABOVE FINISH GRADE
3. TREES SHALL BE PLANTED A MINIMUM OF 10' FROM SANITARY SEWER LATERALS AND 5' FROM WATER SERVICES AND DRIVEWAYS.

Revision	Date	Approved
Drawn : QT	Date : 05-27-99	
Checked : RK	Scale : NTS	

REGISTERED PROFESSIONAL ENGINEER TIMOTHY Y. QUAN No. 27089 EXP. 03-31-01 CIVIL STATE OF CALIFORNIA

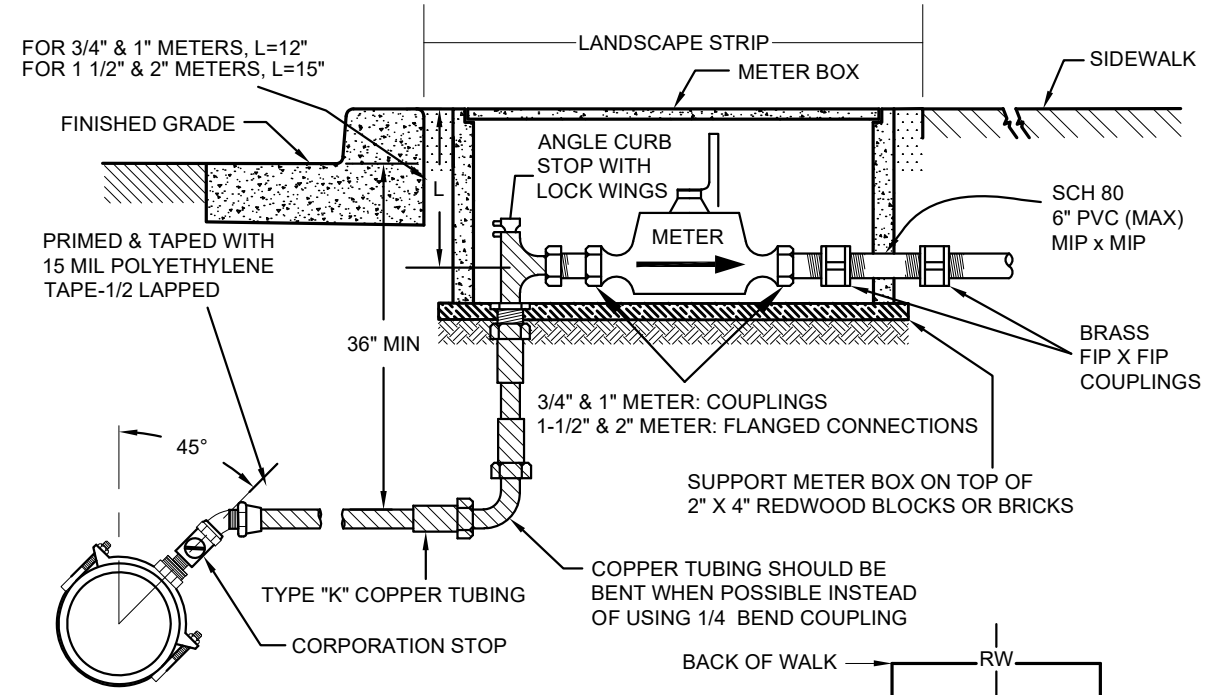
APPROVED BY: _____
ASSISTANT PUBLIC WORKS DIRECTOR

06-29-99 DATE | 03-31-01 EXP. | 27089 R.C.E. NO.

CITY OF MOUNTAIN VIEW
DEPARTMENT OF PUBLIC WORKS
STANDARD DETAIL

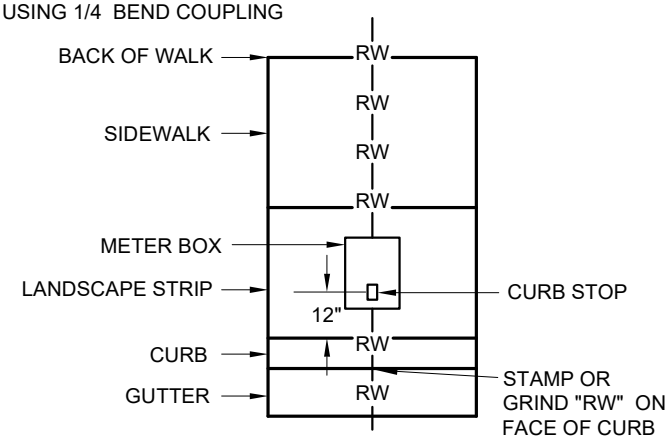
TREE PLANTING AND STAKING

FILE NO. F-1



RECYCLED WATER MAIN

MAIN TYPE	SERVICE CONNECTION TYPE
D.I.P.	STAINLESS STEEL FULL CIRCLE CLAMP WITH THREADED CORPORATION STOP TO BE USED ON ALL 1" AND 2" SERVICES.
P.V.C.	SERVICE SADDLES FORD S-90 OR AS APPROVED BY ENGINEER.



LOCATE ALL METERS INSIDE LANDSCAPE STRIP

NOTES:

1. INSTALL ONE-FOURTH (1/4) INCH PLYWOOD TO BLOCK PIPE PENETRATIONS INTO METER BOX.
2. CLEAN METER BOX OF DEBRIS. NO EARTH-TO-METER CONTACT.
3. SEE STANDARD DETAIL D-31 FOR CATHODIC PROTECTION REQUIREMENTS, WHEN REQUIRED BY ENGINEER BASED ON LOCATION.
4. METERS SHALL HAVE PURPLE RECYCLED WATER REGISTER.
5. METER BOX COVER AND LID SHALL BE STAMPED RECYCLED WATER.
6. FIELD APPLY BITMUASTIC 50 ON ALL BARE METAL AND COVER WITH POLYETHYLENE ENCASEMENT IN ACCORDANCE WITH AWWA STANDARD C105
7. FOR NEW CONSTRUCTION, SERVICE SIZE AND WATER METER SIZE SHALL BE EQUAL.
8. FOR MONOLITHIC SIDEWALKS, LOCATE METER BEHIND WALK. CURB STOP SHALL BE NO MORE THAN 12" FROM BACK OF WALK.

Revision	Date	Approved
Drawn : AR	Date : 07-21-26	
Checked : TT	Scale : NTS	

APPROVED BY:

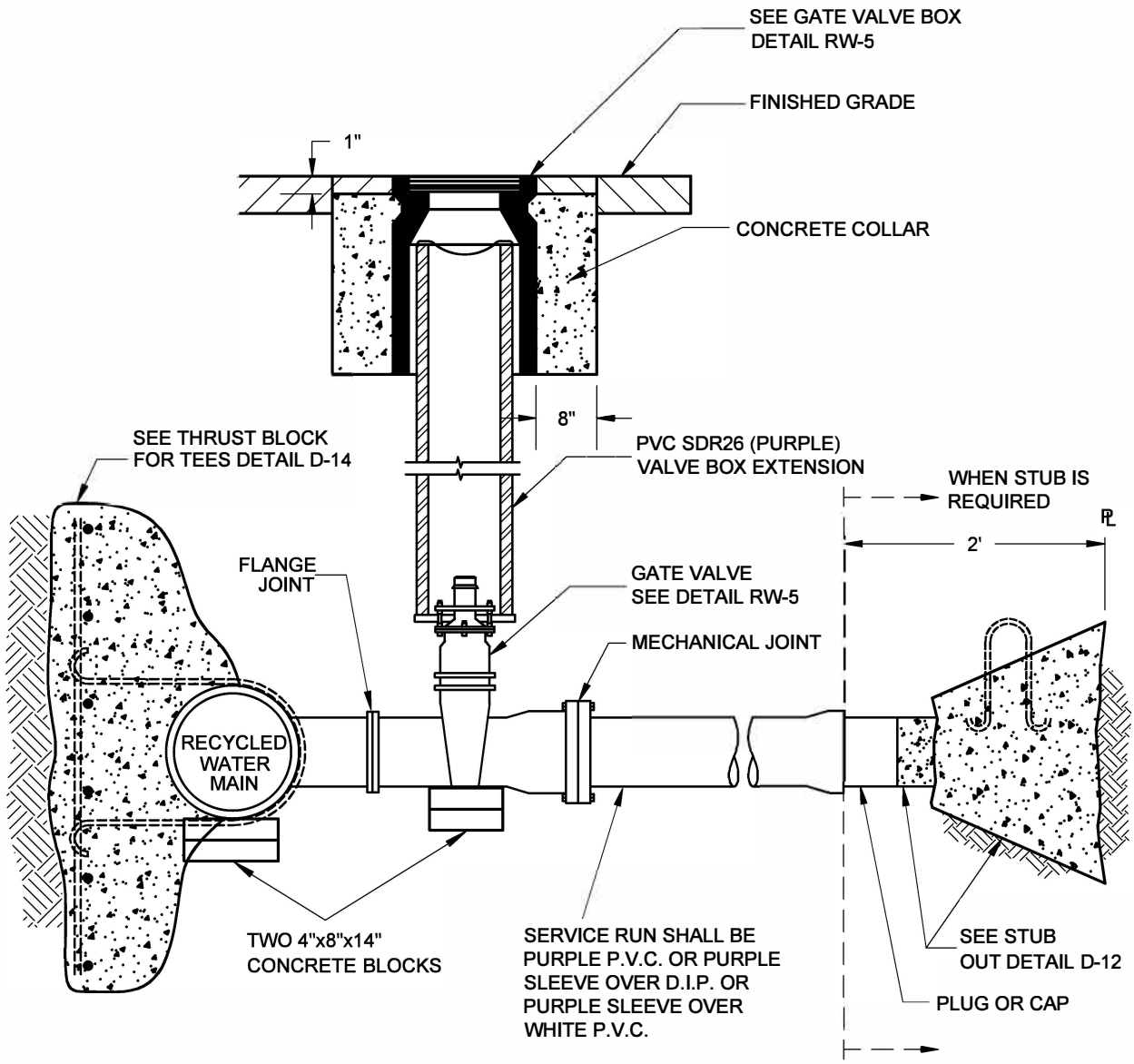
ASSISTANT PUBLIC WORKS DIRECTOR

08-21-2026 DATE | 06-30-28 EXP. | 60299 R.C.E. NO.

CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

RECYCLED WATER
STANDARD 1" AND 2" WATER SERVICES WITH 3/4", 1", 1-1/2", AND 2" WATER METERS

FILE NO. RW-1



NOTES:

1. GATE VALVE ANCHOR REQUIRED WHEN VALVE IS NOT CONNECTED BY FLANGE JOINT TO MAIN TEE
2. RECYCLED WATER SERVICES TO BE AT GRADE OF RECYCLED WATER MAIN
3. PURPLE SLEEVES SHALL BE POLYETHYLENE
4. TRACER WIRE SHALL BE INSTALLED FROM THE MAIN TO WITHIN THE METER BOX

Revision	Date	Approved
Drawn : AR	Date : 07-21-26	
Checked : TT	Scale : NTS	

APPROVED BY:

ASSISTANT PUBLIC WORKS DIRECTOR

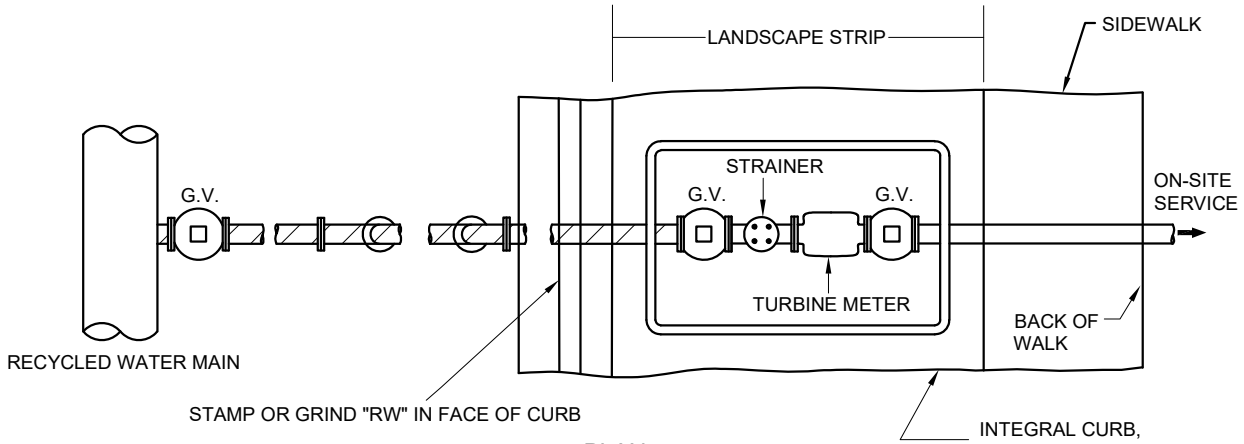
08-21-2026 (DATE) 06-30-28 (EXP.) 60299 (R.C.E. NO.)

REGISTERED PROFESSIONAL ENGINEER EDWARD ARAI COLLIER C 60299 STATE OF CALIFORNIA

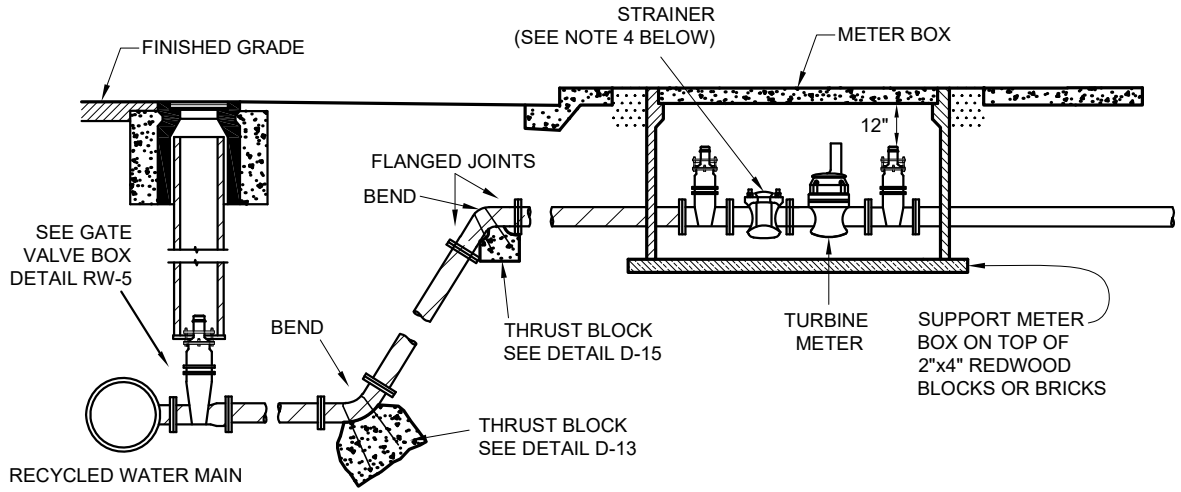
CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

RECYCLED WATER
SERVICE 4" OR LARGER
WITH 3" OR LARGER METER

FILE NO. RW-2



PLAN



ELEVATION

NOTES:

1. THE METER AND METER BOX MAY BE ROTATED 90° TO COMPENSATE FOR SPACE REQUIREMENTS.
2. ALL JOINTS SHALL BE FLANGED TYPE, OR MECHANICAL TYPE JOINTS WITH RETAINER GLANDS. COAT BOLTS, NUTS AND RETAINER GLANDS WITH MASTIC COATING SOLUTION.
3. WRAP ALL DUCTILE IRON PIPE, FITTINGS AND VALVES WITH 8 MIL PURPLE POLYETHYLENE SLEEVE.
4. INSTALL STRAINER BEFORE METER
5. LOCATION OF METER + BACKFLOW TO BE DETERMINED BY CITY ENGINEER.
6. INSTALL 1/4" PLYWOOD TO BLOCK PIPE PENETRATIONS INTO METER BOX
7. CLEAN METER BOX OF DEBRIS. NO EARTH TO METER CONTACT.
8. SEE STANDARD DETAIL D-31A FOR CATHODIC PROTECTION REQUIREMENTS, WHEN REQUIRED BY ENGINEER BASED ON LOCATION.
9. METERS SHALL HAVE PURPLE RECYCLED WATER REGISTER.
10. METER BOX COVER AND LID SHALL BE PURPLE - STAMPED RECYCLED.
11. WARNING TAGS SHALL BE INSTALLED IN METER BOXES. REFER TO DETAIL RW-8.
12. TRACER WIRE SHALL BE INSTALLED FROM THE MAIN TO WITHIN THE METER BOX
13. BENDS SHALL OCCUR PRIOR TO THE CURB AND GUTTER.

Revision	Date	Approved
Drawn : AR	Date : 07-21-26	
Checked : TT	Scale : NTS	

APPROVED BY:

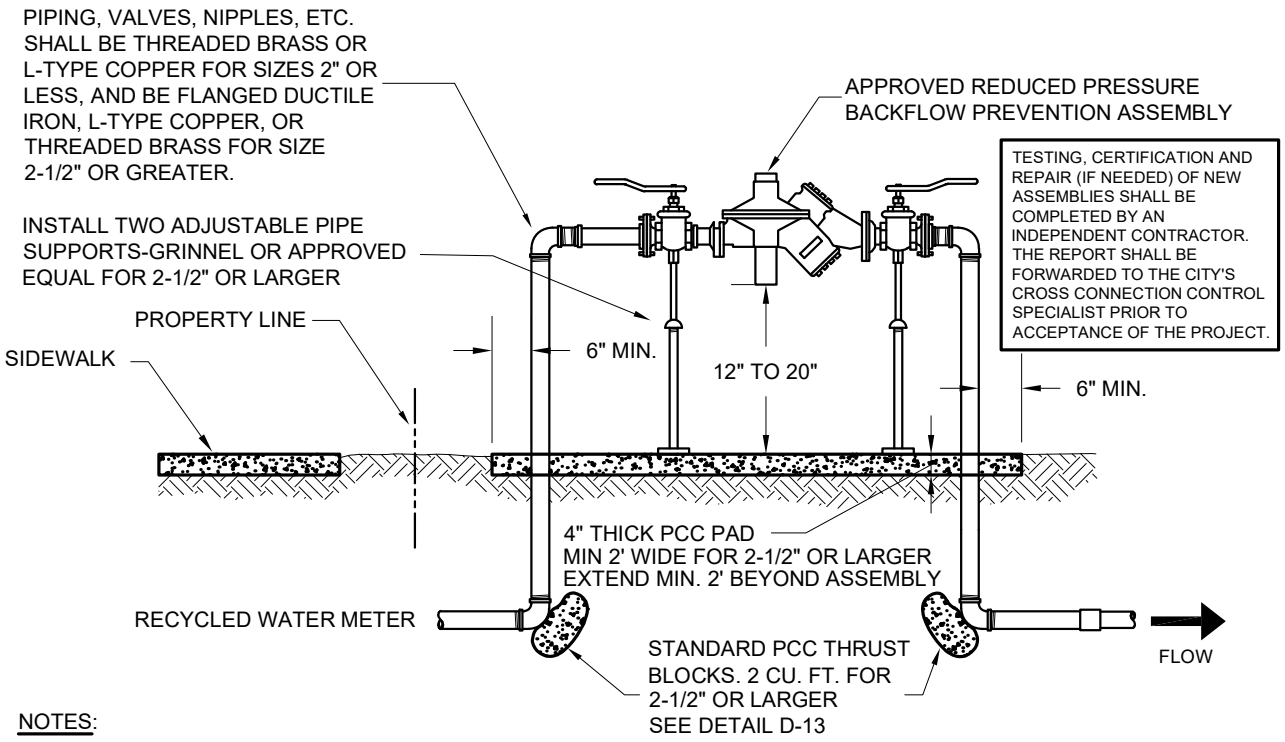
ASSISTANT PUBLIC WORKS DIRECTOR

08-21-2026 DATE | 06-30-28 EXP. | 60299 R.C.E. NO.

CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

RECYCLED WATER
3" OR LARGER WATER METER
TURBINE TYPE

FILE NO. RW-3



NOTES:

1. REDUCED PRESSURE TYPE BACKFLOW PREVENTION DEVICES ARE REQUIRED FOR ALL DUAL PLUMBED SITES, IRRIGATION SYSTEMS, OR AS OTHERWISE REQUIRED BY ENGINEER.
2. APPROVED REDUCED PRESSURE TYPE BACKFLOW PREVENTION DEVICES SHALL BE LISTED IN THE LATEST EDITION OF THE CITY STANDARD PROVISIONS.
3. ALL DEVICES THREE-QUARTER (3/4) INCH TO TWO (2) INCHES WILL HAVE FULL PORT DOMESTIC BALL VALVES, WITH THREADED ENDS. THREE (3) INCHES AND LARGER DEVICES WILL HAVE RESILIENT SEATED GATE VALVES, WITH FLANGED ENDS.
4. PRESSURE DIFFERENTIAL VALVE IS TO BE AT LEAST TWELVE (12) INCHES ABOVE GRADE TO A MAXIMUM OF TWENTY (20) INCHES.
5. BACKFLOW PREVENTION DEVICES SHALL BE INSTALLED ADJACENT TO AND ON PROPERTY SIDE OF SIDEWALK WHERE APPLICABLE.
6. NO CONNECTION BETWEEN THE BACKFLOW PREVENTER AND WATER METER WILL BE PERMITTED. BACKFLOW PREVENTERS SHALL BE PLACED DIRECTLY BEHIND THE WATER METERS UNLESS AN EXEMPTION IS GRANTED. IF AN EXEMPTION IS GRANTED, THE BACKFLOW PREVENTER SHALL BE SCREENED WITH LANDSCAPING AND THE TRENCHES SHALL BE LEFT OPEN SO THAT THE CITY CAN VERIFY THAT THERE ARE NO CONNECTIONS BETWEEN THE BACKFLOW PREVENTER AND THE METER. THE CITY RESERVES THE RIGHT TO TEST THE SYSTEM TO ENSURE THAT THESE REQUIREMENTS ARE MET.
7. WHERE A BACKFLOW PREVENTER IS INSTALLED MORE THAN ONE (1) FOOT BEHIND THE WATER OR IRRIGATION METER, THE PIPING BETWEEN THE BACKFLOW PREVENTER AND THE METER SHALL BE ENCASED IN CONTROLLED DENSITY FILL (CDF).
8. ALL ABOVE GROUND PIPING AND ASSEMBLY SHALL BE IDENTIFIED AS RECYCLED WATER SEE DETAIL RW-8.
9. ALL ACTIVE BACKFLOW PREVENTERS WITH RECYCLED WATER SHALL BE PAINTED PURPLE OR HAVE PURPLE INTEGRATED TO THE MATERIAL WITH THE EXCEPTION OF BACKFLOW ASSEMBLIES. BACKFLOW ASSEMBLIES SHALL NOT BE PAINTED. PURPLE SHALL BE PANTONE 512 OR EQUIVALENT.
10. A 2' MINIMUM CLEARANCE SHALL BE REQUIRED AROUND BACKFLOW PREVENTION ASSEMBLY.

Revision	Date	Approved
Drawn : AR	Date : 07-21-26	
Checked : TT	Scale : NTS	

REGISTERED PROFESSIONAL ENGINEER EDWARD A. RATTO C 60299 STATE OF CALIFORNIA

APPROVED BY:

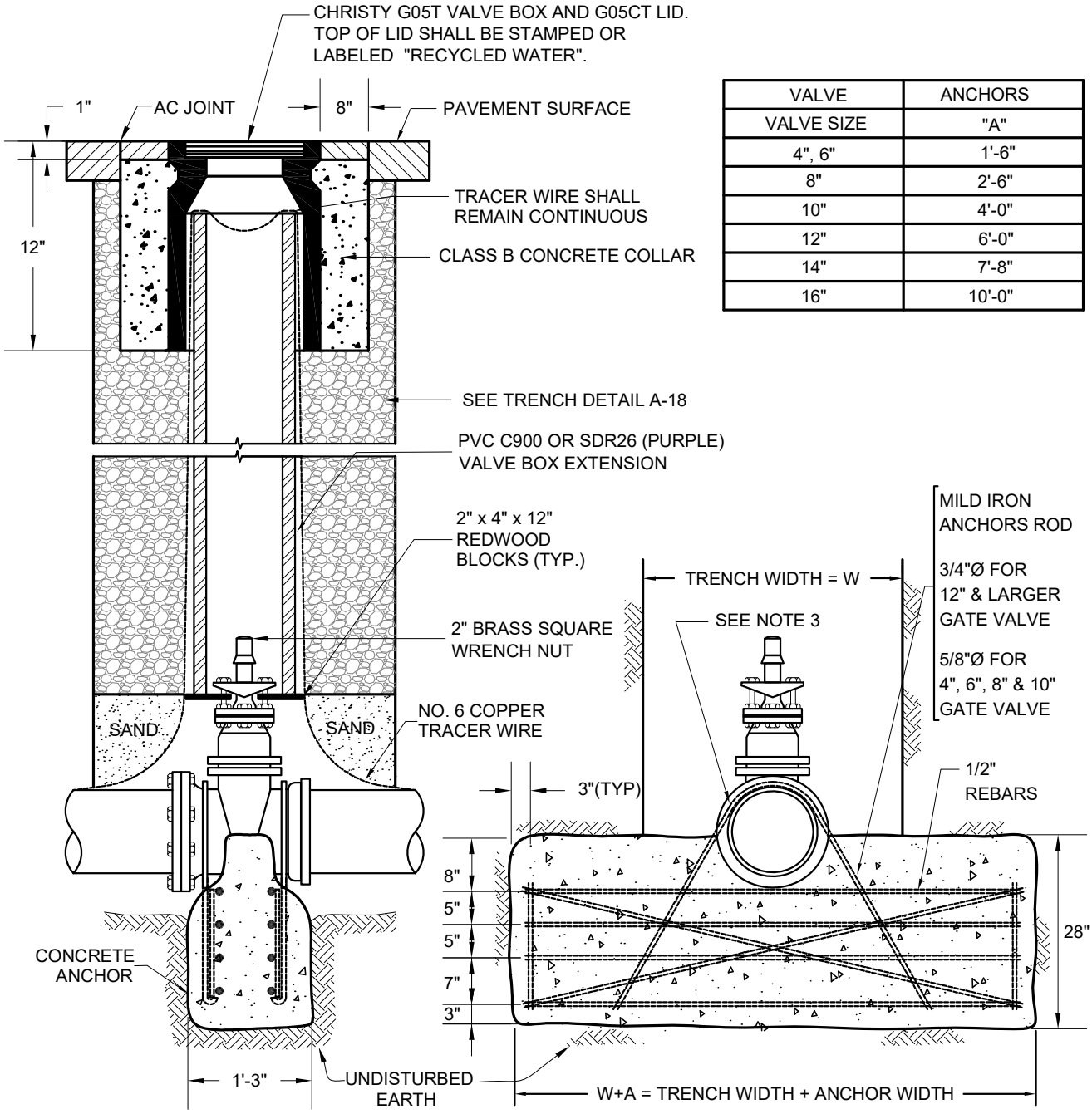
ASSISTANT PUBLIC WORKS DIRECTOR

08-21-2026 (DATE) 06-30-28 (EXP.) 60299 (R.C.E. NO.)

CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

RECYCLED WATER
REDUCED PRESSURE BACKFLOW PREVENTER INSTALLATION

FILE NO. RW-4



VALVE	ANCHORS
VALVE SIZE	"A"
4", 6"	1'-6"
8"	2'-6"
10"	4'-0"
12"	6'-0"
14"	7'-8"
16"	10'-0"

NOTES:

1. WHEN THERE IS A NEED TO RAISE VALVE COVER TO MEET NEW GRADE, ONLY ONE ADDITIONAL RING MAY BE ADDED.
2. FLANGES, BOLTS, AND NUTS SHALL BE KEPT CLEAR OF CONCRETE.
3. COAT EXPOSED PORTIONS OF ANCHOR RODS WITH A MASTIC COATING AND WRAP IN 10 MIL POLYETHYLENE TAPE.

Revision	Date	Approved
Drawn : AR	Date : 07-21-26	
Checked : TT	Scale : NTS	

APPROVED BY:

ASSISTANT PUBLIC WORKS DIRECTOR

08-21-2026 DATE | 06-30-28 EXP. | 60299 R.C.E. NO.

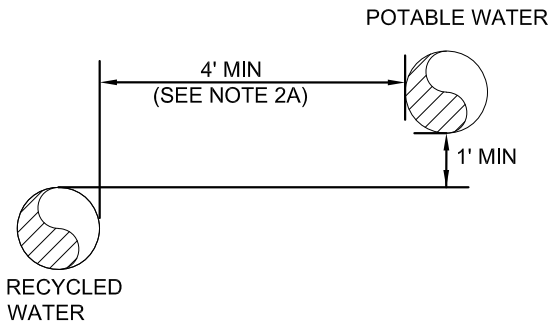
REGISTERED PROFESSIONAL ENGINEER EDWARD A RATTO C 60299 STATE OF CALIFORNIA

CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

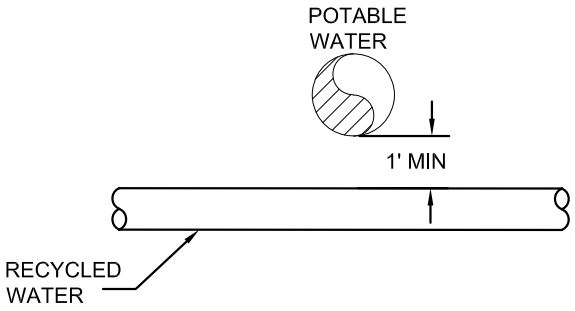
RECYCLED WATER
GATE VALVE BOX AND ANCHOR

FILE NO. RW-5

PARALLEL SEPARATION STANDARDS



CROSSING SEPARATION STANDARDS



NOTES:

1. POTABLE AND RECYCLED PIPES SHALL NOT BE INSTALLED IN THE SAME TRENCH.
2. PARALLEL CONSTRUCTION
   A. THE HORIZONTAL SEPARATION BETWEEN POTABLE AND RECYCLED PIPES SHALL BE A MINIMUM OF FOUR (4) FEET MEASURED BETWEEN OUTSIDE DIAMETERS FOR INSTALLATION IN PUBLIC RIGHT OF WAY AND ON-SITE.
   B. RECYCLED PIPES SHALL BE INSTALLED ONE (1) FOOT BELOW THE POTABLE PIPES WHERE THE TWO PIPES RUN PARALLEL TO EACH OTHER. WHERE THIS IS NOT POSSIBLE, THE PROPOSED DESIGN SHALL BE APPROVED BY THE CITY ENGINEER. DETAILS OF THIS INSTALLATION SHALL BE CLEARLY SHOWN ON THE PLANS.
3. CROSSING CONSTRUCTION
   A. RECYCLED WATER PIPES SHALL BE INSTALLED BELOW POTABLE WATER PIPES, WITH A MINIMUM VERTICAL SEPARATION OF ONE (1) FOOT, MEASURED BETWEEN OUTSIDE DIAMETERS.
   B. WHEN A RECYCLED WATER PIPE CROSSES A POTABLE WATER PIPE THE CROSSING SHALL BE AS CLOSE TO THE PERPENDICULAR AS PRACTICAL AND NO LESS THAN 45 DEGREES. RECYCLED WATER PIPE SHALL ALSO BE SLEEVED WITH PURPLE PVC A MINIMUM TEN (10) FEET ON EITHER SIDE OF THE CROSSING AS APPROVED BY CITY ENGINEER.
   C. PIPE JOINTS SHALL BE A MINIMUM OF EIGHT (8) FEET FROM POTABLE AND RECYCLED WATER PIPE CROSSINGS.

Revision	Date	Approved

Drawn : AR
Date : 04-03-24
Checked : TT
Scale : NTS

APPROVED BY:

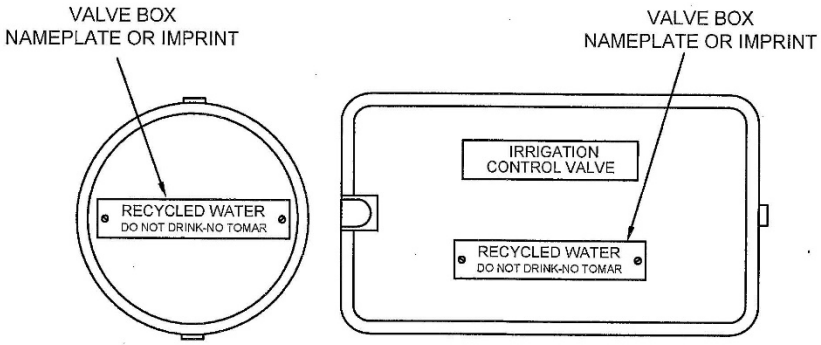
REGISTERED PROFESSIONAL ENGINEER — No. 62565 — CIVIL — STATE OF CALIFORNIA

4-17-24 DATE | 03-31-26 EXP. | 62565 R.C.E. NO.

CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

RECYCLED WATER
SEPARATION STANDARDS
FOR MAINS AND SERVICES

FILE NO. RW-6



NOTE:

1. T. CHRISTY ENTERPRISES, INC. P/N: 3800 (OR EQUAL)

Revision	Date	Approved
Drawn : IL	Date : 6/30/15	
Checked : AT	Scale : NTS	

APPROVED BY:

Jacqueline Ca Solomon

7/1/15
DATE

12/31/15
EXP.

57093
R.C.E. NO.

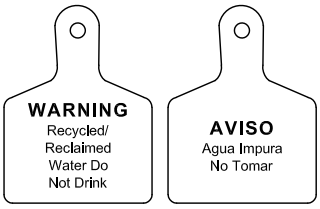
CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

RECYCLED WATER
IRRIGATION BOX LID IDENTIFICATION

FILE NO. RW-7

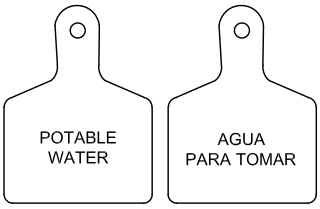
WARNING TAG DETAILS

RECYCLED WATER



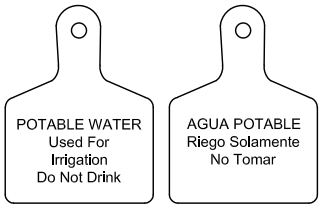
FRONT BACK

POTABLE WATER



FRONT BACK

POTABLE WATER (USED FOR DUAL IRRIGATION SITES)



FRONT BACK

NOTES:

1. RECYCLED WATER TAG SHALL HAVE PURPLE BACKGROUND WITH BLACK LETTERING
2. T. CHRISTY ENTERPRISES INC. P/N: ID-MAX-P2-RC006 (OR EQUAL)
3. POTABLE WATER TAG SHALL HAVE BLUE BACKGROUND WITH BLACK LETTERING
4. T. CHRISTY ENTERPRISES INC. P/N: ID-MAX-B2-PW015 (OR EQUAL)
5. POTABLE WATER IRRIGATION TAG SHALL HAVE YELLOW BACKGROUND WITH BLACK LETTERING
6. T. CHRISTY ENTERPRISES INC. P/N: ID-MAX-Y2-PW017 (OR EQUAL)
7. ALL WARNING TAGS SHALL BE WIRE TIED

RECYCLED WATER PIPE IDENTIFICATION

1. BURIED PIPES AND SLEEVES SHALL BE IDENTIFIED BY ONE OF THE FOLLOWING METHODS:
   A. PURPLE PVC PIPE CONTINUOUSLY LABELED "CAUTION: RECYCLED WATER - DO NOT DRINK." PIPE SHALL BE LAID WITH WORDS FACING UPWARDS.
   B. PURPLE IDENTIFICATION TAPE OR DECALS LABELED "CAUTION: RECYCLED WATER - DO NOT DRINK"; ADHESIVE, PERMANENT, AND RESISTANT TO COLOR FADING AND ENVIRONMENTAL CONDITIONS; IDENTIFICATION SHALL BE AFFIXED ALONG TWO (2) SIDES OF THE PIPE AT TEN (10) FEET INTERVALS AND WHERE THE PIPE CHANGES DIRECTIONS. PURPLE BANDS MAY ALSO BE PAINTED AROUND THE PIPE.
2. ABOVE GROUND PIPES SHALL BE PAINTED PURPLE (PANTONE #512) AND IDENTIFIED USING PURPLE IDENTIFICATION TAPE OR DECALS LABELED "CAUTION: RECYCLED WATER - DO NOT DRINK" ALONG TWO (2) SIDES OF THE PIPE AT TEN (10) FEET INTERVALS.

			CITY OF MOUNTAIN VIEW PUBLIC WORKS DEPARTMENT STANDARD DETAIL
Revision	Date	Approved	
Drawn : AR	Date : 02-29-24		
Checked : TT	Scale : NTS		RECYCLED WATER WARNING TAG DETAIL AND PIPE IDENTIFICATION

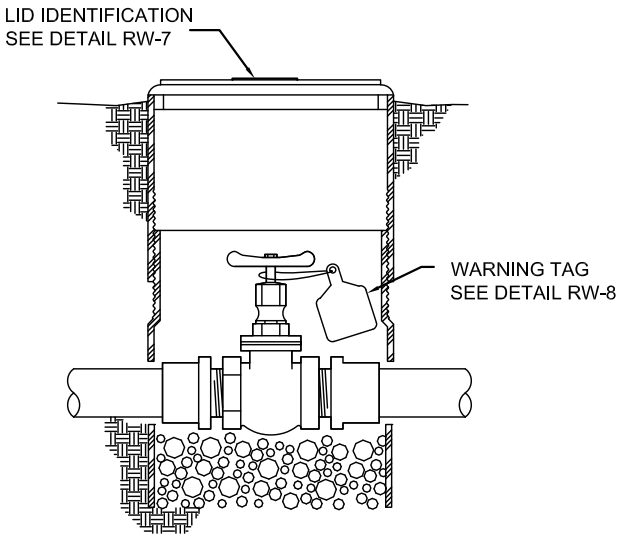
REGISTERED PROFESSIONAL ENGINEER — LUYNH BY REN — No. 62565 — CIVIL — STATE OF CALIFORNIA

APPROVED BY: _____

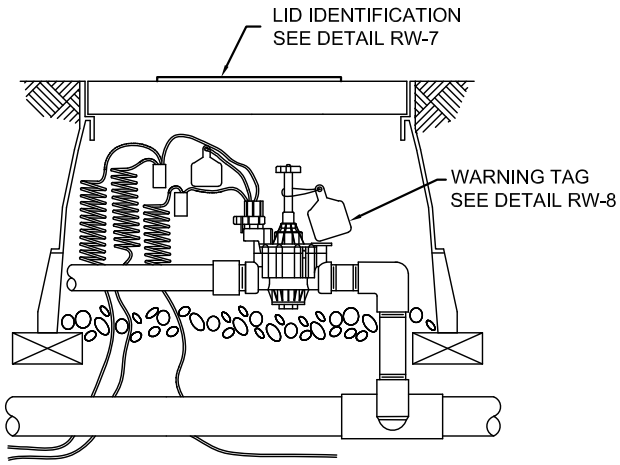
4-17-24	03-31-26	62565
DATE	EXP.	R.C.E. NO.

FILE NO. RW-8

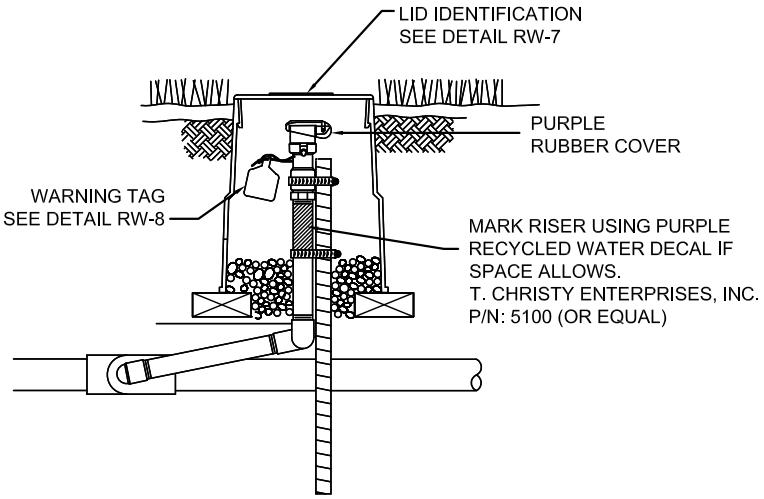
GATE VALVE



REMOTE CONTROL VALVE



QUICK COUPLING VALVE



NOTES:

1. QUICK COUPLING VALVES SHALL REQUIRE A LOCKING FEATURE AND DIFFERENT THREAD TYPE AND SIZE IF RECYCLED AND POTABLE IRRIGATION ARE ON THE SAME SITE.

Revision	Date	Approved
Drawn : AR	Date : 02-29-24	
Checked : TT	Scale : NTS	

APPROVED BY:

REGISTERED PROFESSIONAL ENGINEER — LUYNH BYRON TRUONG — No. 62565 — CIVIL — STATE OF CALIFORNIA

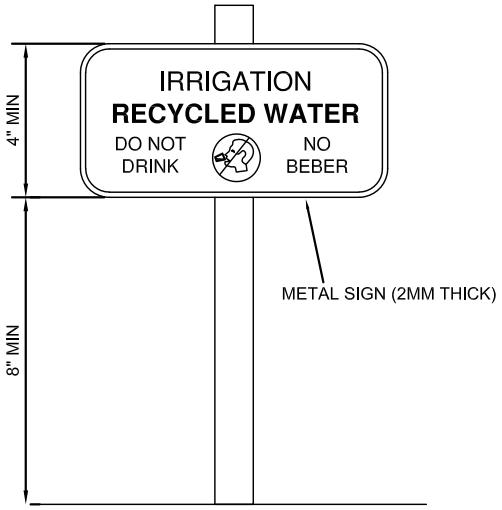
4-17-24 DATE | 03-31-26 EXP. | 62565 R.C.E. NO.

CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

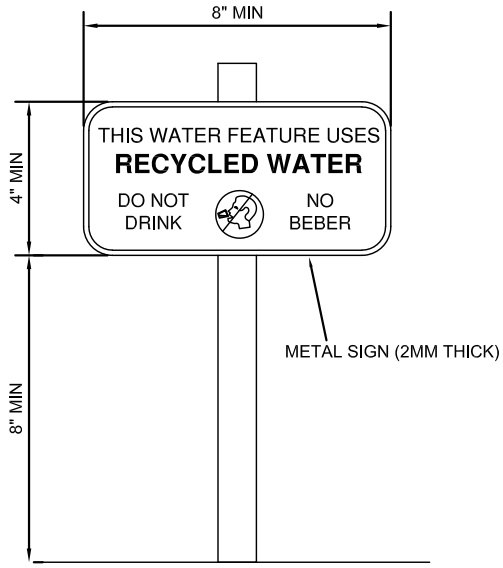
RECYCLED WATER
VALVE LABELING

FILE NO. RW-9

IRRIGATION ADVISORY SIGN



WATER FEATURE ADVISORY SIGN



NOTES:

1. MOUNT SIGNS ON 4" X 4" REDWOOD POSTS OR AFFIX TO OTHER PERMANENT STRUCTURES.
2. MOUNT SIGNS SO THEY ARE CLEARLY VISIBLE AND NOT OBSCURED BY MATURE PLANTS.
3. LETTERING MUST BE LEGIBLY PRINTED ON A CONTRASTING BACKGROUND.
4. T. CHRISTY ENTERPRISES, INC. P/N: ID-SGN9X12WRW (OR EQUAL)
5. MOUNT SIGNS MUST INCLUDE THE INTERNATIONAL "DO NOT DRINK" SYMBOL

Revision	Date	Approved

Drawn : AR
Date : 11-29-23
Checked : TT
Scale : NTS

APPROVED BY:

REGISTERED PROFESSIONAL ENGINEER — No. 62565 — CIVIL — STATE OF CALIFORNIA

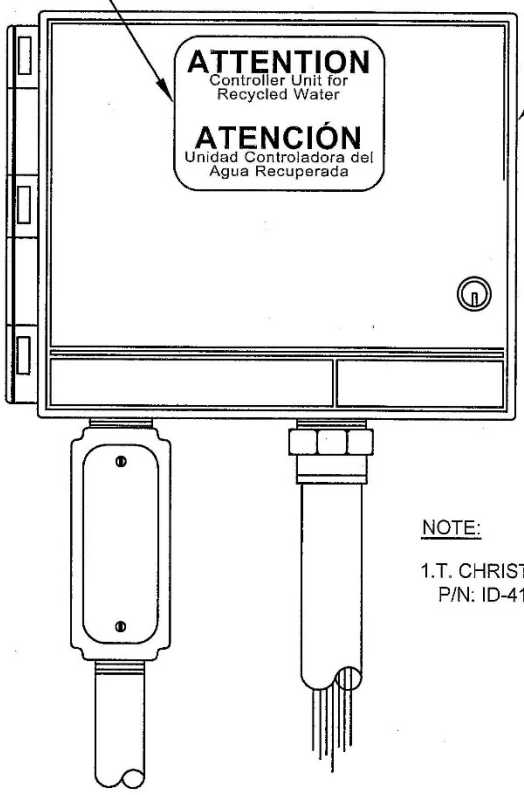
4-17-24 DATE | 03-31-26 EXP. | 62565 R.C.E. NO.

CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

RECYCLED WATER
ADVISORY SIGNS

FILE NO. RW-10

MARKING DECAL SHOWN
AFFIXED TO BOX EXTERIOR
(ALSO AFFIX TO INTERIOR OF
BOX IF POSSIBLE)



CONTROLLER BOX

NOTE:

1.T. CHRISTY ENTERPRISES, INC.
P/N: ID-4100 (OR EQUAL)

Revision	Date	Approved
Drawn : IL	Date : 6/30/15	
Checked : AT	Scale : NTS	

APPROVED BY:

Jacqueline Casolomon

7/1/15
DATE

12/31/15
EXP.

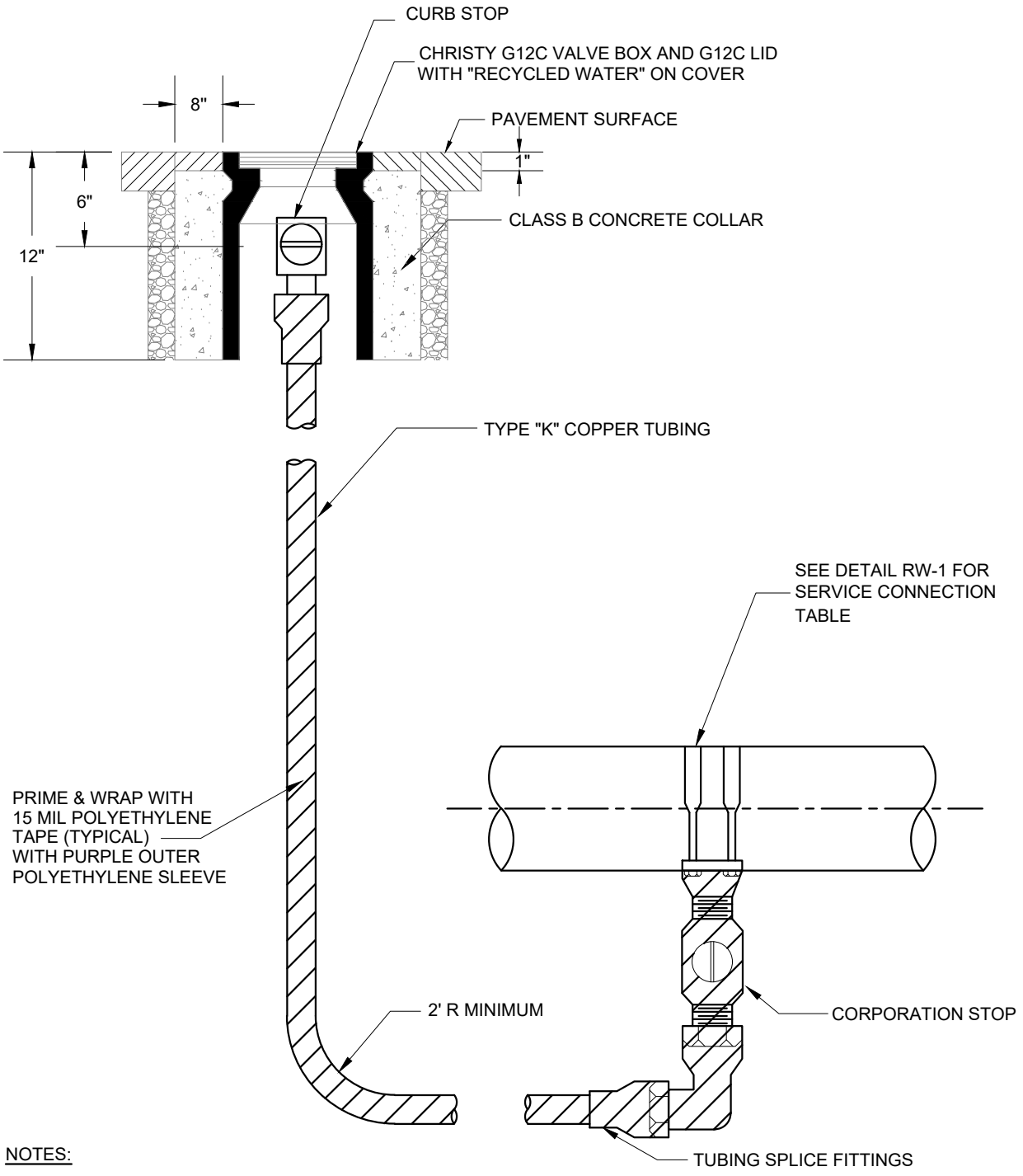
57093
R.C.E. NO.

REGISTERED PROFESSIONAL ENGINEER JACQUELINE ANDREWS CASOLOMON No. 57093 CIVIL STATE OF CALIFORNIA

CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

RECYCLED WATER
CONTROLLER BOX IDENTIFICATION

FILE NO. RW-11



NOTES:

1. FIELD APPLY BITUMASTIC 50 ON ALL BARE METAL AND COVER WITH POLYETHYLENE ENCASEMENT IN ACCORDANCE WITH AWWA STANDARD C105

Revision	Date	Approved
Drawn : AR	Date : 04-03-24	
Checked : TT	Scale : NTS	

APPROVED BY:

REGISTERED PROFESSIONAL ENGINEER — No. 62565 — CIVIL — STATE OF CALIFORNIA

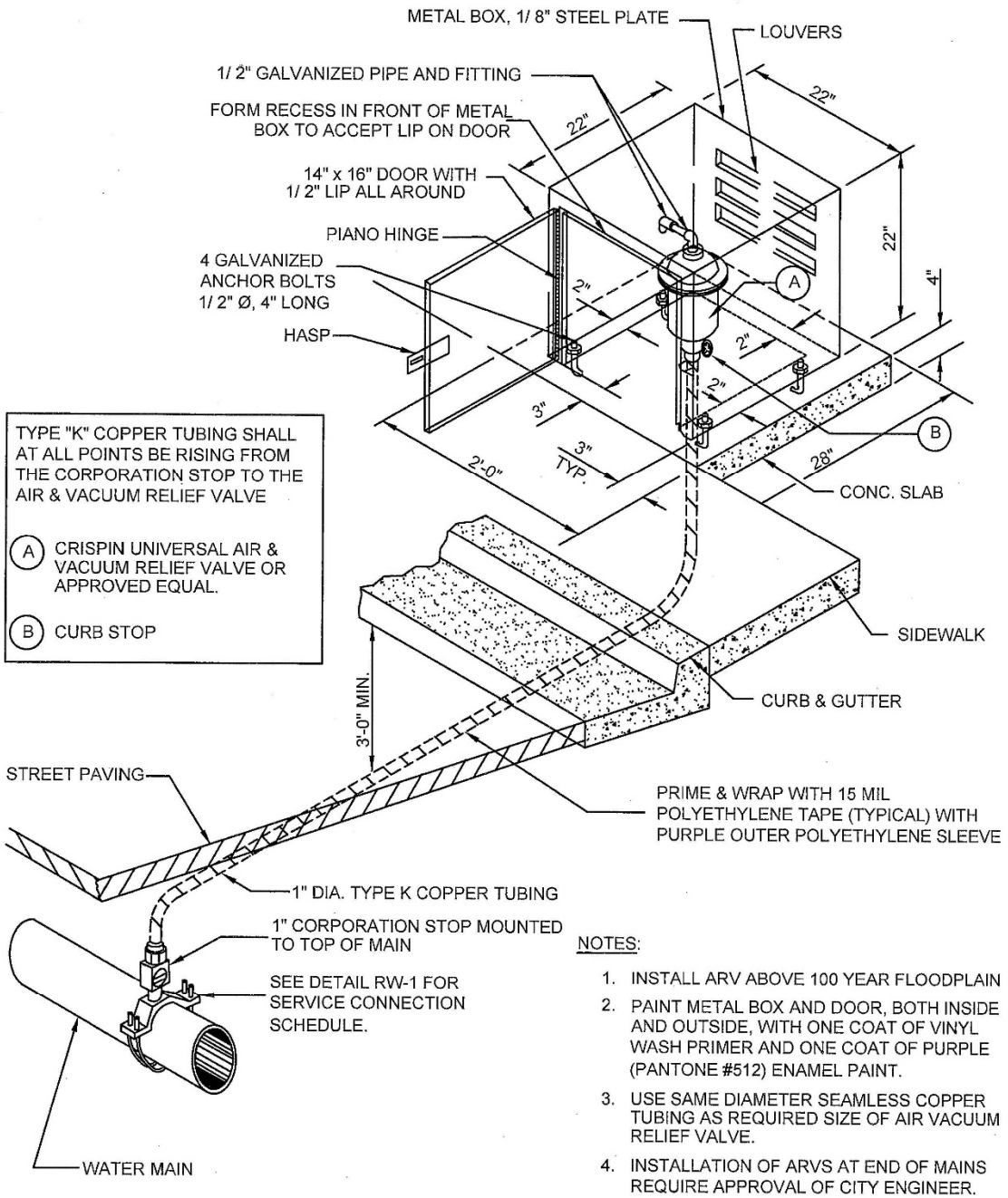
4-17-24 DATE | 03-31-26 EXP. | 62565 R.C.E. NO.

CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

RECYCLED WATER

2" BLOW-OFF VALVE

FILE NO. RW-12



TYPE "K" COPPER TUBING SHALL AT ALL POINTS BE RISING FROM THE CORPORATION STOP TO THE AIR & VACUUM RELIEF VALVE

(A) CRISPIN UNIVERSAL AIR & VACUUM RELIEF VALVE OR APPROVED EQUAL.

(B) CURB STOP

NOTES:

1. INSTALL ARV ABOVE 100 YEAR FLOODPLAIN
2. PAINT METAL BOX AND DOOR, BOTH INSIDE AND OUTSIDE, WITH ONE COAT OF VINYL WASH PRIMER AND ONE COAT OF PURPLE (PANTONE #512) ENAMEL PAINT.
3. USE SAME DIAMETER SEAMLESS COPPER TUBING AS REQUIRED SIZE OF AIR VACUUM RELIEF VALVE.
4. INSTALLATION OF ARVS AT END OF MAINS REQUIRE APPROVAL OF CITY ENGINEER.

Revision	Date	Approved

Drawn: IL | Date: 6/30/15

Checked: WM | Scale: NTS

APPROVED BY: Jacqueline A. Solomon

7/1/15 DATE

12/31/15 EXP.

57093 R.C.E. NO.

REGISTERED PROFESSIONAL ENGINEER JACQUELINE ANDREWS SOLOMON No. 57093 CIVIL STATE OF CALIFORNIA

CITY OF MOUNTAIN VIEW
PUBLIC WORKS DEPARTMENT
STANDARD DETAIL

RECYCLED WATER
AIR RELIEF VALVE

FILE NO. RW-13