COUNTY OF SACRAMENTO
DEPARTMENT OF PUBLIC WORKS

Improvement Standards

May 1, 1989

D.M. FRALEIGH, DIRECTOR
Department of Public Works

COUNTY OF SACRAMENTO

DEPARTMENT OF PUBLIC WORKS

IMPROVEMENT STANDARDS

MAY 1, 1989

PRICE: $12.00 (Tax Included)

NOTE: Copies of these standards may be obtained at 827 - Seventh Street, Room 105, Sacramento, California. Mail orders should be sent to County of Sacramento, Department of Public Works, P.O. Box 1587, Sacramento, CA 95812. There will be an additional charge of $4.80 for the first copy and $2.40 for each additional copy per order for mail orders to cover postage and handling.

RESOLUTION NO. 89-0379

Resolution of the Board of Supervisors of the County of Sacramento, State of California Adopting Improvement Standards, Repealing Resolutions 83-482, 83-503 and 84-141

WHEREAS, the Board of Supervisors of the County of Sacramento, State of California deems it necessary and advisable in the public's interest to revise the existing Improvement Standards governing the design and construction of roads, streets, sanitary sewers, storm drainage, concrete structures, water supply, street lighting, land grading, and other facilities within the County of Sacramento to provide for proper development;

NOW, THEREFORE, BE IT RESOLVED AND ORDERED that the attached Improvement Standards dated May 1, 1989, for said improvements are hereby adopted on this date as the Sacramento County Improvement Standards; and

BE IT FURTHER RESOLVED AND ORDERED that any Improvement Standards previously adopted pursuant to Resolutions 83-482, 83-503 and 84-141 shall not apply to any improvement plans that are received for checking beyond April 30, 1989; and

BE IT FURTHER RESOLVED AND ORDERED that these Improvement Standards shall be in full force and effect for all Improvement Plans received for checking on and after May 1, 1989.

BE IT FURTHER RESOLVED AND ORDERED that the Improvement Standards and Standard Drawings adopted herein, together with the Standard Construction Specifications dated October 1, 1988 and the references included therein to the Standard Specifications of the State of California shall govern the design and construction of improvements in Sacramento County.

89-0379

ON A MOTION by Supervisor J. STRENG, seconded by Supervisor S. SMOLEY, the foregoing Resolution was passed and adopted by the BOARD OF SUPERVISORS of the County of Sacramento, State of California, this 21st day of March, 1989, by the following vote, to-wit:

AYES:	Supervisors	Collin, T. Johnson, Streng, Smoley
NOES:	Supervisors	None
ABSENT:	Supervisors	G. Johnson

Sandra R. Smoley
Chairperson of the Board of Supervisors
of the County of Sacramento

(SEAL)

ATTEST: Holly A. Williamson
Clerk of the Board of Supervisors

In accordance with Section 25103 of the Government Code of the State of California a copy of this document has been delivered to the Chairman of the Board of Supervisors, County of Sacramento on

MAR 21 1989

By Holly A Donaldson
Deputy Clerk, Board of Supervisors

FILED

MAR 21 1989

BOARD OF SUPERVISORS
BY Holly A. Williamson
CLERK OF THE BOARD

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COUNTY OF SACRAMENTO

DEPARTMENT OF PUBLIC WORKS

IMPROVEMENT STANDARDS

SECTION 1

PURPOSE AND DEFINITIONS

1-1 PURPOSE -- It is the purpose of these Improvement Standards to provide standards to be applied to improvements and private works to be dedicated to the public and accepted by the County for maintenance or operation, as well as improvements to be installed within existing rights of way and easements. This is necessary in order to provide for coordinated development of required facilities to be used by and for the protection of the public. These Standards shall apply to regulate and guide the design and preparation of plans for construction of streets, highways, alleys, drainage, sewerage, street lighting, water supply facilities and related public improvements, and set guidelines for all private works which involve drainage, grading, trees, and related improvements.

1-2 DESIGN PRACTICE -- It is recognized that it is not humanly possible to anticipate all situations that may arise or to prescribe standards applicable to every situation. Therefore, any items or situations not included in these Improvement Standards shall be designed in accordance with accepted engineering practice, the County of Sacramento Standard Construction Specifications, the State of California "Highway Design Manual" and "Traffic Manual" , and as required by the Director of Public Works.

1-3 DEFINITIONS -- Whenever the following terms or titles are used in these standards, or in any document or instrument where these standards govern, the intent and meaning shall be as specified in the Sacramento County Standard Construction Specifications, Title 12 of the Sacramento County Code, and as herein defined:

A. Consulting Engineer -- Shall mean any person or persons, firm, partnerships or corporation legally authorized to practice civil, mechanical or electrical engineering in the State of California who prepares or submits improvement plans and specifications to the Department of Public Works of Sacramento County for approval.

B. Developer -- Shall mean any person or persons, firm, partnership, corporation, or combination thereof, financially responsible for the work involved.

C. Development -- Shall mean the act or process of any construction on properties as well as subdivision improvement.

D. Director -- Shall mean the Director of Public Works of Sacramento County acting either directly or through the Deputy Directors, the Chiefs of the appropriate Divisions of the Department of Public Works or their authorized representatives. Director shall also mean the District Engineer where special districts are involved.

E. Laboratory -- Shall mean any testing agency or testing firm which has been approved by the Department of Public Works.

F. Standard Construction Specifications -- Shall mean the latest standard construction specifications adopted by the Board of Supervisors governing the construction of roads, streets, sanitary sewers, storm drainage, concrete structures, water supply, traffic signals, street lighting and other facilities within the County of Sacramento to provide for proper development.

G. Standard Drawings -- Shall mean the standard drawings as set forth in the Standard Construction Specifications and those drawings included herein, approved by the Director or Deputy Director by his signature thereon, and as modified, revised, or added.

H. State -- As used in the State Specifications, shall mean Sacramento County.

I. State Standard Plans -- Shall mean the Standard Plans of the State of California, Department of Transportation. (Latest Edition)

J. Urban Area -- Shall mean the area within the boundary as defined by the Federal Highway Administration.

SECTION 2

GENERAL REQUIREMENTS

2-1 PLANS BY AN APPROPRIATE ENGINEER -- All plans and specifications for improvements, private and public, which are to be accepted for maintenance by the County and private, on-site drainage and grading shall be prepared by a Consulting Engineer of the appropriate branch of engineering covering the work submitted.

2-2 APPROVED PLANS -- Complete plans and specifications for all proposed streets, bikeways, grading, drainage facilities, sewerage, street lighting, water distribution systems, industrial developments, commercial developments, and subdivisions, including any necessary dedications, easements, and rights of entry, shall be submitted to the Department of Public Works for approval. This approval must be substantiated by the signature of the Director prior to the beginning of construction of any such improvements. The Director shall order any Contractor to cease work on any project if said Contractor does not have properly approved plans in his possession.

2-3 REFERENCE TO COUNTY SPECIFICATIONS AND STANDARDS -- The General Notes and Special Provisions of all plans shall include the following note:

All construction and materials shall be in accordance with the latest edition of the County of Sacramento Standard Construction Specifications and Improvement Standards.

2-4 WORK IN COUNTY RIGHTS OF WAY, EASEMENTS AND WATERWAYS --The following shall govern work work done within County rights-of-way, easements, and waterways:

A. Possession of a complete set of County-approved engineered plans shall allow a contractor duly licensed by the State of California to perform work specified on the plans in County rights of way, easements and waterways. The contractor shall be bonded as required and as specified in Chapter 12.08 of the Sacramento County Code.

B. In lieu of the plans required in "A" above, minor work within County rights of way, easements and waterways may be performed in accordance with the following:

1. Minor work within street rights of way and easements may be performed with an encroachment permit.

Minor work generally consists of such items as widening or constructing sidewalks adjacent to existing roadside curb and gutter, constructing driveways in existing curb and gutter, constructing asphalt concrete driveways, installing driveway culverts for Class "C" streets, utility related work, and work which requires cutting the road surface.

The encroachment permit shall be issued in accordance with Division 2 Chapter 5.5 of the Streets and Highways Code of the State of California.

2. Work within street rights of way and easements consisting of street light installations or street light installations and minor work as described in No. 1 above may be performed with an encroachment plan.

   Encroachment plans shall be in accordance with all of the requirements of these standards except that Section 2-1, "Plans By An Appropriate Engineer", will be waived for the preparation of the encroachment plans.

C. Minor work within the flood plain of all creeks and swales, waterways, and drainage easements may be performed with a Sacramento County Water Agency permit.

   Minor work generally consists of such items as connecting yard drains into existing manholes, grading within the flood plain of creeks and swales, removing trees within creeks, and other minor items of work involving waterways.

2-5 IMPROVEMENT PLAN SUBMITTAL -- The initial submittal of improvement plans to the Department of Public Works shall consist of the following:

A. Six sets of plans, complete and in accordance with these Improvement Standards and the Standard Construction Specifications, along with any required specifications, computation, test data, and other material requested by the Director.

B. Two copies of the watershed map and drainage calculations in accordance with Section 5.

C. Two additional copies of the street lighting plan to be used for block numbering on street name signs.

D. An Environmental Certificate from the County's Environmental Impact Section.

E. One copy of the final "Conditions of Approval" and applicable exhibits for all rezones, subdivision approvals, variances, use permits, and any other discretionary planning actions for the subject development.

F. A portion of the plan check and inspection fee in accordance with Section 2-7.

G. The name, address and telephone number of the developer.

H. Utility letters in accordance with Section 2-17.

I. Copies of permits as required by other agencies.

Should there be required alterations or revisions to the plans as submitted, the Director will return one copy with the corrections marked or indicated thereon. If the plans submitted are not prepared in accordance with these Improvement Standards and the Standard Construction Specifications or not in keeping with the standards of the profession, the Director may return them unmarked and unapproved.

2-6 IMPROVEMENT PLAN RESUBMITTAL -- Plans being submitted shall consist of three complete sets of plans, except that plans which involve trunk drainage, as defined by Section 5-1, shall consist of four sets. Additional sets may be required by the Director.

Plans being resubmitted that contain revisions or alterations other than those required by the Director on previously corrected plans shall require the Consulting Engineer to bring those revisions or alterations to the attention of the Director.

2-7 PLAN CHECK AND INSPECTION FEE -- When improvement plans are initially submitted to the Department of Public Works for checking, a portion of the total plan check and inspection fee for the development will be required as a deposit to initiate checking of the plans.

Should the development not be carried to completion, any portion of the required deposit over and above the accumulated costs expended by the Department on the development will be refunded to the developer.

The Department of Public Works shall be notified of any change of billing address.

Required plan check and inspection fee payments shall be $280. For projects estimated at less than $4,000 this shall be the total fee due for the project. For projects estimated at over $4,000 this shall be an initial deposit, with monthly statements indicating the balance due.

2-8 PLAN APPROVAL -- No plans will be approved nor construction authorized until such time as the Director signifies his approval by his signature on the set of plans and not unless such changes, corrections or additions are resubmitted to the Director for approval as previously prescribed for the original plans. At such time as the Consulting Engineer preparing the plans has made the necessary revisions and paid the remainder of the total plan check and inspection fee, as provided under the provisions of Chapter 12.03 of the County Code, and amendments thereto, and any fee required under the provisions of Ordinance No. 1 of the Sacramento County Water Agency, and amendments thereto, has been paid, the Director will sign the tracings in the space provided, after the Consulting Engineer has signed them. The Director's approval is valid for a period of twelve months. Should work not commence within the 12-month period, the plans shall be resubmitted for reapproval.

Final A.C., A.B. and A.S.B quantities shall be submitted for all subdivision developments prior to approval.

2-9 FINAL PLANS REQUIRED -- The Consulting Engineer shall deliver the following number of sets of prints from the approved tracings to the Director:

A. Subdivisions -- Eight complete sets of plans, three additional sets of the street light plans only, and one set of reproducible brown line prints of the street light plans. Two additional sets of the water plans in County owned water districts.

B. Other Developments -- Nine complete sets of plans.

C. Developments containing drainage pipeline systems shall submit a 1 inch = 100 foot scale map of these systems.

One additional set of plans shall be delivered when trunk drainage facilities are shown on the plans. Additional copies of improvements plans may be requested by the Director at his discretion, and these shall be furnished to the County without cost.

Copies of the final utility letters required by Section 2-17 shall be included with the approved plans delivered to the Director.

2-10 IMPROVEMENT PLAN REVISIONS DURING CONSTRUCTION -- Should changes become necessary during construction, the Consulting Engineer shall first obtain the consent of the Director and shall then resubmit the title sheet and the plan sheets affected for approval. The changes on the plans shall be made in the following manner:

A. The original proposal shall not be eradicated from the plans but shall be lined out.

B. In the event that eradicating the original proposal is necessary to maintain clarity of the plans, approval must first be obtained from the Director.

C. The changes shall be clearly shown on the plans with the changes and approval noted on a revision signature block, conforming to Standard Drawing G-1.

D. The changes shall be identified by the revision number in a triangle delineated on the plans adjacent to the change and on the revision signature block.

Minor changes which do not affect the basic design or contract may be made upon the authorization of the Director, but said changes must be shown on "record" plans when the contract is completed.

The Director may order changes in the plans in order to complete the necessary facilities. Changes in the plans ordered by the Director shall conform to all of the above.

2-11 RECORD (AS BUILT) PLANS -- The Consulting Engineer shall keep an accurate record of all approved deviations from the plans and shall provide five copies of these records to the Director upon completion of the work before final approval of the completed subdivision improvements.

Certification by the Consulting Engineer of the finished pad elevations of subdivision lots shall be required prior to final approval of the subdivision improvements. Certification shall be in accordance with Section 9-8.

2-12 CONFLICTS, ERROR AND OMISSIONS -- Excepted from approval are any features of the plans that are contrary to, in conflict with, or do not conform to any California State Law, Sacramento County Code or Resolution, conditions of approval, or generally accepted good engineering practice, in keeping with the standards of the profession, even though such errors, omissions or conflicts may have been overlooked in the Department of Public Works' review of the plans.

2-13 CHANGE IN CONSULTING ENGINEER -- If the developer elects to have a registered civil engineer or licensed land surveyor other than the engineer who prepared the plans provide the construction staking, he shall provide the Director in writing the name of the individual or firm one week prior to the staking of the project for construction. The Developer shall then be responsible for proving all construction, the preparation of revised plans for construction changes, and the preparation of "as built" plans upon completion of the construction.

In the Developer's notification of a change in the firm providing construction staking, he shall acknowledge that he accepts responsibility for design changes and "as built" information as noted above.

2-14 CITY OF SACRAMENTO SEWER SUBMITTALS -- The Consulting Engineer shall submit to the County for approval those sanitary sewer plans for improvements which are within the City of Sacramento and also within a sanitation

district, the collection system of which is maintained by County forces. Both City of Sacramento and County approval is required for such plans.

2-15 SEWER ANNEXATION REQUIREMENTS -- When sanitary sewer plans are submitted for an area that is not within a sanitation or sewer maintenance district. said plans will not be approved until a request for annexation to the appropriate district has been completed, unless otherwise approved by the Director. Annexation request forms and information relative to annexation procedures are available from the Water Quality Division.

2-16 TUNNEL SAFETY REQUIREMENTS -- Any boring or jacking operation of 100 foot or greater length and involving an opening greater than 30 inches in diameter is subject to the State of California Division of Industrial Safety's tunnel safety requirements. The Consulting Engineer shall submit to the Division of Industrial Safety plans and specifications applicable to the tunnel operation, with a letter requesting tunnel classification. This procedure is also recommended to avoid project delay if there is the possibility of any personnel entering the tunnel, regardless of diameter and length. The letter should identify the Public Works agency responsible for the project, and the agency's mailing address. The plans shall identify underground utilities and tanks or areas for storing fuel and toxic gases in the vicinity of the tunnel site. The request for classification should be submitted allowing ample time for the Division of Industrial Safety review in order that any special requirements can be included in the project plans and specifications. The Consulting Engineer shall also attend the required pre-construction meeting.

2-17 EXISTING UTILITIES --All existing utilities are to be shown on the plans. In addition, the Consulting Engineer shall submit prints of the preliminary and approved plans to the utility companies involved. This is necessary for the utilities to properly plan their relocation projects and needed additional facilities. Copies of the transmittal letters to the utility companies shall be provided to the Director. The transmittal letters shall indicate all utility pole conflicts which require relocation. The conflict shall be referenced to stationing and distance from centerline. In addition the following note shall appear on the first page of the plans: No pavement work will occur within the road right-of-way prior to completion of utility pole relocation.

2-18 PARTIAL PLANS -- Where the improvement plans submitted cover only a portion of ultimate development, the plans submitted shall be accompanied by the approved tentative plan or a study plan if there is no approved tentative plan showing topographic features of the ultimate development at an adequate scale to clearly show the proposed improvements.

2-19 OTHER AGENCY NOTIFICATIONS -- The Consulting Engineer is responsible for obtaining the approval and necessary permits of governmental or municipal agencies when their facilities are involved.

2-20 INSPECTION REQUIREMENTS -- Any improvement constructed to the Standard Construction Specifications for which it is intended that the County will assume maintenance responsibility, shall be inspected during construction by the Director. Each phase of construction shall be inspected and approved prior to proceeding to subsequent phases.

Private on-site grading and drainage shall be inspected during construction by the Director.

Any improvements constructed without inspection as provided above or constructed contrary to the order or instructions of the Director will be deemed as not complying with Standard Construction Specifications and will not be accepted by Sacramento County for maintenance purposes.

The Consulting Engineer shall notify the Director when the Contractor first calls for grades and staking and shall provide the Director with a copy of all cut sheets.

Within ten days after receiving the request for final inspection, The Director shall inspect the work. The Contractor, Consulting Engineer, and Developer will be notified in writing as to any particular defects or deficiencies to be remedied. The Contractor shall proceed to correct any such defects or deficiencies at the earliest possible date. At such time as the work has been completed, a second inspection shall be made by the Director to determine if the previously mentioned defects have been repaired, altered, and completed in accordance with the plans. At such time as the Director approves the work and accepts the work for Sacramento County, the Contractor, Consulting Engineer and Developer will be notified in writing as to the date of final approval and acceptance.

On assessment districts and projects where Sacramento County participates in the costs thereof, quantities will be measured in the presence of the Director, Consulting Engineer, and Contractor, and witnessed accordingly.

2-21 SPECIAL NOTICES AND PERMITS -- The Consulting Engineer shall be responsible for advising the Contractor to give the following notices and have in his possession the following permits and plans:

A. Contractor shall be in receipt of official County approved plans prior to construction.

B. Contractor shall notify all utility companies involved in the development prior to beginning of work.

C. Contractor shall notify "Underground Service Alert" (phone 800-642-2444) 2 working days in advance before any digging.

D. Contractor shall be responsible for the protection of all existing monuments and/or other survey monuments and shall notify Sacramento County Surveyor of any damaged or removed County, State or Bureau monuments.

E. Contractor shall notify Water Quality Division upon application for permit and payment of required fees for sewer taps in accordance with Section SS79-02 of the Standard Construction Specifications.

F. The Contractor shall verify all street names with County Surveyor before ordering street signs.

G. Contractor shall be responsible for conducting his operation entirely outside of any floodplain boundaries. Floodplain boundaries shall be clearly delineated in the field prior to construction.

H. Contractor shall be responsible for conducting his operation entirely outside of any no grading area. These area shall be clearly delineated in the field prior to construction.

I. Where work is being done in an off-site easement the Contractor shall notify the property owner 48 hours prior to commencing work.

SECTION 3

PLAN SHEET REQUIREMENTS

3-1 PAPER DETAILS -- All improvement plans shall be prepared on plan and profile sheets 22" or 24" x 36", F.A.S. sheets, Plate "A" plan and profile paper, or special consulting engineer's sheets which have been accepted by the County. Scales: Horizontal 1" = 20', 40', or 50': Vertical 1" - 2', 4', or 5', but only the scale, horizontal or vertical, for which the sheet was intended shall be used.

3-2 DRAFTING STANDARDS -- All plans approved by the County will be microfilmed. Therefore, certain drafting standards have become necessary to produce legible film and subsequent prints. All line work must be clear, sharp and heavy. Letters and numerals must be 1/8 inch minimum height, well formed and sharp. Numerals showing profile elevations shall not be bisected by station grid lines. Dimension lines shall be terminated by sharp solid arrowheads.

3-3 TITLE SHEET -- On subdivision or improvement plans exceeding three sheets in a set, a title sheet shall be prepared showing the following:

*A. The entire subdivision or parcel and project
B. Assessment district limits
C. City Limits
D. Street Names and Widths
E. Section lines, grant lines and corners
F. Adjacent subdivision, including names, lot lines and lot numbers
G. Property lines
H. Public easements
*I. Location map
J. Scale of drawings
*K. Index of sheets
L. Legend of symbols
*M. Signature block conforming to Standard Drawing G-1 and situated at the lower right hand corner of the sheet
N. AC, AB, ASB quantities
O. California Coordinate System Grid Numbers in the upper right hand corner

Improvement plans consisting of three or less sheets and encroachment plans shall not be required to provide a title sheet but shall be required to show all of the above in the plans.

*Shall be shown on the front sheet of encroachment plans and plans consisting of three or less sheets.

3-4 TITLE BLOCK -- Each sheet within the set of drawings shall have an approved title block showing the sheet title, number, date, scale, and the Consulting Engineer's name, signature and license number; the name of the County maintenance water agency or sanitation district, when applicable; and the name of the subdivision or assessment district. Samples may be obtained from the Department of Public Works.

The preferred location is across the right hand end of the sheets. This will facilitate the common method of plan storage by allowing the plan information to be viewed with the plans rolled up.

3-5 DRAINAGE, SEWER, WATER AND GRADING LAYOUT -- On all subdivison plans, the storm drainage, sanitary sewer and domestic water systems shall be shown on an overall plan layout. In addition, the storm drainage and sanitary sewer systems shall be shown on the street plans. Separate grading plans will be required for all subdivisions. On all other plans, an overall plan layout will not be required but the above facilities shall be shown within the development and on the street plans.

All plans showing the domestic water systems shall include signature blocks and be approved by the responsible water and fire districts and for encroachment approval by the Director. The signature block shall conform to Standard Drawing G-1 and shall be situated near the lower right hand corner of the first sheet of the water plans.

Where wells are included as a part of the water system, the layout of the well site shall be drawn to a scale no smaller than 1 inch equals 5 feet, with the layout covering an area at least 50 feet in all directions from the well location.

3-6 PLAN DETAILS -- In additions to the other requirements of these Improvement Standards, the following details shall be shown on plans submitted for approval. This does not in any way exempt the Consulting Engineer preparing plans from the responsibility of preparing neat, accurate and comprehensive plans in keeping with the standards of the profession.

A. Right of Way - Right of Way lines, the boundaries of lots fronting on the street, drainage easements, utility easements, planting easements, section lines and corners, land grant lines and temporary construction easements, both existing and proposed, shall be shown on the plans. All right of way and easement lines shall be properly dimensioned.

B. Topography -- All pertinent topographic features shall be shown, such as street lines, medians, driveways (on both sides of the street when within 40 feet of the median ending), curbs, sidewalks, shoulders, location and size of storm and sanitary sewer lines, high water and frequent inundation levels, water lines, gas lines, telephone conduits, other underground utilities, existing structures, houses, trees (9" and larger) and other foliage, traffic signals, street lights and pullboxes, underground electrical conduits, drainage ditches, utility poles, fire hydrants, retaining walls, masonry structures, and all other features of the area which may affect the design requirements for the area. When the potential utility conflict exists, "as built" elevations of the utilities shall be verified by the Consulting Engineer. For existing structural sections, the grade of the cross

slope on the road and 20 feet into the property at driveways shall be shown.

C. Contours and Elevations -- Existing contours or supporting elevations shall be shown on all plans submitted for subdivision, commercial improvements, or planned unit developments.

D. Profiles -- The plans shall show the existing profile of all roadway centerline, edges of pavement, curb and gutter flow lines, drainage ditches, storm and sanitary sewers. All profiles of proposed improvements shall state centerline elevations at 50 foot intervals and rate of grades, vertical curves and other vertical alignment data. When curb and gutters are designed for reconstructed County roads, elevations shall be shown at the edge of the outside travelled way, or if the road has a full paved section, shall also be shown two feet from the proposed lip of gutter. Any warped surface and vertical curve shall set elevations at 25 foot intervals. All profiles shall be coordinated with County stationing. The Consulting Engineer shall contact the County for such stationing.

The plans shall show the existing ground profile for a minimum distance of 200 feet beyond temporary street endings to facilitate setting proper vertical alignment within the proposed improvement limits. The 200 foot minimum shall be increased when requested by the Director.

E. Stationing and Orientation -- The stationing on plan and profile shall read from left to right. Stationing shall increase from south to north or from west to east. Plans shall be so arranged that the North arrow points toward the top or upper 180 degrees, insofar as practical.

F. Bench Marks -- The bench marks and datum shall be clearly delineated on the plans both as to location, description and elevations. The datum shall be 1929 North American Datum (U.S.G.S. or U.S.C.& G.S.). Consulting Engineers shall contact the County of location and elevation of the nearest official bench mark.

G. California Coordinates System -- The Director may require that the proposed improvements be tied into the California Coordinates System if monumented coordinate points are available within a reasonable distance (200 feet or less) of said improvement as determined by the Director.

H. Typical Sections -- A typical section for each type of facility within the improvement, setting out the structural features, shall be a part of the plans.

I. Cross Sections -- Cross sections shall be included in the plans, where determined necessary by the Director. When in limited areas, unusual topographic features or special conditions occur that would affect the

work, individual cross sections may be shown on the pertinent plan sheet.

J. Special Notes -- Special notes shall be clearly indicated, and it shall be conspicuously noted on the plans that all construction work and installations shall conform to the County of Sacramento Standard Construction Specifications and that all work is subject to the approval of the Director. Notes shall contain a statement regarding obtaining encroachment permits from other agencies when applicable.

3-7 REQUIRED NOTES -- A list of County required notes shall be obtained from the Department of Public Works and shall be attached to the original tracings for all development plans submitted to the County for approval.

SECTION 4

STREETS

4-1 STREET TYPES AND DESIGN WIDTHS -- The standard approved street types and design widths for Sacramento County are as follows:

A. 20 Foot Street (Alley) -- A street depressed in the center with a right of way and surface width of 20 feet. An alley will be accepted by Sacramento County as a public alley only when it is constructed of 6 inch thick portland cement concrete in accordance with Standard Drawing H-29 and with the specific approval of the Director.

B. 40 Foot Street -- A minor residential street with a right-of-way width of 40 feet, a back-to-back of curb width of 32 feet, and 4 foot sidewalks. See Standard Drawing H-16.

40 foot streets are normally used when serving 99 or fewer single family residential units. Some duplexes may be included when the street is less than 400 feet long.

C. 50 Foot Street -- A primary residential street with a right-of-way width of 50 feet, a back-to-back of curb width of 42 feet, and 4 foot sidewalks. See Standard Drawing H-16.

50 foot streets are normally used for serving more than 99 but fewer than 400 single family residential units, and for serving duplex developments.

D. 56 Foot Street -- A collector street with a right-of-way width of 56 feet, a back-to-back of curb width of 48 feet, and 4 foot sidewalks. See Standard Drawing H-17.

56 foot streets are normally used when serving 400 or more residential units.

Where 56 foot streets provide access onto 84 foot, 108 foot, and 130 foot streets, a collector approach street conforming to the standards for a 62 foot street shall be required, as shown on Standard Drawing H-17.

E. 56 Foot Street (Industrial) -- An industrial development or industrial subdivision street with a right-of-way width of 56 feet and a back-to-back of curb width of 48 feet, and 4 foot sidewalks. The industrial street has the same typical section as a 56 foot street (see Standard Drawing H-17) except that Type 2 vertical curb and gutter shall be used instead of Type 1 rolled curb and gutter.

Where industrial streets provide access onto 84 foot, 108 foot, and 130 foot streets, a collector approach street conforming to the right-of-way width, back-to-back of curb widths and approach lengths

of a 62 foot street shall be required. Type 2 vertical curb and gutter and 4 foot sidewalks shall be required. See Standard Drawing H-17.

Sidewalks and planters may be temporarily omitted adjacent to lots or parcels in industrial subdivisions that are not going to be developed immediately.

F. 60 Foot Street -- A collector street with a right-of-way width of 60 feet, a back-to-back of curb width of 48 feet, and 6 foot sidewalks. See Standard Drawing H-17.

60 foot streets are required in all commercial and multiple family developments and are normally used in the vicinity of parks, schools and other public facilities in residential areas when serving more than 400 residential units.

Where 60 foot streets provide access onto 84 foot, 108 foot, and 130 foot streets, a collector approach street conforming to the standards for a 66 foot street will be required, as shown on Standard Drawing H-17.

G. 62 Foot Street -- A collector approach street with a right-of-way width of 62 feet, a back-to-back of curb width of 54 feet, and 4 foot sidewalks. See Standard Drawing H-17.

Approach Streets

62 foot streets shall be used as approach streets for 56 foot streets providing access onto 84 foot, 108 foot, and 130 foot streets. The 62 foot street approach shall be provided for a distance of 180 feet from the cross street right-of-way line with a 40 foot taper. See Standard Drawing H-25.

H. 66 Foot Street -- A collector approach street with a right-of-way width of 66 feet, a back-to-back of curb width of 54 feet, and 6 foot sidewalks. See Standard Drawing H-17.

66 foot streets shall be used as approach streets for 60 foot streets providing access onto 84 foot, 108 foot, and 130 foot streets. The 66 foot street approach shall be provided for a distance of 180 feet from the cross street right-of-way line, with a 40 foot taper. See Standard Drawing H-25.

I. 84 Foot Street -- An arterial street with a right-of-way width of 84 feet, a back-to-back of curb width of 72 feet, and 6 foot sidewalks. See Standard Drawing H-17. Intersection widening shall be required in accordance with Standard Drawings H-24 and H-25.

84 foot streets shall be required when shown on the Sacramento County Major Street and Highway plan.

J. 108 Foot Street -- A thoroughfare street with a right-of-way width of 108 feet, a back-to-back of curb width of 96 feet, and 6 foot sidewalks. See Standard Drawing H-18. Intersection widening shall be required in accordance with Standard Drawings H-24 and H-25.

108 foot streets shall be required when shown on the Sacramento County Major Street and Highway Plan.

K. 130 Foot Street -- A special thoroughfare street with a right-of-way width of 130 feet, a back-to-back curb width of 118 feet, and 6 foot sidewalks.

130 foot streets shall be required when the Board of Supervisors requires an 8-lane roadway.

L. Major Street Design -- 108 foot and 130 foot streets have a solid non-traversable median between cross street intersections which shall be spaced at least 900 feet apart. Minor street intersections (with right turns only) should be no closer than 450 feet from each other or from the cross street intersections. Major driveways which will serve significant traffic volume, as determined by the Director, shall be considered as intersecting streets with regard to spacing, and all other driveways will have right turns only. Driveways should be located as far apart as practical with a minimum of 150 feet between driveways or from driveways to intersections.

All streets 84 feet and wider shall be designed to the appropriate arterial, thoroughfare, or special thoroughfare standards regardless of whether they are apparent on the County Master Plan of Streets and Highways. Where streets are constructed with the arterial, thoroughfare, and special thoroughfare standard widths, it is intended that they meet all the standards specified herein.

Special thoroughfare and thoroughfare streets shall be subject to full or partial access control at the discretion of the Director.

M. Frontage Road -- A street which provides service to abutting property and control of access alongside another street for which direct access is prohibited or undesirable. Frontage roads adjacent to State freeways shall conform to the full width standards for 56 foot and 62 foot streets. All other frontage roads shall have a 26 foot paved surface with a barrier curb on one side and curb and gutter and a minimum 4 foot sidewalk on the other side. See Standard Drawing H-18 and Section 4-17(D).

N. Partial Street -- A street for which the full right of way cannot be dedicated or the complete street cannot be constructed. Partial streets shall be in accordance with Section 4-5.

4-2 STREET CLASS -- The standard approved street classes of Sacramento County are as follows:

A. Class "A" Streets -- Class "A" street improvements shall be in accordance with Standard Drawings H-16 through H-19 and shall consist of the following:

1. "Asphalt" concrete pavement over an aggregate base, and aggregate subbase as required.

2. Concrete curb and gutter and sidewalks.

3. Side slopes not steeper than 1-1/2:1 in cuts or 2:1 in fills, or a reinforced concrete retaining wall beginning at the right-of-way line.

4. Street lights.

Street improvements for all single family residential lots and parcels having a net area of 14,500 square feet or less and a (lot) frontage of 100 feet or less shall be Class "A". The net area shall be considered to be that portion of the lot or parcel exclusive of street rights of way, fenced easements and fenced parkways. Lot frontage in the case of a corner lot shall mean the side of the lot with the narrowest street frontage as defined in the Zoning Code of Sacramento County.

When considering subdivision improvements, the average lot area and average lot frontage shall be used to determine the street class. Lots in excess of 16,000 square feet shall not be considered in averaging lot areas. Lots having a lot frontage in excess of 125 feet shall not be considered in averaging lot frontage.

Property developments on land zoned or used for duplex, multiple residential, business and professional, commercial, and industrial uses shall require Class "A" street improvements, regardless of the individual lot frontage or area.

Single family lots adjacent to 84 foot streets, 108 foot streets, and 130 foot streets shall require Class "A" street improvements when within the limits of the urban area, regardless of the individual lot frontage.

B. Class "B" Streets -- Class "B" street improvements shall be the same as Class "A" except that sidewalks may be omitted.

Any lot designated (RD-) in the County of Sacramento Zoning Code "Residential Land Use Zone," not meeting the area and street frontage requirements for Class "A" street improvements, may install Class "B" street improvements.

Any lot designated AR-1 or AR-2 in the County of Sacramento Zoning Code, "Agricultural-Residential Land Use Zone," shall install Class "B" street improvements. The street width requirement for AR-1 or AR-2 improvements shall be 24 foot pavement width for 40 foot streets and 28 foot pavement width for 50 foot or larger streets. See Standard Drawing H-16.

The Director will consider an exception to the Class "B" street improvement requirements to allow Class "C" street improvements in AR-1 or AR-2 development in special case situations where there is no reasonable design that will provide a satisfactory hydraulic outfall for the development without using roadside ditches, or in situations where unreasonably extensive grading or on-site private drainage systems would be required to provide satisfactory drainage for the lots.

The normal condition of using 40 foot streets to serve up to 99 single family residential units (Section 4-1(B) shall also apply to AR-1 and AR-2 development.

C. Class "C" Streets -- Class "C" street improvements shall be in accordance with Standard Drawing H-19 and shall consist of the following:

1. Asphalt concrete pavement over an aggregate base. Intersection widening at 84 foot, 108 foot, and 130 foot streets shall be in accordance with Standard Drawing H-28.

2. Roadside ditches in cuts and 2:1 or flatter fill slopes. Ditches shall be in accordance with Section 5-10(F).

3. Street lights in accordance with Section 8.

The total width of the asphalt concrete surface shall be as follows:

Street Type	Pavement Width
40 foot street	32 feet
50 foot street	34 feet
56 foot street and larger	36 feet

Any lot designated in the Zoning Code-County of Sacramento, "Agricultural-Residential Land Use Zone" larger than AR-2, may install Class "C" street improvements.

4-3 STRUCTURAL SECTIONS -- The following standards for the design of structural sections shall govern the preparation of plans for proposed improvements.

A. The minimum allowable thickness of roadbed section shall be as follows:

1. 6" Portland cement concrete and 4" aggregate base on 20 foot streets (alleys).

2. 2" asphalt concrete and 6" aggregate base on 40 foot streets serving single family residential and duplex developments.

3. 3" asphalt concrete and 6" aggregate base on 50 foot, 56 foot, 60 foot, 62 foot and 66 foot streets.

4. 3" asphalt concrete, 6" aggregate base, and 6" aggregate subbase on 84 foot, 108 foot, and 130 foot streets.

5. The structural section for industrial streets shall be 3" asphalt concrete and 6" aggregate base unless otherwise specified by the Director.

6. Developments shall use paving sections established by the Director for streets other than 40 and 50 foot streets where such special structural sections have been established.

7. Class "C" streets, including the shoulders, shall have the same pavement structural section as the corresponding width of Class "A" streets.

8. In transition areas from one street width to another street width standard, the heavier structural section shall be used in the transition area.

9. As an alternate to the preceding structural sections, total asphalt concrete structural sections may be specified to the following minimum thicknesses:

   a. 5-1/2 inches of asphalt concrete equals 2 inches of asphalt concrete and 6 inches of aggregate base.

   b. 6 inches of asphalt concrete equals 3 inches of asphalt concrete and 6 inches of aggregate base.

   c. 9 inches of asphalt concrete equals 3 inches of asphalt concrete, 6 inches of aggregate base and 6 inches of aggregate subbase.

Total asphalt concrete sections must receive the specific approval of the Director.

B. In those areas considered by the Director as being critical soil condition areas, it will be required that the pavement be designed on the basis of the resistance R-value as determined in accordance with the State of California, Department of Transportation, California Bearing Ratio, or other approved method.

The thickness of the various structural components will be determined by the tables, charts, formulas and procedures contained in the State Design Manual, or as directed by the Director.

Traffic index will be furnished by the Director, as required.

C. Portland cement concrete streets may be constructed with the approval of the Director.

4-4 PROFILE STANDARDS -- The following standards for the design of profiles shall govern the preparation of plans for proposed improvements. See Section 3-6(D).

A. The minimum grade on new streets shall be 0.25 percent except that the minimum curb and gutter grade around intersection corner roundings shall be 0.50 percent. Curb and gutter elevations on crest and sag vertical curves shall be adjusted to meet the 0.25 percent minimum grade.

B. The minimum grade of gutter sections constructed on existing streets shall be 0.20 percent.

C. Standard cross slope on new streets shall be 2.0 percent.

D. The minimum cross slope on widening shall be 1.5 percent and the maximum cross slope shall be 3.0 percent. The cross slope of the widening shall conform to the cross slope of the existing pavement whenever possible.

E. When two streets intersect, neither street shall have a grade greater than 3.0 percent for a minimum distance of 40 feet measured from the curb line of the intersecting street, except in unusually rough terrain, as determined by the Director. The centerline of the lesser intersecting street shall meet the crown slope at the projected lip of the gutter. Crown slope may be reduced to 1.0 percent within the intersection, if necessary.

The minimum vertical curve length allowable at the intersection of two grades shall be 50 feet. Vertical curves on residential and collector streets may be omitted where the algebraic difference in grades does

not exceed 2.0 percent. The minimum vertical curve data to be computed and shown on the plans shall consist of the point of intersection elevation, the tangent gradients, the middle ordinate and the length of curve.

F. The design speed and minimum stopping sight distance over any segment of roadway shall be as follows unless a lesser design speed is specifically approved by the Director:

Street Type	Recommended Design Speed	Minimum Stopping Sight Distance
40 foot R/W	25 MPH	150 feet
50 foot R/W	30 MPH	200 feet
56 foot R/W	35 MPH	250 feet
60 foot R/W	35 MPH	250 feet
62 foot R/W	40 MPH	300 feet
66 foot R/W	40 MPH	300 feet
84 foot R/W	45 MPH	360 feet
108 foot R/W	50 MPH	430 feet
130 foot R/W	50 MPH	430 feet

Stopping sight distance is measured from the drivers' eyes, which are assumed to be 3.5 feet above the pavement surface, to an object 0.5-foot high on the road.

4-5 PARTIAL STREETS -- Partial streets may be permitted by the Director along the boundary of a subdivision or property of the developer where the full right-of-way cannot be dedicated or where the complete street cannot be constructed, but will ultimately be constructed with adjacent development.

The minimum right-of-way width shall be 40 feet or one-half of the proposed right-of-way, whichever is greater.

Partial streets shall be constructed to a complete geometric and structural section for a minimum paving width specified by the following:

A. On 40 and 50 foot streets, the pavement width shall be 24 feet.

B. On 56 and 60 foot streets, the pavement shall extend five feet past centerline for a total of 26 feet.

C. On 62 and 66 foot streets, the pavement shall extend five feet past centerline for a total of 29 feet.

The intersection pavement edges shall have a minimum radius of 13 feet on the uncompleted side. All other edge of pavement radii shall be 25 feet or greater.

When paving partial construction of an ultimate street development, the edges of the current pavement are to be protected by use of 2" x 6" approved headers, construction grade, or by placing a minimum of one foot additional width of aggregate base material beyond the edge of pavement to the grade and depth of the adjacent structural section.

4-6 OFFSET INTERSECTION --

A. Streets intersecting any 40 foot or 50 foot residential street from opposite sides shall have their centerlines meet, or the offset between intersections shall be a minimum of 150 feet.

B. Streets intersecting any 56 foot, 60 foot 62 foot or 66 foot industrial or residential collector street from opposite sides shall have their centerlines meet, or the offset between intersections shall be a minimum of 200 feet.

C. Streets intersecting any 84 foot street from opposite sides shall have their centerlines meet, or the offset between intersections shall be a minimum of 300 feet.

D. See Section 4-1(L) for intersection spacing requirements for 108 foot and greater streets where there are median dividers.

4-7 CUL-DE-SAC -- Cul-de-sac streets shall be terminated with a bulb which shall have right-of-way and back of curb radius dimensions conforming to Standard Drawing H-20 and the following:

Approach Street	R/W Radius	Back of Curb Radius
40 foot street	40 feet	36 feet
50 foot street	40 feet	36 feet
56 foot street	54 feet	50 feet
Industrial street	54 feet	50 feet
60 foot street	56 feet	50 feet

No cul-de-sac shall exceed 600 feet in length.

A hammerhead bulb with a right-of-way and geometric dimensions conforming to Standard Drawing H-20A may be approved by the Director in lieu of the standard cul-de-sac when there is no vehicular access from the development. Special turnaround designs may be approved by the Director under unusual topographic or other conditions.

4-8 ELBOW INTERSECTION -- Elbows shall be required at right angle intersections in accordance with Standard Drawing H-21. Only under unavoidable or extreme conditions will an elbow other than 90°±5° be permitted by the Director.

4-9 CENTERLINE RADII -- The curve data (delta angle, length, tangent and radius) for all centerline curves shall be computed and shown on the plans.

The minimum radius curve for 40 foot streets shall be 200 feet.

The minimum radius curve for 50 foot streets shall be 350 feet with the exception that 50 foot streets exceeding 1,000 feet in length and functioning as collectors serving over 99 lots and connecting to 84 foot, 108 foot, or 130 foot streets shall have a minimum radius curve of 500 feet.

The minimum radius curve for 56 foot and 60 foot streets shall be 500 feet.

The minimum radius curve for 62 foot and 66 foot streets shall be 800 feet.

The minimum radius curve for 84 foot, 108 foot, and 130 foot streets shall be 2,000 feet.

Special consideration will be given to unusually difficult alignment problems. Any exception to the above minimum radius requirements must be approved by the Director.

Where a centerline radius on a major street that is less than the above requirements is approved by the Director, superelevation may be required.

A minimum tangent length of 200 feet is required between reversing curves on 56 foot and larger streets.

4-10 SIGHT DISTANCE AT INTERSECTIONS -- Streets shall not be designed with intersections on the inside of curves or at any location in general where sight distance will be inadequate for drivers to tell if they can safely enter the traffic flow or cross the street. The minimum distance from an intersection to a curve shall be the applicable minimum sight distance listed below. Exceptions may be made by the Director for especially difficult design circumstances only if visibility easements to provide adequate sight distances are established. In lieu of visibility easements, additional street right of way may be dedicated. Minimum intersection design sight distance standards shall be as follows:

Minimum Sight Distance

Type Street Being Entered	Recommended Design Speed (MPH)	Minimum Sight Distance*
40' R/W	25	280'
50' R/W	30	330'
56' R/W	35	390'
60' R/W	35	390'
62' R/W	40	440'
66' R/W	40	440'
84' R/W	45	500'
108' R/W	50	550'
130' R/W	50	550'

*Distance measured from an entering driver's eye position to the position of the closest approaching vehicle's far front corner.

The entering driver's eye position shall be assumed 3 feet to the right of the entering street's centerline, 3.5 feet above the pavement surface, and 11 feet clear of the nearest vehicle lane on the street being entered.

The position of the closest approaching vehicle's far front corner shall be assumed 3 feet from the edge of the nearest approaching vehicle lane and 4.25 feet above the pavement surface for each direction of travel.

Standard Drawings H-26 and H-27 show details of the areas which must be controlled for adequate intersection sight distance on 84 foot, 108 foot, and 130 foot streets. Other street types and alignments require individual designs based on the minimum sight distance standards given above.

Major driveways serving significant traffic volume, as determined by the Director, shall be considered as intersecting streets with regard to sight distance.

All streets and driveways shall conform to Standard Drawing H-30 for visibility requirements, as well as to the requirements herein.

Visibility easements shall describe an area to be maintained clear of any and all obstructions to a clear view from the adjacent streets except as exempted by the County Code. No sign, hedge, structure, natural growth, fence, or other obstruction of any kind whatsoever to a clear view, higher than 2'6" above the nearest pavement surface (or travelled area where no pavement exists) shall be installed or maintained or shall be permitted to be installed or maintained within the easement area.

Visibility easements must be identified on subdivision maps.

All visibility easement areas (or additional street right-of-way provided in lieu of) between fences or walls and curbs or sidewalks shall be improved as follows:

A. Standard portland cement concrete sidewalk shall be placed in all areas having a width of 3 feet or less, and in all areas within intersection corner roundings.

B. All areas having a width greater than 3 feet and not within intersection corner roundings shall be surfaced with 2 inches of asphalt concrete or other impervious, non-raveling surfacing subject to the approval of the Director. Soil sterilization shall be applied in accordance with Section SS33-04 of the Standard Construction Specifications.

4-11 RIGHT-OF-WAY RADII -- Minimum right-of-way radii for intersection corner roundings shall be in accordance with the Standard Drawings and the following:

Street Type	R/W Radius
40 foot	20 feet
50 foot	20 feet
*50 foot	25 feet
All others	25 feet

* intersects with a wider street

When two streets of different widths intersect, the radius for the narrower street shall apply, except that when a 50 foot street intersects a wider street, the radius for the wider street shall apply.

4-12 RIGHT-OF-WAY WIDTHS -- Right-of-way widths shall be in accordance with these standards for the type of street under consideration, and the Standard Drawings, or as required by the Director. Right-of-way widths at 84 foot, 108 foot, and 130 foot street intersections shall be in accordance with Standard Drawings H-24 and H-25 or as required by the Director.

In no instance, without specific approval of the Director, shall a street have a right-of-way width which is less than that of the street for which it is a continuation. Minimum transitions from a wider to a narrower right-of-way width at 84 foot, 108 foot, and 130 foot street intersections shall be in accordance with Standard Drawing H-25.

Right-of-way widths on 56 and 60 foot streets at intersections where the right-of-way width of the continuation of the street beyond the intersection increases and at intersections that have unusually high

traffic volumes shall be widened to a 62 or 66 foot right-of-way in accordance with Standard Drawing H-25 and as determined by the Director.

Building setbacks, landscaping requirements and parking requirements shall be based on the ultimate right-of-way width regardless of the location of existing public street improvements or right-of-way lines.

4-13 BUS STOPS -- Bus stops with paved shelter pad areas shall be required on 84 foot streets, 108 foot streets, and 130 foot streets, at all intersections with 50 foot or larger streets.

Bus stops shall be located on the far right hand side of the intersection, unless otherwise ordered by the Director, and shall be in accordance with Standard Drawing H-24A.

At all intersections of 84 foot, 108 foot, and 130 foot streets with other 84 foot, 108 foot, and 130 foot streets, bus stops shall be provided with turnouts that are integrated with standard intersection widening in accordance with Standard Drawings H-24 and H-25.

Bus stop turnouts shall be provided on 84 foot, 108 foot, and 130 foot streets in accordance with Standard Drawings H-24 and H-25 at collector street intersections which have or will need traffic signals as determined by the Director.

Where intersections are too widely spaced to provide satisfactory bus stop intervals, as determined by the Director, mid-block bus stops and turnouts may be required as shown on Standard Drawings H-24 and H-24A.

Bus stop turnouts may also be required at other locations as determined by the Director.

Sidewalks shall be 6 feet wide at bus stops with an 11 foot wide section to accommodate bus shelters as shown on Standard Drawings H-24, H-24A, and H-25.

Type 2 curbs shall be required at all bus stops and turnouts in accordance with Standard Drawing H-24A.

4-14 INTERSECTION WIDENING -- Pavement widening at intersections shall be in accordance with the following:

A. Pavement widening shall be required at intersections of 84 foot, 108 foot, and 130 foot streets in accordance with Standard Drawing H-25.

B. Pavement widths on 56 and 60 foot streets at intersections where the right-of-way width on the continuation of the street beyond the intersection increases and at intersections that have unusually high traffic volumes shall be widened to a 62 or 66 foot street standard in

accordance with Standard Drawing H-25 and as determined by the Director.

C. Pavement widening on 56 foot streets and 60 foot streets intersecting with 84 foot, 108 foot, and 130 foot streets shall be required in accordance with Sections 4-1(D,F,G, & H) and Standard Drawing H-25.

D. The Director may determine that longer widening than the minimum standards shown on Standard Drawing H-25 is necessary at certain special case important intersections when documentation was made prior to submittal of plans.

E. Pavement widening shall be required at all intersections of Class "C" streets with 84 foot, 108 foot, and 130 foot streets in accordance with Standard Drawing H-28.

F. Private roads shall be required to accommodate "U" turns at all signals. A minimum outside clear 44 foot radius pavement path shall be required.

G. Where the projected curb lines do not line up and straight crosswalks cannot be accommodated, the developer shall be required to install guidestrips. The design, materials, and location shall be determined by the Director in accordance with the "Sacramento County Guidestrip Polices," approved by the County Board of Supervisors on August 18, 1987.

4-15 PARTIAL PAVEMENT WIDENING -- Partial pavement widening shall be terminated in accordance with the following:

A. Partial pavement widening shall be terminated with the end of the pavement perpendicular to the street unless otherwise specified below. A 2"x6" redwood header board shall be required at the pavement ending.

B. Partial pavement widenings that terminate adjacent to an intersection or driveway shall be tapered 45 degrees to the street if right-of-way is available.

C. The end of a partial pavement widening that terminates a travelled lane in the direction of travel shall be tapered one foot per one foot of pavement offset per 5 MPH increment of design speed. The design speed used in determining the taper shall be that given in the table in Section 4-4(F).

D. Pavement tapers for the termination of partial street widening different from the above may be required by the Director.

4-16 PAVEMENT CORNER RADII -- The minimum edge of pavement radii for intersection corner roundings shall be in accordance with the Standard Drawings and the following:

Class "A" and "B" Streets

Street Type	E. P. (C.& G. Lip Radius
40 foot	27 feet
50 foot	27 feet
*50 foot	32 feet
All others	32 feet (4 ft. sidewalks)
	34 feet (6 ft. sidewalks)

*intersects with a wider street

When two streets of different widths intersect, the radius for the narrower street shall apply, except that when a 50 foot street intersects a wider street, the radius for the wider street shall apply.

Class "C" Streets

All intersection pavement edges on Class "C" streets shall have a minimum radius of 25 feet where widening is not required by Section 4-14(E).

Partial Streets

All intersection pavement edges on partial streets shall have a minimum radius of 25 feet.

4-17 DEVELOPER'S PAVEMENT, SIGNAL, AND STREET LIGHT RESPONSIBILITY --

A. Development shall conform to the centerline established by the Director. A list of streets with special centerline offsets is available in the office of the Director and is published annually by the Director about January 15.

B. Where the existing pavement section does not generally meet the current standard and/or the centerline grade and alignment are not satisfactory to the Director, the Developer shall be responsible for the pavement section to the centerline on all streets within, adjacent, and contiguous to his project.

The Developer shall overlay any areas beyond the center line where the design centerline grade deviates from the existing. The Developer shall also be responsible for overlaying any low areas where the new pavement meets the existing pavement to maintain a uniform cross slope.

The County will pay for any pavement necessary where the full structural section is replaced beyond the centerline if the Director elects to adjust the grade and/or alignment of the existing street.

C. When making a connection to an existing street end, the Developer shall be responsible for removing and reconstructing up to a maximum of twenty feet of the existing roadway to make a satisfactory connection as required by the Director.

D. The Developer shall be responsible for all of the structural section and pavement on all new streets within, adjacent, and contiguous to the project, including frontage roads. If the street is to be paved under a future County contract, the Director may require a cash deposit or other suitable instrument for the roadway and related work and include the work in the County contract.

E. All temporary approaches to existing roadways required as a result of the development shall be at the Developer's expense. The temporary approaches shall be paved with the structural section to be determined individually for each situation.

F. The Developer shall be responsible for relocating existing traffic signals and street lights, and installing new traffic signals and street lights as necessary for new street and driveway locations. The Developer shall also be responsible for relocating existing traffic signals and street lights as necessary for the installation of new curbs or new curbs and sidewalks at locations where there are no existing curbs or curbs and sidewalks.

The County shall participate in the relocation costs for small lot developments (up to one acre in size) in accordance with the following:

Lot Size (Based on Final Development Size of Property)	Amount of County Participation In Relocation Contract Costs
0.14 acre or less	50%
1.00 acre or more	0

The amount of County participation shall be prorated on a straight line basis between the values in the above schedule for lot sizes between 0.14 acre and one acre.

Any costs to upgrade or maintain existing signals such as replacing detectors shall be paid 100% by the County.

The County will prepare the traffic signal relocation construction plans to be given to the Developer within 30 days after being requested in writing.

G. The Developer shall be responsible for constructing or modifying curbed median islands where required by these standards, or when required for traffic control as a result of the development, as determined by the Director. If the street is to be paved under a future County contract, the Director may require a bond or cash deposit for the roadway and related work and include the work in the County contract.

H. The Developer shall be responsible for bus stops, bus turnouts, and intersection widening as shown on Standard Drawings H-24, H-24A, and H-25 and in accordance with Sections 4-13 and 4-14 of these Standards.

I. The Developer shall be responsible for all drainage facilities (bridges, pipes, culverts, and appurtenances) crossing new streets within, adjacent, and contiguous to the project. Section 4-19 states developer responsibility and County participation for drainage facilities on existing improved streets.

J. The Developer shall be responsible for all on-site modifications to allow for access for the disabled, including but not limited to: guidestrips, sidewalk ramps, etc. The developer will not be responsible for remedial road work or delineation for the disabled outside of the limits of his project.

4-18 COUNTY COST PARTICIPATION -- With the submittal of improvement plans for checking, the Engineer shall include an application for County cooperation in the proposed work if County participation is proposed for the improvement. This application shall show the items of work and the estimated quantities.

The County will notify the Consulting Engineer by letter as to the acceptance and the extent of cooperation.

The Consulting Engineer is to submit the County proposal to the Developer for his approval prior to the final approval of the improvement plans.

Should the Developer not approve the County proposal, time will be allowed for negotiation between the Developer and the County to arrive at a mutually acceptable price or a separate course of action prior to final approval of the improvement plans.

Any portion of work shown on the Consulting Engineer's plans, for which the County has agreed to cooperate, shall not be segregated by note or legend, but shall be included in the general contract. The County will reimburse the Developer for these cooperative items, after acceptance by the Director and final payment of plan check and inspection fees.

Final quantities will be determined by field measurement, observed jointly by the County Inspector, the Contractor, and the Developer or his designated agent.

Unit prices prepared for fee and bond calculation and authorized in County Code Section 12.03.210 shall be used as a basis for cooperative work. The Director may negotiate unit or lump sum prices for items not usually encountered, or for unusual field conditions.

4-19 REPLACING CULVERTS -- The County will cooperate in the replacement of highway cross culverts for the same length as the existing culverts as follows (See Section 4-18):

A. The entire cost for inflowing cross culverts to the property under development that must be replaced.

B. The entire cost for out-flowing cross culverts if the existing culvert is of unsatisfactory size and has unsatisfactory grade.

C. If the existing out-flowing cross culvert is to satisfactory grade but unsatisfactory size, the County will pay for the cost of the pipe only.

D. If the existing out-flowing cross culvert is of satisfactory size, the County will not participate in the cost to replace the culvert.

E. Major trunk and collector drainage facilities being constructed by agreement with the Sacramento County Water Agency will be replaced for the entire right-of-way width in accordance with the foregoing and in conformance with these Improvement Standards.

4-20 TRENCHING IN EXISTING PAVED ROADWAYS -- Crossings other than perpendicular crossings of existing roadways and all trenching in high traffic locations shall provide for select backfill material and increased structural section depth over the standard for that particular roadway. Boring may be required on 84 foot, 108 foot, and 130 foot streets where, in the opinion of the Director, high peak hour traffic volumes or other unusual conditions exist. The Developer may be required to coordinate trenching work schedules to avoid cutting new pavement in instances where repaving is planned by the County. No trenching will be permitted on any street that has been recently constructed or has been overlayed within the last three years.

4-21 TESTING OF MATERIAL -- Testing of materials to be utilized in work performed under the Standard Construction Specifications shall be performed in accordance with the methods of the Laboratory of the State of California, Department of Transportation. Signed copies of the test results, as required, shall be submitted to the Director. Test results shall show clearly the name of the individual and firm performing the

tests, as well as the name of the project, the date of sampling, and the date of testing. Tests performed by the County Materials Laboratory will be charged to the Developer as part of inspection billing.

The tests indicated in the Standard Construction Specifications will be the minimum required. In large, developments or those developments presenting special problems, a more comprehensive and extensive testing program may be required. Such conditions will be evaluated and an appropriate testing program prescribed on an individual basis. Two copies of any Federal Housing Administration required soils tests shall be submitted with proposed plans.

4-22 STREET NAMES -- All roads and streets within an improvement shall be named by the Developer subject to the approval of the Director. No duplication of names already in use or previously proposed will be permitted. Sound-alike names or names with more than 13 spaces are not acceptable.

Street name signs shall be furnished and erected by the Developer. Street name signs shall conform to the requirements of the Standard Construction Specifications and these Improvement Standards.

Street names and street name sign locations shall appear on plans submitted for approval. Sign details shall be as shown on Standard Drawing No. H-11.

Block numbering shall be required on all street name signs.

Private roads that are paved with asphalt or Portland cement concrete and/or are served by County Standard A-7 driveways or equal and that serve five or more residences shall have street name signs installed in accordance with Section 4-23(B) below. Street name signs for private roads may be the same as for public streets (Standard Drawing No. H-11) except the words "Sacramento County" must be omitted. Also, a separate additional sign must be placed on the same post saying "Not a County Road", which shall be 9 inches wide, 8 inches high, and have 1-3/4 inch high black letter on a white background.

4-23 STREET SIGN LOCATIONS -- Street sign locations shall conform to the following:

A. Two street name sign installations (with four sign plates on each post) are required at each intersection where one or both of the intersecting streets has a right-of-way width of 80 feet or greater. At a four-way intersection, the installations shall be located on both far right-hand corners of the intersection relative to the street having the greater right-of-way width or relative to the more important street if right-of-way widths are equal.

At a "Tee" intersection, the first installation shall be located on the far right-hand corner of the intersection, relative to the through street, and the second installation shall be located adjacent to the through street at a point in line with the centerline of the terminating street. One sign plate should be omitted from the standard four-plate installation at the "Tee" intersection sign locations where an approach street does not exist.

B. One street name sign installation (with four sign plates on each post) is required at each intersection where both intersecting streets have a right-of-way width of less than 80 feet. At a four-way intersection, the installation shall be located on one of the far right-hand corners of the intersection relative to the street having the greater right-of-way width or relative to the more important street if the right-of-way widths are equal. At a "Tee" intersection, the installation shall be located on the far right-hand corner relative to the through street.

C. For highways with frontage roads, the street name sign installations shall be located in the divider strip between the frontage road and the main traveled lanes of the highway. All other requirements shall be as outlined above, except that only one sign will be required (in the divider strip in line with the centerline of the minor street) when there is no opening in the divider strip for access to the main highway.

D. Standard Drawings H-12 through H-15 show placement details for street name signs. On streets having a right-of-way width of 80 feet or greater, the street name sign installations are to be located adjacent to the more important street, at the end of the curb return. On streets with right-of-way widths less than 80 feet, the street name sign installations are to be located at the midpoint of the curb return.

E. Street name signs shall be placed on street light poles wherever possible, in accordance with Standard Drawings H-13 and H-14.

4-24 TRAFFIC SIGNS -- All cul-de-sac and dead-end (stub) streets greater than 300 feet in length and all cul-de-sac and dead-end (stub) streets less than 300 feet in length where the curb at the centerline of the end of the street is not visible from the standard driver's eye position at the entering intersection shall be posted with a standard 24" x 24" code W53 (Not A Through Street) sign. The bottom of the sign shall be a minimum of 7 feet above the sidewalk. The standard location for the W53 sign is on the right hand side at the tangent point of the corner rounding, 6 inches (minimum) from the back of sidewalk.

All hammerhead street ends shall be posted with a standard 24" x 24" Code W-31 (end) sign, and a standard 18" x 18" red Type N marker. The red type N marker shall be mounted below the W31 sign, on the same post. The top

of the red Type N marker shall be a minimum of 4 feet above the sidewalk. The standard location for the W31 - Red Type N installation is in the head on position, facing traffic, approximately 3 feet to the right of the prolongation of the street centerline, 6 inches (minimum) from the back of sidewalk.

The sign posts shall be 4" x 4" S4S treated douglas fir (State of California, Spec. No. 56-2.02B).

4-25 PERMANENT BARRICADES -- Where improvements are temporarily terminated on a street proposed to be extended in the future, the improvements shall include a permanent type barricade at the end of the street extending completely across the right-of-way to prohibit access and to serve as a warning to the public. The barricade shall be constructed, erected, painted, and signed in accordance with Standard Drawing H-8. When necessary, barricades may be lengthened by making the 2" x 12" plank continuous with splicing at the posts.

Gates may be required where streets stub into public park areas or like areas.

Timber barricades with SW-44 signs and Type "L" markers in accordance with Standard Drawing No. H-8A shall be required where partial street widening terminates at the far end of the widening in the direction of traffic. If the ground beyond the pavement constriction is free of fixed objects and relatively flat, the Director may approve the placement of delineators on 6 foot spacing as shown on Drawing H-8A in lieu of a timber barricade and signs.

Sidewalk barricades shall be constructed at the end of sidewalks where pedestrians cannot safely continue beyond the end of the sidewalk. Sidewalk barricades shall conform to Standard Drawing H-9.

4-26 STREET TREES -- Permission to remove any tree in County rights-of-way or easements shall be obtained from the Director in advance (Tree Removal Permit or Encroachment Permit required).

All trees removed from within the ultimate right-of-way shall be replaced with trees from the approved street tree list.

Trees shall not be planted any closer than five feet from the back of sidewalks adjacent to County streets.

Where there are four foot minimum planters adjacent to the sidewalks, the planters may be widened to accommodate the planting of trees.

See Sections 3-6(B) and 9-7 of these Improvement Standards, and Section SS-103 and Standard Drawing L-1 of the Standard Construction Specifications for additional requirements regarding trees.

Approved trees for planting in County rights-of-way and public easements are listed as follows (desired trees not listed may be planted with the approval of the Director):

DECIDUOUS STREET TREES

Botanical Name	Common Name
Acer platanoides	Norway Maple
Acer platanoides "Crimson King"	Red Leaf Norway Maple
Alnus cordata	Italian Alder
Celtis australis	European Hackberry
Celtis sinensis	Chinese Hackberry
Fraxinus moraine	Moraine Ash
Fraxinus uhdei	Evergreen Ash
Liquidamber burgundy	Burgundy Sweet Gum
Nyssa sylvatica	Tupelo Sour Gum
Pistacia chinensis	Chinese pistache
Platanus acerifolia "Bloodgood"	London Plane Tree
Platanus acerifolia "Yarwood"	London Plane Tree
Pyrus calleryana "Bradford"	Bradford Pear
Quercus coccinea	Scarlet Oak
Quercus lobata	Valley Oak
Quercus rubra	Red Oak
Sapium sebiferum	Chinese Tallow Tree

EVERGREEN STREET TREES

Acacia melanoxylon	Blackwood Acacia
Laurus nobilis	Grecian Laurel
Magnolia grandiflora	Southern Magnolia
Magnolia grandiflora "St. Mary's"	St. Mary's Magnolia
Quercus agrifolia	Coast Live Oak
Quercus ilex	Holly Oak
Quercus suber	Cork Oak
Ulmus parvifolia	Chinese Elm
Umbellularia california	California Laurel

CONIFER STREET TREES

Calocedrus decurrens	Incense Cedar
Ginkgo biloba	Maidenhair Tree
Pinus halenpensis	Allepo Pine

4-27 DRIVEWAYS -- Driveways shall be in accordance with Standard Drawings H-3, H-3A, H-4, and H-22 as applicable, and the following:

A. Driveways entering Class "B" or Class "C" Streets shall meet the property line at such a grade and elevation as to permit conversion to a Class "A" street without regrading the driveway beyond the property line. The maximum driveway slope shall be 10 percent except in unusual terrain conditions and specifically approved by the Director.

B. Concrete driveways will not be permitted within the right-of-way lines when entering Class "C" streets. See Standard Drawing H-3A.

C. No driveway will be allowed within 5 feet of a side property line on a commercial development. Exceptions may be approved by the Director for joint driveways or in unusual cases. Joint driveways may be required by the Director and a joint use driveway agreement will be required prior to approval of improvement plans.

D. The minimum width for a single family residential and duplex driveway shall be 16 feet. Residential and duplex driveways with plus grades shall have a rise of no more than 8 inches above the back-of-sidewalk grade at a point 7 feet from the back of sidewalk. Maximum residential and duplex driveway width shall be 35 feet.

E. All commercial and multiple family developments shall install Type A-6 or A-7 driveways except as otherwise provided in this section. The design of major driveways which will serve significant traffic volume, as determined by the Director, shall be based on the width, cross section, and geometrics of a 60 foot or 66 foot public street. The standard multiple family and commercial driveway width shall be 45 feet on 84 foot, 108 foot, and 130 foot streets and 35 feet on streets of 66 feet or less in width. Lesser widths may be approved by the Director. Driveways on 84 foot, 108 foot, and 130 foot streets shall have a minimum clear spacing of 150 feet between driveways. Lesser spacing may be approved by the Director when warranted by conditions at a particular site. Exceptions should be obtained as early as possible, prior to submission of improvement plans or development plans.

A center median up to 10 feet wide may be approved by the Director for certain driveways. The normal driveway width will be increased by the median width.

F. The standard driveway for industrial developments shall be Type A-6 or Type A-7, 45 feet wide, as shown on Standard Drawings H-3 and H-4.

G. When driveways are abandoned or relocated, the driveway sections must be removed and replaced with standard curb and gutter, sidewalk and planters.

H. When street frontage improvements are existing with Type 1, Type 1A, or Type 2 curb and gutter, Type A-6 or A-7 driveways shall be installed for all accesses serving more than four single dwelling units.

I. Driveways entering levee roads and driveways entering commercial property on all roads shall have a slope not exceeding 5 percent for a minimum distance of 20 feet, measured from the edge of existing pavement. Driveways normally used by vehicles towing house or boat trailers shall have special requirements to be determined on an individual basis by the Director.

J. The nearest edge of driveways shall not be closer than 50 feet to the end of existing or future traffic medians. Medians shall be reconstructed and/or lengthened to conform to this section if necessary, as determined by the Director.

K. Visibility requirements for driveways shall be in accordance with Standard Drawing H-30 and Section 4-10. Increased visibility requirements may be required for driveways serving a significant amount of truck traffic.

L. Major commercial driveways which will serve significant traffic volume, as determined by the Director, shall be considered as intersecting streets and shall conform to the requirements of Section 4-6 regarding offsets.

M. Driveways near major intersections shall be no closer than 150 feet from the present or future intersection curb return. Exceptions may be granted by the Director. Exceptions should be obtained as early as possible, prior to submission of improvement plans or development plans.

N. Driveways and private roads accessing public streets with no curbs and gutters and sidewalks shall be paved with dust free surfacing (either asphalt concrete or a double chip seal). Driveways and private roads accessing public roads with sidewalks and/or curbs and gutters shall be paved with concrete or asphalt concrete. See Standard Drawing H-3A.

4-28 PEDESTRIAN LANES -- Pedestrian lanes within a development shall be constructed with a minimum of 3-5/8 inches of portland cement concrete, Class "B", for the full width of the easement.

The maximum grade for pedestrian lanes shall be 8.33 percent.

Pedestrian lanes, where situated between lots, shall be fenced with chain link fencing from the street right of way to the back lot line. These fences shall be 6 feet high from the building setback line to the back lot

line and 36 inches high from the building setback line to the street right-of-way line.

Cross fencing to control access shall be placed at the street ends of all pedestrian lanes in accordance with Standard Drawing H-10.

All pedestrian lanes shall have lighting installed in accordance with Section 8-8(C).

4-29 HANDICAP RAMPS -- Sidewalk ramps for handicapped pedestrians shall be constructed at all street intersections and at other locations where required by the Director, in accordance with Standard Drawings H-5, H-5A, and H-5B, as applicable.

Intersections with Type 1 or 1A (rolled) curbs shall have fully depressed ramps in accordance with Standard Drawing H-5.

Intersections with Type 2 (vertical) curbs shall have sloped ramps in accordance with Standard Drawings H-5A and H-5B.

At "T" intersections, ramps shall be constructed in the appropriate positions on the far side of the through street, opposite the ramps at the corner roundings of the intersecting street.

4-30 CURB AND GUTTER -- Curb and gutter shall be installed adjacent to all developments in accordance with Standard Drawing H-2 and the following:

A. Type 1A Curb and Gutter: All developments and all locations not included in B through F below, or as required by the Director.

B. Type 1 Curb and Gutter: 40 foot and 50 foot streets in single family residential developments.

C. Type 2 Curb and Gutter or Type 6 Gutter: Industrial subdivisions.

D. Type 2 Curb and Gutter: Frontage roads; parks; unfenced schools; open space areas; public facilities; 50, 56, 60, and 66 foot streets with commercial and multi-family (not duplex) developments.

E. Type 2 Curb and Gutter: Within the curb return areas of all intersections of 84 foot, 108 foot, and 130 foot streets, and at all bus turnouts. (See Standard Drawings H-24, H-24A, and H-25.)

F. Type 2 Curb and Gutter: Locations on 84 foot, 108 foot, and 130 foot streets where the sidewalk is separated from the curb by lawn or approved landscaping (the separation shall be not less than 5 feet nor more than 25 feet, except at transitions.)

4-31 CROSS GUTTERS -- No cross gutter will be allowed on 56 foot, 62 foot, 66 foot, 84 foot, 108 foot, and 130 foot streets. Cross gutters will be permitted on 40 foot and 50 foot streets in AR-1 and AR-2 development. Cross gutters will be permitted on 40 foot and 50 foot streets in development other than AR-1 and AR-2, only with the specific approval of the Director when the intersection cannot reasonably be drained to an underground system. See Standard Drawing H-1.

4-32 BARRIER CURBS -- Barrier curbs shall be in accordance with these standards and Standard Drawing H-2 (Type 3, 4, or 5 curb). Barrier curbs shall be required at all locations where parking will be allowed in a front yard. See Standard Drawing H-23 for planter and barrier curb details (lawn may extend to the back of sidewalk in lieu of planters.)

Barrier curbs shall be required at bus stops behind a sidewalk where the slope is toward the sidewalk (to prevent sheet flow across the sidewalk). Undersidewalk drains shall be used to remove drainage collected at the back of the barrier curb, as necessary to prevent any flow across the sidewalk. See Standard Drawings H-24A and H-35.
Barrier curbs shall be required behind a sidewalk where the slope behind the sidewalk is greater than 6:1 and the slope is away from the sidewalk (for pedestrian safety). Where a retaining wall is allowed, creating a dropoff adjacent to the sidewalk, a minimum 36 inch high barrier fence is required in lieu of the barrier curb at the back of the sidewalk (see Section 4-34 below). Lot grading shall be done so as to not require fencing immediately adjacent to intersections and driveways in violation of the sight distance and visibility requirements of Standard Drawings H-26, H-27, and H-30.

4-33 SIDEWALKS -- Sidewalks shall be in accordance with these standards and the Standard Drawings.

The standard width for all sidewalks shall be 6 feet except as specified below.

All school developments shall have eight foot sidewalks along all frontages except that six foot sidewalks may be used along fenced play areas where no access is provided, as determined by the Director.

Sidewalks may be 4 feet wide only for single family, duplex, or industrial development on streets with 62 foot or narrower rights of way.

All sidewalks adjacent to business or commercial developments shall be 6 feet wide, including those which are in an MP zone.

Sidewalks shall be 6 feet wide at bus turnouts as shown on Standard Drawings H-24, H-24A, and H-25.

Where utility poles and other obstructions are situated within street-side sidewalks, a minimum of four feet of clear uninterrupted sidewalk area shall be provided. Where it is necessary to widen the sidewalk beyond its standard width to attain the four foot clearance, the widened area shall extend a minimum of five feet beyond each side of the obstruction and a ten foot taper on each side of the widening shall be required.

In certain special case situations, with approval by the Director, sidewalks may be separated from the curb by lawn or approved landscaping. The distance between the back of the curb and the edge of the sidewalk may vary (meandering sidewalk), but shall not be less than 5 feet nor more than 25 feet, except at transitions. Type 2 curb and gutter shall be required at all locations where the sidewalk is separated from the curb.

Sidewalk widening shall be required at all major intersections on backup lot developments in accordance with Section 4-10 and Standard Drawings H-26 and H-27.

Where sidewalks end in fill areas, the fill shall be extended beyond the end of the sidewalk for a minimum distance of six feet. As an alternate, a cut-off wall may be constructed at the end of the sidewalk.

Sidewalk barricades shall be required in accordance with Standard Drawing H-9 where satisfactory provision cannot be made for pedestrians to safely continue beyond the terminus of the sidewalk.

4-34 FENCES -- The location for fences or walls along public streets shall conform to the requirements of the Sacramento County Zoning Code, Sections 301-60 and 301-61. Fences or walls shall not encroach upon visibility easements required by Section 4-10 and, when applicable, Drawings H-26 and H-27 of these Improvement Standards. All fences and walls are subject to the visibility requirements of the Sacramento County Code (Title 12). See Standard Drawing H-30.

Fences and walls may require modification to accommodate street light poles and/or foundations.

When a barrier fence is required by the conditions described in Section 4-32, "Barrier Curbs," the Barrier fence shall be three feet high, shall be chain link type (or another type approved by the Director), shall be placed at the back of sidewalk, and shall conform to the visibility requirements described herein.

4-35 PRIVATELY OWNED BRIDGES -- Bridges intended for the sole use of the occupants of a multi-family type development or any bridge on a private road shall be designed to withstand an H-20 load, unless specifically approved by the Director for a lesser loading. Other design features of the bridge, including but not limited to widths, railings, clearances and materials shall be in conformance with County and State Standards. A

soils report prepared by a qualified soils engineer will be required. Design calculations signed by the Consulting Engineer and including the registration number shall be required.

4-36 STREET TERMINATIONS -- Vehicular access shall not be permitted from the end of a stubbed street. To obtain vehicular access, the street must be extended through the property or properly terminated with a standard cul-de-sac bulb. In cases where no access is provided to the end of the street, a modified cul-de-sac bulb may be approved by the Director. (See Section 4-7 of these Standards.)

SECTION 5

STORM DRAINAGE DESIGN

5-1 Drainage Policy

A. It is the policy of Sacramento County that all new habitable structures be protected from the 100-year (1%) flood event and that all public roads be protected from the 10-year (10%) flood event.

B. Specific requirements for the improvement and construction of drainage facilities are set forth in the Sacramento County Water Agency Drainage Ordinance, the Improvement Standards of Sacramento County, the County of Sacramento Standard Construction Specifications, and the Sacramento County Code.

5-2 Drainage Maintenance - Sacramento County maintains drainage facilities within the Sacramento County Metropolitan Storm Drain Maintenance District and within designated storm drain maintenance benefit assessment district. New development in areas outside the existing maintenance districts will be required to join or form a benefit assessment district for storm drain maintenance as required by the Director.

5-3 Permits from Other Public Agencies - Where other public agencies assert jurisdiction over aspects of drainage improvements required by Sacramento County, the approval of said agencies shall be secured before the county will issue permits. Examples of such agencies are the State of California Department of Fish and Game, the State Reclamation Board, and the U. S. Army Corps of Engineers.

5-4 Federal Flood Program

A. The County of Sacramento is a participant in the National Flood Insurance Program and all development in the County shall comply with the regulations of the Federal Emergency Management Agency (F.E.M.A.).

B. Amendments of F.E.M.A. flood maps will be required for all commercial & subdivision development located in a federal flood zone. Petitions for a Letter of Map Amendment (L.O.M.A.) or Letter of Map Revision (L.O.M.R.), including any fee required by F.E.M.A., shall be submitted to the Water Resources Division before improvement plans are approved.

5-5 Drainage Classification

A. Minor -- Drainage facilities receiving runoff from an area of less than 30 acres shall be called a minor system.

B. Trunk -- Drainage facilities receiving runoff from an area of thirty acres or larger shall be called a trunk system.

C. On-Site Drainage -- Drainage facilities required to carry runoff within the development, excluding trunk drainage conduits, facilities draining public streets, and facilities draining concentrated flow from other properties.

5-6 Drainage Fees and Credits - All development in Zone 11 of the Sacramento County Water Agency is conditioned upon payment of a drainage fee. Said fees are administered by the Sacramento County Water Agency for the construction of trunk drainage systems. The Water Agency will reimburse second parties for the construction of trunk drains according to a predetermined credit schedule where such work is required by the County. The fee and credit schedule is shown in the Agency Ordinance and revised annually on March 1. Approved credit letters shall be obtained prior to approval of development plans.

5-7 Drainage Capacity Design - All drainage systems shall be designed to accommodate the ultimate development of the entire upstream watershed.

5-8 Surface Drainage Grading Design - The consulting engineer shall be responsible for designing a grading plan which insures that storm waters flow through a development in a manner that will not flood structures in the event of malfunction or overloading of the drainage system.

5-9 Drainage Diversions

A. The diversion of natural drainage will be allowed only within the limits of the proposed improvement. All natural drainage must enter and leave the improved area at its original horizontal and vertical alignment unless an agreement, approved by the Director, has been executed with the adjoining property owners.

B. Temporary drainage diversions during construction shall be approved by the Director and shall be located and constructed in such a fashion as to permit their removal when necessary for the prevention of damage to adjoining property.

5-10 Drainage Easements

A. All drainage facilities other than on-site systems shall be located in one of the following:

1. Public street or alley.

2. Public utility easement, specifically dedicated to include drainage facilities.

3. Dedicated drainage easement (forms will be supplied by the Director).

B. Offsite drainage easements will be required whenever there is a concentrated discharge of drainage water onto offsite private property where that discharge is not made into a continuous pipeline or watercourse with defined bed and banks.

In the event that offsite easements cannot be obtained through negotiation, the County will condemn necessary rights of way providing that the person, firm or corporation requesting such condemnation

shall enter into a written agreement to pay all costs and expenses of the condemnation.

The agreement shall require a cash deposit of not less than $1,500.00 and shall require payment of all costs and expenses in excess of the deposit as specified by the County. Any unspent funds will be returned.

C. Dedication of easements shall be completed and submitted to the Director with copies of deeds or title reports for the affected properties before improvement plans will be approved.

D. Closed Conduits -- Easements for closed conduits shall meet the following requirements.

1. Minimum width of ten feet with the centerline of the pipe at quarter point; pipe may reverse sides at angle points.

2. For pipes exceeding 24" in diameter or trenches exceeding five feet in depth, the easement width shall be based on the following formula unless otherwise approved by the Director:

WIDTH = Trench depth + pipe diameter + two feet

3. Minimum width of fifteen feet for side and backlot drains in a subdivision.

E. Open Channels -- Easements for open channels shall have sufficient width to contain the channel, fencing where required, and a 15-foot service road. A service road may not be required where the channel bottom is lined and a suitable access ramp is provided.

5-11 Design Runoff -- Design criteria for drainage runoff shall be as follows:

A. Under 160 acres --

1. The runoff to be used in storm drainage design for drainage area 160 acres and smaller shall be computed from the Drainage Zone chart and the accompanying Design Runoff graphs shown on Standard Drawings R-28, R-29, R-30, and R-31. The selection of the appropriate chart will be on the basis of the County General Plan.

2. In drainage areas which contain multiple zoning, the runoff shall be computed from the following formula:

$$Q_{Design} = Qr + (Qm - Qr)\frac{Am}{A_t} + (Qc - Qr)\frac{Ac}{A_t}$$

Where:

Qr = Flow from residential curve using total area of watershed.

Qm = Flow from Multiple Family formula using total area of watershed.

Qc = Flow from commercial curve using total area of watershed.

3. Residential runoff curves shall be used for those areas zoned AR-2 to RD-5, inclusive. Multiple family runoff shall be computed for those areas zoned RD-7 to RD-30, inclusive. Commercial runoff curves shall be used for those areas zoned RD-40 and commercial uses.

4. At sag points where the total change in grade exceeds 4% within 200 feet of a drop inlet the design Q at that inlet shall be increased to 0.7 cfs/acre. Minimum connector pipe diameter at said inlets shall be twelve inches.

B. 160 to 1,280 Acres

1. The runoff to be used in storm drainage design for drainage areas between 160 and 1,280 acres shall be computed from plates 5, 7A, 7b, and 7c of the County of Sacramento Master Drainage Plan, Part I, County Wide Hydrology, October, 1961. Copies of these plates are available from the Water Resources Division.

2. Low density curves shall be used for AR-5 and AR-10 development. Medium density curves shall be used for watersheds in which more than one-half the area is zoned for single family residential use. High density curves shall be used for commercial or multiple family development.

3. Non-urban runoff (Plate 5) shall be used only for those areas zoned Perm. AG., Ag-20 or higher.

C. Watersheds greater than 1,280 acres will require special design as determined by the Director.

D. The runoff rate as determined per sections 5-11A and 5-11B is defined as the 10-year (10%) peak flow rate (Q_{10}). The 100-year (1%) peak flow rate (Q_{100}) is defined as 1.65 Q_{10}, as per said County Master Drainage Plan.

5-12 Hydraulic Design Criteria -- In order to provide a uniform drainage system in the County of Sacramento, the following criteria shall be followed in all hydraulic computations unless otherwise authorized by the Director.

A. Flow Computations -- All hydraulic computations shall be in accordance with the following:

1. Manning's Formula shall be used to compute capacities of all open and closed conduits and all cross culverts which will become a part of the closed conduit system.

2. The minimum "n" values to be used in Manning's formula shall conform to the following:

Precast Pipe	0.015
Concrete Cast-In-Place	0.015
Vitrified Clay Pipe	0.013
Asbestos Cement	0.013
Ribbed Steel Pipe	0.015
Ribbed Aluminum Pipe	0.015
Polyvinylchloride Pipe	0.015
Concrete Box Culvert	0.015
Corrugated Metal Pipe 2-2/3" x ½" Corrugations	0.024
Corrugated Metal Pipe 3" x 1" Corrugations	0.026
Multi-Plate Arch Pipe	0.031
Open Channel Fully Lined	0.015
Earth Channel, Clean, Uniform Sides	0.035
Open Channel with Lined Bottom, Clean Sides	0.025
Natural Channel	0.050 or as specified

Analysis Methods that account for all minor losses may use manufacturer's recommended 'n' values as approved by the Director.

B. Pipe Criteria -- Pipe criteria shall be as follows:

1. Closed conduits shall be designed for Q_{10}. The pipe slope shall equal the hydraulic gradient unless otherwise approved by the Director.

2. Minimum pipe diameter allowable on any closed conduit shall be 10 inches, except for on-site drainage where the minimum size shall be 8 inches or as approved by the Director.

3. Minimum velocity in closed conduits shall be 2 feet per second (f.p.s.) when flowing full.

C. Driveway Culverts -- Driveway culvert criteria shall be as follows:

1. Driveway culverts shall be approved by the County for size, grade, alignment, and type. Contractor shall contact County for encroachment permits.

2. The minimum allowable pipe diameter of driveway culverts shall be 12 inches.

3. The length of driveway culverts for residential property shall not exceed 30 feet, and for commercial and industrial shall not exceed 40 feet.

4. Driveway culverts will not permitted unless the County has agreed to defer the normal Class "A" or Class "B" street improvements, except in cases of temporary construction access.

D. Cross Culvert Criteria -- The design of cross culverts shall be as follows:

1. Cross culverts shall be designed in accordance with procedures outlined in the U.S. Dept. of Transportation "Hydraulic Design of Highway Culverts," Hydraulic Design Series No. 5, September 1985.

2. Cross culvert size shall be determined on the basis of runoff as specified in these standards.

3. Cross culverts shall be checked against Q_{100} to assure that no adverse effect will occur upstream as a result of the higher design event.

4. Cross culvert profile will be determined by an examination of the overall profile of the channel for a minimum distance of 500 feet on each side of the installation.

E. Open Channels - Open channels shall consist of concrete lined channels, lined bottom channels or natural earth channels.

Criteria for permanent open channels shall be as follows:

1. Open channels shall be designed for the 100-year flood event. Freeboard requirements will be specified by the Director.

2. Open channel design shall include a U. S. Army Corps of Engineers' H.E.C. 2 water surface profile analysis.

3. Minimum velocity:

2 feet per second (f.p.s.)

4. Maximum velocity:

a. Earth channels, 6 f.p.s.
b. Lined channels, 10 f.p.s.
c. Bottom lined channels, 8 f.p.s.

5. The centerline curve radius of an open channel shall be equal to or greater than twice the bottom width. (35-foot minimum).

F. Design Computation -- The design computation for drainage shall include the following information which shall be submitted <u>before</u> the plans will be accepted for checking.

1. Watershed map (USGS topo map for offsite watersheds; separate plan for on-site sheds).

2. Drainage area in acres.

3. C.F.S. in each pipe or channel reach.

4. Invert elevations of each pipe or channel reach.

5. Top of structure elevation or top of channel lining elevation.

6. Hydraulic grade line elevation. (Not required when design is based on hydraulic grade line inside conduit).

7. Hydraulic gradient.

8. Pipe size, type, class, length and gradient.

9. Channel dimensions and water surface profile computations.

G. Hydraulic Grade Lines (H.G.L.)

1. For closed conduits the hydraulic grade line shall be a minimum 0.50 feet below the elevation of inlet grates and manhole covers. The hydraulic grade line shall be shown on the plans wherever the H.G.L. is above the top of the pipe.

2. For open channel systems the H.G.L. shall be shown for the 10-year and 100-year flood events.

H. Drainage Profiles - A plan and profile shall be shown for all drainage systems which carry natural drainage that originates upstream of the limits of the development. On-site drainage may be shown in plan view only, unless otherwise requested by the Director. See Section 5-12 for extending profiles off-site.

I. Drainage Along Class "C" Streets -- The criteria for design of drainage along Class "C" streets are as follows:

1. Roadside ditches within the road right of way shall not drain more than 1500 feet parallel to the roadway.

2. Roadside ditches will not be allowed within the road right of way when the drainage exceeds the capacity of an 18" pipe.

3. Side slopes of roadside ditches shall be per standard drawing H-19 of these improvement standards.

4. Hydraulic gradients for roadside ditches shall be shown on the plans and shall be below the structural section of the roadway.

5. Driveway culverts sized for each individual lot shall be included in the plans.

J. Class "C" Subdivisions -- Design criteria for class "C" subdivisions shall be determined on an individual basis. The Sacramento County

Water Resources Division should be consulted before engaging in the design of any Class "C" subdivision.

5-13 Drainage Structures -- Drainage structure criteria shall be as follows:

A. Closed Conduits - The requirements for closed conduits are as follows:

1. Closed conduits shall be either cast-in-place concrete pipe, precast reinforced concrete pipe, non-reinforced concrete pipe, asbestos cement pipe, vitrified clay pipe, corrugated steel pipe, corrugated aluminum pipe, polyvinylchloride pipe, ribbed steel pipe or ribbed aluminum pipe, as defined in the Standard Construction Specifications. Exceptions shall be approved in writing by the Director.

2. Metal pipe to be constructed within a public easement or right-of-way shall be designed for a service life of fifty (50) years in accordance with the methods specified in Section 7-851.3 of the California Department of Transportation Highway Design Manual. The Consulting Engineer shall provide certified copies of the laboratory report giving the results of pH and resistivity tests. The report shall also include a map showing the location of each site where samples were taken.

   Unless otherwise specified by the Director, a minimum of two soil samples shall be taken for the first 1000 lineal feet of pipe or fraction thereof on a project with a minimum of one additional sample being required for each additional 1000 lineal feet of pipe or fraction thereof. The samples shall be taken along the approximate alignment and at the approximate depth of the pipe to be installed. Priority in sampling shall be given to trunk facilities.

3. The specific type of pipe or alternate pipes to be used in the development shall be shown on the plans. If the developer proposes to use any type of pipe not shown on the approved plans, the plans shall be resubmitted for approval.

   A minimum of three pipe alternates shall be shown on Assessment District plans to be constructed under the Improvement Act of 1911 and on plans for pipe to be constructed with Sacramento County Water Agency contributions.

4. All pipes shall be constructed with a minimum cover of two feet unless other utilities or grade conditions prohibit. In no case

shall minimum pipe cover be less than specified on Standard Drawings R-32, R-33, R33A and R-33B.

At locations where the minimum cover requirements cannot feasibly be obtained, the conduit shall be either encased in concrete or provided with a concrete cover or other method of pipe protection as specified by the Director.

Pipe strength requirements for minimum cover in the street may be taken from the Standard Drawings or may be determined in accordance with generally accepted engineering practice.

5. In fill areas, or in areas with poor soil conditions where it is anticipated that a good, firm, vertical-walled trench cannot be constructed, in lieu of using Standard Drawings R-32, R-33, R-33A and R-33B, the consulting engineer shall design the pipe structural requirements in accordance with good engineering practice. If trench conditions are uncertain, a note shall be placed on the plans making it the contractor's responsibility to place the proper strength pipe if poor trench conditions are encountered.

6. Pipe Alignment Requirements

   a. Drainage pipelines shall be located in the street whenever possible. The location of storm drainage pipelines in new streets shall be six (6) feet north or west of and parallel to the centerline of the street.

   b. Pipelines may be placed under curb and gutter; the minimum clearance shall be three (3) inches between the bottom of gutter section and top of pipe.

   c. All new storm drains shall be placed a minimum of one hundred (100) feet from existing and proposed water wells.

   d. Meandering and unnecessary angular changes of pipelines shall be avoided. Angular changes when necessary shall not exceed 90 degrees.

B. Pipeline Radius Criteria: All pipe placed on curves shall meet manufacturer's recommendations for curved alignment. All curves, radii, length of pipe joints, and types of pipe shall be shown on the plans.

C. Manholes - Requirements for manholes are as follows:

1. Standard precast concrete or saddle type manholes shall be used where required. Where special manholes or junction boxes are required, the design must be approved by the Director. In no case will junction boxes or manholes be allowed which are smaller than 24 inches inside dimension.

2. Manholes shall be located at junction points, angle points greater than 15 degrees, and changes in conduit size. On curved pipes with radii of 200 feet to 400 feet, manholes shall be placed at the B.C. and E.C. and on 300 feet maximum intervals along the curve. On curves with radii exceeding 400 feet, manholes shall be placed at the B.C. and E.C. and on 400 maximum intervals along the curve for pipes 24 inches and less in diameter and 500 feet maximum intervals along the curve for pipes greater than 24 inches in diameter. Manhole spacing on curves with radii less than 200 feet will be determined on an individual basis.

3. Spacing of manholes, junction boxes or inlets of such size as to be accessible for maintenance shall not exceed 500 feet for drains 24 inches and smaller in diameter, and 600 feet for pipes greater than 24 inches in diameter. The spacing of manholes shall be nearly equal whenever possible.

4. All manholes and junction boxes other than inlets shall have standard manhole covers as shown in the standard drawings. Manholes will not be allowed in the gutter flow line except as approved by the Director.

5. A reinforced concrete lid as shown on Standard Drawing R-25 shall be required when any pipe would enter the manhole above the base of a manhole cone.

6. Slotted manhole covers may be used to pick up minor drainage in non-traffic areas, including on-site drainage on residential lots. Covers shall conform to standard drawing R-23 or R-24A.

7. Improvement plans shall include a special detail for all manholes at junction points where there is a change in pipe direction and pipe diameter exceeds 48-inches.

D. Inlets - Requirements for inlets are as follows:

1. Inlets shall be placed so that the length of flow in the gutter does not exceed 500 feet in either direction, except for Class B streets in AR-1 and AR-2 development where length of gutter flow shall not exceed 1,000 feet in either direction. The depth of flow in the gutter at the inlet shall not exceed 0.35 feet, as determined by the charts on Standard Drawings R-34 and R-35. The flow rate used to check the depth shall include any runoff that may by-pass upstream grates. The maximum allowable area draining to one on-site inlet shall be two (2) acres.

2. Inlets at sag points where by-pass flow from upstream grates is possible shall be Type B. Type E inlets shall be used at all

other sag points. The connector pipe from the inlet shall be sized to accommodate the design runoff taking into consideration by-pass flow from upstream inlets.

3. A Type B inlet will be required at sag points where lot pads are less than 1.0 foot above the street.

4. Types A, B, and C inlets shall be used on 84-foot and 110-foot streets and in commercial and industrial areas.

   Type D and E inlets will be acceptable on streets 66 feet or less in width, provided that the conditions of 1 and 2 above are satisfied.

   Type F inlets shall be used in unimproved medians, and may be used in roadside ditches away from driveway locations.

5. Drop inlets in streets shall be placed at lot lines in residential subdivisions, except at intersections where they shall be placed at the curb return.

6. Non-standard drop inlets for on-site drainage shall conform to the following: Inlets for on-site drainage as defined in Section 5-1C shall be 12 inches in the least dimension. The area of the opening "G" in square inches shall not be smaller than G=30A where "A" is the area in acres of the contributing watershed.

   All inlets for on-site use that are not shown in the Improvement Standards shall be clearly dimensioned on the plans. All grates shall be designed to provide adequate safety for automobile traffic, bicycles and pedestrians.

   Gutter drains as shown on the Standard Drawings may be used for on-site drainage only in areas not subject to vehicular traffic.

7. Types A or B inlets may be used as junction boxes. When used as junction boxes where pipe is changing directions, the inside dimension requirements for junction boxes shall be met. Only the first three inlets of a drainage system may be used as junction boxes. Inlets shall not be used as junction boxes in sag points.

8. Drop inlets draining public streets may be connected directly to a trunk line 36 inches in diameter or larger by means of a lateral not exceeding 15 inches in diameter and 20 feet in length and having a slope not exceeding 30 percent. At sag points the drop inlets shall be connected to a manhole.

9. Single on-site drop inlets may be connected directly to a trunk line 36 inches or greater in diameter, provided that the connector pipe is not longer than 80 feet and that blockage of the inlet could not cause flooding of adjacent properties.

D. Junction Boxes - The requirements for junction boxes are as follows:

1. Junction boxes shall be constructed of reinforced concrete or fabricated from reinforced concrete pipe section where size limitations permit, except when standard inlets are used as junction boxes as specified in Section 5-11(C).

2. Minimum wall thickness for reinforced concrete junction boxes shall be 6 inches.

3. The inside dimension of junction boxes shall be such as to provide a minimum of three inches clearance on the outside diameter of the largest pipe in each face.

4. All junction boxes shall be rectangular in shape unless otherwise approved by the Director.

5. Junction boxes deeper than 4 feet shall have a minimum dimension of 48 inches.

E. Pipe Stubs -- The criteria for pipe stubs shall be as follows:

1. Temporary pipe stubs shall be two sizes larger than the permanent pipe unless a flared end section or CSP drop inlet is used.

2. A headwall and/or trashrack shall be required where the upstream pipe ends at a park or permanent (more than two years in the future) open field.

3. Whenever a pipe stub is required, all ditches and swales shall be "trained" toward the stub.

4. Pipe stubs shall be as deep as possible considering public safety.

F. Headwalls, Wingwalls, Endwalls, Trash Racks, Access Control Racks, and Railings -- The requirements for these facilities are as follows:

1. All headwalls, wingwalls, and endwalls shall be considered individually and in general shall be designed in accordance with the Standards and Specifications of the California Department of Transportation.

2. Trash racks will be provided where they are necessary to prevent clogging of culverts and storm drains and eliminate hazards. Trash racks shall be designed in conformance with Standard Drawings R-16 and R-18. Temporary trash racks will be allowed where it is anticipated pipe will be extended in the near future (within two years).

3. Access control racks shall be required on pipes 24" or larger and shall conform to S.D. R-15.

4. Metal beam guard rail or chain link fencing may be required by the Director at culverts, headwalls, box culverts, and on steep side slopes. When so required, the railing shall be installed in accordance with the Standard Construction Specifications.

G. Drainage pumps -- Drainage pumping plants shall be designed in accordance with the latest edition of the Hydraulic Institute Standards and as specified by the Director.

H. Detention Systems -- The criteria for detention systems shall be as follows:

1. Temporary detention systems shall require the written approval of the Director.

2. The design of any detention system shall be approved by the Director.

5-14 Channels and Outfall Design -- The design of channels and outfalls shall be as follows:

A. Open Channels -- Requirements for open channels are as follows:

1. Drainage may be conducted through an open channel under the following criteria and as approved by the Director:

a. The flow rate exceeds the capacity of a 72-inch pipe.

b. The outfall is at an elevation such that minimum cover cannot be obtained over the pipe.

c. County policy requires the channel to remain natural.

2. Channels shall be constructed to a typical cross section. Fully lined channels shall be designed with side slopes of 1 horizontal to 1 vertical; channels with unlined sides shall be designed with side slopes of 3 horizontal to 1 vertical. Exceptions shall be approved by the Director.

Lined channels shall have a minimum bottom width of 6 feet and shall have an access ramp for maintenance equipment.

3. For all channels, either improved or natural, the following items shall be shown on improvement plans in addition to information heretofore required:

a. Typical sections and cross sections.

b. Profile of the existing channel and top of bank profile for a minimum of 1000 feet each side of the development in order to establish an average profile grade through the development. The Consulting Engineer shall contact the County for profiles of major drainage channels.

4. Interceptor Ditches -- Interceptor ditches or approved alternates shall be placed at the top of the cut or bank where deemed necessary by the Director to prevent erosion of the channel bank. Runoff shall not be allowed to "Sheet drain" over top of bank.

5. Erosion Protection -- Erosion protection as specified by the Director shall be placed at the top of the cut or bank where deemed necessary by the Director to prevent erosion of the channel bank.

B. Outfall Profiles:

1. All drainage outfalls shall be shown both in plan and profile on the improvement plans for a distance of 1000 feet or until a definite "daylight" condition is established.

All drainage ditches upstream of the improvement shall be shown on the plans and profile for a distance of at least 500 feet or until an average profile grade through the improvement is established.

The profiles shall include ditch flow-line and top of bank elevations.

2. When improvements have more than one unit, the drainage outfall shall be shown as extending to the property boundary, and beyond if required, although it may not be constructed with the current unit development. All temporary outfalls shall be shown both in plan and profile on the improvement plans.

5-15 Fencing Requirements -- The requirements for fencing (see Standard Drawing R-1) shall be as follows:

A. Improved channels in developed areas exceeding three (3) feet in depth and with side slopes steeper than 3:1 shall be fenced with six (6) foot chain link fence.

In all other areas fencing shall be placed only upon the recommendation of the Director.

B. Drive gates shall be minimum 12 feet wide, and walk gates shall be 4 feet wide minimum.

C. Fences shall be located 6 inches inside the drainage easement lines and a minimum 12 inches from top of bank.

D. No fencing will be allowed within the floodway of an open watercourse without the approval of the Director. Special requirements shall be specified by the Director for fencing within the 100-year floodplain of any open watercourse.

5-16 Access Across Land Subject to Flooding -- Private roads accessing parcels across land subject to flooding shall be constructed at or above the ten-year water surface elevation; bridges shall have a soffit elevation a minimum of one foot above the 100-year flood elevation. This paragraph shall not be construed to lessen requirements specified elsewhere in these Standards.

5-17 Natural Streams and Natural Stream Tributaries -- Development within the 100-year floodplain of designated natural streams and natural stream tributaries shall meet the special conditions of the Zoning Code in addition to those required by this section.

5-18 Fill in a Floodplain -- Fill for the removal of land from the 100-year floodplain of a watercourse must be compacted to 95 percent of the maximum density obtainable with the standard proctor test method issued by the American Society for Testing and Materials (ASTM Standard (D-698) or an equivalent test method acceptable to F.E.M.A.

SECTION 6

DOMESTIC WATER SUPPLY SYSTEM

6-1 INTRODUCTION -- These improvement standards shall govern the engineering design of all domestic water systems intended for operation and maintenance by the County of Sacramento. The County of Sacramento operates retail water service through its "Sacramento County Water Maintenance District", and wholesale water through zones of the Water Agency.

6-2 INTENT OF CRITERIA -- The intent of these criteria is to provide a water system that will dependably and safely convey the required amount of high quality water throughout the distribution system with the least cost. In establishing the required amount of water, periods of peak domestic demand occurring in conjunction with an emergency fire flow demand shall be considered.

6-3 CURRENT STANDARDS -- Pertinent and current requirements of the following agencies or standards shall be complied with. In case of conflict the design criteria of the County of Sacramento, as established herein, shall govern. The Department of Public Works shall advise where these standards may be obtained, on request.

A. Environmental Protection Agency Drinking Water Regulations.

B. Laws and Standards of the State of California, Department of Public Health Services relating to Domestic Water Supply.

C. Standard Construction Specifications of the County of Sacramento, Department of Public Works.

D. General Order No. 103 of the California Public Utilities Commission.

E. Sacramento County Code, Section 6.28, regulating the installation, operation, construction, reconstruction, and repair of wells and pumps.

F. State of California; Water Well Standards (Bulletin 74-81).

G. Title 17, Chapter V, Sections 7583-7622, California Administrative Code, and County Ordinance No. 676 regarding cross-connections and backflow prevention.

H. Uniform Fire Code.

I. Ordinance No. 18 of the Sacramento County Water Agency where applicable within zones of the Water Agency.

6-4 CONNECTION PERMITS AND FEES -- A permit shall be obtained for each connection to the water system. Contact the Water Resources Division for information concerning Water Agency and/or water district fees.

6-5 WATER SUPPLY QUALITY -- The quality of the water shall conform to the Environmental Protection Agency Drinking Water Act, and the State Department of Health Services Drinking Water Standards.

6-6 WATER SUPPLY PRESSURE -- Normal operating pressures of not less than 35 p.s.i. nor more than 100 p.s.i. shall be maintained at service connections to the distribution system, except that during periods of peak domestic and fire demand, the pressure shall not be less than 20 p.s.i.

6-7 RATE OF DOMESTIC USE -- For design of the distribution system, a peak domestic demand rate of fifteen gallons per minute per gross acre shall be assumed. For extension of existing systems consisting of more than 500 services, the design shall be based on records of the average rate of consumption per service on the day of maximum use. Special consideration shall be given to area zoned for multiple housing, schools, commercial, or industrial development. Storage reservoirs shall be considered in meeting these requirements.

6-8 REQUIRED FIRE FLOWS -- Required fire flows shall be determined by the Uniform Fire Code, the fire protection district having jurisdiction, and the County of Sacramento.

6-9 WELL AND PUMPING PLANT DESIGN -- All phases of well and pumping plant design shall be coordinated with, and shall be under the direction of Sacramento County Water Resources Division. Particular attention shall be given, both in design and construction, to conformance with Sacramento County Code, Section 6.28 and Bulletin 74-81, "Water Well Standards: State of California" of the State Department of Water Resources.

In general, all developments must have a minimum of two (2) sources of water. If adequate elevated or ground level storage is provided, a single system may be acceptable upon approval by the County Water Resources Division.

Site selection shall be approved by the Sacramento County Water Resources Division and meet the requirements of the Environmental Health Division of the County Environmental Management Department, and the State Department of Health Services.

Sacramento County Water resources Division has technical specifications for well drilling and plans of site layout available for review.

6-10 TRANSMISSION SYSTEM DESIGN -- Sizing and layout of transmission mains shall conform to Master Water Supply Plans of the Sacramento County Water Agency.

Technical specifications for water transmission mains shall be requirement of the proposed improvement plans.

Under no circumstances shall fire hydrants or water services be directly connected to a transmission main.

6-11 TRANSMISSION SYSTEM LAYOUT REQUIREMENT --

A. Improvement plan criteria --

1. Two (2) sets of improvement plans shall be submitted directly to the Water Supply Section of the Water Resources Division.

2. The transmission main shall be shown in full on the plan and profile, including valves, air relief devices, and blow off devices.

3. Elevations shall be shown at all grade changes.

4. Transmission mains shall maintain a minimum vertical clearance from all other utilities of 1'-0".

5. Four (4) sets of signed plans shall be supplied directly to the Water Supply Section of the water Resources Division.

B. Transmission main location -- All transmission mains shall be installed within public rights-of-way and easements.

1. In general, the location shall be three (3) feet from the curb and gutter. The transmission main may be located in a landscape frontage if so directed by the engineer.

2. Ten (10) feet shall be the minimum horizontal separation from water mains and sanitary sewer mains.

3. Minimum cover shall be 36" in all locations.

6-12 DISTRIBUTION SYSTEM DESIGN -- Sizing of mains shall be such that the stated normal pressures and the minimum requirements for main spacing and sizing are maintained.

The Hazen-Williams formula shall be used in the hydraulic study of the system, using a "C" value of 130 for cement-lined pipe, PVC C900, and ductile iron pipe.

A Hardy-Cross hydraulic analysis of any proposed distribution system shall be supplied to the Water Resources Division upon request. In design of the system, the maximum delivery from any hydrant of a type conforming to current County Standard Construction Specifications shall be assumed to be limited to 1,500 gallons per minute.

6-13 DISTRIBUTION SYSTEM LAYOUT REQUIREMENTS -- The water system layout requirements are as follows:

A. Improvement plan criteria --

1. Two (2) sets of plans shall be submitted directly to the Water Supply Section of the Water Resources Division.

2. The distribution main shall be shown on plan and profile (top of pipe only). A water plan shall be included as part of the improvement plans, showing locations of valves, fire hydrants, and water services.

3. Details of water mains crossing other utilities or unusual alignments will be provided if deemed necessary by the Water Resources Division.

4. Four (4) sets of signed plans shall be supplied directly to the Water Supply Section of the Water Resources Division.

B. Main Location -- All water mains shall be installed within public rights-of-way or easements.

1. The water main location shall be three (3) feet from the curb and gutter on the northerly or westerly side of the street. If it should be necessary because of existing improvements or possible conflict with other utilities, and with the approval of the Water Resources Division, the mains shall be installed within an easement immediately adjacent to and behind the property line fronting on the public right-of-way.

2. If it is necessary to install a water main within a private road, the easement shall be the width of the paving plus one foot each side.

3. Ten (10) feet shall be the minimum horizontal distance between parallel water and sanitary sewer lines and the water main shall be higher than the sewer. On crossings, the water line shall be at least 12" above the sewer line.

4. When crossing a sanitary sewer force main, it shall be specified that the water main be installed a minimum of three (3) feet above the sewer line and be of cast iron or ductile iron.

5. In every instance where a water main is to be installed in public right-of-way or easement, the Highways and Bridges Division shall be consulted for preferred location and the Water Resources Division approval obtained.

C. Main Layout and Sizing -- The distribution system, whenever possible, shall be in grid form so that pressures throughout the system tend to become equalized under varying rates and locations of maximum demand. The minimum pressures and flows as specified shall govern design of the system. The following conditions are to be considered for the distribution system design:

1. In general, the minimum pipe size shall be eight inches inside diameter.

2. Where water main is installed in a major thoroughfare (84 feet right-of-way or greater), dual mains (one pipeline on each side of the street) may be required.

3. Mains shall maintain a minimum cover of 30" (36" in rights-of-way 50' and greater) and a maximum depth of 60", both from gutter flow-line, unless otherwise specified by the Water Resources Division.

4. Mains shall maintain a minimum 1'-0" vertical clearance from all utilities.

D. Valves, Hydrants, and Blow-offs -- The distribution system shall be equipped with a sufficient number of valves so that no single shut-down will result in shutting down a transmission main. Valves will also be spaced no greater than 500 feet in school, commercial, industrial, or multiple-family dwelling areas. In other residential areas, valves shall be spaced such that no single shut-down will result in shutting down more than 15 services or 800 feet, whichever results first. In no case shall more than two fire hydrants be removed from service. The valves shall be so located that any section of main can be shut down without going to more than three locations to close valves. Valves at intersections shall be located within the curb returns, and set as close to minimum pipe depth (30" to 36") as possible. Three valves shall be placed where mains cross and two valves where mains tee. If it is necessary to install valves between street intersections, they shall be located on property lines between lots.

Fire hydrants and blow-off assemblies shall be located as follows:

1. Fire hydrants shall be placed at street intersections wherever possible, and located to minimize the hazard of damage by traffic. They shall have a maximum normal spacing of 500 feet measured along the street frontage. Hydrants located at intersections shall be installed at the curb return. All others shall be located on property lines between lots.

2. Not more than two hydrants shall be placed on a six-inch main between intersecting lines. The minimum size main serving a fire hydrant shall be six inches in diameter. The pipeline connecting the hydrant and the main shall be a minimum of six-inch, with a gate valve flange connected to the main. On long runs, a second valve may be required near the hydrant location by the fire protection district having jurisdiction.

3. A fire hydrant assembly shall be installed on all permanent deadend runs. Blow-off valves shall be used if dead end runs are temporary and less than standard spacing will result if a fire hydrant is used. Wherever possible, the blow-off shall be installed in the street right-of-way, three feet from the curb and gutter. In no case shall the location be such that there is a possibility of back-siphonage into the distribution system.

E. Service Lines -- Service lines from the water main to the property line or edge of easement shall normally be installed at the time the main is constructed. Services from mains installed in private roads shall extend one foot beyond the edge of the pavement. Service line criteria shall be as follows:

1. In all new subdivisions, the service line shall preferably be located within 9 inches to 30 inches from the side property line.

2. Normal size of a service line shall be one inch. Schools, commercial, industrial, or multiple-family units with higher demand shall be provided with larger service lines, subject to approval of the Water Resources Division. All services shall be installed with a corporation stop at the main and a curb stop or gate valve at the property line. The gate valve shall be used only when the service is 1-1/2 inches or larger. Installation of a valve box is required for all services.

3. The Water Quality Division Maintenance Section shall make all water service taps into existing mains upon application for a permit and payment of the required fees. A note to this effect shall be placed on the plan sheet which details the area that requires such tapping. Application should be made to Sacramento County Department of Public Works and the required fees paid at least five (5) days in advance of the time the tap is desired. All excavation and backfill, and the installation of the remainder of the water service shall be done by the Contractor. (Note: The above applies only when the service is constructed as a part of an improvement contract. For rules regarding the installation of an individual water service, contact the Sacramento County Department of Public Works.)

F. Water Meters -- Water meters shall be installed on all commercial, industrial, multi-family, and irrigation services.

G. Water Pipe -- Pipe used in the construction of water distribution systems shall be either asbestos-cement, cast iron, or polyvinyl chloride pipe. The pipe and the method of placement shall confirm to the Standard Construction Specifications.

H. Detector-Check Valves -- A detector-check valve and bypass meter is required on each fire service line into a building. See standard drawing W-8 for specifications and typical installation details.

I. Back-Flow Devices -- Back flow devices are required in accordance with Title 17, Chapter V, Sections 7583-7622 of the California Administrative Code.

SECTION 7

SANITARY SEWER DESIGN

7-1 DESIGN CRITERIA -- These criteria shall apply to the engineering design of any sanitary sewer system of up to 10 mgd PWWF capacity to be maintained by the County of Sacramento or, with those exceptions as noted, to that within private multiple ownership residential or multi-parcel commercial and industrial developments. The design of interceptor systems (greater than 10 mgd PWWF capacity) shall be coordinated with the Water Quality Division. A basic design criteria is that each property owner is responsible for the installation of a collector sewer across his/her property frontage. Lacking such construction participation, the in-lieu fee provisions of the appropriate sanitation or sewer maintenance district shall apply, unless otherwise approved by the Director.

7-2 AVERAGE FLOW DETERMINATION -- Flow determination shall be based upon the most recent zoning. The minimum population density used shall be equivalent to that of single family zoning. The area shall be examined for trends toward population concentration greater than present zoning allows and/or more than five lots per acre and, if found, an estimate should be made of the probable extent of such concentration. This estimate shall be used as the basis for determining flow.

A. Single Family Detached Units -- Flow shall be based on 400 gallons per residential unit (lot) per day, and a minimum of five lots per acre. However, if the number of lots per acre is known, and is greater than five, the actual number shall be used.

B. Single Family Planned Unit Developments -- Flow per unit shall be 300 gallons per residential unit/day and the actual number of units per acre shall be considered. However, in the absence of known data, the density shall be assumed to be 12 units per acre. If characteristics of the individual dwelling units are similar in characteristics to single family detached units (area, number of rooms) the Director may assign the same design flow values as shown for single family detached residential units.

C. Multiple Residential -- Flows shall be determined from the curve on Standard Drawing No. S-9. However, if the type of improvements planned are known and estimated discharges are available, they shall be used in the design, subject to approval of the Director. When the number of units is used to determine design flow, the value assigned to each unit shall be 300 gallons per day, unless the individual dwelling units are similar in characteristics to single family detached residential units. In the latter case, the Director may assign flow quantities of 400 gallons per day per dwelling unit. Mobile home flow shall be 300 gallons per day per unit.

D. Schools -- The larger flow, as determined from one of the two following methods, shall be used:

1. The entire school area shall be assumed to contribute an average flow equivalent to that of an equal area of single family, detached residential units: i.e., 2000 gallons per acre per day.

2. Average daily flow per school shall be based on the type of school as follows, with the indicated capita limits including ultimate student population plus administration, teaching and operating personnel.

Type of School	Avg. Daily Flow	Capita Limit
Elementary (K-5, K-6 or K-8)	0.025 MG	1,000
Upper Elementary (6-8, 7-8 or 7-9)	0.060 MG	1,500
High School (9-12 or 10-12)	0.080 MG	2,000

For enrollments and personnel in excess of that indicated, there shall be added 25 gallons per day per additional capita in elementary schools and 40 gallons per day per additional capita in upper elementary and high schools.

E. Industrial and Commercial -- Every attempt shall be made to base design flows on specific quantities for the type of development expected. In the absence of specific knowledge of the type of development expected, a flow value of 2,000 gallons per acre per day shall be used for design purposes unless some other value is deemed appropriate based upon surrounding development. The minimum diameter of sanitary sewer laterals for a commercial or industrial development shall be eight inches. Small, isolated commercial projects may be allowed to construct a six inch diameter lateral upon approval of the Director.

Special attention shall be given to any facilities with a magnitude or type of discharge that could be detrimental to the public system. In accordance with the Connection Fee Ordinance of the Sacramento Regional County Sanitation District, in cases where a user expects to contribute a peak hourly flow rate that exceeds the average hourly flow rate on the average day of the maximum month by a factor greater than 4.2, the District Engineer may require the user to construct, at his own cost, peak flow attenuation facilities which will reduce the peak hourly flow rate to not more than 4.2 times the average flow rate during said average day of the maximum month. Siting constraints as set forth in that Ordinance shall also be taken into consideration. The requirements of the Sewer Use Ordinances of the respective Sanitation or Sewer Maintenance District shall also apply.

F. Infiltration -- A normal amount of infiltration was considered in establishing the above discharge rates. However, in areas with high ground water, it may be necessary to increase these rates to reflect a greater amount of infiltration.

7-3 DESIGN FLOW -- Design flow shall be calculated by multiplying the average flow for the upstream service area, as determined above, by the peaking factor obtained from the curve on Standard Drawing No. S-11, except that the minimum peaking factor for service areas consisting primarily of commercially and/or industrially zoned lands shall be 2.4. Minimal line of concentration may result in further increase to the peaking factors shown on the curve.

7-4 PIPE CAPACITY, SLOPE, VELOCITY, SIZE, DEPTH AND MATERIAL -- Design criteria for the pipe are as follows:

A. Size -- The minimum size of laterals which serve single family development shall be six inches in diameter. Schools, commercial, industrial, and multiple residential shall be served by lines a minimum of eight inches in diameter. However, single commercial buildings which contribute negligible flow, when located among single family development, may be served by a lateral six inches in diameter, subject to the approval of the Director.

B. Slope and Velocity -- Manning's formula shall be used to determine the relation of slope, design flow, velocity, diameter, and "n" value. The "n" value shall be 0.013 for all pipe materials.

1. Following is a table of slopes and design flow capacities for various pipe diameters. Pipe slopes less than those listed in this table shall not be used without the approval of the Director. The slopes indicated are based on a velocity of two feet per second with the pipe flowing full.

Pipe Diameter (inches)	Slope (foot per foot)	Capacity at 0.7 depth (MGD)	Capacity when flowing full (MGD)
6	0.005	0.22	
8	0.0035	0.38	
10	0.0025	0.58	
12	0.002	0.85	1.0
15	0.0015	1.32	1.6
18	0.0012	1.95	2.35

2. The maximum depth of flow at design conditions in any lateral (10-inch diameter or less) shall be 0.7 diameter. Lines 12-inches in diameter or larger may be designed to flow full unless direct service sewer connections are planned, in which case the 0.7 diameter maximum depth shall govern.

C. Capacity -- Pipe capacity, in all cases, shall be adequate to carry the design flow from the entire tributary area, even though said area is not within the project boundaries.

D. Depth -- In the design of a system, one of the controlling conditions shall be that the lateral system is to be at sufficient depth to provide a minimum slope for the service sewer of 1/4 inch per foot, at the same time maintaining a minimum cover of 12 inches at any buildable location within the properties to be served, and a minimum of four feet of cover at the right of way line, except that the depth shall be increased to five feet when water main is installed at the back of sidewalk.

E. Material -- Pipe material shall be as approved by the Director, and shall conform to the requirements of the Standard Specifications. Pipe materials which will normally be considered are as follows:

1. Vitrified Clay Pipe conforming to the provisions of Section SS-54 of the Standard Specifications.

2. Cast Iron Pipe conforming to the provisions of Section SS-56 of the Standard Specifications.

3. Ductile Iron Pipe conforming to the provisions of Section SS-57 of the Standard Specifications for pipelines 10 inches in diameter and less.

4. Asbestos Cement Pipe conforming to the provisions of Section SS-55 of the Standard Specifications, except that asbestos cement pipe shall not be used in industrial subdivisions.

5. Reinforced Concrete Pipe conforming to the provisions of Section SS-47 of the Standard Specifications.

The following pipe materials will be considered on a case by case basis, subject to the provisions stated.

6. Acrylonitrile-Butadien-Styrene (ABS) Composite Pipe or Polyvinyl Chloride (PVC) Composite Pipe conforming to the provisions of Section SS-61 of the Standard Specifications may be approved. Requests for approval shall include either soil testing information or a letter from a Soils Engineer stating that the

native soils on the project site within the area of the pipe zone will have a minimum soils reaction modulus (E') of 150 psi. This type pipe, when allowed, will be permitted in residential subdivisions only.

7. Concrete Cylinder Pipe and Cement Mortar Lined and Coated Steel Pipe conforming to Section SS-58 of the Standard Specifications may be approved for force mains or where justified by special conditions.

7-5 SEWER LOCATIONS AND ALIGNMENT REQUIREMENTS -- Location and alignment criteria are as follows:

A. General -- All sanitary sewers shall be placed within rights-of-way dedicated for public streets unless the use of easements is specifically approved by the Director. In some streets, dual laterals may be required. There shall be a minimum horizontal clearance of ten feet between parallel water and sanitary sewer lines and the water main shall be higher than the sewer. On crossings, the water line shall be at least 12 inches above the sewer line. If a sanitary sewer force main must cross a water main, the requirements of Section 6-10 shall apply.

B. Location in New Subdivision -- In new subdivisions, sewers shall preferably be located six feet south or east of street centerlines within minor and primary streets.

C. Location in Existing Streets -- When sanitary sewers are to be installed in an existing street, factors such as curbs, gutters, sidewalks, traffic conditions, traffic lane conditions, pavement conditions, future street improvements plans, and existing utilities shall all be considered. The approval of the County Highways and Bridges Division, the Water Resources Division, and the Water Quality Division shall be obtained in every instance.

D. Easements -- Permanent easements shall be a minimum of 10 feet wide for sewers up to 36 inches in diamter and ranging up to 20 feet wide for larger diameter sewers.

Temporary working easements of adequate dimensions shall be provided to allow the construction within the permanent easement to be completed in a safe and reasonable manner. Easements shall be granted to the appropriate sanitation district or, if a maintenance district is involved, to the County of Sacramento.

E. Water Well Clearance -- No sanitary sewer interceptor, trunk line, lateral, or service shall be placed nearer than 100 feet to any water well, public or private, unless the well has been abandoned in full accord with the Environmental Health Division of the County Environmental Management Department's standards, or the location

otherwise approved, in writing, by the appropriate health agencies. If a clearance of less than 100 feet is approved, all pipe within that distance from the well shall be of material approved by the Director. In no case shall a clearance of less than 50 feet be allowed.

F. Alignment -- Alignment of all sewer pipe and structures shall be designed to provide a minimum six inch clearance from all other utilities and/or improvements, unless otherwise approved by the Director.

1. Horizontal alignment shall be parallel to the street centerline wherever possible. Minimum radius for sanitary sewers 6 inches through 12 inches in diameter shall be 200 feet. A larger radius shall be used wherever practicable or where necessary to avoid joint deflection in excess of the pipe manufacturers' recommended maximum. For pipe 27 inches in diameter or larger, mitered joints, fittings, or other methods as specified in the Standard Specifications may be utilized to accomplish alignment changes.

2. Vertical alignment shall provide a constant slope between manholes. If a change in grade is necessary, construction of a manhole shall be required unless the use of a vertical curve is approved by the Director. In such case, elevations shall be shown at ten-foot intervals throughout the length of the vertical curve. This maximum deflection shall be two percent at each ten-foot interval.

7-6 TRENCH LOADING CONDITIONS AND PIPE DESIGN -- The loading condition and pipe design criteria for conduits are as follows:

A. Rigid Conduit Loading -- On rigid conduits, Marston's formula shall be used to determine the load placed on the pipe by the backfill. The procedure for rigid pipe is described in the ASCE Manual and Report of Engineering Practice No. 60, the Clay Pipe Engineering Manual, and in similar handbooks. In the absence of specific soils data, as determined by a Soils Engineer, a soil weight of 120 p.c.f. and a Ku factor of 0.110 shall be used.

B. Flexible Conduit Loading -- On flexible conduits, Marston's formula for flexible conduits as shown in ASCE Manual and Report of Engineering Practice No. 60 and in other similar handbooks shall be used to determine the load placed on the pipe by the backfill. The maximum load allowable shall be determined by pipe deflections computed by the Iowa Deflection Formula (or Spangler's Formula). In the absence of specific soils data, as determined by a Soils Engineer, a soil weight of 120 p.c.f., a Ku factor of 0.110, and a bedding constant of 0.110 shall be used. The soils reaction modulus (E') shall be estimated using a method acceptable to the Director,

and shall consider the modulus values of both the native and the bedding materials. In lieu of this, the bedding soils reaction modulus (E') used in the deflection calculation shall be 40 psi for Type I bedding and 1,500 psi for Type II bedding, utilizing imported material to twelve inches above the top of the pipe. Deflection lag factor shall be 1.5. Placement of flexible conduit within soils equivalent to Class V and types MH and CH of Class IV ASTM D2321 material will not be permitted.

C. Safety Factor -- On rigid conduits, a safety factor of 1.25 shall be used for reinforced concrete pipe, and 1.5 for all other pipe. Only the three edge bearing strength of the pipe shall be used in the computations for rigid pipe.

D. Allowable Deflection -- On flexible conduits, the maximum allowable deflection shall be 3%. Deflection shall be measured as described in Section SS 96-04 of the Standard Specifications. Computations shall be submitted showing the ability of the conduit to withstand local buckling unless the design conforms to Standard Drawing No. S-12.

E. Bedding and initial Backfill -- Bedding types and factors shall be as per Standard Drawing No. S-4. Bedding and initial backfill type shall be as necessitated by height of cover over the pipe, trench width, pipe strength, and other factors used to determine safe pipe loading. Special attention shall be given to backfill requirements for pipe located in State rights-of-way and for pipe placed in areas where trench width is excessive, such as in the vicinity of bore pits. See Section 7-12 regarding this condition. Any special backfill requirements shall be noted on the the plans.

Unless otherwise noted on the plans, bedding and initial backfill for 10-inch diameter and smaller rigid conduit shall be Type I and for 12-inch and larger Type II, with trench widths subject to limitations set forth in Standard Drawing No. S-10 and in the Standard Specifications. The minimum trench width shall be pipe O.D. plus 12 inches.

Bedding and initial backfill for flexible conduit shall by Type II utilizing imported material to twelve inches above the top of the pipe, except as permitted in Standard Drawing No. S-12. Placement of native material between springline and twelve inches above the top of pipe will not be permitted. The minimum trench width shall be pipe O.D. plus 24 inches.

Type II Alternate, III, and IV bedding and initial backfill are intended primarily for emergency field conditions. Their use shall normally not be specified on the plans and shall require specific written approval of the Director before use. Type III and IV bedding and initial backfill shall not be used with flexible pipe materials.

F. Special Pipe Strength Requirements -- Cast or ductile iron, asbestos-cement, or other high-strength pipe approved by the Director, shall be used whenever cover is greater than 25 feet or extra support strength is required. Cast or ductile iron pipe, Class 200 (DR-14) PVC pipe conforming to the requirements of AWWA C900, or other high-strength pipe approved by the Director shall be used whenever cover is less than three feet, or insufficient clearance exists between the sewer pipe and rigid or load transmitting structures.

G. Design Guide -- Tables which relate cover, pipe diameter, trench width, and bedding and initial backfill type for vitrified clay, asbestos-cement, and ABS/PVC composite pipe according to the procedures contained in these Standards, are provided on Standard Drawing Nos. S-10 and S-12.

7-7 MANHOLE CRITERIA -- The design criteria for manholes are as follows:

A. General - Manholes shall be placed at the intersections of all sanitary sewer lines, at the end of any line terminating with a cul-de-sac which has five or more lots fronting on the cul-de-sac, at the end of all permanent lines 120 feet or more in length, and at the end of any temporary line more than 200 feet in length. All manholes from which sewer line extensions are anticipated shall have a pipe stub installed at the grade and in the direction of the anticipated extension. Summit manholes connecting two sewer laterals are not acceptable.

B. Spacing -- Maximum spacing of manholes shall be 400 feet for all straight lines of ten-inch diameter or less. A line with a radius greater than 400 feet shall be considered as straight for purposes of this section. Manhole spacing on lines which are on a continuous curve of 200-foot radius (min. allowable) shall be 200 feet. Manhole spacing on curved lines of radius between 200 and 400 feet, or where only a portion of the line is curved, shall be adjusted proportionately. Reverse curves require a manhole at the point of tangency between the curves. A manhole shall be required at any change in vertical alignment, unless use of a vertical curve is approved by the Director. A manhole shall also be placed at any abrupt change in horizontal alignment, except as specified for pipe 27 inches in diameter and larger.

C. Elevation Criteria -- When two lines of the same size enter a manhole such that the flow of one must change direction by more than 20 degrees or if flow in a single line must change direction more than that amount, the invert grade at the exit must be at least 0.10 foot below that of the entrance pipe or, as a maximum, the crown of the exit pipe shall match the invert of the entrance pipe. If the pipes entering and exiting any manhole are not of the same size, the minimum invert elevation differential shall be that which occurs when

the pipes are matched crown to crown and the maximum invert elevation differential shall be based on the invert of the entering pipe matching the crown of the exit pipe. Drop connections are not governed by the above elevation requirements.

D. Construction Requirements -- Manhole construction shall conform with the provisions of Standard Drawing No. S-1. Lock-type or pressure-type manhole covers shall be used on manholes located in areas subject to flooding. Where the manhole depth is less than four feet, an 18-inch high cone, as shown on Standard Drawing No. R-25, may be used. The plans shall note that the frame on manholes located in unimproved areas shall be set 12 inches above existing ground level. Manholes for flexible conduit shall be designed such that flexing of the pipe does not result in infiltration or exfiltration at the interface between manhole and pipe. Specially designed flexible boots or integrally cast bells may be required by the Director. Pipe material which does not provide adequate bonding between pipe and manhole may similarly require special designs.

E. Connections to the Interceptor System -- Improvement plans which require a connection to a Sacramento Regional County Sanitation District interceptor or interceptor structure shall include a note specifying that the Water Quality Division Engineering Section be notified at least two working days in advance of the start of intended construction. This is necessary to allow for the special inspection procedures that will apply to such construction.

7-8 DROP CONNECTION CRITERIA -- A drop connection shall be required whenever a pipe enters a manhole higher than as specified in Section 7-7. Drop connections shall conform to Standard Drawing No. S-2. The inside drop connection shall be used for all six and eight-inch diameter laterals and services and the outside drop type for ten-inch and larger connections. There shall be no more than two inside drop connections into a four-foot diameter manhole. If an elevation difference of at least three feet is not available, the slope of the incoming line shall be increased to eliminate the need for the drop.

7-9 FLUSHING BRANCH CRITERIA -- A flushing branch may be used in lieu of a manhole at the end of any line less than 120 feet in length. A flushing branch may also be used at the end of a line less than 200 feet in length if the line extends to a subdivision boundary and if there are definite plans for its extension. If a line extends to a subdivision boundary, is planned for definite extension, and has no service sewer connections, it may be capped. Flushing branches shall conform to Standard Drawing No. S-6.

7-10 SERVICE SEWER DESIGN -- The design criteria for service sewers are as follows:

A. General - Service sewers shall conform to Standard Drawing No. S-5 and shall be constructed normal to the lateral unless otherwise approved by the Director. The service sewer shall extend from the lateral sewer to the edge of public right-of-way or edge of easement unless a water main is to be installed at back of sidewalk as part of the subdivision improvements. In such cases service is to be extended to seven feet back of sidewalk. The cleanout to grade is to remain within two feet of back of sidewalk. See Note 10 of Standard Drawing No. S-5 for cover requirements. Service sewers shall extend one foot beyond edge of pavement of any private road and easements of adequate width to accommodate the services shall be obtained. A plan and profile of any service sewer shall be supplied to the Director upon request.

The cleanout to grade that is required at the termination of service sewers shall be constructed with subdivision improvements or at the time connection is made to the building sewer. Unless otherwise noted on the plans, construction of the cleanout to grade is the responsibility of the contractor for the subdivision improvements. If installation of the cleanout is deferred, the Consulting Engineer shall indicate on the plans that a 4" x 4" post shall be placed at the end of the service sewer, extending from the flow line to not less than 12 inches above ground surface. This deferral is not allowable where water main is to be installed at back of sidewalk.

B. Sizing -- Normal service sewer size is four inches. Schools and other developments expected to contribute high sewage flows shall be served by six-inch or larger service sewers. In addition, service sewers shall be sized according to requirements of the Uniform Plumbing Code, the Water Quality Division, and determinations by the Consulting Engineer. If the service sewer and lateral are of the same size, a manhole must be constructed; if the lateral is larger than the service sewer, a factory fitting at the connection is satisfactory. Connection to trunk lines, where permitted, shall be as directed by the Director.

C. Construction by County Forces -- The Water Quality Division, upon application for permit and payment of required fees, shall construct all service sewers from existing sewers and manholes to individual residential lots and commercial, multiple residential, and industrial developments. If existing laterals and manholes are being utilized for service connections in constructing new subdivision improvements, the requirements shall apply only to County forces making the taps. A note to this effect shall be placed on any plan sheet which indicates a connection to the existing system.

D. Connection Limitations -- Service sewers shall not directly connect to 12 inch diameter or larger pipe or to lines more than 25 feet in depth without the approval of the Director.

E. Material -- If the service has less than three feet of cover measured from the gutter flowline, cast or ductile iron pipe, Class 200 (DR-14) PVC pipe conforming to the requirements of AWWA C900, or other high strength pipe approved by the Director, shall be used. In all other cases, the service shall be of the same material as the lateral to which it connects, except that ABS-DWV pipe may be connected to a VCP "T" or "Y" as shown on Standard Drawing No. S-5.

F. Location -- When sanitary sewers are constructed as part of new subdivision improvements, a service sewer shall be constructed to each lot. In new subdivisions or developed areas, unless specifically requested otherwise in writing by the property owner or Consulting Engineer, service sewers shall be placed on the low side of any typical subdivision lot or similar parcel with two percent or greater slope across the front or shall be placed in the center of lots of lesser slope. Consideration shall be given to trees, improvements, etc., so as to minimize interference when the service sewer is extended to service the house.

   If the property is located such that service is available both to a line located in an easement and also in right-of-way, service shall be to the latter location unless otherwise approved by the Director. No service sewer shall be located such that future on-site construction will result in the line being in such proximity to a water well or water main or service that applicable health standards will be violated.

G. Depth -- The Consulting Engineer shall verify the adequacy of the normal service sewer depth at the edge of easement or right-of-way to serve the intended parcel. A depth of four feet to crown of pipe, measured from existing ground surface or edge of adjacent roadway, whichever is lower, shall be considered normal service sewer depth, except under conditions stated in Note 10 on Standard Drawing No. S-5. Whenever greater depth is required, the Consulting Engineer shall designate the invert elevation of the service sewer at the edge of the right-of-way or easement on the construction plans. If a joint trench is being utilized for other utilities, the Consulting Engineer shall indicate on the plans that a joint trench will exist and shall adjust service elevations as necessary. It shall be the responsibility of the Consulting Engineer to arrange for coordination of the grade of utilities located in the joint trench and the service sewers.

H. Special Requirements in Developed Areas -- In developed areas, a service sewer shall be provided each parcel participating in the project which contains a source of sewage less than 200 feet from a

lateral. A property owner's request for service location shall be honored whenever practicable. Parcels which have two or more sources of sewage must have an independent service sewer provided each sewage source which can be separated from the rest of the parcel and sold. A service sewer shall be provided each subdivision lot or lot similar as to size and possible development. At an early stage of design, the Consulting Engineer shall send every property owner affected by the proposed work a questionnaire requesting, in writing, the owner's preferred service sewer location. In absence of a response to this questionnaire, the Consulting Engineer shall provide a service sewer as required by this Section. In addition, when service sewers are staked immediately prior to construction, each property owner shall be given notice that he should give consideration to the staked location of his service sewer and, if not satisfactory, immediately notify the Consulting Engineer. The date of notification, nature of change, and other pertinent information shall be recorded. Compilation of this information shall be the responsibility of the Consulting Engineer and the information shall be furnished to the Director upon request.

7-11 CREEK CROSSING DESIGN -- Advance approval of the Director and of other appropriate agencies is necessary prior to initiating design. The criteria for creek crossing design is as follows:

A. General -- In all cases, the proposed future creek bed elevation shall be used for design purposes. Crossing details of pipe, piers, anchorage, transition couplings, etc., shall be shown upon a detail sheet of the plans in large scale.

B. Construction and Material -- For line sizes ten inches and smaller, cast or ductile iron pipe, or other pipe material as approved by the Director, shall be used under the full creek width, plus ten feet each side, unless the pipe is four feet or more below the creek bed elevation. For line sizes twelve inches and larger, pipe used shall be as directed by the Director. Special care shall be taken to provide a firm base for the pipe bedding. The plans shall specify that all soft or organic material within the creek banks shall be replaced with select imported backfill. In addition, a layer of four-inch to eight-inch cobbles shall be placed and compacted on the top surface of the trench area for the full width of the creek. Unless otherwise directed a clay plug shall be required at the top of the pipe at the downstream side of the crossing. The plug shall be a minimum of four feet in length, shall extend the full width of the trench, and shall extend twelve inches above and below the pipe.

If the pipe must cross above the creek bed, cast or ductile iron, or welded steel pipe shall be used. Steel pipe may be cement lined and coated, fusion epoxy lined and coated, or glass lined; the Director shall approve the type of coating and lining specified, and the gauge, class, or thickness of the pipe. The Director may specify which is to be used.

Reinforced concrete piers of adequate depth shall be located as necessary for adequate support of the pipe. The pipe shall be held in cylindrical cradles, formed in the pier tops, by galvanized steel straps, with galvanized anchor bolts of adequate size. Cushion material shall be placed between the pipe, clamps, and support. The invert elevation at the point of maximum deflection of the suspended pipe shall be higher than the invert of the pipe at its downstream support.

C. Design -- Calculations shall be submitted which clearly indicate the design of the pipe and supports regarding impact, horizontal and vertical forces, overturning, pier and anchorage reactions, etc.

7-12 BORING AND JACKING REQUIREMENTS -- Where use of conductor casing is specified, the casing shall be corrugated steel pipe, reinforced concrete pipe, or welded steel pipe. The casing shall be of sufficient diameter to allow dry sand to be blown into the void between the carrier and the conductor and to allow adjustment of the carrier pipe to grade. Normally, an inside diameter six inches greater than the outside diameter of the couplings of the carrier pipe is sufficient. Welded steel conductor pipe shall have a minimum wall thickness of 1/4 inch for sizes up to and including 24 inches in diameter and 5/16 inch for sizes 27 inches to 36 inches in diameter. Corrugated steel pipe conductor shall not be less than No. 10 gauge for sizes up to 36 inches, and No. 8 gauge for diameters to 60 inches. R.C.P. conductor must be designed for the loading condition and, if jacked, the additional loading imposed by the jacking operation.

Direct dry boring of reinforced concrete pipe and of the portion of sewers and service sewers which pass beneath curbs and gutter, sidewalks, and other obstructions, up to a maximum length of 15 feet, is permissible. Six inch and smaller pipelines may be installed by wet boring where approved by the Director. Pipe material used in the small size dry and wet bores shall be cast or ductile iron pipe, or Class 200 (D-14) PVC pipe conforming to the requirements of AWWA C900. Installation and other material specifications shall conform to the requirements of the Standard Specifications.

Backfill in bore pits shall be given special attention with respect to preventing structural failure of the pipe entering or exiting the conductor, and adequate bedding and initial backfill shall be specified.

7-13 PUMP STATION AND FORCE MAIN REQUIREMENTS -- Every phase of pump station design, including force mains, shall be closely coordinated with and shall be under the direction of the Sacramento County Water Quality Division. The Water Ouality Division will make sample plan sheets available to the Consulting Engineer which will show the general layout and control system required for a typical acceptable sewage pump station. The plans shall show the testing required prior to acceptance of the pump station.

Unless otherwise approved by the Director, "fee title" shall be granted to the County or to the appropriate district for the pump station site and any access road thereto.

7-14 SEWER IMPROVEMENT PLAN REQUIREMENTS -- Plans for the construction of sanitary sewers whether in conjunction with other improvements or for a sewer project only, shall conform to the following standards, as well as other standards contained in the General and Plan Sheet Requirements of these Improvement Standards.

A. Study Map -- A study map may be required prior to review of the sewer design if there is a possibility that upstream or adjacent areas might require service through the subject property. The map should show the entire service area including upstream tributary and adjacent areas, and all other data necessary to determine anticipated sewage flows. The method of sewering the entire service area, including pipe sizes and slopes, shall be shown to the extent necessary to determine the requirements within the subject property.

B. General Requirements -- Plans for sewer improvement projects should include a layout sheet, plan and profile of each sewer line, and any necessary detail drawings. The plans must be clearly legible and conform to accepted practice with respect to drafting standards. All information which, in the opinion of the Director, is necessary for the satisfactory design, review, construction, and maintenance of a project shall be provided and, where applicable, shall be shown on the plans.

C. Layout Sheet -- All sewer improvement plans shall include an overall map which shows the project boundaries, sewer lines, manholes, flushing branches, and other important items of the work. Where pavement is to be cut in several locations, the pavement replacement requirements shall be shown on the layout sheet.

A parcel or area which benefits from and financially participates in a sewer construction project, but is not included within the project boundaries, shall have a note to this effect placed on the layout map and on the plan and profile sheet if the parcel appears thereon. Parcels which make use of those facilities may be subject to additional fees at the time of connection, if the participation has not been so noted.

D. Plan and Profile Sheets -- Sewers which are to be maintained by a District shall be shown by both plan and profile views on approved plan and profile paper. The following standards, with respect to drafting and the information to be included on the plan and profile sheets, generally apply to projects in developed areas. In new subdivisions, only the requirements which are applicable shall apply.

1. Sewer lines to be constructed shall be indicated on the profile by parallel lines spaced the pipe diameter or by a single heavy line at the pipe invert for ten-inch diameter and smaller lines only. Manholes shall also be indicated by parallel lines spaced according to scale or by a single heavy vertical line, if the sewer profile is also shown as a single line. Slope shall be printed 1/8 inch above, and preferably parallel to, the pipe line, or between the parallel lines. The length , size, and type of pipe material between each manhole shall be printed parallel to the horizontal grid lines and approximately halfway between the ground surface and pipe line. All pipe inverts at manholes and other structures shall be indicated on the profile. The invert elevations shall be printed parallel to the horizontal grid lines and shall be under scored by a line which then runs at a 45-degree angle to the corresponding pipe invert. When manholes, manholes with drop connections, flushing branches, or other appurtenances are to be constructed, the profile shall be so noted. Existing facilities shown on the profile shall be cross-hatched. Manhole identification on the plan view may be oblique. Stationing shall appear at the lower edge of the profile grid directly under the manhole.

2. In approved areas, the location of each service sewer proposed to be constructed shall be indicated on the plans by stationing, or by reference to a permanent, well-defined structure, if available. In new subdivisions, the service sewers shall be located by stationing unless the situation exists, such as at the end of a cul-de-sac, where stationing is not an adequate description of location. In such cases a dimension to a lot line may be used. The invert elevation of the service sewer at its upstream end shall be shown on the plans whenever the standard depth is inadequate to serve the property. Standard depth shall conform to the conditions set forth on Standard Drawing No. S-5.

   Improvements or lots shown on a plan sheet but served to a line shown on another plan sheet shall have the direction of service shown by a small triangle and letter "S". "As Built" plans shall also show the service sewer location measured from the nearest downstream manhole.

3. Both permanent and working easements shall be shown to scale on the plans. Easement dimensions shall be given and each easement shall be tied to both the property line and the sewer line. Each permanent easement shown on the plans shall be identified by a box or table, on the same plan sheet, which gives the property owner's name and the book and page number in which the easement is recorded. The Consulting Engineer shall provide the book and page number.

4. Indicate the limiting maximum trench width, as measured at the top of the pipe, on the plans between well-defined points of application; the pipe material and class, if more than one class is available; and the bedding-backfill type. Type I bedding, when used, and unlimited trench width, when allowed, need not be shown on the plans. If more than one combination of pipe material or class, maximum limiting trench width, or bedding type is available, a practical range of such combinations shall be shown on the plans.

5. Proposed sewer lines shall be adequately dimensioned from street centerline. If the sewer is to be located in an easement, sufficient dimensions and bearings from physical features to locate the line in the field shall be shown on the plans.

6. Gas, water, storm sewers, and all other main utility lines above or below ground shall be determined and shown on the plans with accuracy as great as practicable. The location of any utility line which is parallel to and within five feet of the sewer line or which crosses the sewer line at an angle of 30 degrees or less shall be determined with an accuracy of +/- 1.0 foot and the clearance shown on the plans. Service lines such as water and gas normally shall not be shown.

7. Trees and other objects within 10 feet of construction centerline shall have their correct location shown on the plans and the clearance from construction centerline shown. The diameter of tree trunks and interfering heavy tree branches shall be noted. Removal of a tree or object, or other special handling shall be noted on the plans. The Consulting Engineer shall assume full responsibility for such notes as it is assumed that he has made all necessary arrangements with the owner of the object to be handled. Written documentation of any special arrangements regarding preservation of property made between property owners and the Consulting Engineer shall be supplied to the Director if no easement document is involved. If an easement is negotiated, all special arrangements are to be included in the easement document. Tree removal within public rights-of-way or easements must be approved by the Director.

8. Culverts shall be shown on both plan and profile when crossed by the construction or when parallel and within 20 feet of the construction line. The size and type of all such culverts shall be indicated and when the culvert crosses or is perpendicular or nearly so and within 20 feet of the construction line, the invert of the culvert end nearest the construction line shall be shown.

9. Addresses of buildings shall be shown on the plan view, within the outline of the building. Only the front line and indication of side lines of buildings need be shown.

E. Detail Drawings -- Items of a special nature should be shown with detail drawings, either on the plan sheets, or on a separate detail sheet.

F. Connection to existing facilities where bypassing or stoppage of existing flow will be required -- When improvement plans require connection to an existing facility which will require bypassing or stoppage of existing flows, a note shall be placed on the plans which provides an estimate of the existing flow to be bypassed (in gpm), or the times between which the flow may be stopped. Coordination with the Water Quality Division Engineering Section is required in developing these numbers. The note shall also require the contractor to contact the Water Quality Maintenance Section at least 48 hours prior to initiating the bypass/stoppage operation so the temporary facilities and equipment can be evaluated for adequacy. Where the bypassing/stoppage operation will be accomplished on a major trunk or interceptor, submittal of a work plan for review may be required prior to initiation of the operation.

7-15 DESIGN OF ON-SITE SEWER SYSTEMS FOR PRIVATE MULTIPLE OWNERSHIP RESIDENTIAL DEVELOPMENTS -- The following design requirements shall apply to that portion of the sanitary sewer system within a privately owned multiple ownership development that is "on-site" and is not an outfall sewer for an upstream area, thereby being considered a private system and not subject to maintenance by County forces.

A. Planned Unit Developments and Townhouses -- Residential developments where separate lots and structures are sold. These differ from usual subdivisions in that adjacent land is owned in common and maintenance is performed by a homeowner's association.

1. General -- Sanitary sewers shall meet all requirements for public sewers contained in these Improvement Standards, except as specified below.

2. Manhole spacing -- Maximum spacing of manholes on laterals shall be 300 feet for all straight runs of pipe.

3. Wyes -- Wyes shall be used for all service sewers connecting to the "on-site" laterals. Tees as shown on Standard Drawing No. S-5 are not allowed.

4. Asbestos - Cement Pipe -- Class 1500 or Class 2000R asbestos-cement pipe may be used as the minimum pipe class instead of Class 2400 as required by the Standard Construction Specifications.

5. Minimum Depth -- All lines located within vehicular traffic areas shall have a minimum cover of three feet to finish grade. Additionally, if the cover over the pipe at any location may be

less than two feet at any time after the pipe is installed, cast or ductile iron pipe or Class 200 (DR-14) PVC pipe conforming to the requirements of AWWA C900 shall be installed.

6. Plan and Profile Sheets -- "On-site" improvement plans may be prepared without the sanitary sewer profile that is required by these Improvement Standards, unless otherwise instructed by the Director. However, the final "on-site" grades and drainage facilities must be shown on the plans on the same sheet as the plan view of the sanitary sewers. Plan sheet sizes shall be as specified in Section 3-1 of these Improvement Standards.

7. Backwater Valves -- Backwater valve requirements as specified in the appropriate sewer use ordinance shall apply to all service sewers.

8. Location -- Wherever possible, laterals shall be located in areas to be paved.

9. Review and Approval -- Plans must be reviewed and approved by the Water Quality Division of the Department of Public Works.

B. Condominiums or Cooperative Developments -- Attached residential homes where shares of the total development are sold.

The "on-site" sanitary sewers may be constructed as required by the most current edition of the Uniform Plumbing Code (UPC) adopted by the Board of Supervisors. These plans will require the approval of the Plumbing Section of the Building Inspection Division of the Department of Public Works in addition to the standard approvals required. The developer may elect the option of designing the "on-site" sanitary sewers under the requirements of Section 7-15A. If "on-site" sewers are designed in accordance with the standards for Planned Unit Developments, the plans will be reviewed and approved as set forth in Section 7-15A. Approval will be subject to compliance with those standards.

7-16 MULTI-PARCEL COMMERCIAL AND INDUSTRIAL DEVELOPMENTS -- The "on-site" sanitary sewers for all new commercial and industrial developments containing more than one parcel, shall be designed in accordance with the requirements contained in Section 7-15A of these standards unless otherwise specified by the Director, except that asbestos-cement pipe will not be allowed in such developments. Each separate parcel within a multi-parcel commercial or industrial development shall have its own separate connection to the public sewer system.

This section shall be applied to all commercial/industrial developments which are initially approved as a single parcel development and are subdivided after the date of adoption of these Improvement Standards.

SECTION 8

STREET LIGHT DESIGN

8-1 STREET LIGHTS REQUIRED -- Street lights shall be required for all lots and parcels being developed or constructed upon unless excepted by Section 8-2. In addition, street lights may be required for lots and parcels containing existing structures which are being improved or altered, depending on the nature and extent of the work. Illustrations of street lights generally required are shown on Standard Drawing TS-7.

8-2 STREET LIGHTS NOT REQUIRED-- Street lights shall not be required under the following circumstances:

A. Single family residential subdivisions having an average lot street frontage of more than 125 feet will not be required to install a street light system along the streets, but shall as a minimum, be required to install street lights at all intersections, cul-de-sacs, and other locations deemed by the Director to be essential for safety.

B. For planned developments, residential, commercial, and industrial developments where the internal streets are not offered for dedication, a street lighting system will not be required for the internal non-dedicated streets, but shall be provided by the developer on the external public street frontage.

8-3 DEVELOPER'S RESPONSIBILITY -- Existing street lights which must be relocated or repositioned as a result of the construction of new streets or driveways into a development shall be the responsibility of the developer.

8-4 UTILITY COMPANY AUTHORIZATION -- A written notice from the serving utility company, stating that line clearances and service have been checked and are adequate, shall be submitted to the Director for all developments.

8-5 GENERAL PLAN DETAILS -- The plans shall show and identify all street lights to be installed, all existing lights in the immediate vicinity of the project, all conduit and conductor runs, service points, trees, and all applicable provisions and details specified in these standards.

On subdivision plans, the street lights shall be shown separately. In addition to the above, the following shall be required on the street light portion of subdivision plans, even though duplications may be involved:

- A signature block conforming to Standard Drawing G-1
- A vicinity map or equivalent
- Utility poles and public utility easements
- Names of adjacent subdivisions
- Intersecting property lines of adjacent properties
- A legend conforming to Standard Drawing TS-7
- A North arrow and appropriate scale (1"=10' to 1"=100')
- All existing street lights on both sides of any streets

- All trees within the vicinity of the conduit runs or proposed street lights.

8-6 DESIGN STANDARDS -- Street lighting shall be designed in conformance with these specifications, the current edition of the Sacramento County Standard Construction Specifications, and the "American National Standard Practice for Roadway Lighting" of the American Standards Institute, except that the average horizontal maintained foot candles for the various street classifications shall be as shown on Standard Drawing TS-8. Data and calculations supporting the satisfaction of the above requirements shall submitted for review, or the predetermined design standards included herein shall apply.

8-7 STREET LIGHT DESIGN DETAILS -- Design details for street lights are as follows:

A. Intersections -- Intersections shall have at least one street light. Intersection street light locations and the number required shall conform to Standard Drawings TS-14 and TS-15.

B. Cul-de-sacs -- All cul-de-sacs exceeding 130 feet in length, measured from the street light location at the intersection to the right-of-way line at the end of the cul-de-sac, shall have a street light within the bulb. The location of the street light within the bulb shall conform to Standard Drawing TS-15.

C. Pedestrian Lanes -- Street Lights shall be placed at both ends of pedestrian lanes.

D. Spacing -- Maximum street light spacing, measured along the street centerline, shall conform to Standard Drawing TS-9, except on arterial and thoroughfare streets with a 1,000-foot or smaller radius horizontal curve, in which case the maximum spacing is 170 feet. Note that on Standard Drawing TS-9, light spacing for 84-foot, 108 foot, and 130 foot streets is based on a one-side arrangement. Spacing on all other streets is based on a two-side arrangement. The one-side spacing arrangement is a system whereby the street light spacing relates to the distance between street lights all on the same side of the street. The two-side arrangement relates to the distance between street lights taking into consideration the street lights on both sides of the street. The actual constructed street type and right-of-way width shall be the controlling factor for determination of street light spacing rather than the street classifications (arterial, collector, etc.).

E. Street Light Poles -- All street light poles shall be of galvanized steel, aluminum or concrete, except as provided for by Item "F" below. All pole construction and materials shall conform to the standards outlined in the Standard Construction Specifications, Section SS106-07, "Lighting Poles", and the Standard Drawings contained therein. Poles shall be identified on the plans or in the special provisions. Identification shall be by "pole series catalog

numbering procedure" as shown in the Standard Construction Specifications for galvanized steel poles, or by construction material, bolt circle diameter, luminaire mounting height, pole dimensions and length of mast arm for other approved poles.

The Director may approve special or unusual designs if warranted by the character of the surrounding neighborhood. Where special or unusual design street light poles not specified in the Standard Construction Specifications are to be used, the developer shall supply additional poles to the County for future pole replacement. The minimum number of replacement poles to be supplied to the County shall be 10% of the poles being installed with any fractional percent rounded up to the next whole number.

The position of the street light poles shall conform to Standard Drawing TS-3.

F. Street Lights on Existing Utility-Owned Poles -- Where there are permanent existing (or necessary planned) utility owned poles adjacent to the roadway, the street lights may be installed upon the utility pole in lieu of the poles required. Should the utility pole option be utilized, the following shall apply:

1. In the Sacramento Municipal Utility District (S.M.U.D.) service area, the developer shall arrange to install County-owned/utility-maintained street lights on existing utility poles in accordance with S.M.U.D. Rate 52.

2. In the Pacific Gas and Electric Company (P.G.& E.) service area, the developer shall arrange to install P.G.& E. owned and maintained street lights on existing utility poles in accordance with P.G. & E. Rate LS-1.

3. Spacing of lights shall be varied to meet locations of existing utility poles, but shall not exceed the maximum spacing specified by Standard Drawing TS-9. Street light mounting heights shall be as shown on Standard Drawing TS-9. All luminaires shall have wattages relating to the street classification requirements shown on Standard Drawing TS-9.

G. Luminaires -- The type of street light and the appropriate wattage shall be specified on the plans. The luminaires shall be high-pressure sodium type with internal ballasts. All luminaires shall conform to the standards outlined in the Standard Construction Specifications, Section SS106-08, "Luminaires".

The light pattern for each luminaire shall be specified on the plans. The light pattern for each luminaire shall be obtained from Standard Drawings TS-9, TS-14, and TS-15.

H. Service -- All street light systems shall have underground service provided. Service points shall be provided within a utility easement immediately adjacent to or within the right-of-way and shall be open and easily accessible to the street frontage. Types of service are as follows:

1. The Director may approve overhead service in unusual areas where there is reason to believe it cannot be provided underground.

2. A direct underground service consists of one or two lights being served from a single service point. The service point may be in the form of a pullbox installed by the developer or a service pedestal provided by the utility district. See Standard Drawing TS-4 for commercial and residential requirements.

3. Multiple service is three or more lights being served from a single service point installed by the developer. The service point shall be a pullbox. Multiple systems shall have a service can normally located adjacent to the service point, between the service point and the light system. The service can and details shall conform to Standard Drawing TS-2. All multiple light services shall conform to Section SS106-15, "Service", of the Standard Construction Specifications.

   Three light multiple service: Diagram A, as shown on Standard Drawing TS-13 shall be delineated on the plans to indicate only one circuit. Diagram "A" shall be used for a maximum of three lights.

   Four or more light multiple service: Diagram C or Diagram E, as shown on Standard Drawing TS-13 shall be delineated on the plans to indicate the exact number of circuits and sizes of main breakers.

I. Pullboxes -- All pullboxes, including the size, shall be shown and identified on the plans. Pullboxes shall be installed at all locations where more than two conduit runs intersect, where conduit runs are more than 250 feet long, where shown on County Standard Drawings, at critical angle points, behind each light when No. 4 A.W.G. conductors are used, and at such locations ordered by the Director. Normally a No. 3-1/2 pullbox will be allowed when three or fewer conduits of 1-1/4" or smaller size are involved. For all other situations, a No. 5 or No. 6 pullbox shall be specified.

J. Conductors -- All conductors, including quantity and size, shall be identified on the plans. Unless otherwise specified, conductors shall be single conductor, solid or stranded copper, sized in accordance with these standards and the National Electrical Code.

1. On a direct underground service, the minimum conductor shall be No. 8 A.W.G.

   No conductor shall be larger than No. 4 A.W.G.

2. On multiple service, the minimum conductor size from the service point to the service can shall be No. 8 A.W.G. The size of each conductor from the service point to the luminaires shall be such that the voltage drop along each circuit will not exceed 7% for 2-wire systems and 6% for 3-wire systems of the nominal service voltage to the farthest luminaire. The nominal service voltage to be used is 115 volts. Calculations shall be submitted substantiating the design criteria for every circuit. Calculations shall also be submitted showing the total load in amperes of each circuit at the service can. See Standard Drawing TS-10 or TS-11 for typical calculations.

   Wiring Diagram "A" and "C" shall be used for 2-wire systems and Wiring Diagram "E" shall be used for 3-wire systems as shown on Standard Drawing TS-13.

   In lieu of the submission of design criteria calculations, the conductor size and the circuit breaker amperage may be obtained from Standard Drawings TS-10, TS-11, and TS-12.

Where only one photo cell is required in a multiple service system, it shall be connected to the service can with three No. 14 A.W.G. conductors.

K. Photo Cell -- A single photo cell receptacle shall be provided on the luminaire nearest to the service point for multiple service containing four or more lights. All other light systems shall have a photo cell in each luminaire.

L. Conduit -- All conduit runs, including the size, shall be shown and identified on the plans. The conduit size shall be determined using Standard Drawing TS-12 as a guideline, with the minimum size being one-inch diameter conduit.

For a system designed using the 3-wire principle, only 2 circuits (one set of 3 wires) shall be allowed in any conduit. Circuits based on the 2-wire principle and the 3-wire principle shall not be mixed in any conduit. All circuits may, however, be mixed in the same conduit from the service can to the first pull box.

The design may include more than two circuits in a conduit if the conductors for each circuit (2-wire) or set of circuits (3-wire) are identified by conductor insulation which is a solid color or a basic color with a permanent colored stripe. The identification stripe shall be continuous over the entire length of the conductor.

M. Electrical Equipment and Work -- Control and switching equipment and fusing of all circuits shall meet the requirements of the National Electrical Code, the Basic Electrical Regulations, Title 24, Part 3, of the California Administrative Code, the rules of the National Board of Fire Underwriters, and the County of Sacramento.

8-8 MASTER PLANNING -- Master planning is the determination of street light locations between control points. Control points are proposed street light locations at street intersections in accordance with Section 8-8 and Standard Drawings TS-9, TS-14, and TS-15, and existing street lights. The purpose of master planning is to establish an overall uniform street light system meeting minimum requirements. On 84-foot, 108 foot, and 130 foot streets, master planning shall apply to only one side of the street. On all other streets, master planning shall apply to both sides of the street. The procedure for master planning is outlined as follows:

A. Identify the nearest intersections each way from the street light locations being planned. Determine the location of the street lights at the intersections in conformance with the design standards in Section 8-8 above.

B. Identify any existing street lights situated between the intersections.

C. Determine the distance between the adjacent designed intersection street lights and/or adjacent existing street lights, whichever are nearest to the street light locations being planned.

D. Divide the distance into equal spaces between lights not to exceed the maximum spacing requirements specified in Section 8-8 above.

E. Compare the light locations to intersecting property lines, driveways, pedestrian lanes, and other obstructions as follows:

1. If the location falls close to a property line and it can be adjusted to the property line while staying within the maximum spacing allowed, then the adjustment should be made.

2. Generally, street lights should be situated at intersecting property lines for residential lots and parcels with minimal frontage (75 feet or less). The light spacing may have to be unbalanced, with additional lights being added to attain this and still comply with the maximum spacing allowed.

3. Street light locations shall be adjusted to miss driveways, existing utility poles, and other obstructions by five feet.

F. Where utility-owned poles with overhead electric power lines are existing, the serving utility company shall be contacted to determine if the street lights can be installed on the poles. When a street light location falls within 25 feet of an existing electric power

pole, arrangements should be made for the utility company to install the light on their pole. See Section 8-8(F).

G. Street light locations on 84-foot, 108-foot, and 130-foot streets should be adjusted, when possible, to obtain a more uniform light distribution if there are existing street lights on the opposite side of the street.

SECTION 9

GRADING

9-1 GENERAL REQUIREMENTS -- Grading shall confirm to Sacramento County Code Chapter 16.44 and the Uniform Building Code, except as modified by these Improvement Standards.

9-2 PLAN SHEET DETAILS -- In addition to the requirement of Section 3, the following items shall be included on grading plans:

A. Slope symbols for 3:1 slopes or steeper.

B. Ridge and/or valley delineation.

C. Typical lot grading details.

D. Proposed spot and/or pad elevations.

E. Flow directional arrows (off-site, around perimeter of development when adjacent to developed areas) and perimeter elevations at the property line.

F. Existing spot elevations and/or contour lines on-site and off-site around perimeter of development. Where the existing terrain is not relatively flat, contour lines shall be mandatory. The spot elevations or contour lines shall be extended off-site for a minimum distance of 50 feet (flat terrain -- 100 feet minimum) when adjacent to undeveloped areas.

G. Existing trees (variety, size and elevation at base of all trees nine inches or larger).

H. Retaining wall details (symbols, construction details and limits).

I. Back of sidewalk elevations.

J. Storm drainage system.

K. Typical sections across side yard property lines where the difference in finish pad elevations exceeds two feet. Delineated on the section shall be the side yard drainage scale and the minimum distance between the proposed building and the side yard property line.

L. Names of adjacent subdivisions.

M. Off-site intersecting property lines.

N. Signature block for certification of pad elevations by Consulting Engineer for all projects.

O. For all export projects:

1. Location of spoiled disposal
2. Spoil slopes to be 3:1 or flatter
3. Finish spoil heights to be less than 3'
4. No spoil within 5' of property lines
5. Spoil shall not block drainage
6. Spoil shall be levelled prior to acceptance of project.

P. Silt retention details as necessary if construction may extend into or through the raining season (October 1 to April 15).

9-3 ROLLING TERRAIN GRADING -- Grading of rolling terrain shall be accomplished in a manner whereby the effect of the rolling terrain is maintained as close to that which exists as practically possible. Every effort shall be exerted to keep grading of rolling terrain to an absolute minimum.

9-4 BOUNDARY GRADING -- Special attention shall be given to grading adjacent to the exterior perimeter property line of a development. All adverse effects to off-site properties adjacent to new developments shall be reduced to an absolute minimum. Fills and cuts adjacent to the exterior perimeter property line shall be designed in accordance with the following:

A Fills -- Fills in excess of one foot shall not be allowed without adequate justification and approval by the Director.

When fills are unavoidable, they shall conform to Standard Drawing G-2 and shall be constructed in the following manner:

1. If possible, fill slopes shall be constructed off-site, with the property line being situated at the top of the fill.

2. A right of entry shall be required for all off-site fills prior to plan approval.

The following note shall be placed on the plans: Right of Entry obtained from (name) on (date).

3. In lieu of off-site slopes, retaining walls, 5:1 slopes or flatter, or combinations thereof may be utilized on-site.

B. Cuts -- Cuts shall be constructed in accordance with Standard Drawing G-3, except that the slope setback from the property line to the slope hinge point shall be a minimum of 2 feet for all slopes steeper than 5:1.

C. Fences -- When fences are required, they shall be placed within 1.0' of the property line. The height of a fence shall be measured from the highest ground adjacent to the fence, regardless of the side that is developing.

9-5 INTERIOR GRADING -- Differences in elevations across interior property lines within a development, such that slopes or retaining walls are required, shall conform to Standard Drawing G-3 and the following:

A. Property Lines -- Property lines shall be situated at the top of fill and cut slopes. It is desirable that surface flow does not drain onto new slopes steeper than 5:1. Grading shall be such that surface runoff will not be concentrated at the top of slopes, but will be allowed to sheet flow down the slopes.

Property lines shall be situated at the top sides of retaining walls with a minimum setback of 1.0 foot from the property line to the retaining wall. See Standard Drawing G-4.

B. Slopes -- The maximum earth slopes allowed shall be 2:1 (horizontal to vertical) and the minimum shall be 1%. Minimum asphalt concrete surface slopes shall be 1% and minimum cement concrete slopes shall be 0.25%. All proposed slopes that are 3:1 or steeper shall be shown on the plans by some type of slope symbol delineation.

C. Cross Lot Surface Flow -- Grading of residential or duplex lots shall be such that surface flow shall be restricted to a maximum of one lot flowing across another lot. Developments with situations that mandate grading which allows more than one lot to drain across another lot shall be required to provide a pipe system to maintain the one-lot rule. Any deviation from the above shall receive specific approval by the Director.

D. Lots on the low side of streets at sag points shall be graded in such a manner as to preclude flooding of the building pad area in the vent of malfunction or overloading of the street drainage system. At such locations post and beam construction will be required where the building pad is less than 1.0 feet above the street centerline.

E. Commercial developments shall not be allowed to "sheet drain" more than fifty feet of site frontage to a public street.

9-6 RETAINING WALLS -- Retaining walls, including limits, heights and construction details, shall be shown on the development plans. Design calculations signed by the Consulting Engineer and including the registration number shall be required for all walls exceeding 36 inches in height or when a fence is an integral part of the wall.

Redwood retaining walls shall conform to Standard Drawing G-4 as a minimum design. Contrary to the above, construction details of redwood retaining walls on the plans shall not be required when reference to Standard Drawing G-4 is made. When fences are to be constructed atop redwood retaining walls, 4" x 6" posts at 4' centers shall be used. All 4" x 6" posts shall extend above the retaining wall and act as fence posts. Alternate designs meeting UBC standards will be considered.

Wood retaining walls shall not be allowed adjacent to street rights of way except as approved by the Director.

All retaining walls within 8 feet of the property line and exceeding 2' in height shall be either concrete or masonry.

Grading shall be such that on-site runoff, other than side slope areas, will not flow over wood retaining walls.

Where pads on adjacent lots are 10' apart and the difference in elevation exceeds 2.5', a retaining wall will be required as per Standard Drawing G-4.

9-7 GRADING AT TREES -- Grading near trees shall be in accordance with the following:

A. Grading under trees with aesthetic value (trees with a 9-inch diameter trunk or larger, measured 4-1/2 feet above the ground, in healthy condition, and all oak trees) shall be given special attention. Every reasonable effort shall be made to avoid removing trees or creating conditions adverse to the tree's health.

B. The natural ground within the drip line of trees, especially oak trees, shall remain as undisturbed as possible. Grading within the drip line of oak trees will not be permitted without adequate justification and approval by the Director.

C. Trees with a 9-inch or larger trunk diameter that are questionable as to health, safety, or aesthetic value shall be reviewed by the County Tree Coordinator. If a tree is found to be not worthy of saving, the Director can approve its removal.

D. Cross sections may be required where trees are located adjacent to roadways, new slopes or critical areas. In addition, a dimension from the face of a tree to some critical point or line may be required.

E. The following comments regarding oak trees shall be included on all improvement plans where oak trees are to be saved:

1. Only those oak trees marked with an "X" are to be removed during construction. (A Tree Removal Permit is required for removal of any oak tree with a 6-inch diameter trunk or larger, measured at 4-1/2 feet above the ground.)

2. During construction, there shall be no grading, trenching, earth removal or addition, building pad formation or earth alteration of any kind within the drip line of any oak tree not marked with with an "X."

3. Prior to the construction phase of the project, a physical barricade shall be erected and maintained coincidental to the drip lines of all oak trees not marked with an "X". Within this barrier no construction related activities shall be allowed including but not limited to vehicular parking or material storage. The physical barricade shall be T-bars and 4 foot high hogwire fencing.

F. The following oak tree development control measures shall be incorporated into all grading, utility, and development plans:

1. No grade cuts greater than 1 foot shall occur within the driplines of oak trees, and no grade cuts whatsoever shall occur within 5 feet of their trunks;

2. No fill greater than 1 foot shall be placed within the driplines of oak trees and no fill whatsoever shall be placed within 5 feet of their trunks.

3. No trenching whatsoever shall be allowed within the driplines of oak trees. If it is absolutely necessary to install underground utilities within the driplines of an oak tree, they shall be either bored or drilled.

4. Paving within the driplines of oak trees shall be stringently minimized. When it is absolutely necessary, porous paving material such as turfstone, interlocking pavers, or other material specifically approved by the Director shall be used and no paving shall occur within 5 feet of their trunks.

Piped aeration systems can be used, as an alternate to porous paving material, only when the paving material is installed within 6 inches from the original ground elevation. The piped aeration system shall not be installed any deeper than 1 foot from the original ground elevation. The piped aeration system shall be approved by the County Tree Coordinator prior to construction.

9-8 CERTIFYING PAD ELEVATIONS -- Upon completion of the grading and prior to acceptance of the subdivision improvements by the County, the Consulting Engineer shall verify the final pad elevations. The elevations shall be verified at the center and the corners of each pad. Elevation deviations or more than 0.20 feet shall be noted on the tracings.

A signature block, certifying that final graded elevations in the field are the same as those shown on the plans, shall be included on the tracings of the subdivision grading plans. The Consulting Engineer shall sign the signature block, certifying to the above, and shall provide three sets of record (as-built) grading plans to the Director.

9-9 MAINTENANCE OF ACCESS TO UTILITY FACILITIES -- Continuous, suitable access shall be maintained during all stages of construction to any facility owned or operated by a utility/district providing essential services, i.e. sanitary sewer, water, drainage, electricity, gas, telephone, etc.)

SECTION 10

SOUND BARRIER DESIGN

10-1 LOCATION REQUIREMENTS -- Sound barriers may be required along the rear and side property lines of residential developments adjacent to freeways, major highways and other ground level noise elements in order to achieve the noise control objectives of the Sacramento County Noise Element and Noise Ordinance.

10-2 SOUND STUDY -- When it appears to the Director that a sound barrier may be necessary or when a sound barrier is a condition of development, a sound study prepared by an Acoustical Consultant shall be submitted to the Department of Community Health before the improvement plans will be approved by the Director. The sound study shall include a recommended height and termination points for the sound barrier including all backup material leading to the recommendations.

10-3 DESIGN -- The sound barrier shall be designed to obtain a 60 LDN at the affected property line or as required by the Department of Community Health. A list of approved sound barriers is available from the Department of Public Works.

The Director may approve new sound barriers upon request. The request shall include plan details and calculations prepared and signed by an appropriate Consulting Engineer.

Sound barriers shall be designed for a minimum longevity of 30 years.

Sound barriers normally will not be allowed within public rights of way when installed as a condition of the development or as an option of the builder. The Director may allow certain sound barriers to be within the public rights of way with an encroachment permit. Normally, if 2 feet or less of public street right of way is available, no permit will be granted.

10-4 PLAN REQUIREMENTS -- All construction details for sound barriers, including the locations and limits, shall be shown on the site improvement plans.

SECTION 11

SURVEY MONUMENTS

11-1 SURVEY MONUMENTS, SUBDIVISIONS -- The Consulting Engineer shall place survey monuments at the following locations within the improvements:

A. At the intersections of all street centerlines.

B. At the beginning and end of all curves on the street centerlines.

C. At all subdivision boundary corners designated by the Director and such other locations so as to enable any lot or portion of the improvement to be retraced or located.

D. The above described monuments shall be as follows:

1. Subdivision boundary monuments, except those in street pavement, shall be not less than 1-1/4 inch galvanized iron pipe, 30 inches in length, capped and tagged.

2. Subdivision boundary monuments in street pavement shall be not less than 3/4 inch galvanized iron pipe, 18 inches in length. Top of pipe shall be driven flush with surface pavement.

3. Centerline and street intersection monuments shall be 3/4 inch galvanized iron pipe or No. 4 reinforcing bar, not less than 12 inches in length. Top of the pipe or bar shall be driven flush with pavement surface.

4. All such monuments shall be referenced to permanent objects located nearby and all ties shall be furnished the Director for general public use. Final approval of the subdivision will not be made until such ties have been furnished to the Director.

E. Survey monuments shall be placed by the Consulting Engineer at all section corners, quarter corners and centers of sections within the improvement, and off-site, due to deed dependency, as required by the County Surveyor. The section corner, quarter corner, and centers of sections monuments shall be Class "B" concrete, poured in place, with minimum dimensions of 8"x8"x36". Ferrous material shall be placed in the monument to make it locatable with a magnetic locater.

A metal survey plate will be furnished by the County Surveyor and installed by the Consulting Engineer before the concrete has acquired its initial set and shall be firmly embedded in the concrete. As an alternate monument, a 2" galvanized iron pipe, not less than 24" in length shall be placed in paved areas, and 48" in length in unpaved areas. If the 2" galvanized iron pipe alternate is used, the metal plate shall be embedded in epoxy or concrete poured in the pipe.

Survey monument boxes shall be provided and placed by the Consulting Engineer at all quarter corners and section corners located within ultimate rights-of-way. Survey monument boxes shall be cylindrical with at least a 9-inch inside diameter, a minimum 12-inch height and shall have interlocking rings suitable for traffic situations.

F. The Consulting Engineer shall place a note on all construction plans stating that the Contractor is responsible for the protection of all existing monuments and other survey markets.

REFERENCES

* Sacramento County Standard Construction Specifications
  County Administration Building
  Cashier Office, Room 305
  827 - 7th Street
  Sacramento, CA 95814

* Sacramento County Improvement Standards
  County Administration Building
  Cashier Office, Room 305
  827 - 7th Street
  Sacramento, CA 95814

* Sacramento County Codes
  County Administration Building
  Survey, Information and Permits, Room 304
  827 - 7th Street Sacramento, CA 95814

* State of California Standard Specifications
  State of California
  Department of Transportation
  6002 Folsom Boulevard
  Sacramento, CA 95819

* Ordinance #1 Sacramento County Water Agency
  County Administration Building
  Survey, Information and Permits, Room 304
  827 - 7th Street
  Sacramento, CA 95814

* Cal. Adm. Code Title 8 Ch 4 Sub 20
  State of Calif; Documents Section
  P. O. Box 20191
  Sacramento, CA 95820

* State of Calif. Design Manual
  State of California
  Department of Transportation
  6002 Folsom Blvd.
  Sacramento, CA 95819

* California Standard Plans
  State of California
  Department of Transportation
  6002 Folsom Boulevard
  Sacramento, CA 95819

* Environmental Protection Agency Drinking Water Regulations
  U. S. Environmental Protection Agency
  Region IX, 100 California Street
  San Francisco, CA 94111

* Laws Standards of the State of California Relating
to Domestic Water Supply
State of California
Department of Public Health
Berkeley, CA 94704

* General Order #103 of the Public Utilities Commission
California State Public Utilities Commission
340 McAllister Street
San Francisco, CA

* Insurance Services Office Grading Schedule for
Municipal Fire Protection
for Determination of Required Fire Flow
Insurance Services Office
Public Protection Grading
160 Water Street
New York, New York 10038

* County of Sacramento Master Drainage Plan, Part I
County Administration Building
Survey, Information and Permits, Room 304
827 - 7th Street
Sacramento, CA 95814

* American National Standard Practice for Roadway Lighting
American National Standards Institute
1430 Broadway
New York, NY 10018

* National Electric Code
County Administration Bldg.
Cashiers Office, Room 305
827 - 7th Street
Sacramento, CA 95814

* Basic Electrical Regulations Cal. Ad. Code Title 24, Part 3
State of California Document Section
P. O. Box 20191
Sacramento, CA 95820

* Uniform Building Code
County Administration Building
Cashier Office, Room 305
827 - 7th Street
Sacramento, CA 95814

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

APPROVED: _____ _____
STREET LIGHTS DATE

SUBDIVISION STREET LIGHT PLANS

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

APPROVED _____ _____
ENCROACHMENT DATE

APPROVED _____ _____
STREET LIGHTS DATE

ENCROACHMENT PLANS

REVISIONS	NO.	DESCRIPTION	COUNTY APPROVAL	
			APPROVED BY	DATE

See notes ① & ②

1" min. ½" min.

PLAN REVISION

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

COUNTY PLAN APPROVAL:

PLAN & INSPECTION FEE			DRAINAGE FEE	
STREETS	GRADING	SEWER	LIGHTING/SIGNALS	DRAINAGE

IMPROVEMENT PLANS

ENCROACHMENT APPROVED BY:

_____ _____
SACRAMENTO COUNTY DATE

APPROVED BY:

_____ _____
NAME OF FIRE DISTRICT DATE

APPROVED BY:

_____ _____
NAME OF IRRIGATION DISTRICT DATE

SUBDIVISION WATER DISTRIBUTION PLANS

① *To be placed adjacent to signature block on title sheet.*

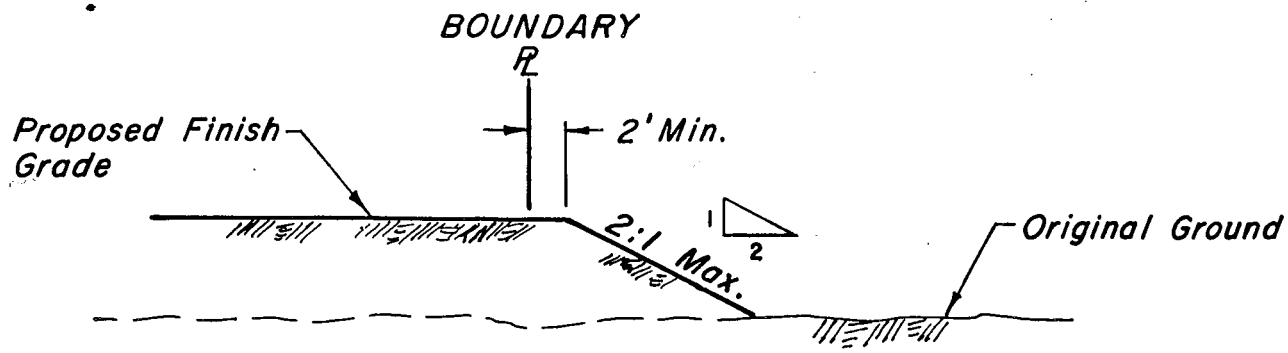
② *To be placed on all sheets which include the revision.*

Douglas M. Wadsworth
DIRECTOR

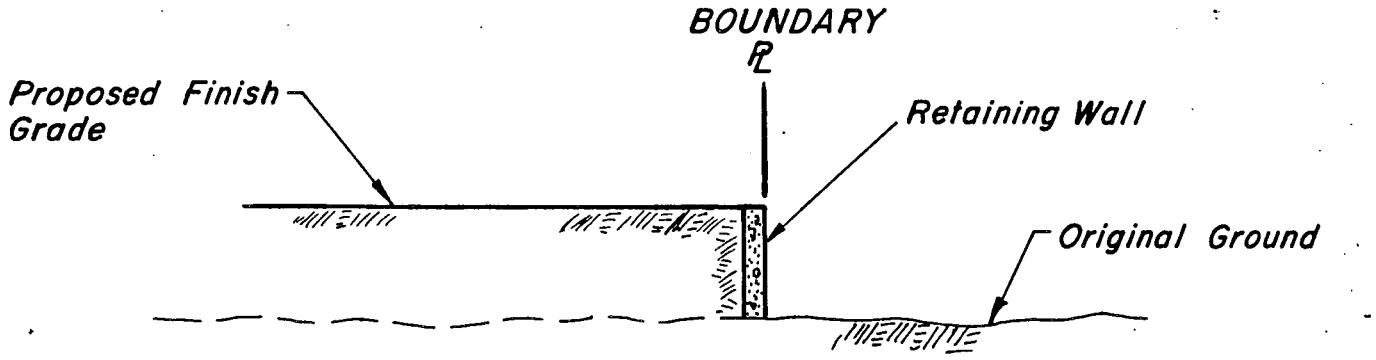
SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

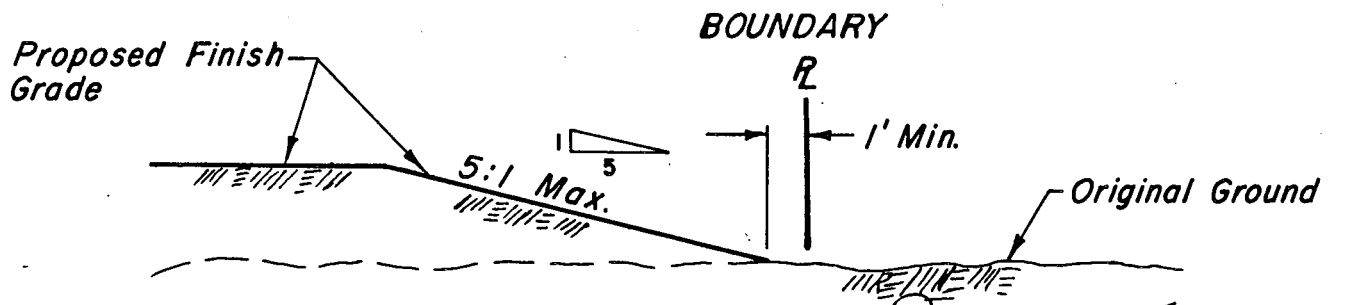
SIGNATURE BLOCKS

SCALE: *NONE* DATE: *3-89*	DRAWN BY: *R.N. & B.F.*	G-1



MOST DESIRABLE





LEAST DESIRABLE

DIRECTØR

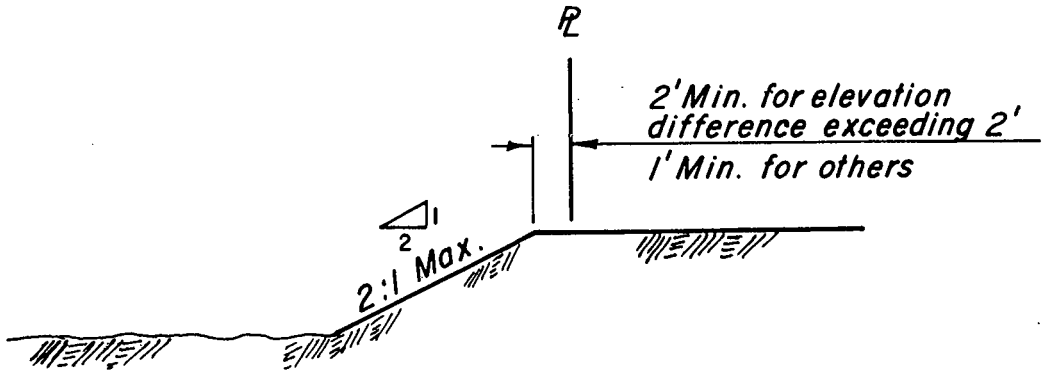
NOTE: See S.D. G-3 for cuts adjacent to exterior perimeter property lines.

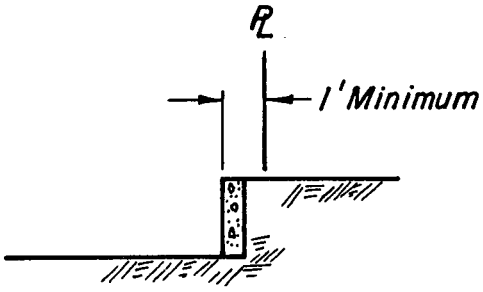
SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

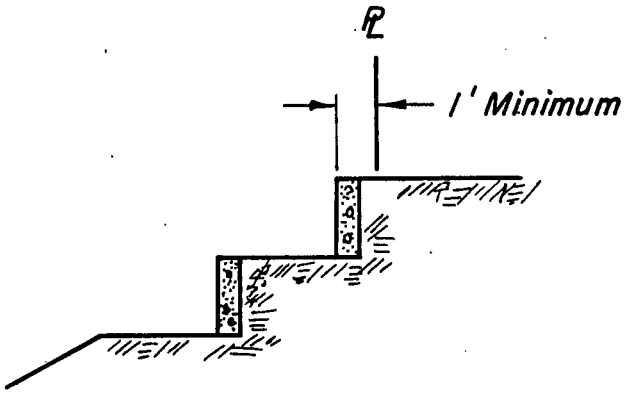
EXTERIOR PERIMETER PROPERTY LINE GRADING

SCALE: NONE
DATE: 3-89
DRAWN BY: R.N. & B.F.

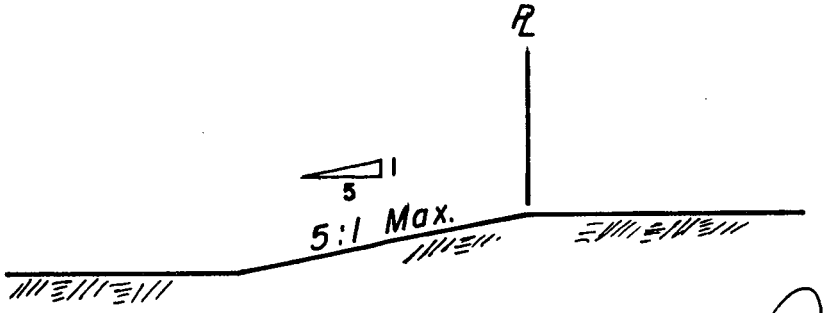
G-2







RETAINING WALLS



DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

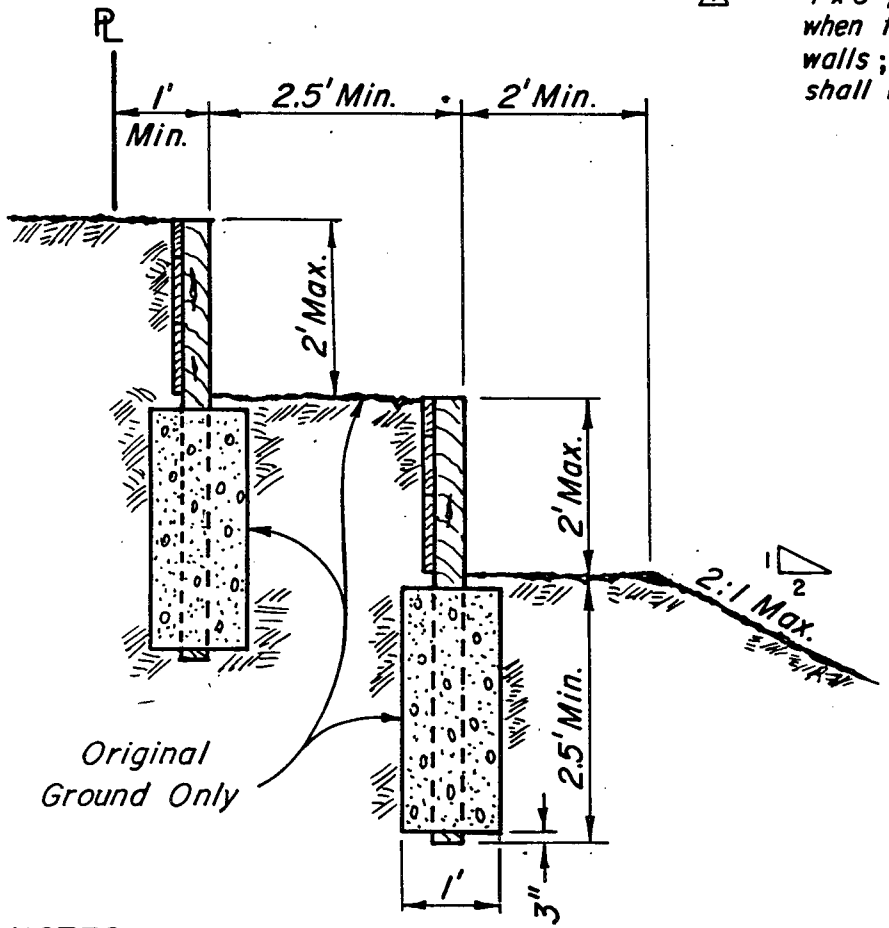
INTERIOR
PROPERTY LINE GRADING

SCALE: NONE
DATE: 3-89
DRAWN BY: R.N. & B.F.

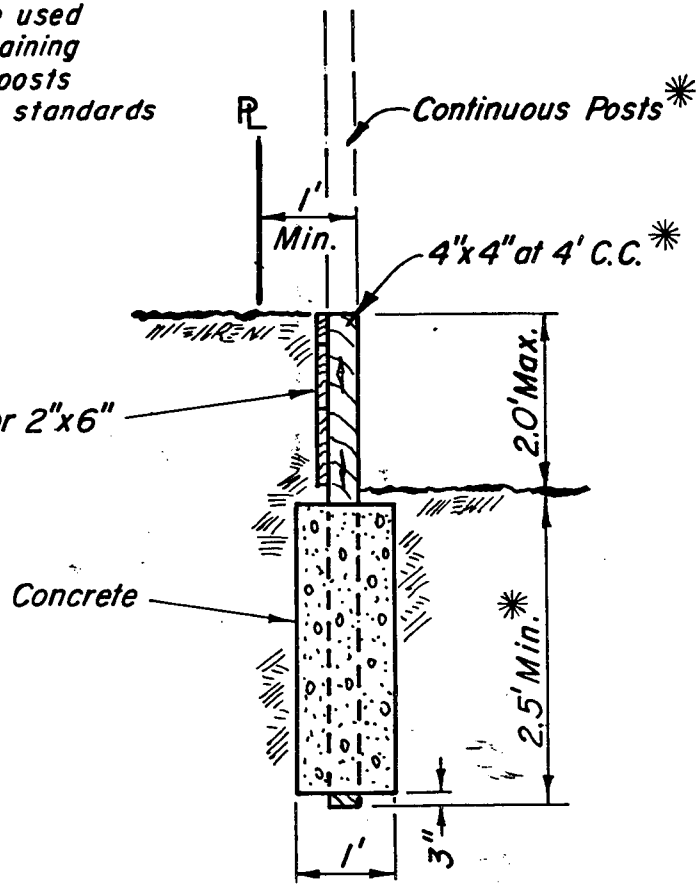
G-3

NOTE:

1. Use for cuts adjacent to boundary or exterior perimeter property lines.
2. ⚠ No double retaining walls to be constructed on side yards for lots to be in conformance to FHA standards.



⚠ ✳ 4"x6" posts at 4' centers shall be used when fences are attached to retaining walls; Minimum embedment for posts shall be 3.0'. — meets U.B.C. standards



NOTES:

1. Material for Wooden Walls shall be Redwood.
2. All Wooden Materials shall be Grade No. 2 or better with no open grain Material allowed.
3. Wooden Walls shall not be used adjacent to Street Right of Ways.
4. Concrete, Concrete Block and other Wall Details to be determined on Individual Basis.
5. A Building Permit shall be obtained for all Retaining Walls exceeding 36 inches in height, when construction details are not shown on approved improvement plans.
6. All walls over 24" in height and within 8' of a property line are required to be of masonry construction.

Douglas M. Shoemaker
DIRECTOR

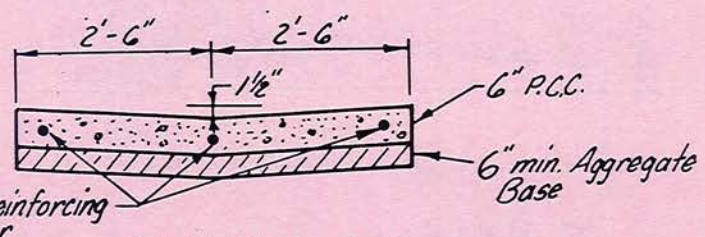
SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

RETAINING WALL DETAILS

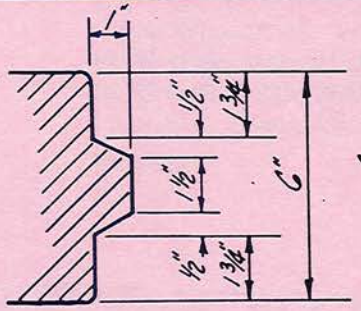
SCALE: NONE
DATE: 10-88
DRAWN BY: R.N./M.T.

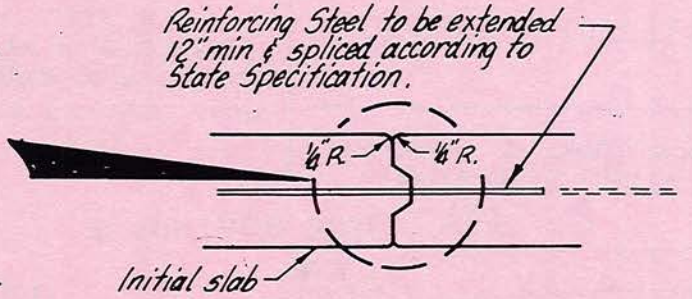
G-4

⚠ REV 1-80

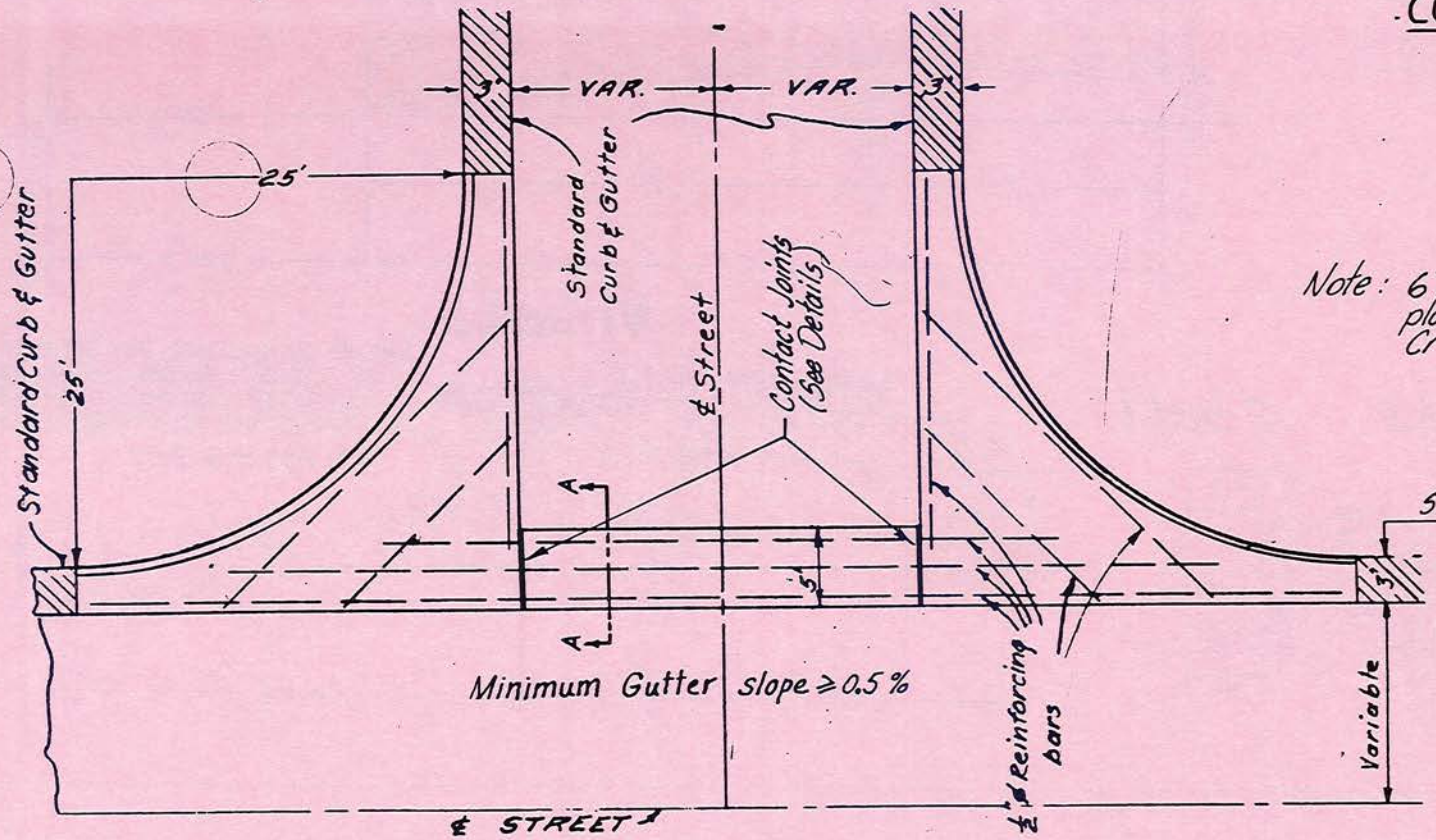


SECTION A-A





CONTACT JOINT DETAIL



Note: 6" min Aggregate base to be placed within limits of Cross Gutter.

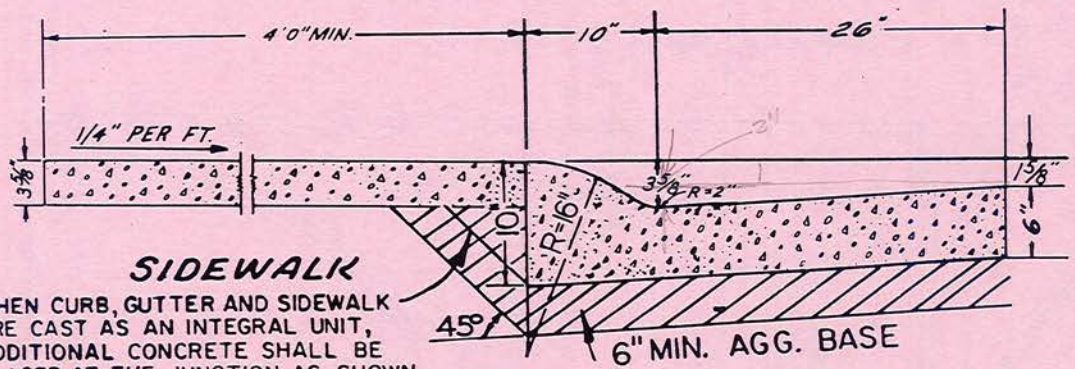
Dan Fenton
DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

• CROSS GUTTER

Scale: NONE
Date: 5-87
Drawn By:

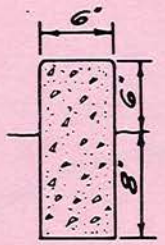
H-1



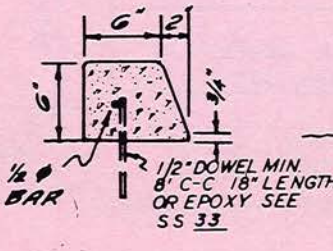
SIDEWALK

WHEN CURB, GUTTER AND SIDEWALK ARE CAST AS AN INTEGRAL UNIT, ADDITIONAL CONCRETE SHALL BE PLACED AT THE JUNCTION AS SHOWN

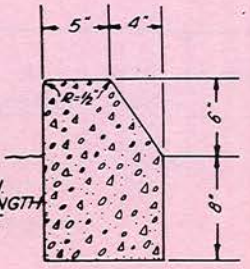
TYPE 1A



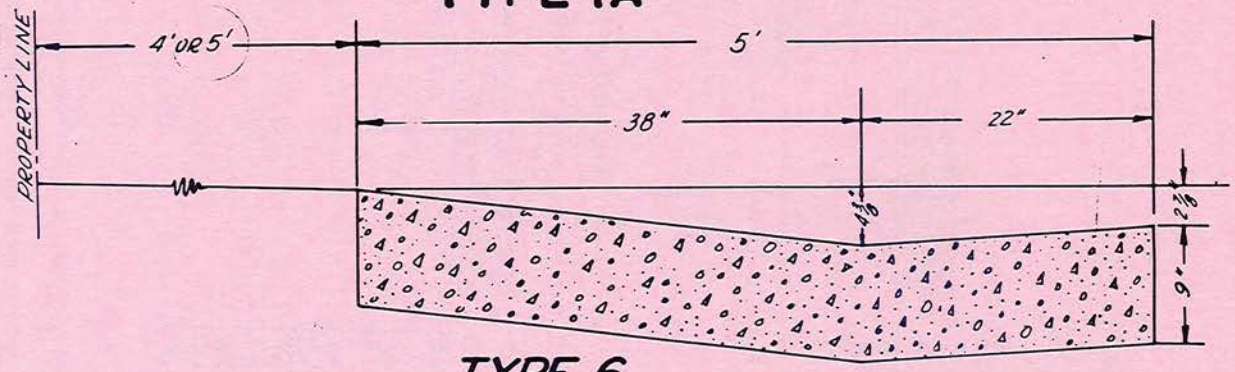
TYPE 3



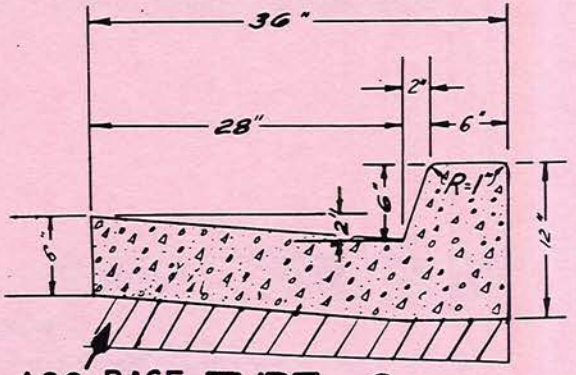
TYPE 4



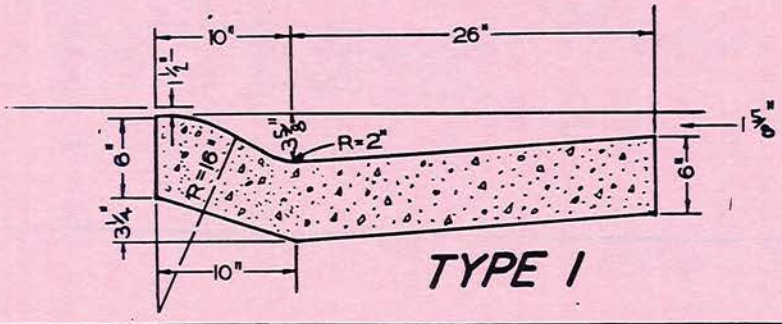
TYPE 5



TYPE 6



6" MIN. AGG. BASE **TYPE 2**



TYPE 1

NOTES:

LOCATE ½" TRANSVERSE EXPANSION JOINTS OF ASPHALT IMPREGNATED CELOTEX IN SIDEWALK, CURB AND GUTTER AT 20' INTERVALS.

ALL CONCRETE TO BE CLASS "B".

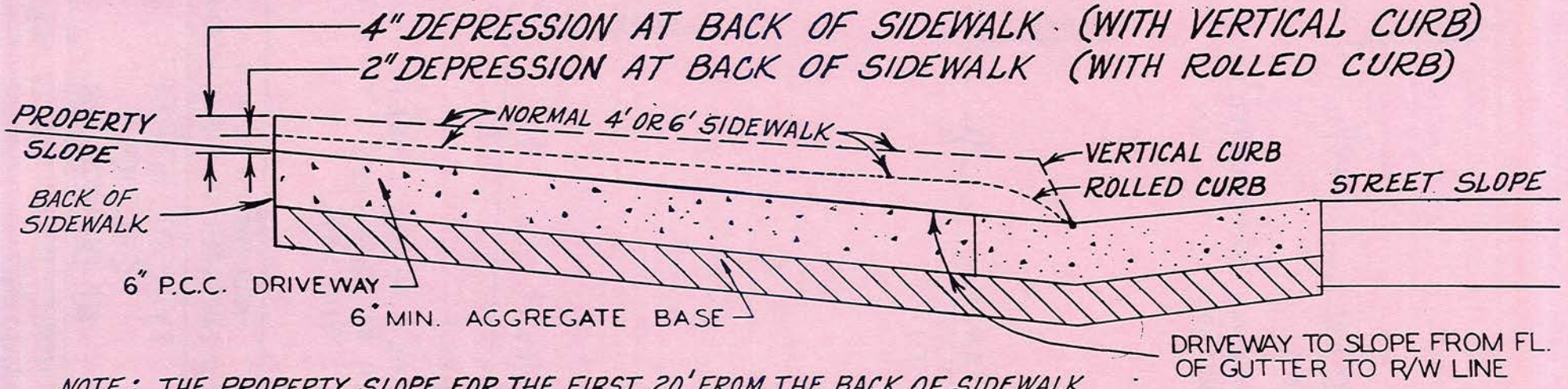
Dan Fruchtenicht
DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

CURBS & GUTTERS

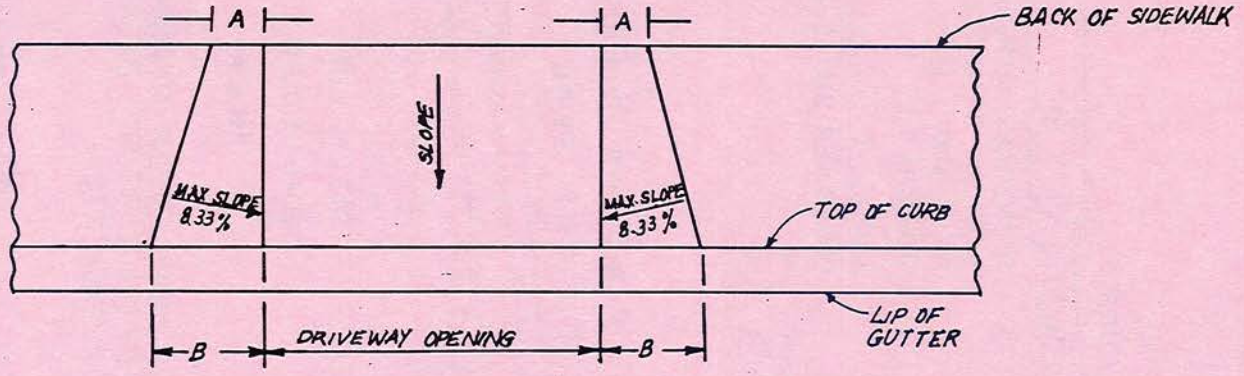
Scale: NONE
Date: 5-87
Drawn By:

H-2



NOTE: THE PROPERTY SLOPE FOR THE FIRST 20' FROM THE BACK OF SIDEWALK MUST BE DESIGNED SO THAT THE ALGEBRAIC DIFFERENCE OF THE PROPERTY SLOPE AND STREET SLOPE WILL NOT EXCEED 7% WITH VERTICAL CURB AND 10% WITH ROLLED CURB. IF PROPERTY SLOPE IS NEGATIVE, IT IS NOT TO EXCEED 5% FOR THE FIRST 20' FROM THE BACK OF SIDEWALK.

TYPICAL DRIVEWAY SECTION



CURB TYPE	TRANSITION A	TRANSITION B
ROLLED	2'	4'
VERTICAL	4'	6'

NOTE: FOR CURB HEIGHT OTHER THAN STANDARD, THE MAXIMUM 8.33% SLOPE CONTROLS TRANSITION LENGTH A AND B.

DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

COMMERCIAL DRIVEWAYS
TYPE A-6

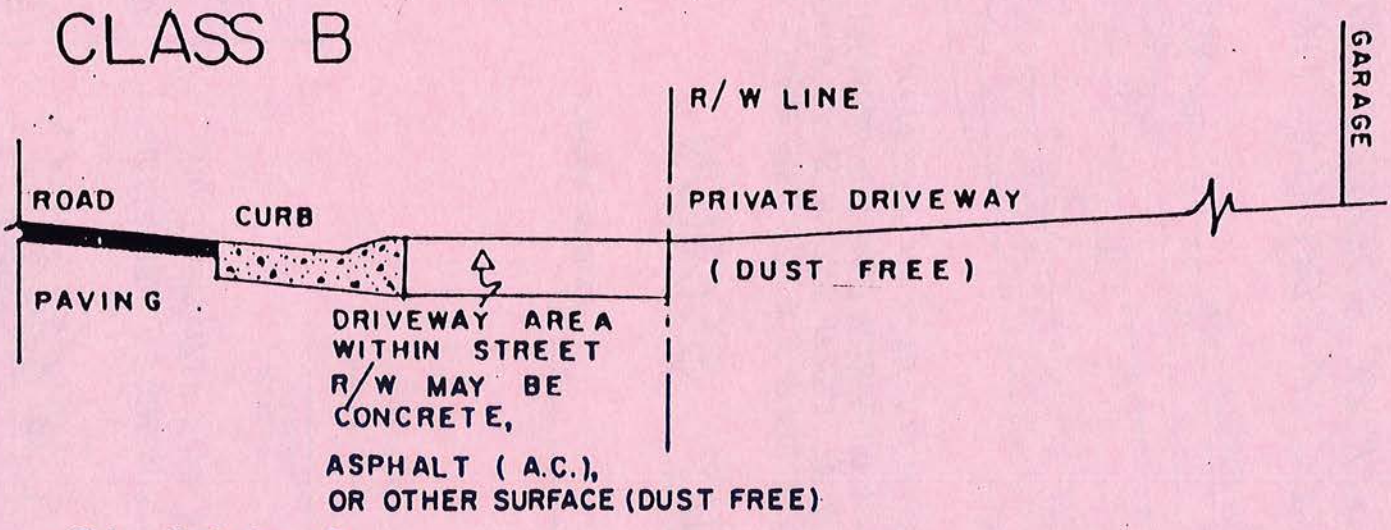
Scale: NONE
Date: 7-88
Drawn By: D.I.R.

H-3

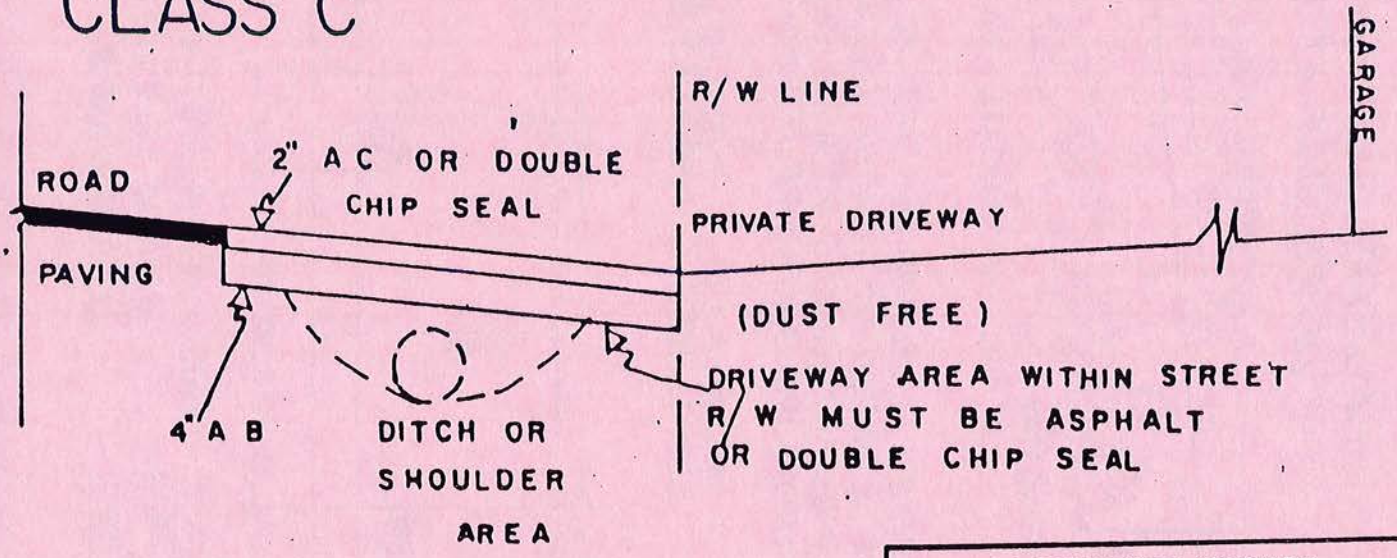
5H

CLASS A

CLASS B



CLASS C



NOTE: SEE IMPROVEMENT STANDARDS SECTION 4-27 FOR DRIVEWAY REQUIREMENTS.

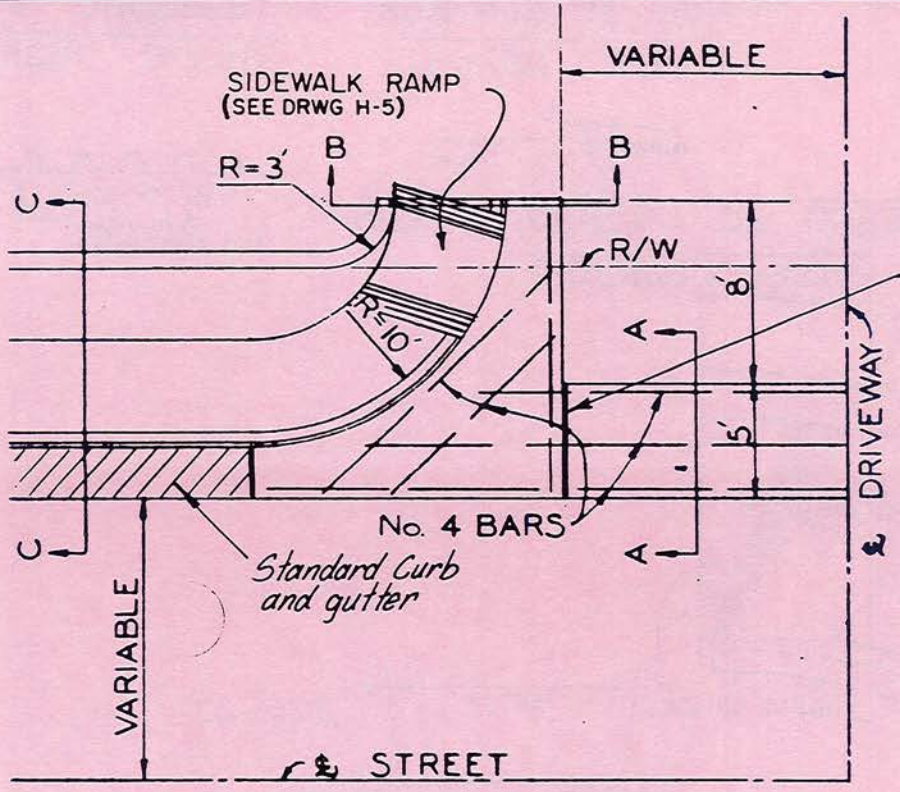
Del Paulsen
DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

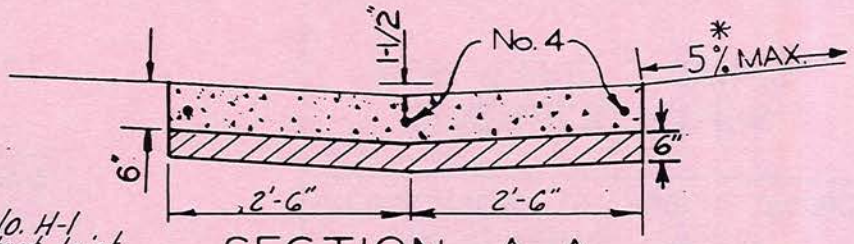
TYPICAL STREET SECTIONS AT DRIVEWAYS

DRAWN BY: M.T.
SCALE: NONE
DATE: 1-89

H-3A



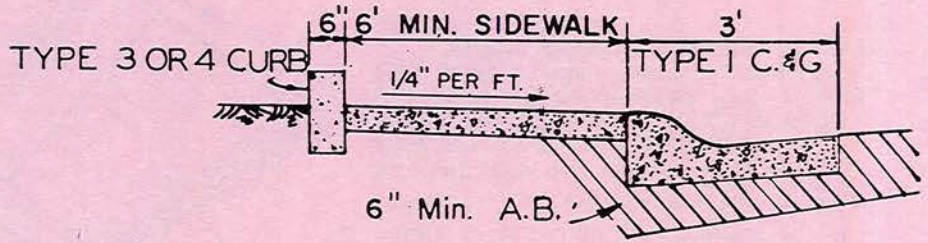
PLAN



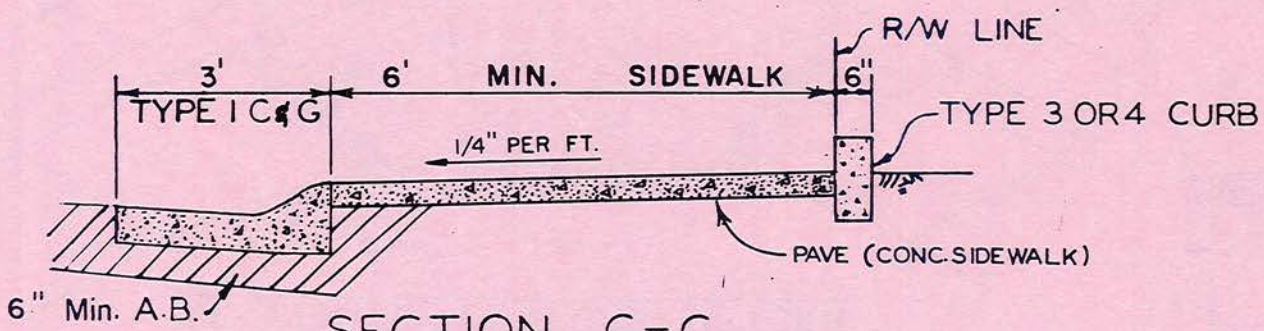
SECTION A-A

NOTES 1: 6" min Aggregate base to be placed within limits of driveway.

* 2: Driveway slope not to exceed 5% for a minimum of 20 feet from edge of pavement.



SECTION B-B



SECTION C-C

DIRECTOR

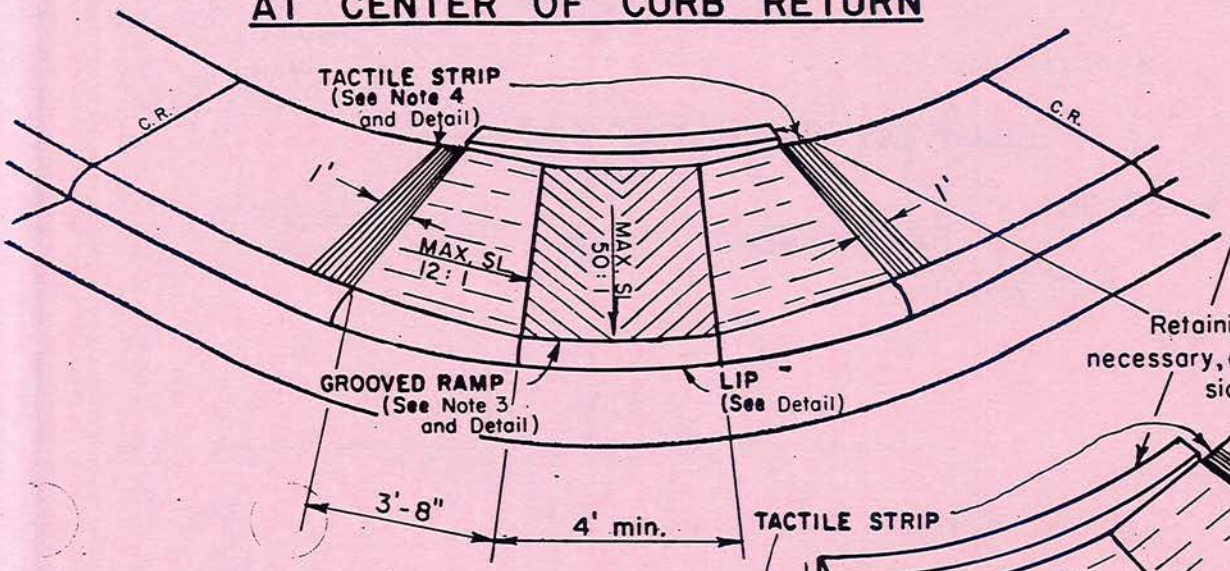
SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

SPECIAL COMMERCIAL FRONTAGE ENTRANCE TYPE A-7

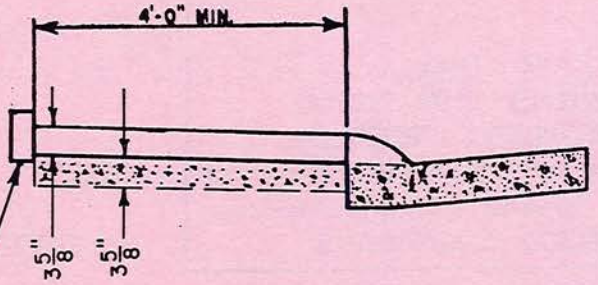
Scale: None
Date: 1-89.
Drawn By: M.T.

H-4

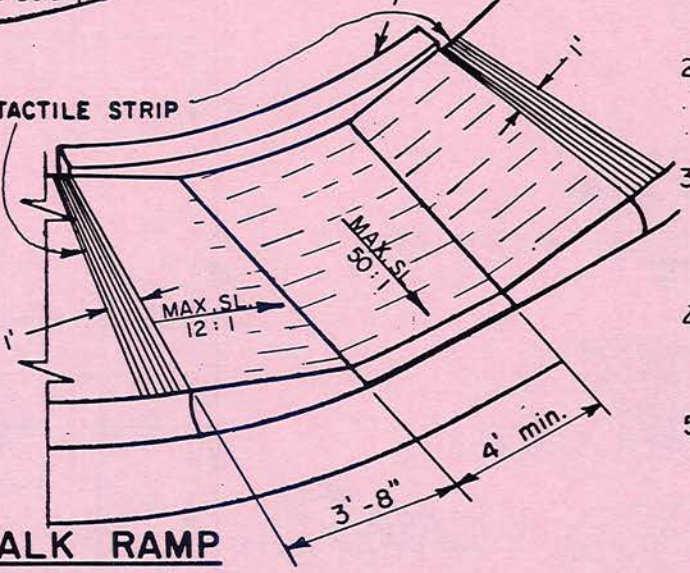
SIDEWALK RAMP
AT CENTER OF CURB RETURN



CROSS SECTION



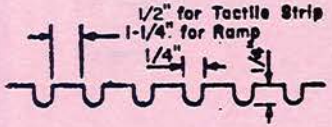
Retaining curb, if necessary, at back of sidewalk.



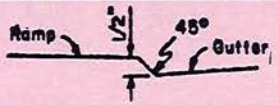
SIDEWALK RAMP
NOT AT CENTER OF CURB RETURN

Notes:

1. Two ramps shall be installed at each corner of intersections of streets of 84' or greater where conditions permit.
2. Single ramps shall be constructed at the center of curb returns for all other intersections or as determined by the Director for special conditions.
3. Ramps located in the center of curb returns shall be grooved. The grooves shall parallel the crosswalks and form a "V" pattern pointing towards the center of the intersection.
4. **Ramps shall have a heavy broom finish transverse to the slope of the ramp and a tactile strip 1' (one ft.) wide along the perimeter.**
5. Retaining curb (Type 3) shall be installed where lot slope is toward the sidewalk. (To prevent sheet flow across sidewalk)



TYPICAL DETAIL
FOR GROOVES



TYPICAL DETAIL
FOR LIP OF RAMP

Dan Fruchtenicht
DIRECTOR

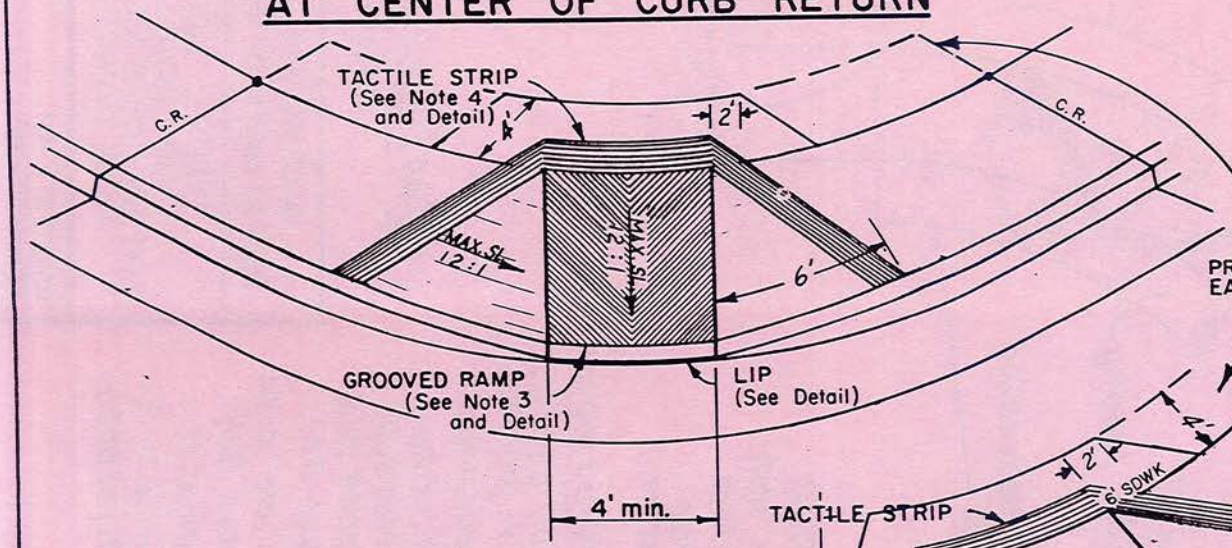
SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

SIDEWALK RAMPS FOR TYPE I CURBS

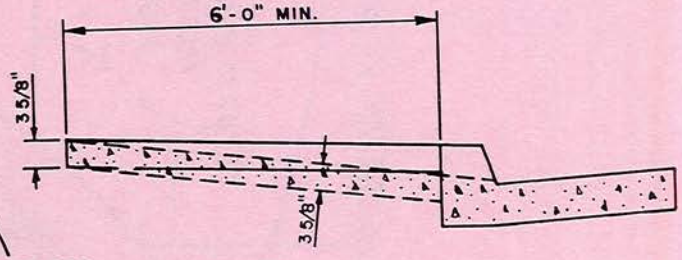
Scale: NONE
Date: 12-88
Drawn By: M.T.

H-5

SIDEWALK RAMP
AT CENTER OF CURB RETURN

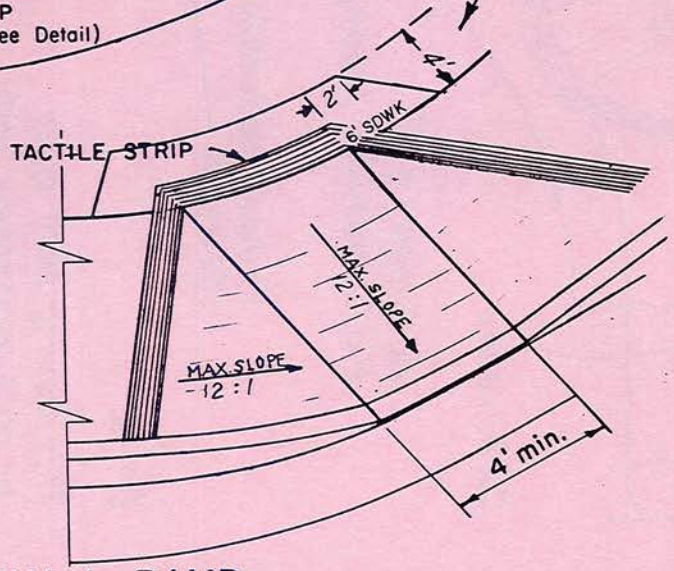


CROSS SECTION

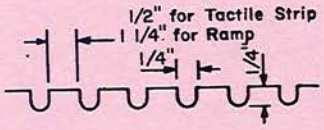


Notes:

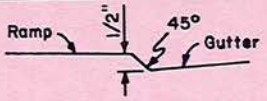
1. Two ramps shall be installed at each corner of intersections of streets of 84 or greater where conditions permit. See Std. Dwg. H-5B.
2. Single ramps shall be constructed at the center of curb returns for all other intersections or as determined by the Director.
3. Ramps located in the center of curb returns shall be grooved. The grooves shall parallel the crosswalks and form a "V" pattern pointing towards the center of the intersection.
4. Ramps shall have a heavy broom finish transverse to the slope of the ramp and a tactile strip 1' (one ft.) wide along the perimeter.



SIDEWALK RAMP
NOT AT CENTER OF CURB RETURN



TYPICAL DETAIL
FOR GROOVES



TYPICAL DETAIL
FOR LIP OF RAMP

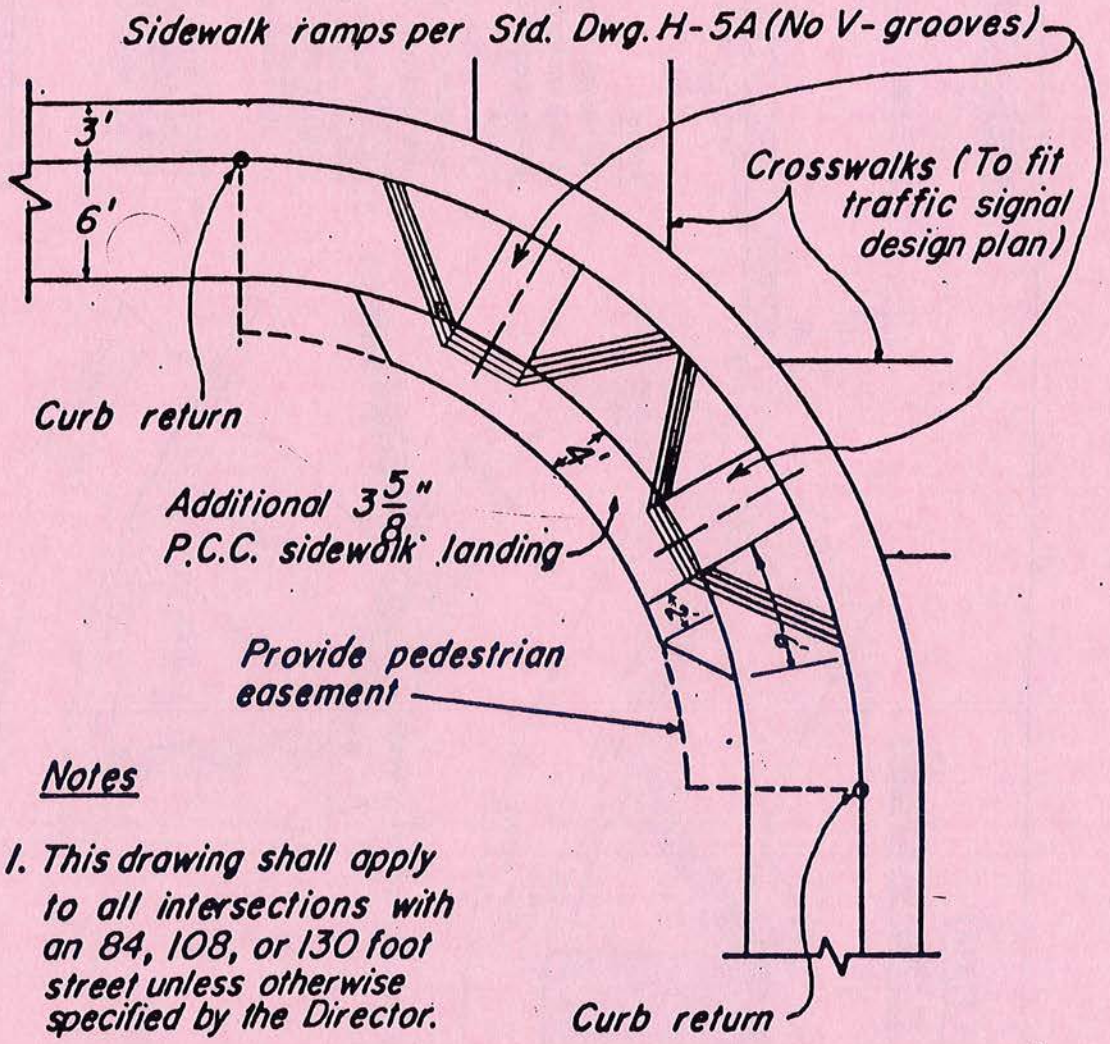
DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

SIDEWALK RAMPS
FOR TYPE 2 CURBS

Scale: NONE
Date: 12-88
Drawn By: M.T.

H-5A



Notes

1. This drawing shall apply to all intersections with an 84, 108, or 130 foot street unless otherwise specified by the Director.
2. At intersections with no major (84, 108, or 130 foot) streets, a single ramp (with v-grooves) may be used. The pedestrian easement is required between curb returns, and the sidewalk landing to 6' beyond each side of the ramp. (See Dwg. H-5A)
3. All intersections with Type I or IA (Rolled) curbs shall have fully depressed sidewalk ramps in accordance with drawing H-5, and drawing H-5B will not apply.

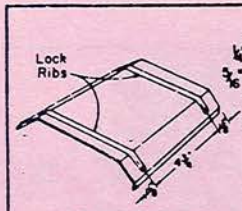
D M Freeman
DIRECTOR

SACRAMENTO COUNTY DEPARTMENT OF PUBLIC WORKS

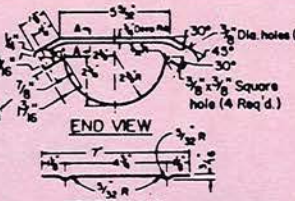
TYPICAL SIDEWALK RAMP INSTALLATION FOR 84', 108' & 130' STREETS WITH TYPE 2 CURBS

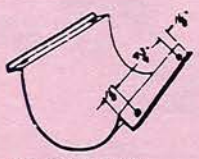
DRAWN BY: M.T.
SCALE: 1" = 10'
DATE: 1-89

H-5B

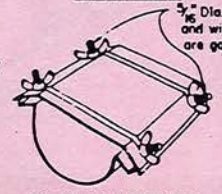


COUPLING CAP

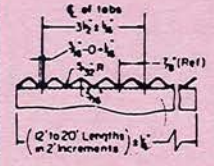




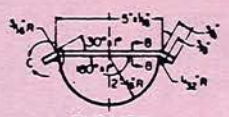
COUPLING BAND

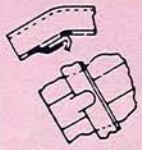


COUPLING ASSEMBLY

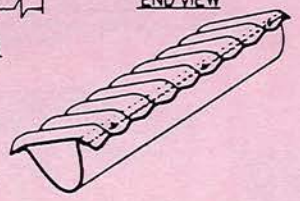


SECTION B-B





TAB DETAIL C

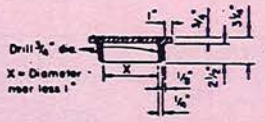


PIPE ASSEMBLY

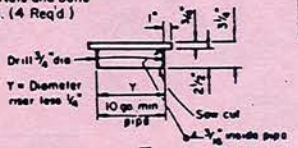
SEMICIRCULAR PIPE UNDERDRAIN

NOTES:

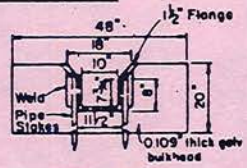
1. Tolerance on all dimensions is ± 1/32" except as shown.
2. Corrugated lips at ends of underdrain may fall up, down or at any intermediate position.
3. Corrugated top section shall be attached to bottom section by tabbing as shown.
4. One-piece coupling assembly with centering rib on coupling cap may be used in lieu of two-piece coupling assembly shown.



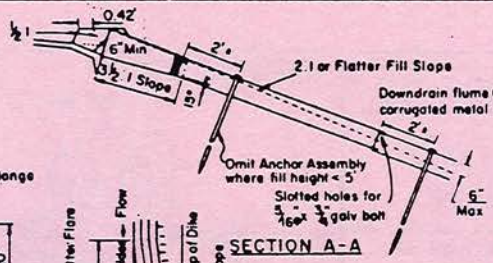
CAST STEEL COVER

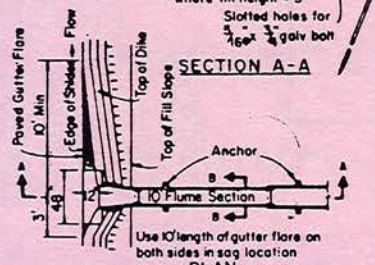


WELDED STEEL COVER

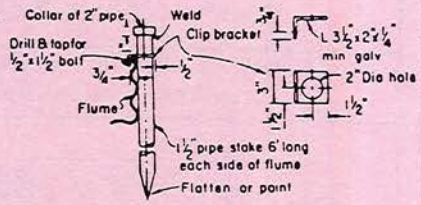


SECTION B-B
ANCHOR ASSEMBLY

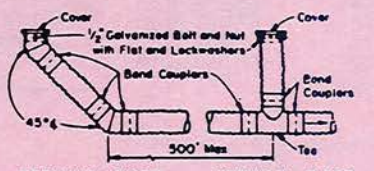




TAPERED INLET AND FLUME DOWNDRAIN

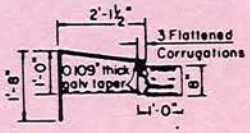


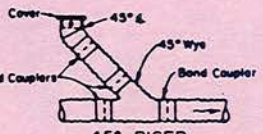
ANCHOR DETAIL



TERMINAL RISER VERTICAL RISER

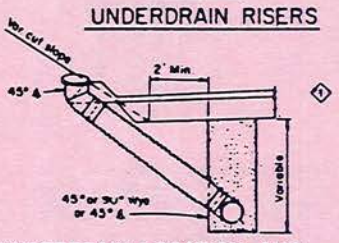
Perforated metal pipe risers and perforated metal pipe underdrain shown. Use type of pipe specified.



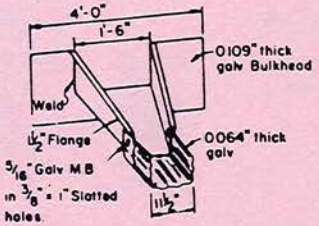


45° RISER

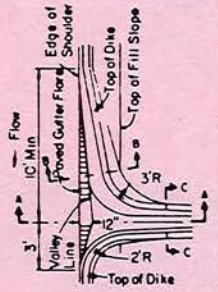
UNDERDRAIN RISERS



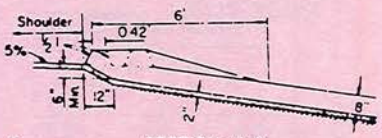
UNDERDRAIN LOCATION AND RISERS ANGLED TO CUT SLOPE



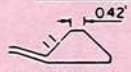
TAPERED INLET



PLAN

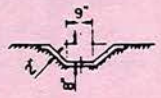


SECTION A-A



SECTION B-B

NOTE Cross-section of slope ditch may be semicircular vee or trapezoidal. Min top width = 25" Min depth = 8"



SECTION C-C

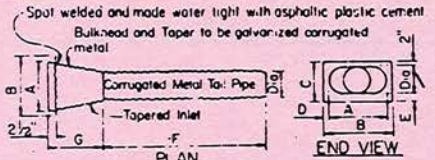
DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

UNDERDRAINS AND OVERSIDE DRAINS

SCALE: NONE
DATE: 5-87
DRAWN BY:

H-6



Bulkhead and Taper of same thickness as Tail Pipe with 0.079" Max.
Tail Pipe of same thickness as Downdrain Pipe.

ENTRANCE TAPER-TYPE 1
ALTERNATIVE A

Tail Pipe of same thickness as Downdrain Pipe.

ENTRANCE TAPER-TYPE 1
ALTERNATIVE B

NOTES
Taper joints may be welded or riveted
Dimensions to be as tabulated below for Type I Alternatives A and B

DIA	A	B	C	D	E	F	G
8"	16"	25½"	15"	4¾"	5"	6'	2'
12"	18"	25½"	19"	3¼"	5"	6'	2'
15"	21"	30"	23"	4½"	6"	6'	2'
18"	24"	34"	27"	5"	7"	6'	2'
24"	34"	46"	35"	6"	9"	4'	4'

ENTRANCE TAPER-TYPE 1
ALTERNATIVE A&B

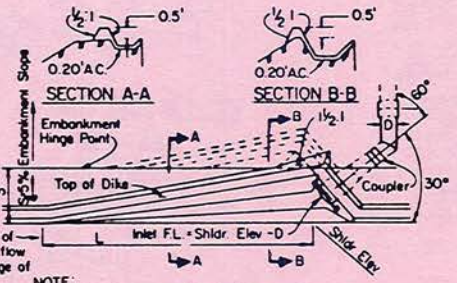
ENTRANCE TAPER-TYPE 2

NOTE. Tapered inlet of same construction and dimensions as Type I-Alternative A or B.

C.S.P. Dimensions as tabulated below

P	10"	15"	18"	21"	27"
Q	8"	12"	15"	18"	24"

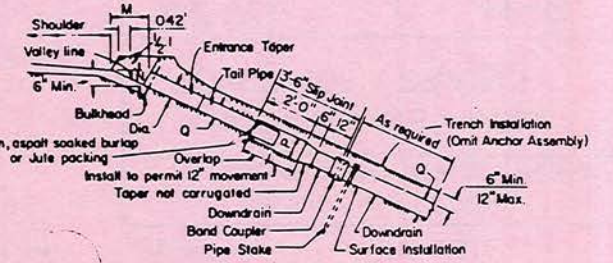
Slip joint to be same thickness as downdrain pipe.



NOTE
Extend dike base to provide suitable support where dike extends beyond hinge point.

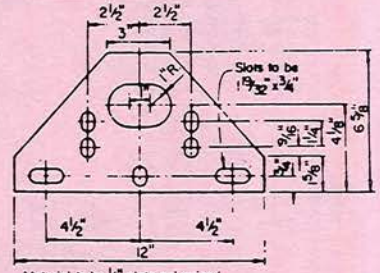
(Recommended for grades of 2% or greater)

DIA D	MIN L
8"	15'
12"	20'
15"	30'
18"	35'
24"	45'



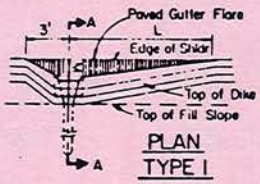
NOTE: (1) Cable, slip joint or anchor assembly to be placed when specified.
(2) Slip joint to be omitted when completely buried.
(3) Slip joint for Type I entrance taper shown. Type 2 similar.

ENTRANCE TAPER AND PIPE DOWNDRAIN



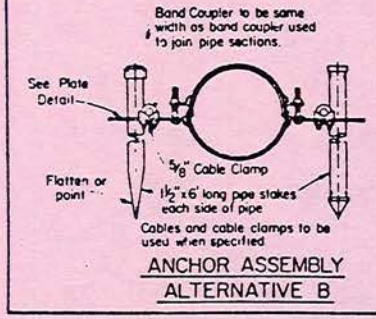
Material to be ¼" plate galvanized after fabrication.

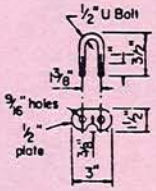
PLATE DETAIL

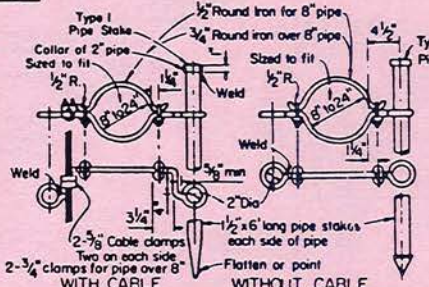


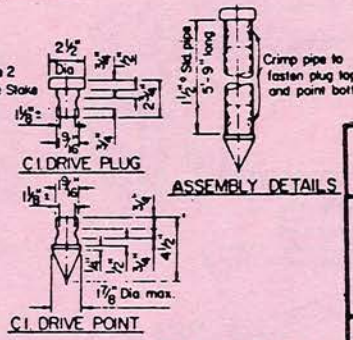
DIA	MIN L	M	N
8"	10'	18"	8"
12"	15'	20"	12"
15"	25'	24"	15"
18"	30'	30"	16"
24"	40'	36"	18"

1 - For payment purposes an Anchor Assembly shall included two Pipe Stakes.
2 - All Pipe Stakes and Hardware to be galvanized after fabrication
3 - Either Alternative A or Alternative B Anchor Assemblies and Type I or Type 2 Pipe Stakes may be used at Contractor's option for C.S.P. or C.A.P., Alternative A anchor assembly only to be placed in annular corrugation. May be placed on annular or alternative annular coupling band if securely fastened on downstream side of joint. Alternative B anchor assembly to be fastened to pipe sections and not to a band coupler used to join sections









Don Kraemer
DIRECTOR

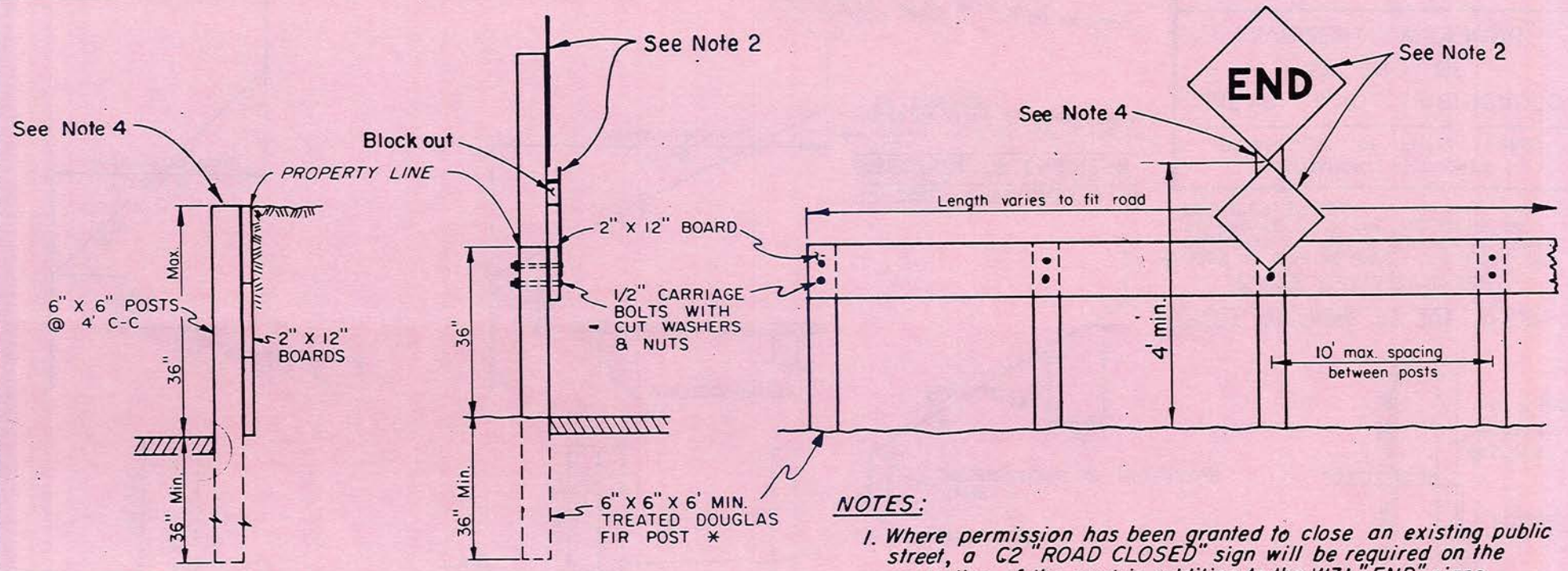
SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

UNDERDRAINS AND OVERSIDE DRAINS

SCALE: NONE
DATE: 5-87
DRAWN BY:

H-7

1. ADDED NOTE-2, 4-18-85. RN.



STREET ENDING IN CUT WHERE SLOPE NOT OBTAINABLE

NOTES:

1. Where permission has been granted to close an existing public street, a C2 "ROAD CLOSED" sign will be required on the centerline of the road in addition to the W31 "END" signs.
2. 24"x24" W31 signs and 18"x18" Red Type N markers.▲ Block out as necessary for Type N marker top mounting bolt. (Bottom mounting bolt normally through barrier rail.)
3. All exposed surfaces shall be painted with white paint conforming to State **Standard Specification** 91-3.
4. Post at center or nearest to center on right hand side to be extended to provide mounting for signs.

NO. & SIZE OF SIGNS

R/W WIDTH	W31		TYPE N		C2 SIGN	
	SIZE	NO.	SIZE	NO.	SIZE	NO.
40' & 42'	24"	1	18"	1	36" X 24"	1
50',56',60',62' & 66'	24"	1	18"	1	48" X 30"	1
80' & 84'	24"	2	18"	2	48" X 30"	1
108' & 130'	24"	3	18"	3	48" X 30"	1

* STATE OF CALIFORNIA SPECIFICATION 56-2.02B

▲ Red Type N markers to have solid red reflective background without added reflectors.

DIRECTOR

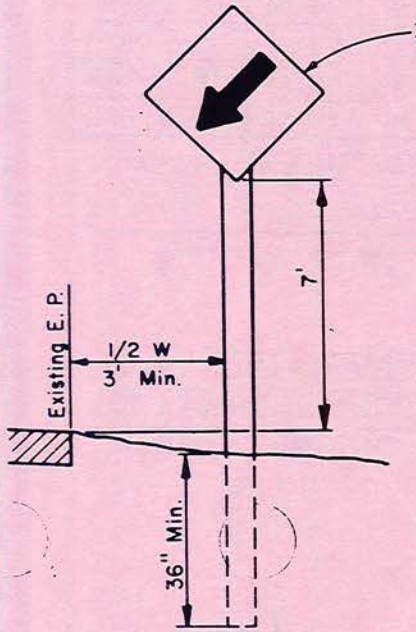
SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

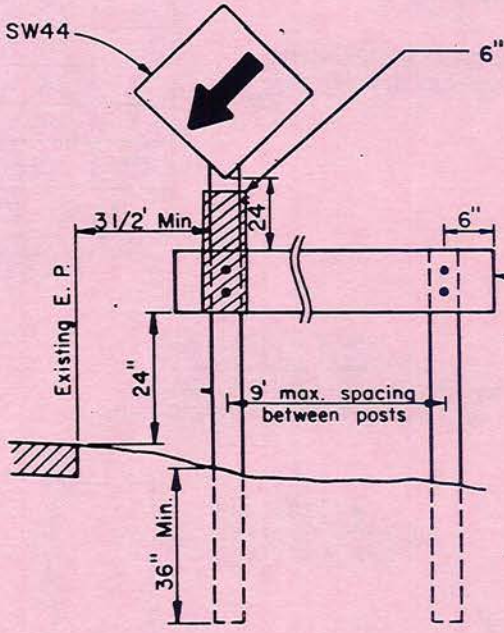
STREET CLOSURE
TIMBER BARRICADE

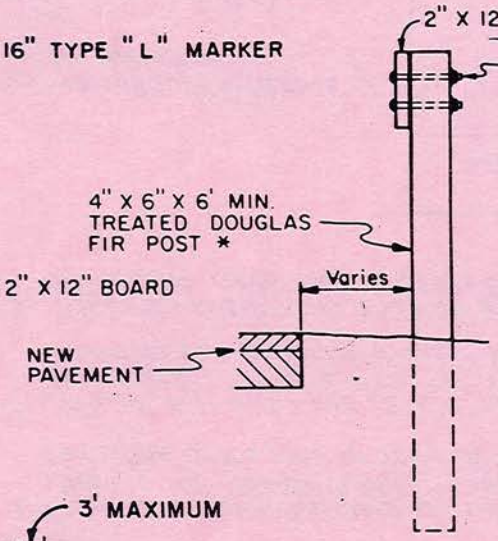
SCALE: NONE
DATE: 7 – 88

H-8

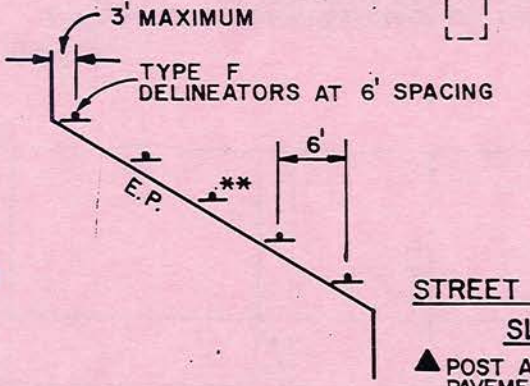
(REVISED TO ADD RED TYPE N MARKERS 6-85)

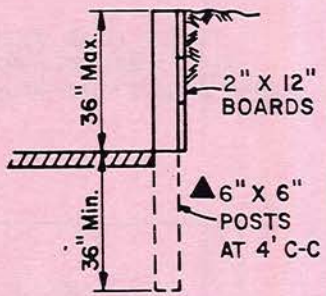


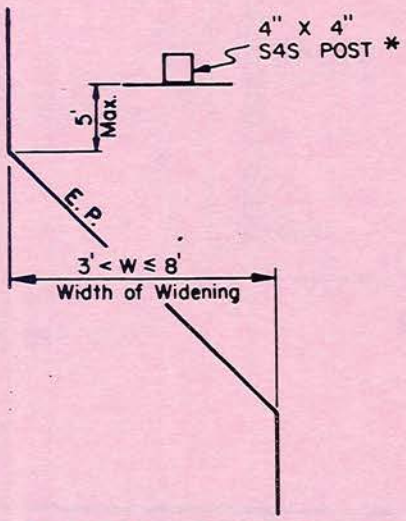


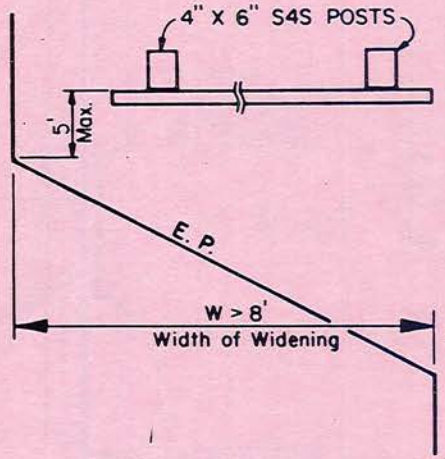


ALL EXPOSED SURFACES SHALL BE PAINTED WHITE IN CONFORMANCE WITH THE REQUIREMENTS OF SECTIONS 91-3.01 AND 91-3.02 OF THE STATE STANDARD SPECIFICATIONS.









STREET WIDENING AT CUT WHERE SLOPE NOT OBTAINABLE

▲ POST AT SIDE NEAREST THE EDGE OF PAVEMENT TO BE OF SUFFICIENT HEIGHT TO PROVIDE FOR THE MOUNTING OF REQUIRED SIGNS.

SPECIAL APPLICATION AT DIRECTION OF ENGINEER

** SW44 IN LIEU OF TYPE F DELINEATOR AT DIRECTION OF ENGINEER.

* STATE STANDARD SPECIFICATION 56-2.02B

D M Kaufi

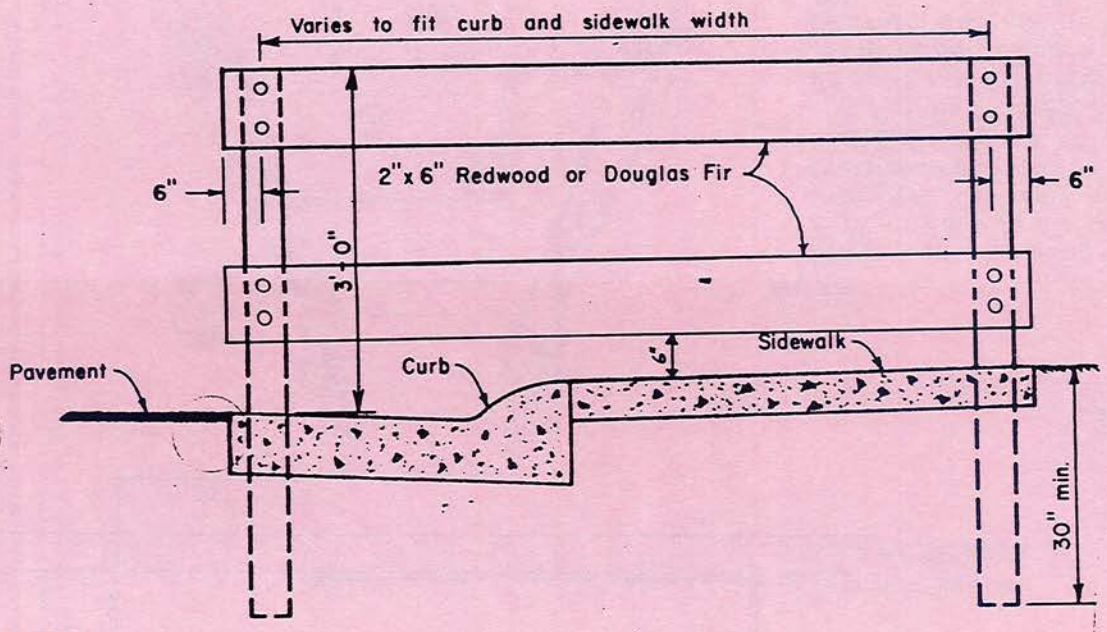
DIRECTOR

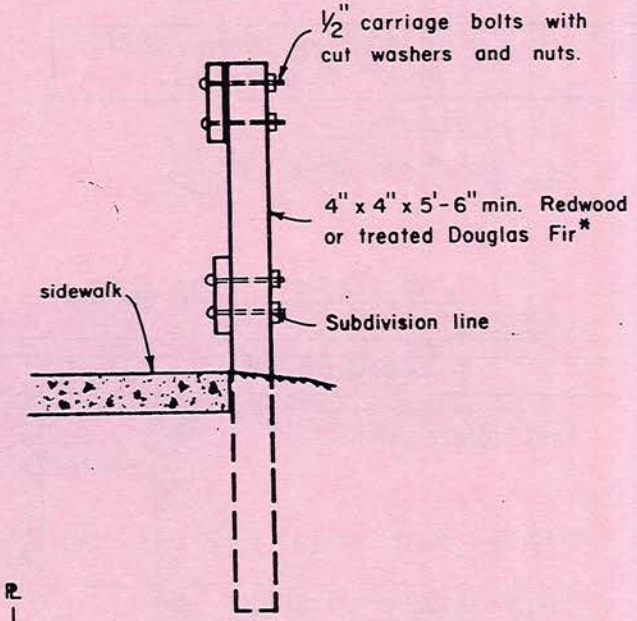
SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

SIGNS AND BARRICADES AT END OF PAVEMENT WIDENING

SCALE: NONE
DATE: 7-88

H-8A

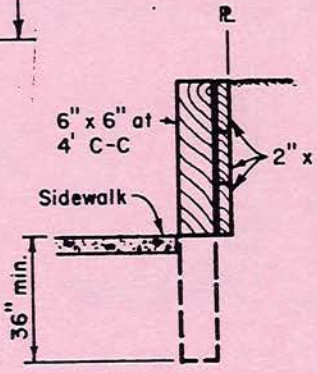




NOTES:

1. Sidewalk barricades to be erected at each location where satisfactory provision can not be made for pedestrians to continue beyond the terminus of a sidewalk.
2. All exposed surfaces to be painted with two (2) coats of white paint conforming to section 91-3.02 of State Specifications.

*State of Calif. Specification 56-2.02B



STREET ENDING IN CUT WHERE SLOPE NOT OBTAINABLE

DM Graves
DIRECTOR

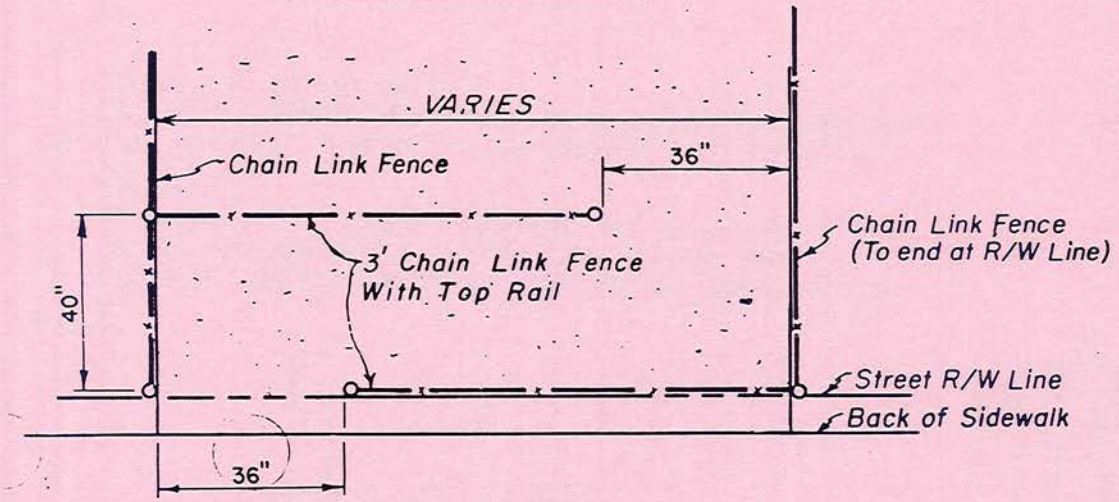
SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

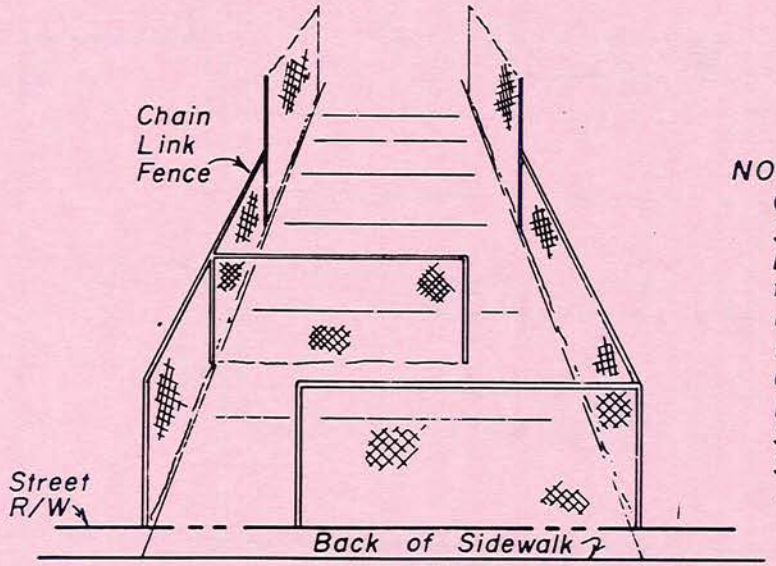
SIDEWALK BARRICADE

SCALE: NONE
DATE: 7-88

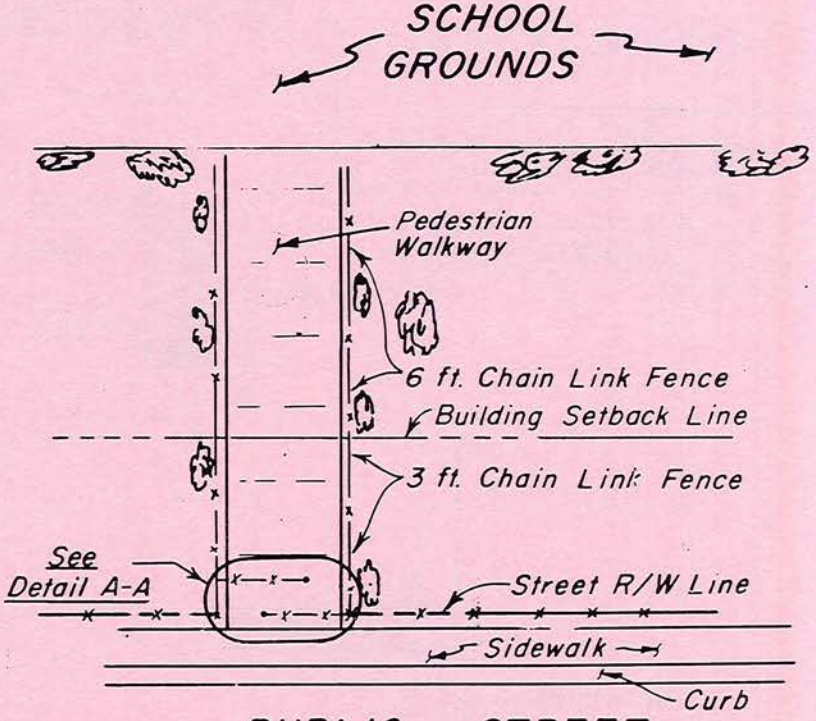
H-9

DETAIL A-A





PICTORIAL VIEW



PUBLIC STREET

NOTE:
Chain Link Fencing shall be 3 ft. high with a 1-1/4 in. Diameter Top Rail within the Building Setback Line and 6 ft. high outside of the Building Setback Line. Chain Link Fencing shall be in accordance with Section SS-100 of the Standard Specifications. Street lights shall be placed at both ends of the pedestrian lane.

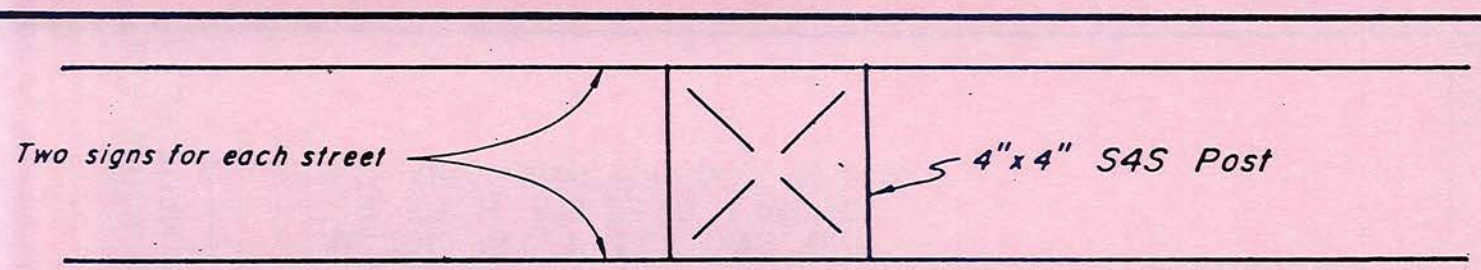
DIRECTOR

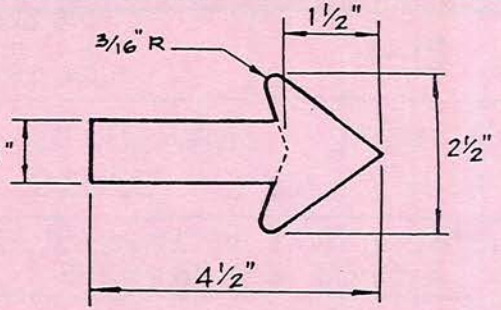
SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

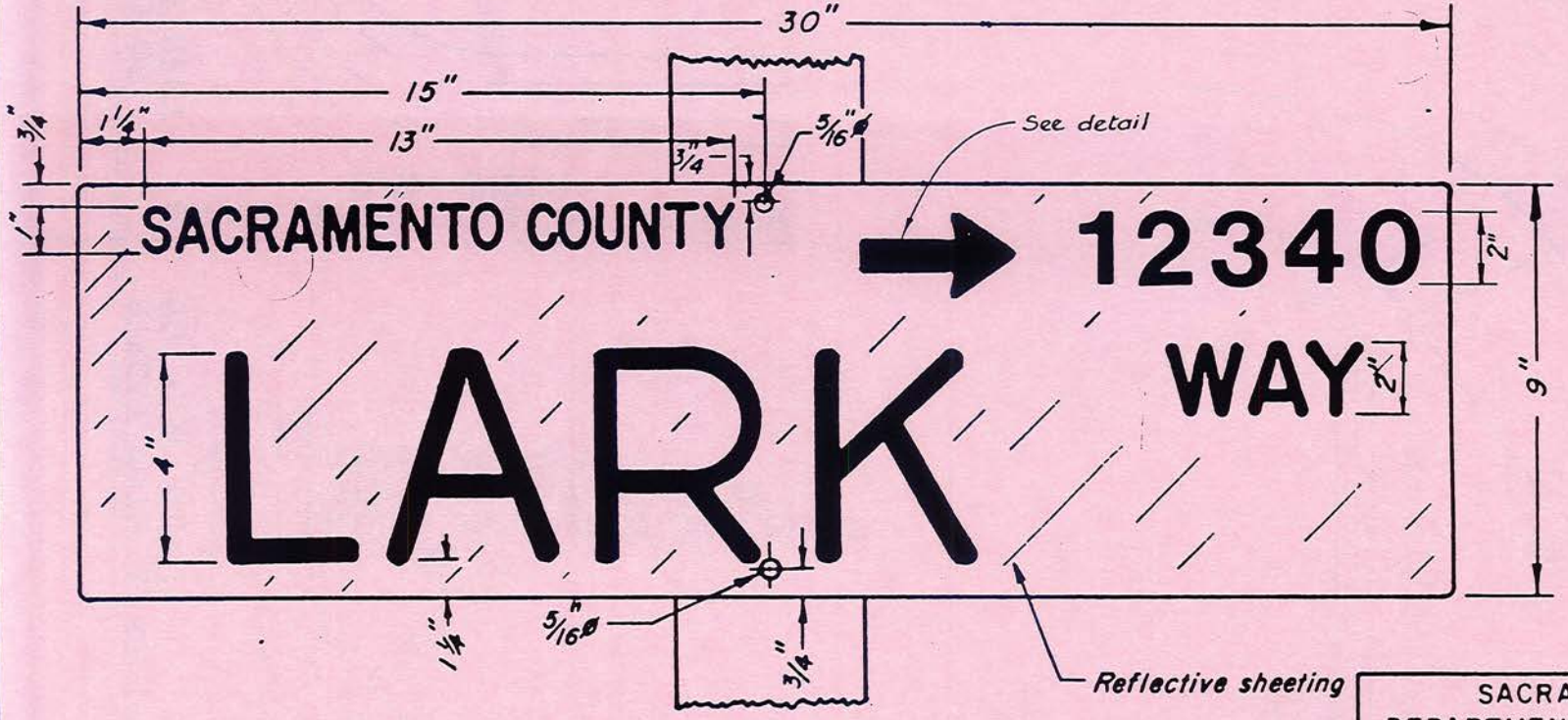
PEDESTRIAN LANE WITH BIKE BARRIER

SCALE: NO SCALE
DATE: 1-89
DRAWN BY: M.T.

H-10







Notes:

1. Aluminum sheet alloy 6061-T6 0.080" gauge rounded corners 1/4" radius.
2. For two (2) streets place second pair of signs and at 90° to signs as shown.
3. Posts shall be Redwood or Treated Douglas Fir (State of California Spec. No. 56-2.02 B)
4. Block numbers shall be as shown on the plan in 2" Series "C"

SIGN DETAILS FOR SINGLE STREET

D M Fackrell
DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

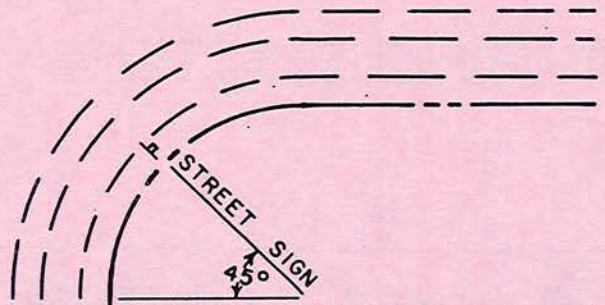
STREET SIGN
FULLY REFLECTORIZED

Scale: No Scale
Date: 7-88
Drawn By:

H-11

STREET WITH LESS THAN
80' R/W WIDTH

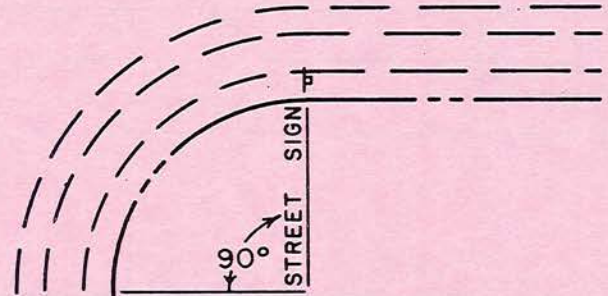
STREET WITH LESS THAN
80' R/W WIDTH



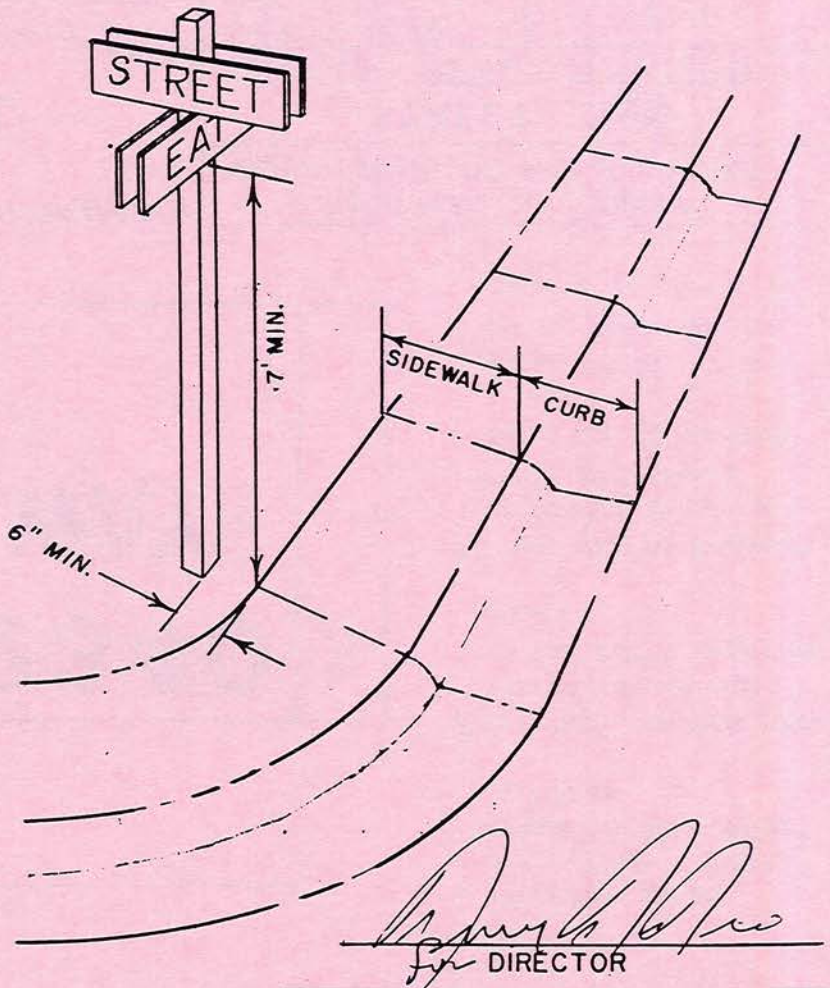
MINOR INTERSECTIONS BOTH STREETS HAVING LESS THAN 80' R/W.

MAJOR STREET 80' OR GREATER
R/W WIDTH

R/W WIDTH EQUAL TO OR
LESS THAN MAJOR STREET



MAJOR INTERSECTIONS ONE OR BOTH STREETS HAVING 80' OR GREATER R/W WIDTH.



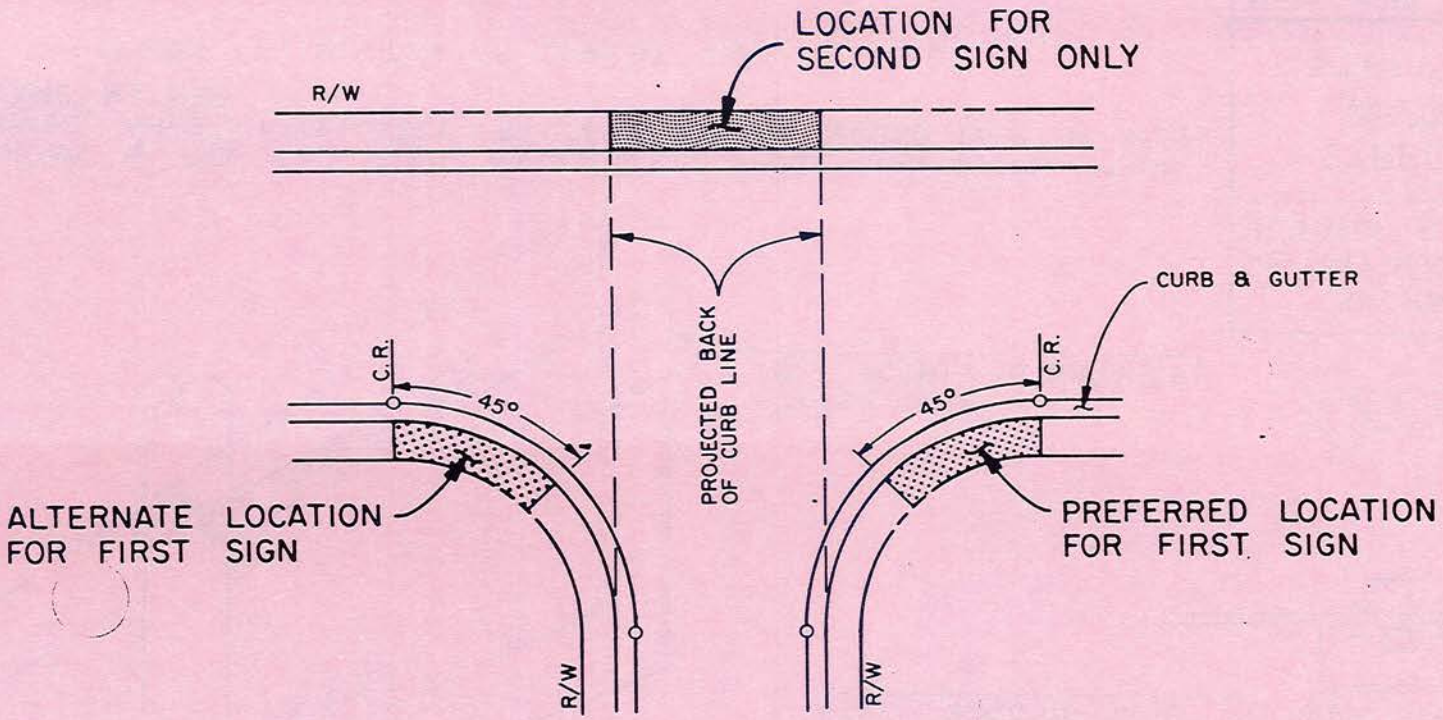
for DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

STREET NAME SIGN PLACEMENT DETAILS

Scale: NONE
Date : 5-87
Drawn By:

H-12



DIRECTOR

NOTES:

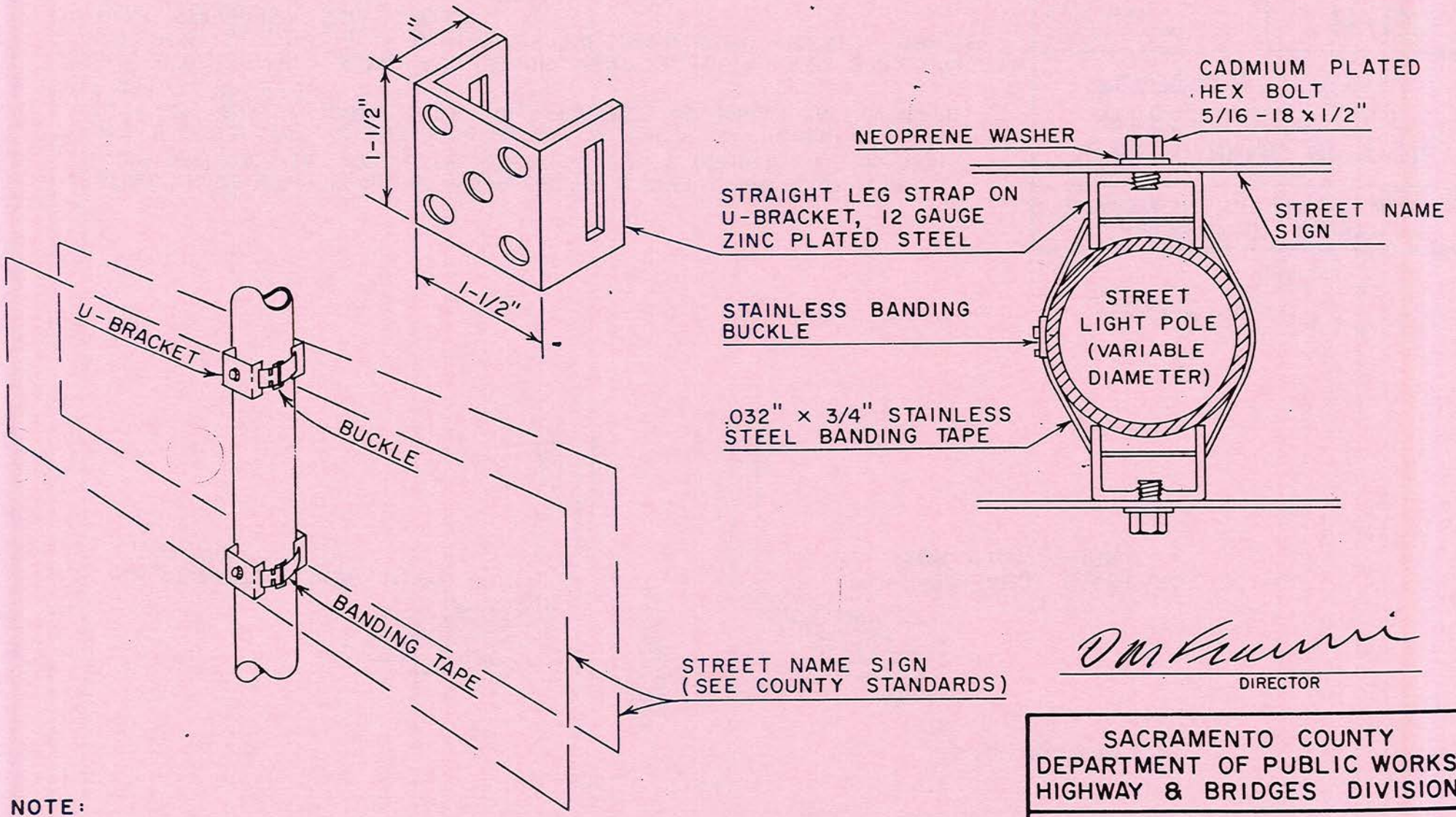
1. STREET NAME SIGNS SHALL BE INSTALLED ON STREET LIGHT POLES WHEN THEY ARE LOCATED WITHIN THE LOCATION LIMITS DEFINED ON THIS DETAIL.
2. THE LOCATION FOR SECOND SIGN SHALL BE USED ONLY WHEN 2 (TWO) SETS OF STREET NAME SIGNS ARE REQUIRED AS SHOWN IN STANDARD DRAWING NO. H-15.
3. ALL OTHER STREET NAME SIGN REQUIREMENTS IN SECT'S 4-22 & 4-23 AND IN DRAWINGS H-11, H-12, H-14 & H-15 OF THE SACRAMENTO COUNTY IMPROVEMENT STANDARDS SHALL APPLY.

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

STREET NAME SIGN ON STREET LIGHT POLE PLACEMENT DETAIL

SCALE: NONE
DATE: 5-87

H-13



DIRECTOR

NOTE:

DETAIL SHOWN IS FOR TWO SIGN INSTALLATION. FOUR SIGN INSTALLATION MAY BE MADE, WHERE APPLICABLE, BY FASTENING A SECOND PAIR OF SIGNS IN THE SAME MANNER.

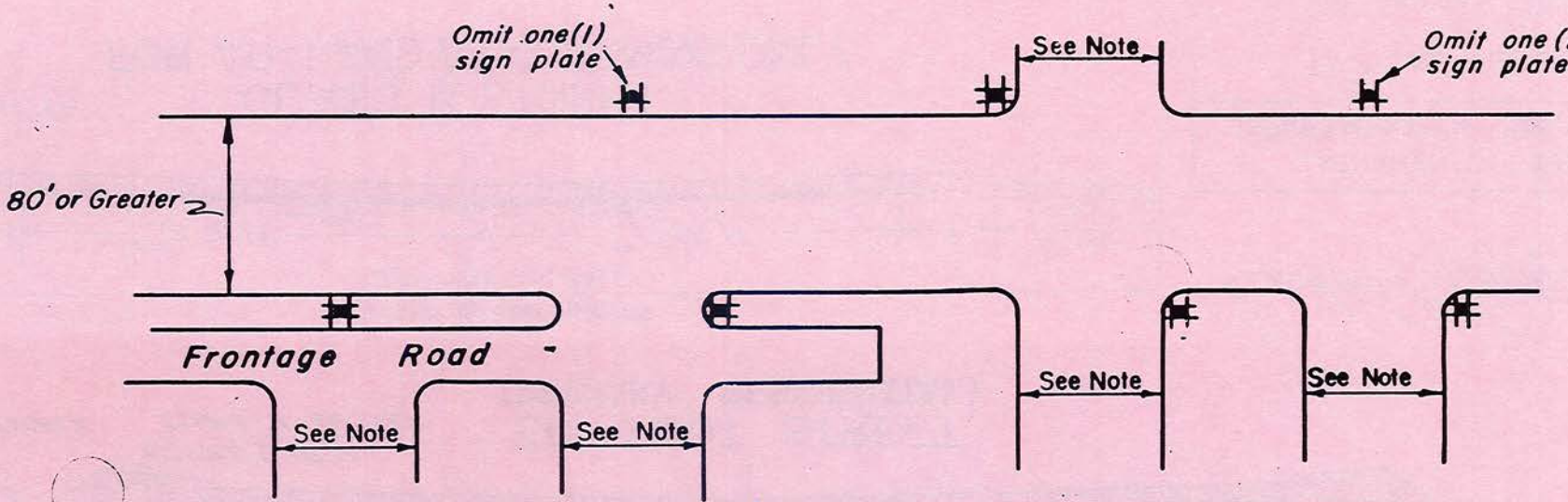
STANDARD CLEARANCE TO BOTTOM OF LOWEST SIGN IS 7 FEET.

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS
HIGHWAY & BRIDGES DIVISION

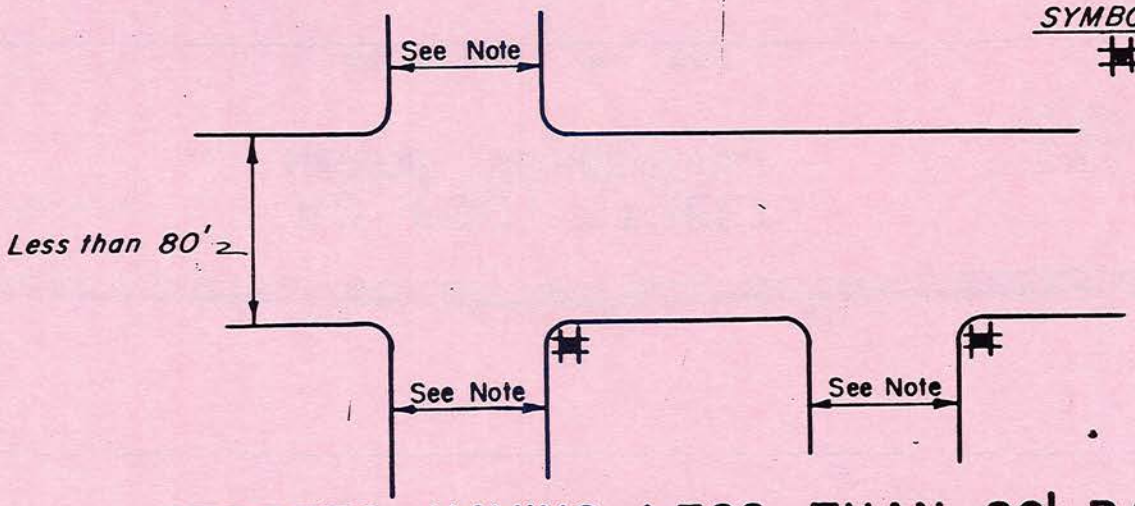
STREET NAME SIGN INSTALLATION ON STREET LIGHT POLE

SCALE: NONE
DATE: 5-87

H-14



STREETS HAVING 80' OR GREATER R/W WIDTH



SYMBOL:

.. Standard street name sign installation. Four(4) sign plates on 4"x4" post or on Street Light Pole.

NOTE:

Intersecting streets with equal or lesser R/W width.

STREETS HAVING LESS THAN 80' R/W WIDTH

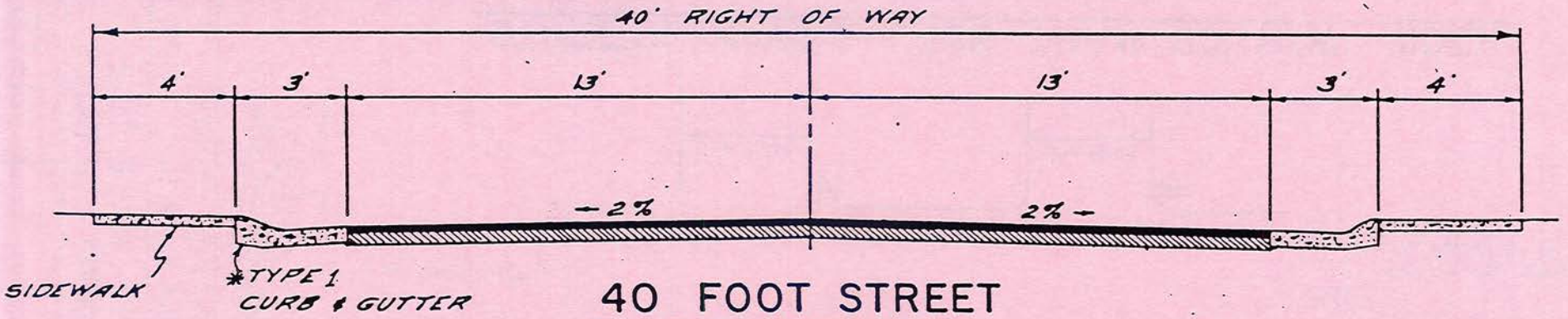
SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

DIRECTOR

STREET NAME SIGN PLACEMENT DETAILS

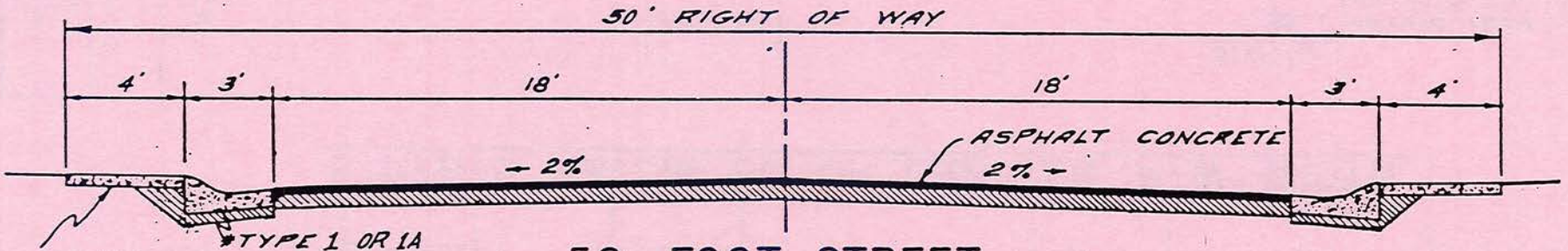
Scale: NONE
Date: 3-89
Drawn By:

H-15

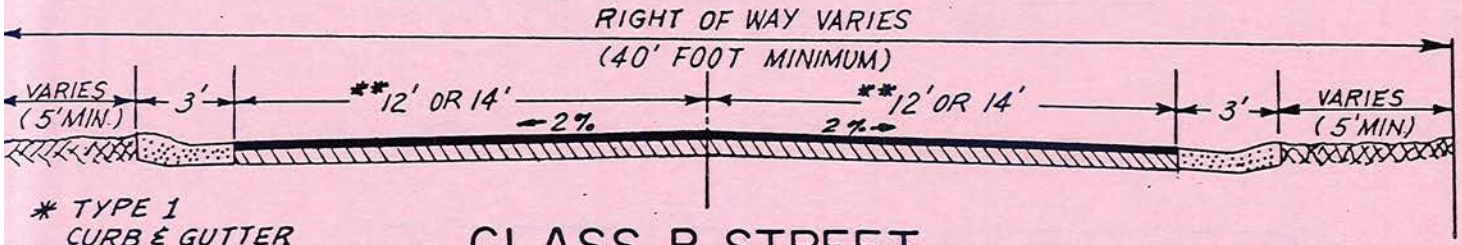


40 FOOT STREET
(MINOR RESIDENTIAL)

* TYPE 1 CURB & GUTTER MAY BE USED IN SINGLE FAMILY DEVELOPMENTS ON 40 FOOT AND 50 FOOT STREETS ONLY.



50 FOOT STREET
(PRIMARY RESIDENTIAL)



CLASS B STREET
FOR AR-1 AND AR-2 ZONING ONLY

SEE IMPROVEMENT STANDARDS SECTION 4-2(B)

** 12' FOR 40' STREETS, 14' FOR 50' OR LARGER STREETS

Douglas M. Fraser
DIRECTOR

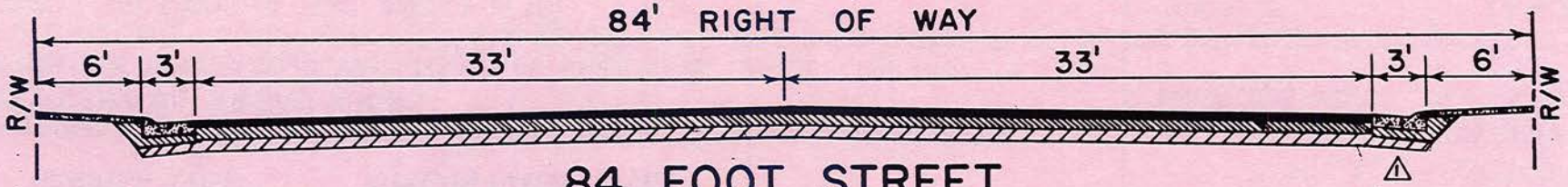
SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

TYPICAL SECTIONS

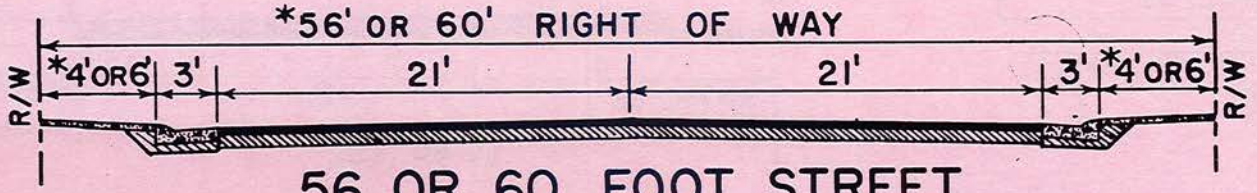
RESIDENTIAL STREETS

DRAWN BY: M.T.
SCALE: NONE
DATE: 9 - 88

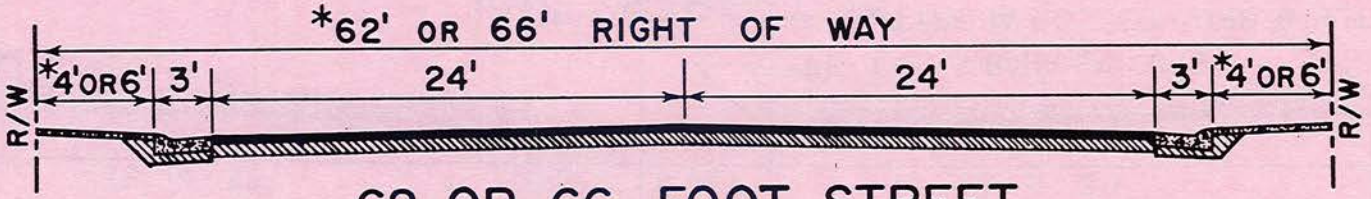
H-16



84 FOOT STREET
(ARTERIAL)



56 OR 60 FOOT STREET
(COLLECTOR)



62 OR 66 FOOT STREET
(COLLECTOR APPROACH TO 84 AND 110 FOOT STREETS)

D. W. McKenzie
DIRECTOR

NOTES:

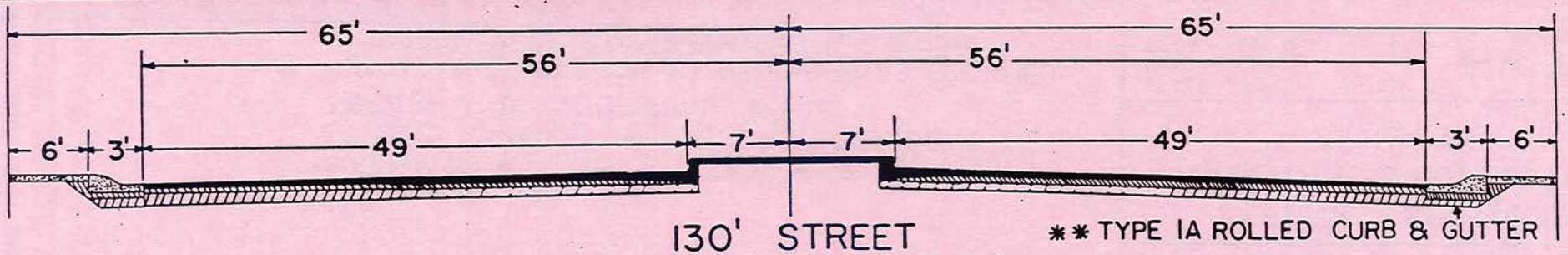
1. *SIDEWALK MAY BE 4 FEET WIDE ONLY IN SINGLE FAMILY & DUPLEX RESIDENTIAL AREAS, AND INDUSTRIAL AREAS.
2. VERTICAL CURB (TYPE 2) REQUIRED AS SPECIFIED IN IMPROVEMENT STANDARDS SECTION 4-30.

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

TYPICAL SECTIONS
ARTERIAL & COLLECTOR
STREETS

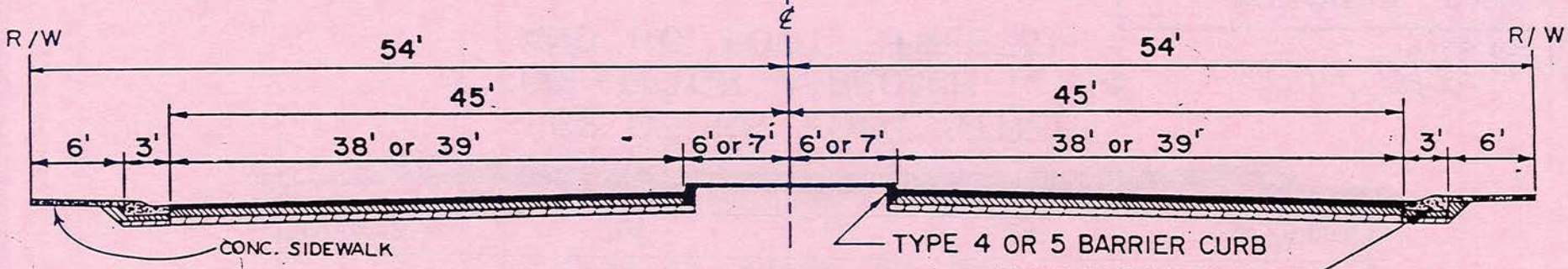
SCALE: NONE
DATE: 1-89
DRAWN BY: M.T.

H-17



130' STREET
(SPECIAL THOROUGHFARE)

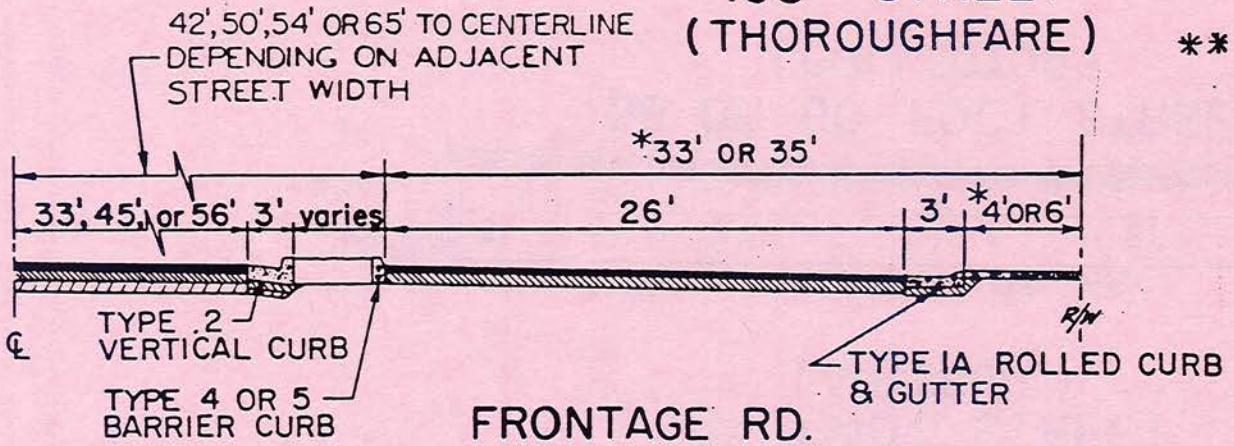
** TYPE IA ROLLED CURB & GUTTER



108' STREET
(THOROUGHFARE)

** TYPE IA ROLLED CURB & GUTTER

** TYPE 2 CURB & GUTTER REQUIRED AS SPECIFIED IN IMPROVEMENT STANDARDS SECTION 4-30



FRONTAGE RD.

*SIDEWALK MAY BE 4 FEET WIDE IN SINGLE FAMILY AND DUPLEX RESIDENTIAL AREAS ONLY.

FRONTAGE ROADS ADJACENT TO STATE FREEWAYS SHALL CONFORM TO THE FULL WIDTH STANDARDS FOR 56' AND 62' STREETS. SEE IMPROVEMENT STANDARDS SECTIONS 4-1(M) AND 4-17(D).

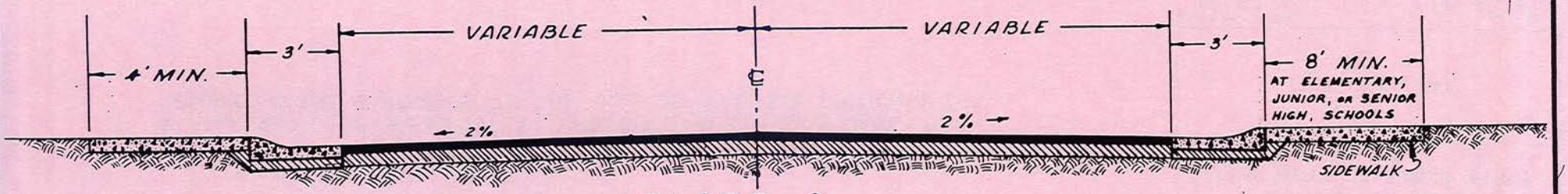
Douglas M. Kern
DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

TYPICAL SECTIONS
SPECIAL THOROUGHFARE
THOROUGHFARE & FRONTAGE RD.

Scale: NONE
Date: 9-88
Drawn By: M.T.

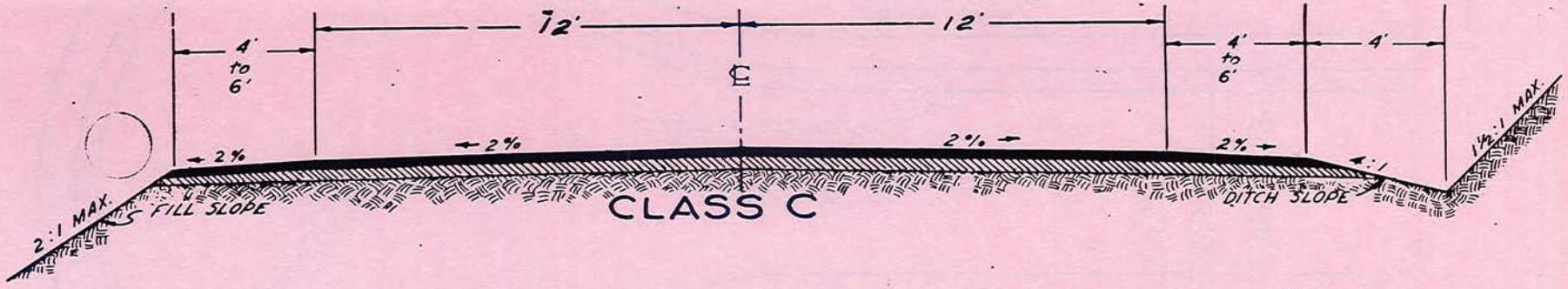
H-18



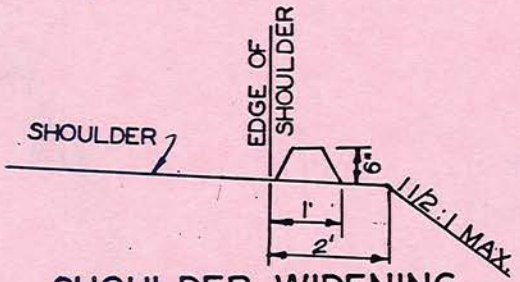
CLASS A

CLASS B

SAME AS CLASS A - EXCEPT SIDEWALKS MAY BE OMITTED



CLASS C



SHOULDER WIDENING WITH A.C. DIKE

Douglas Matsumura

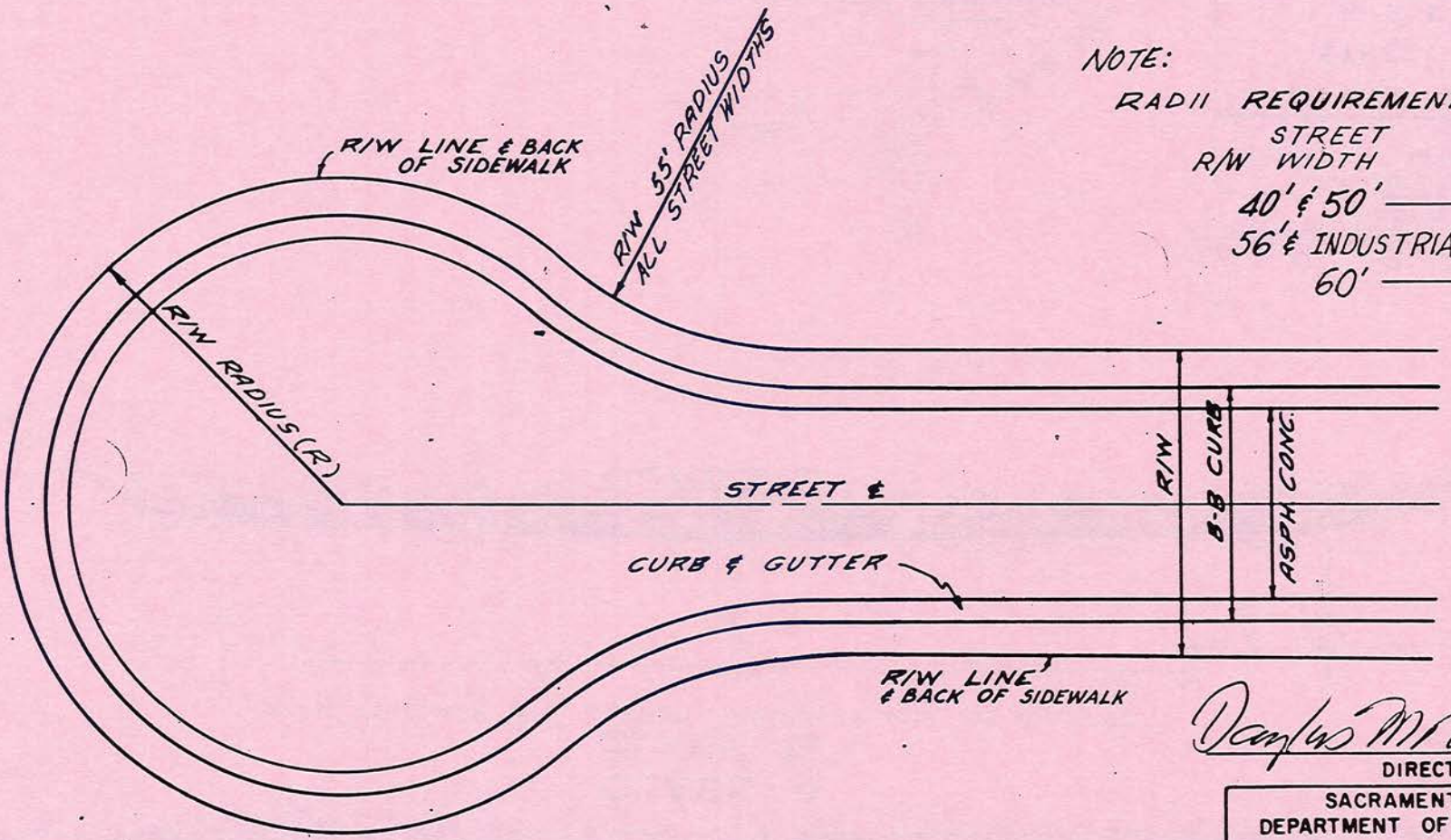
DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

TYPICAL SECTIONS
STREET CLASSES
'A', 'B' & 'C'

Scale: NONE
Date: 1-89
Drawn By: M.T.

H-19



NOTE:

RADII REQUIREMENTS

STREET R/W WIDTH	(R)
40' & 50'	40'
56' & INDUSTRIAL	54'
60'	56'

A STANDARD CODE W53 (NOT A THROUGH STREET) SIGN MAY BE REQUIRED AT THE ENTRANCE TO THE CUL-DE-SAC, (SEE SECTION 4-24).

Douglas M. Kimmis

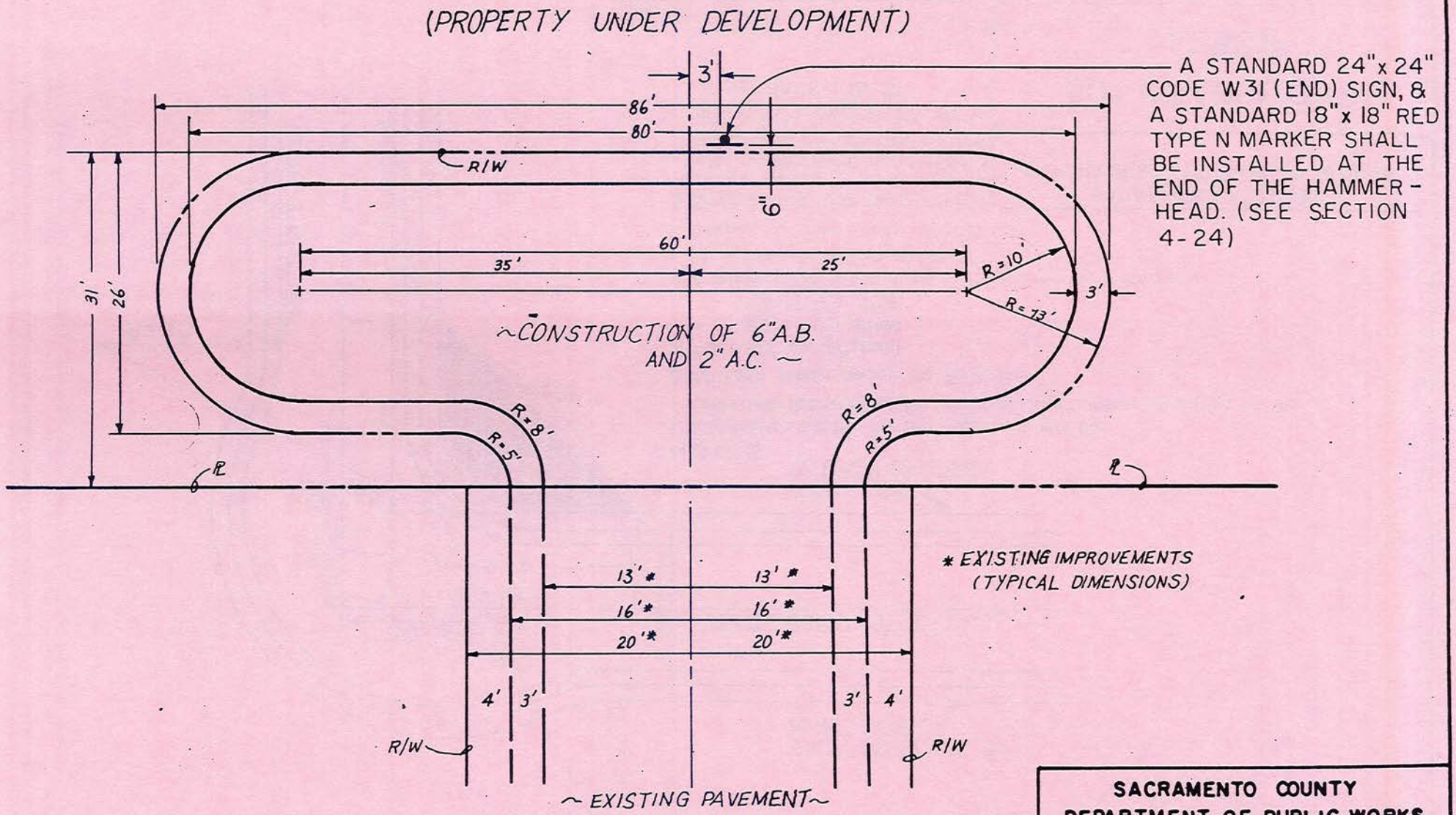
DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

CUL-DE-SAC

Scale: None
Date: 9-88
Drawn By: B.F./M.T.

H-20



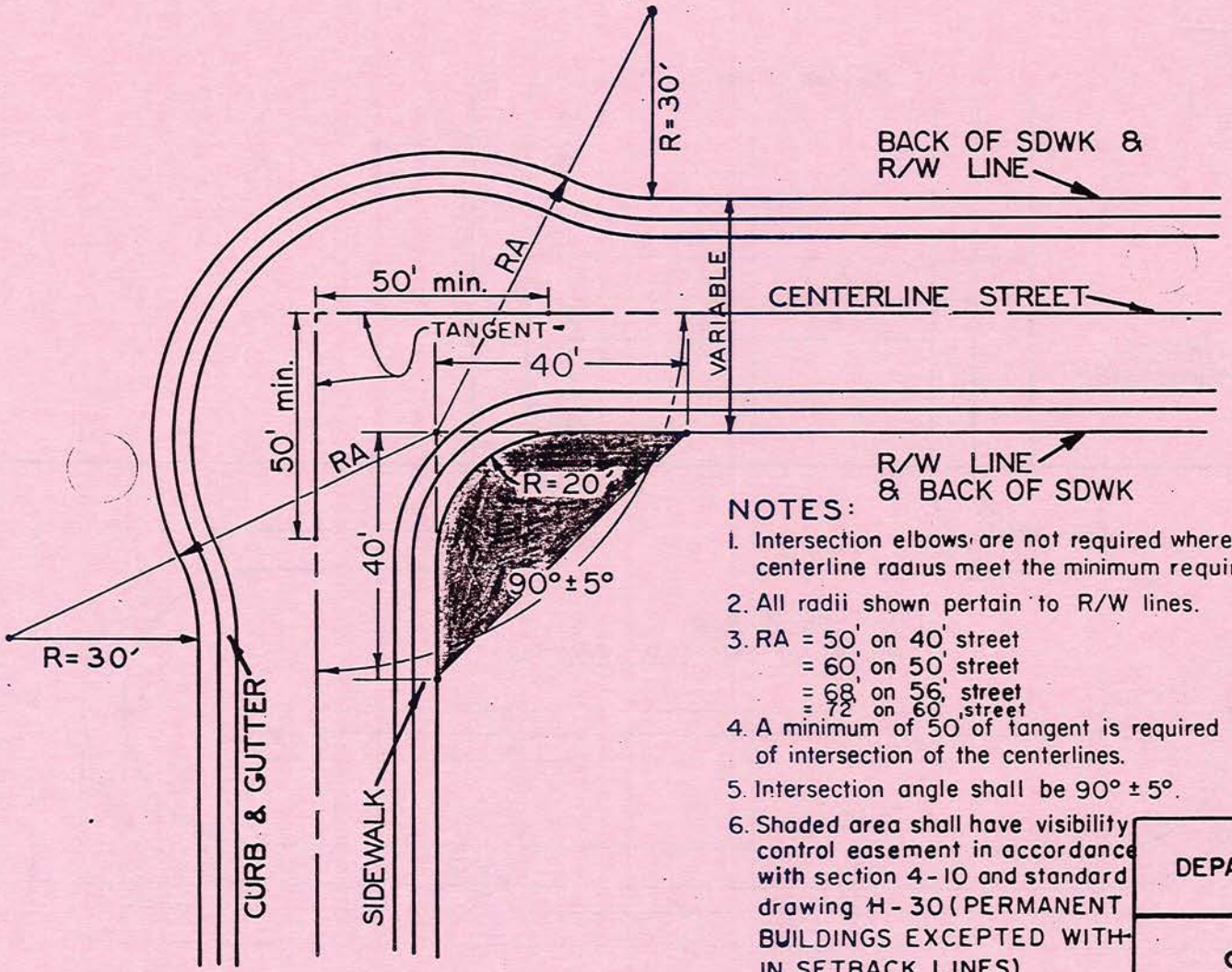
DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

HAMMER-HEAD DESIGN

DRAWN BY: M.T.
SCALE: NONE
DATE: 7-88

H-20A



NOTES:

1. Intersection elbows are not required where the centerline radius meet the minimum requirements in section 4-9
2. All radii shown pertain to R/W lines.
3. RA = 50' on 40' street
   = 60' on 50' street
   = 68' on 56' street
   = 72' on 60' street
4. A minimum of 50' of tangent is required from the point of intersection of the centerlines.
5. Intersection angle shall be 90° ± 5°.
6. Shaded area shall have visibility control easement in accordance with section 4-10 and standard drawing H-30 (PERMANENT BUILDINGS EXCEPTED WITHIN SETBACK LINES)

Douglas M. Kramer

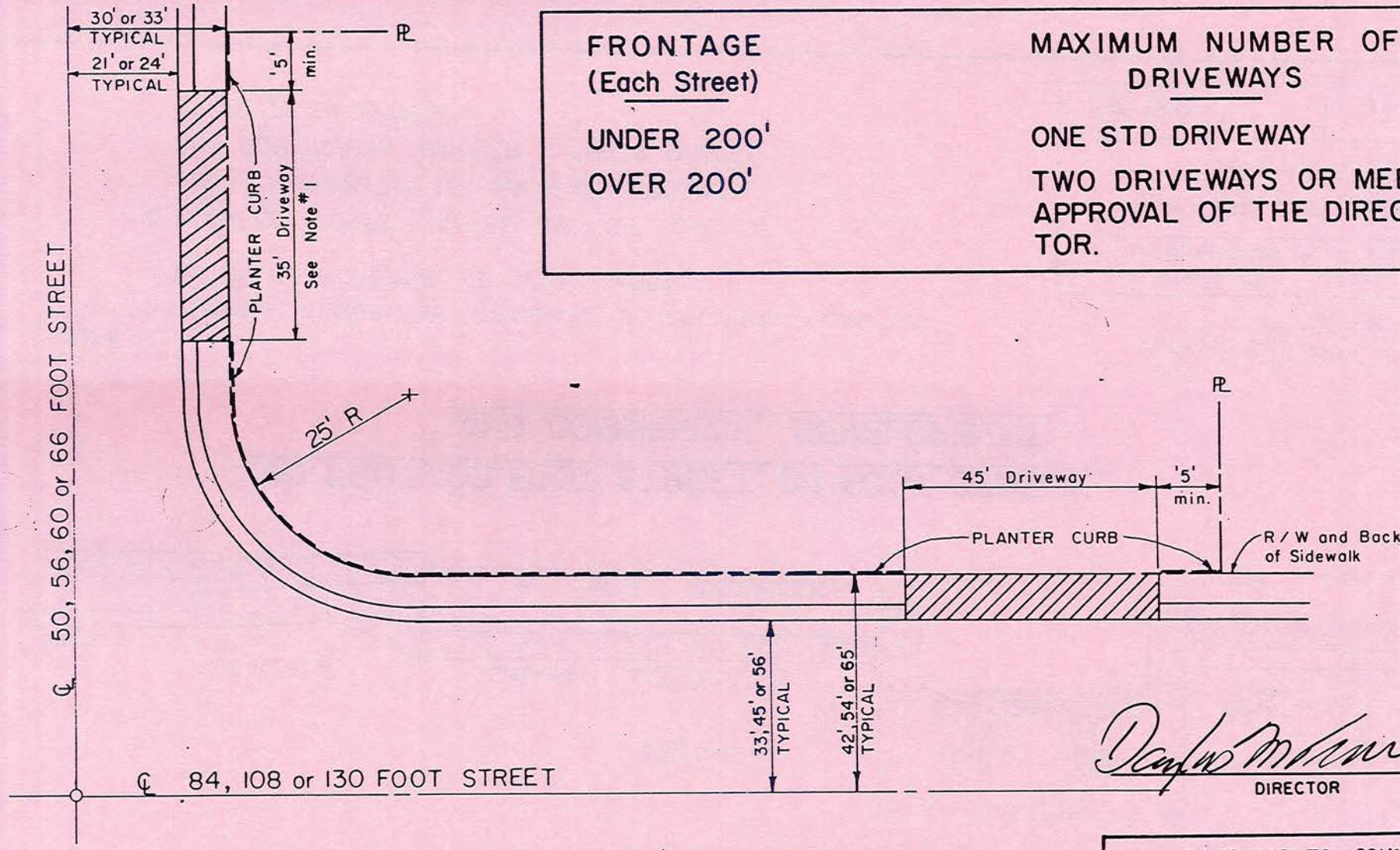
DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

90° INTERSECTION ELBOW

Scale: NONE
Date: 9-88
Drawn By: M.f.

H-21



FRONTAGE (Each Street)	MAXIMUM NUMBER OF DRIVEWAYS
UNDER 200'	ONE STD DRIVEWAY
OVER 200'	TWO DRIVEWAYS OR MEET APPROVAL OF THE DIRECTOR.

Douglas M. Kamman
DIRECTOR

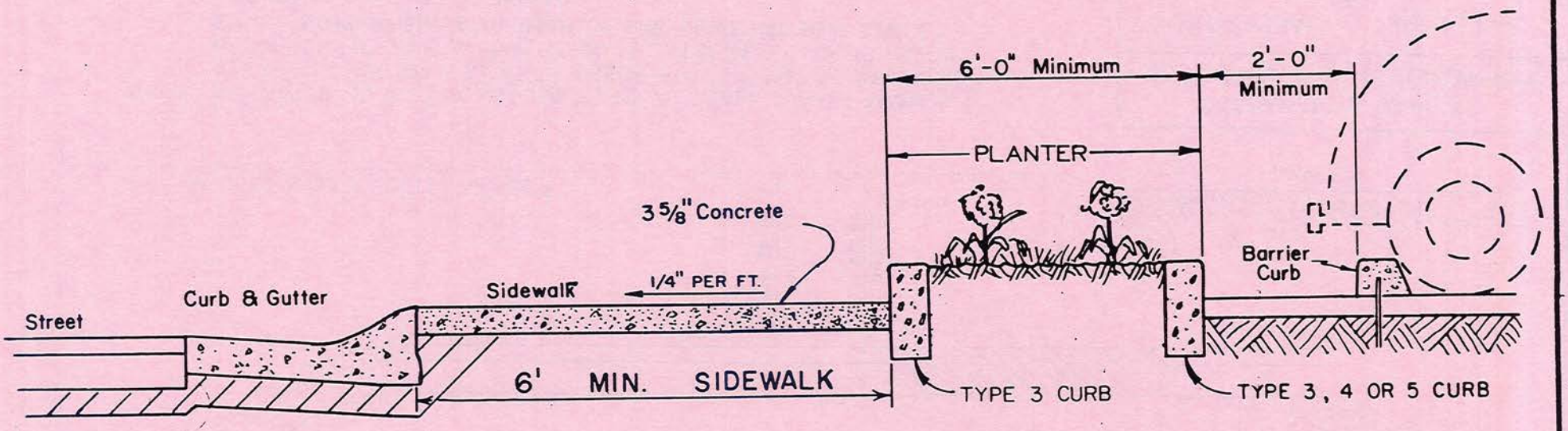
Note: DRIVEWAYS ON 84', 108', AND 130' STREETS SHALL HAVE A MINIMUM CLEAR SPACING OF 150 FEET. LESSER SPACING MAY BE APPROVED BY THE DIRECTOR FOR UNAVOIDABLE, EXTREME CONDITIONS, ON SMALL LOTS WHERE A MINIMUM OF ONE DRIVEWAY PER STREET FRONTAGE WILL BE PROVIDED.

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

COMMERCIAL FRONTAGE AND DRIVEWAY REGULATIONS

DRAWN BY: M.T.
SCALE: NONE
DATE 7-88

H-22



130 FOOT, 108 FOOT STREET, 84 FOOT STREET, AND COMMERCIAL DEVELOPMENT

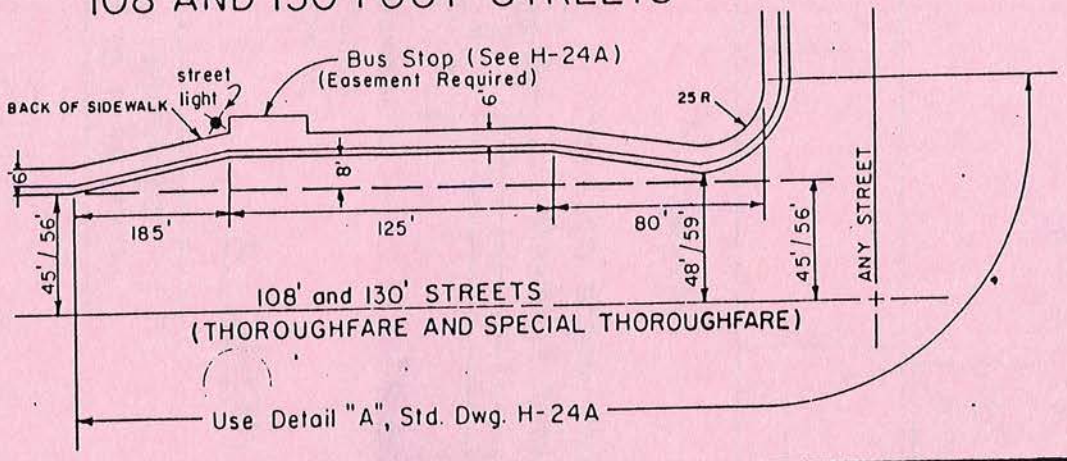
NOTES:

1. BARRIER CURBS ARE OPTIONAL IF REQUIRED PLANTER WIDTH IS INCREASED 2'-6" OR MORE.
2. PLANTER CURBS MAY BE OMITTED ONLY IF LAWN IS PLANTED TO BACK OF SIDEWALK AND CONTINUOUS BARRIER CURB IS PLACED AT LOCATION SHOWN.

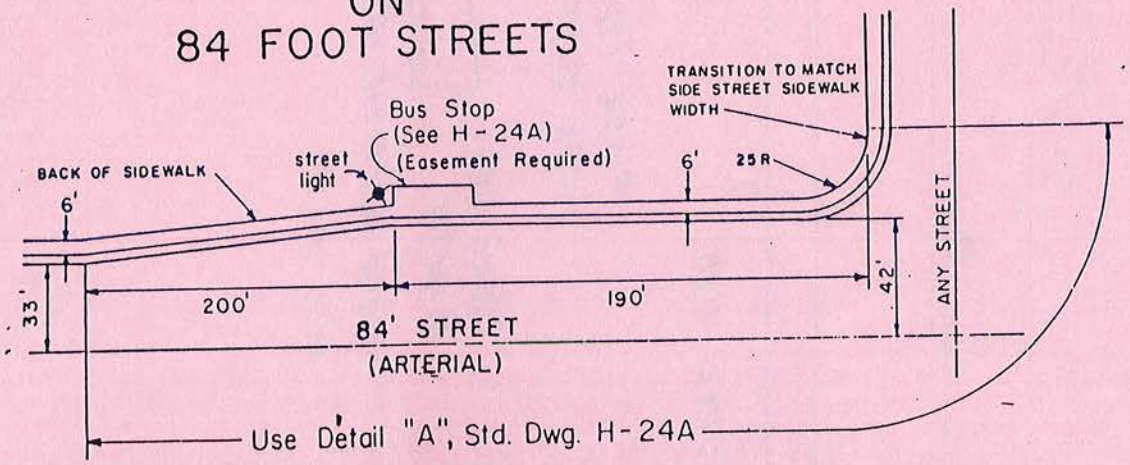
DIRECTOR

SACRAMENTO COUNTY DEPARTMENT OF PUBLIC WORKS	
PLANTER AND BARRIER CURB DETAILS	
SCALE: NO SCALE DATE: 7-88 DRAWN BY:	H-23

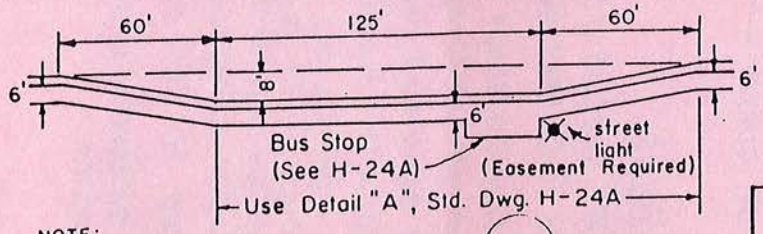
BUS TURNOUT ON 108 AND 130 FOOT STREETS



BUS TURNOUT ON 84 FOOT STREETS



TYPICAL MID-BLOCK BUS TURNOUT



NOTE:

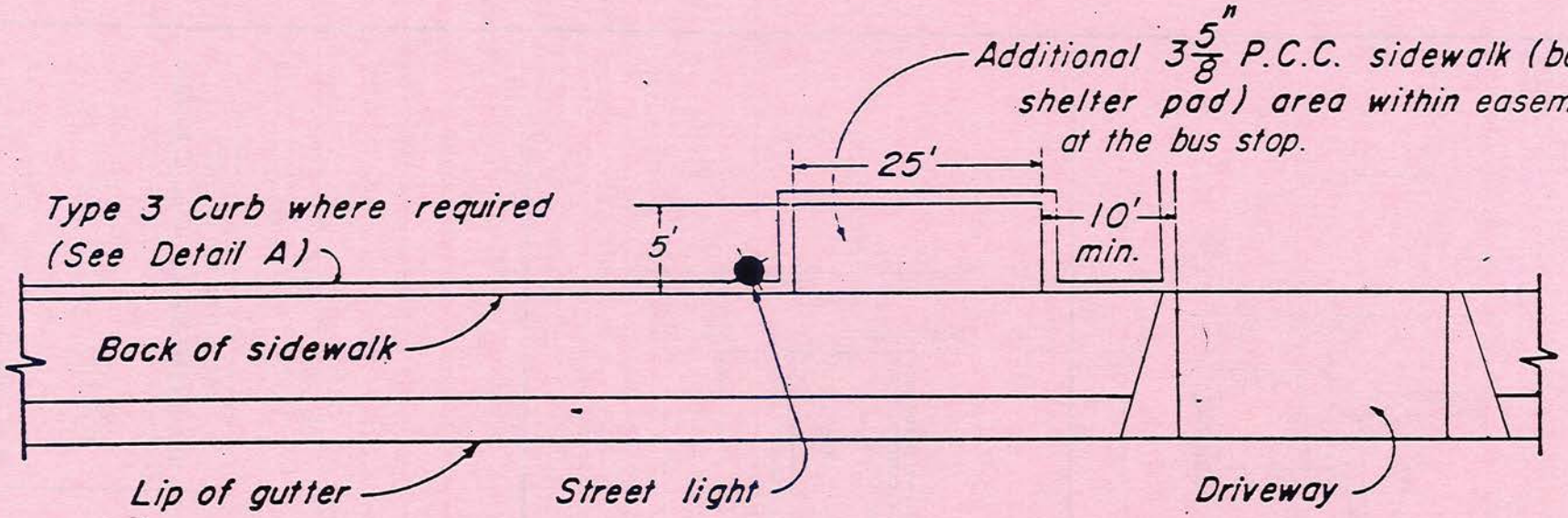
1. BUS STOPS AT INTERSECTIONS OF 84' STREETS, 110' STREETS, 130' STREETS ARE PROVIDED FOR BY STANDARD INTERSECTION WIDENING. (DRAWING H-25).
2. THE DIMENSIONS SHOWN ARE MINIMUM STANDARDS, THE DIRECTOR MAY DETERMINE LONGER WIDENING TO BE NECESSARY AT CERTAIN SPECIAL CASE IMPORTANT INTERSECTIONS WHERE DOCUMENTATION WAS MADE PRIOR TO SUBMITTAL OF PLANS.

DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

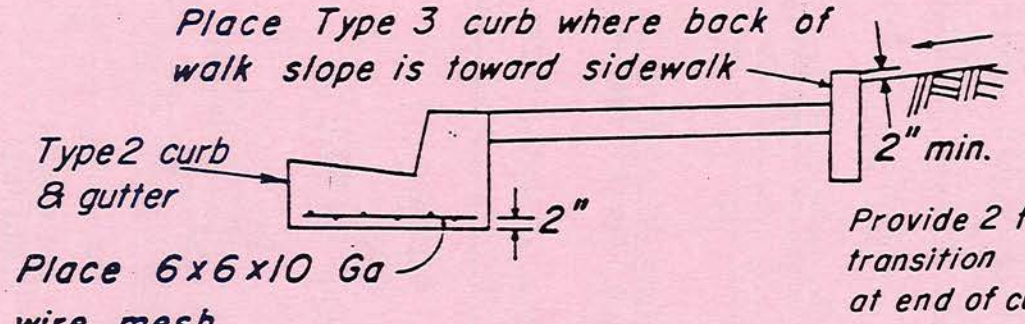
BUS TURNOUT

DRAWN BY: M.T. SCALE: NONE DATE: 1 - 89	H-24



Notes

1. Detail 'A' section shall be used for 100 feet each side of bus stops without turnouts. The wire mesh reinforcing steel shall be continued across any driveways within the 100 foot distance from the bus stop.
2. See drawing H-24 for application of Detail A at bus stop turnouts.
3. Place Under-Sidewalk Drains (Std. Dwg. H-35) at all behind-sidewalk drainage catch points.



DETAIL A

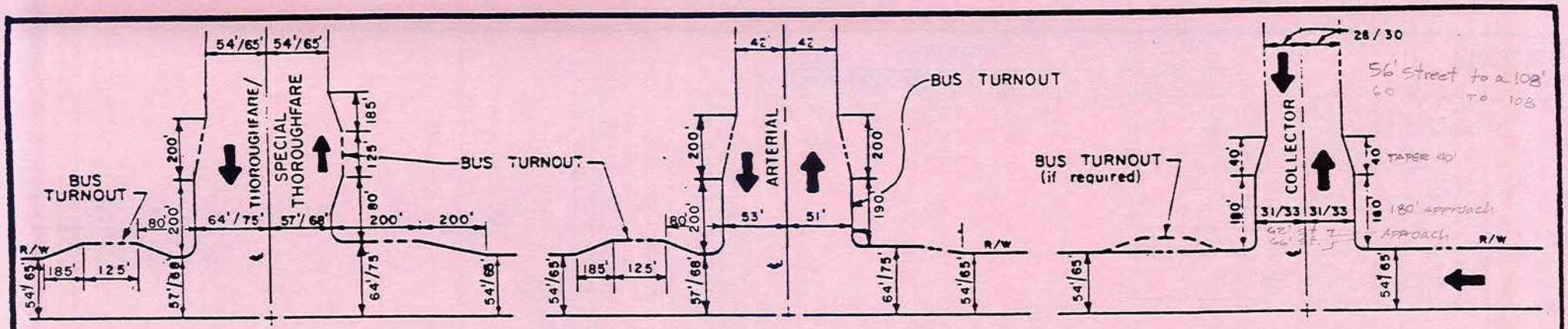
Douglas M Warren
DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

BUS STOP

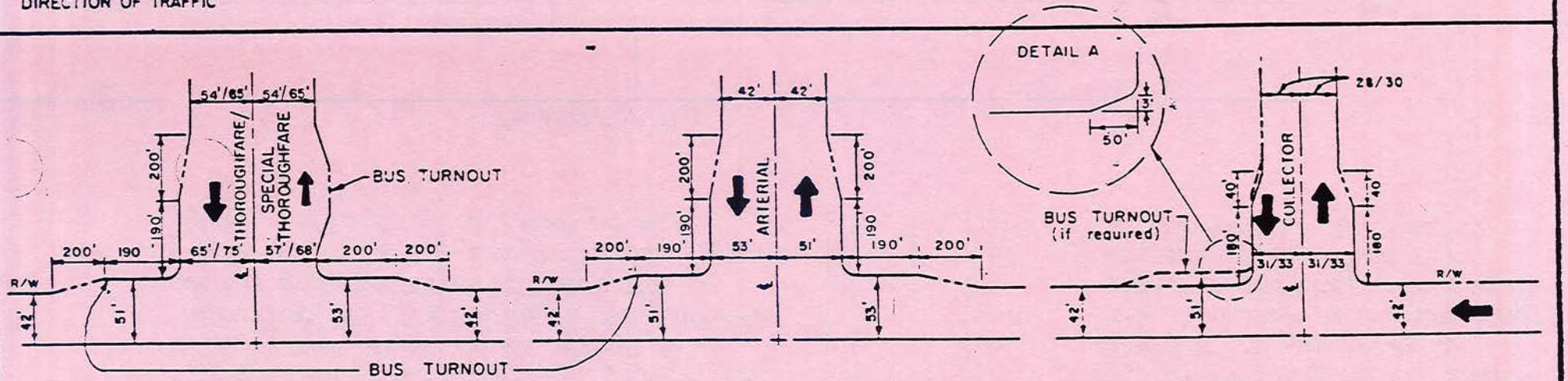
DRAWN BY: M.T.
SCALE: NONE
DATE: 7-88

H-24A



(THOROUGHFARE) 108' STREET / (SPECIAL THOROUGHFARE) 130' STREET

DIRECTION OF TRAFFIC



(ARTERIAL) 84' STREET

STD. STREET WIDTHS

SPECIAL THOROUGHFARE	65'	℄ to R/W
Thoroughfare	54'	℄ to R/W
Arterial	42'	℄ to R/W
Collector	28' or 30'	℄ to R/W

Douglas M. Vann
DIRECTOR

GENERAL NOTES:

1) Radius at corners of all intersections is 25'.
2) Widening not usually required at Collector/Collector and smaller intersections.
3) See Bus Turnout Standard for dimensions.
4) Detail A also applies to 50' streets approaching 84' and larger streets.
5) Pedestrian easements per Std. Dwg. H-5B and H-24 are also required.
6) Type 2 curb and gutter shall be required within all curb return areas, and at all bus turnouts as shown on Std. drawings H-24 & H-24A.
7) Detail A applies only where there is no bus turnout.

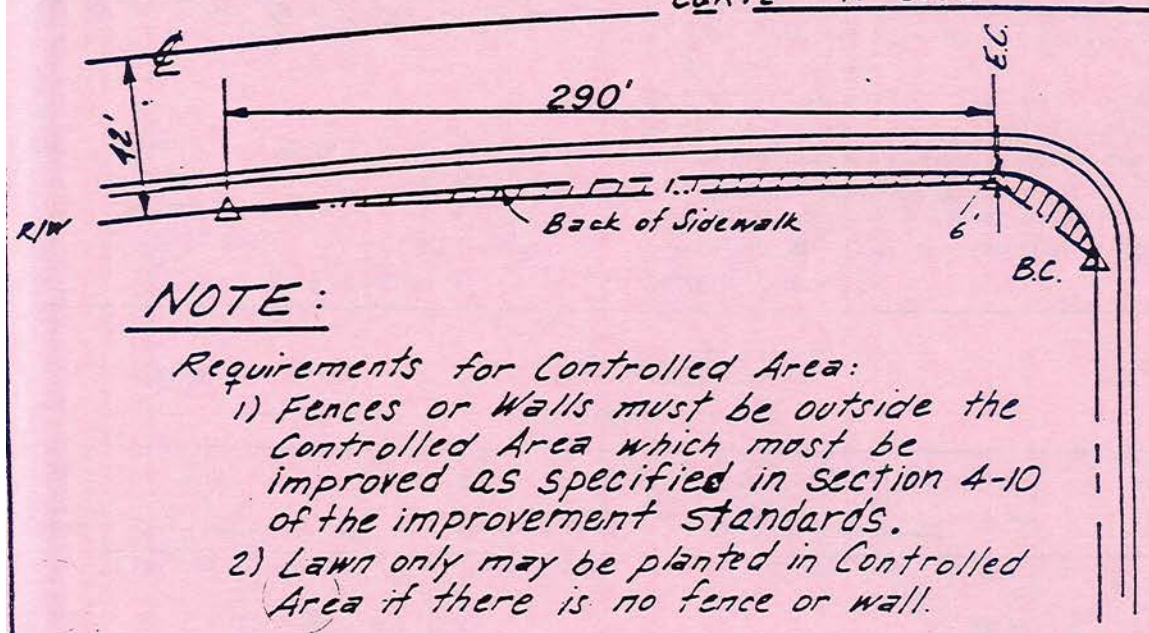
SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

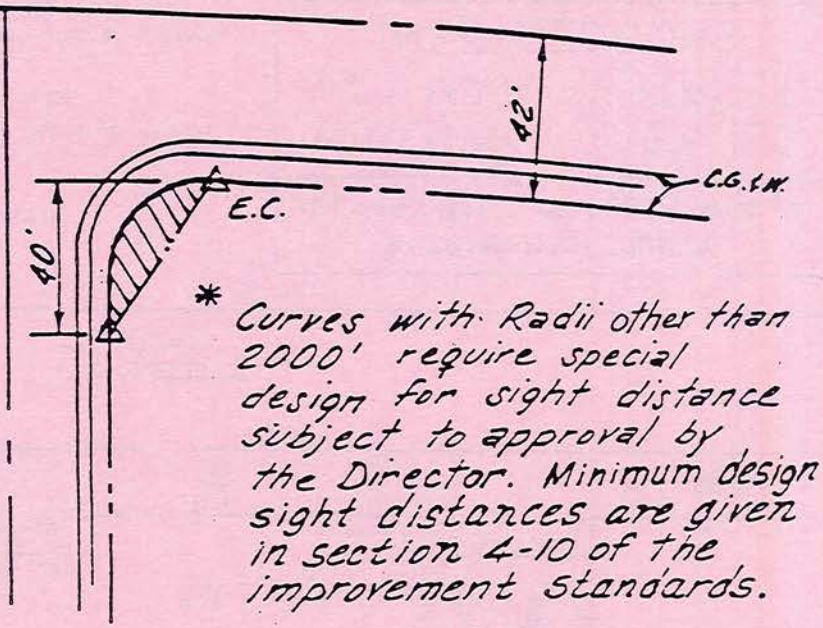
WIDENING DETAILS AT MAJOR STREET INTERSECTIONS

Scale: None
Date: 1-89 M.T.

H-25

CURVE R = 2000' *





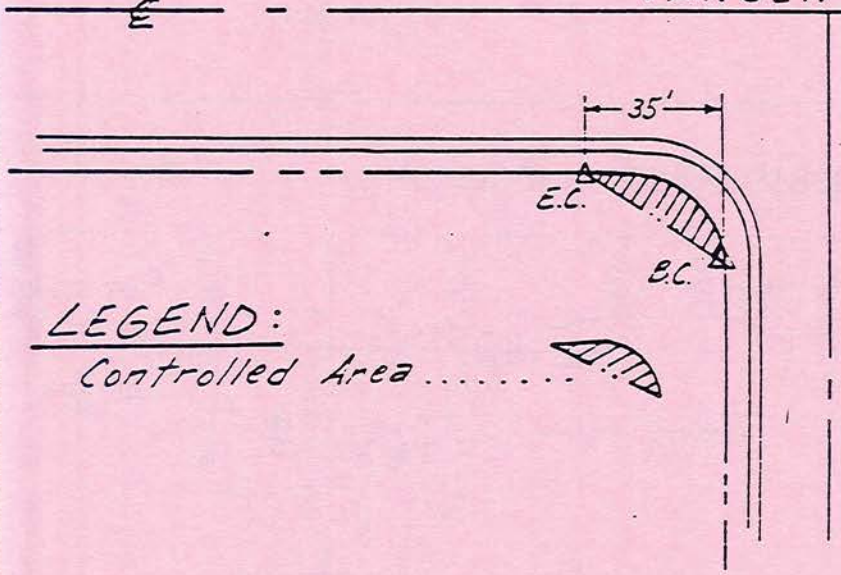
NOTE:

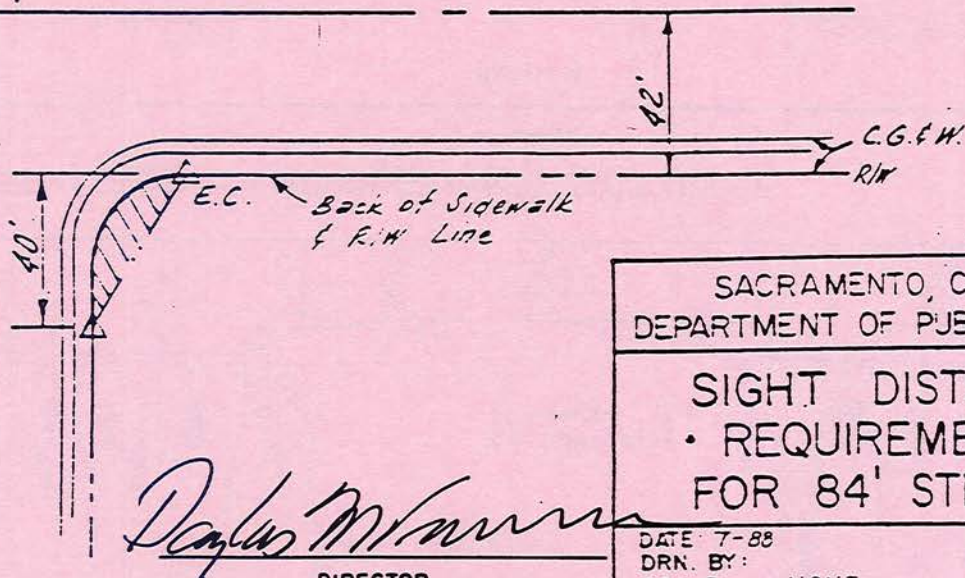
Requirements for Controlled Area:

1) Fences or Walls must be outside the Controlled Area which most be improved as specified in section 4-10 of the improvement standards.
2) Lawn only may be planted in Controlled Area if there is no fence or wall.

* Curves with Radii other than 2000' require special design for sight distance subject to approval by the Director. Minimum design sight distances are given in section 4-10 of the improvement standards.

TANGENT





LEGEND:

Controlled Area .....

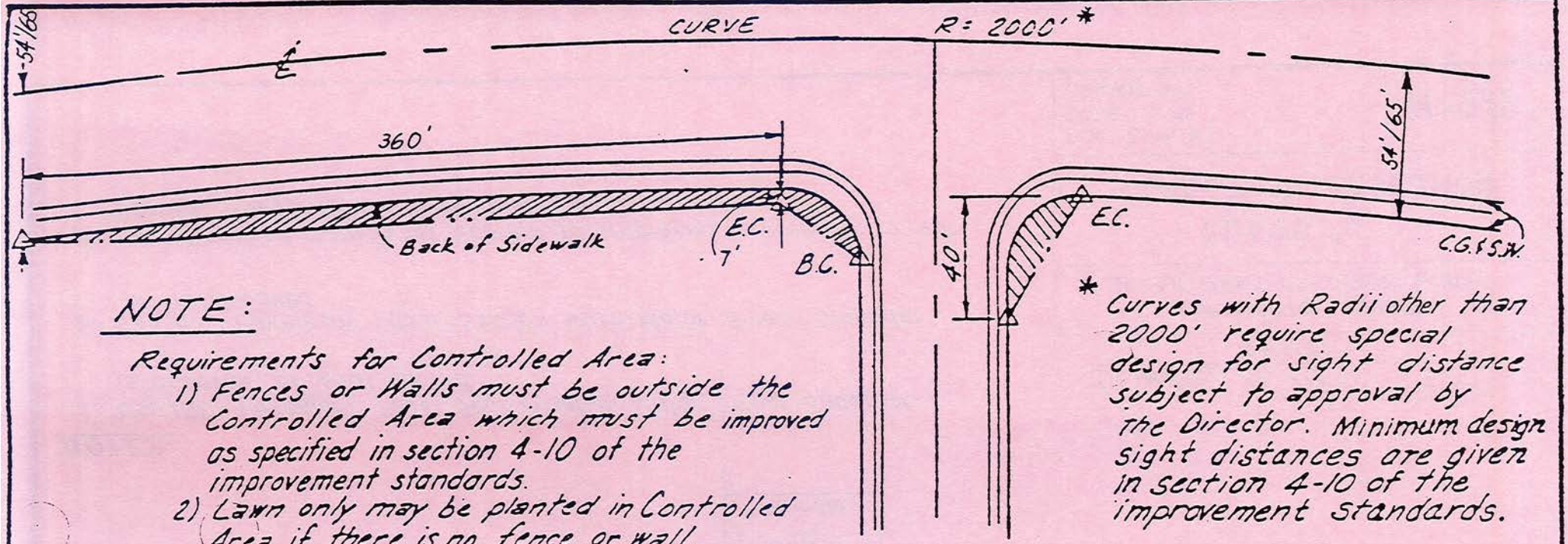
Douglas M. Vanna
DIRECTOR

SACRAMENTO, COUNTY
DEPARTMENT OF PUBLIC WORKS

SIGHT DISTANCE • REQUIREMENTS FOR 84' STREETS

DATE: 7-88
DRN. BY:
SCALE: NONE

H-26

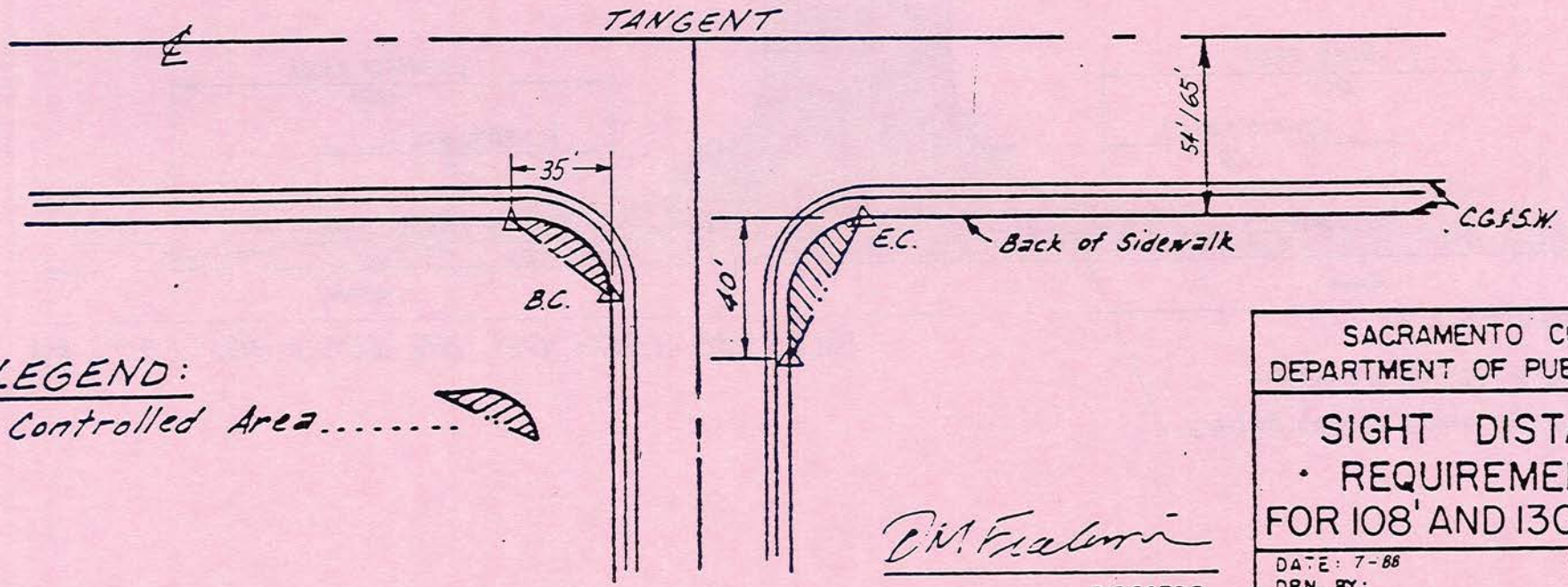


NOTE:

Requirements for Controlled Area:

1) Fences or Walls must be outside the Controlled Area which must be improved as specified in section 4-10 of the improvement standards.
2) Lawn only may be planted in Controlled Area if there is no fence or wall.

* Curves with Radii other than 2000' require special design for sight distance subject to approval by the Director. Minimum design sight distances are given in section 4-10 of the improvement standards.



LEGEND:

Controlled Area.....

D.M. Fraser

DIRECTOR

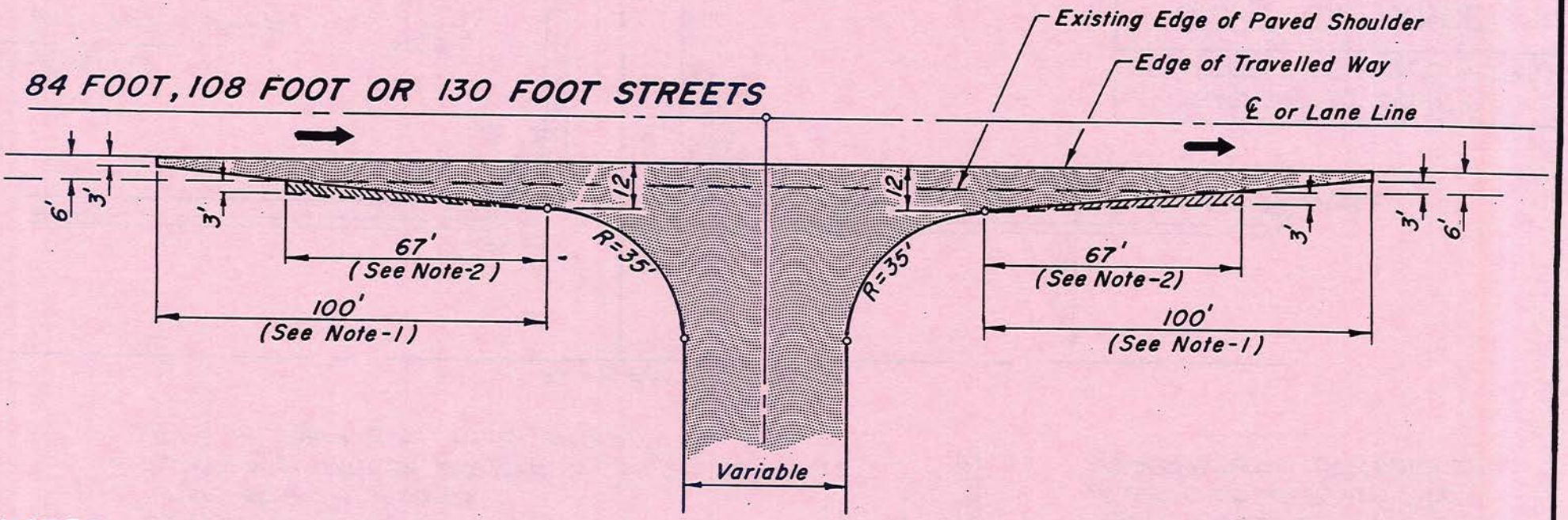
SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

SIGHT DISTANCE REQUIREMENTS FOR 108' AND 130' STEETS

DATE: 7-88
DRN. BY:
SCALE: NONE

H-27

84 FOOT, 108 FOOT OR 130 FOOT STREETS



NOTES:

1. Use 100' Pavement Taper Section when Major Street Shoulder is unpaved or seal coated.
2. Use 67' Pavement Taper Section when Major Street Shoulder is fully paved.
3. Full Roadbed Structural Section to be placed in accordance with County Standards for Area to be paved.

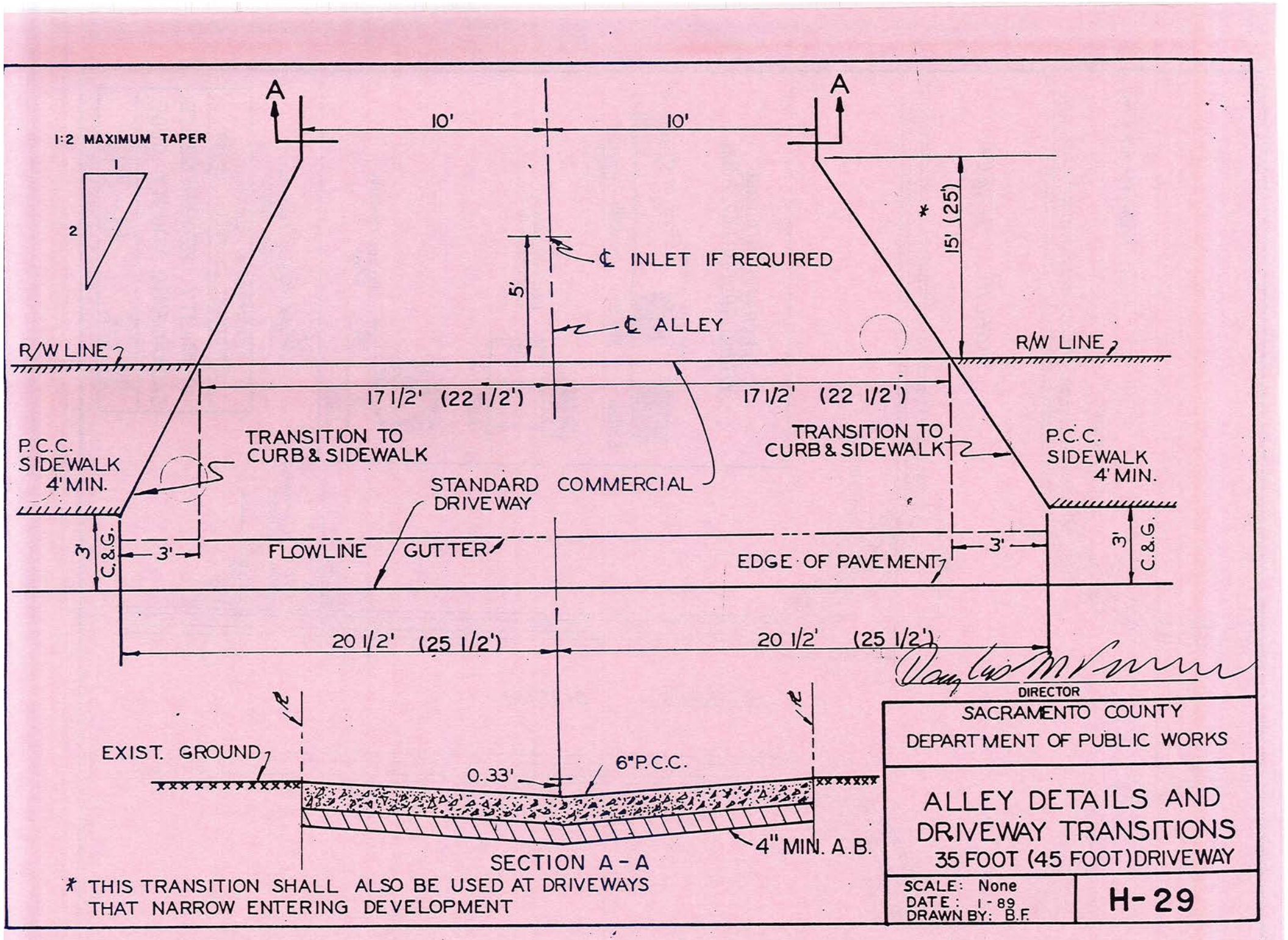
Douglas M. Shoemaker
DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

CLASS "C"
STREET INTERSECTION

SCALE: NONE
DATE: 7-88
DRAWN BY:

H-28



* THIS TRANSITION SHALL ALSO BE USED AT DRIVEWAYS THAT NARROW ENTERING DEVELOPMENT

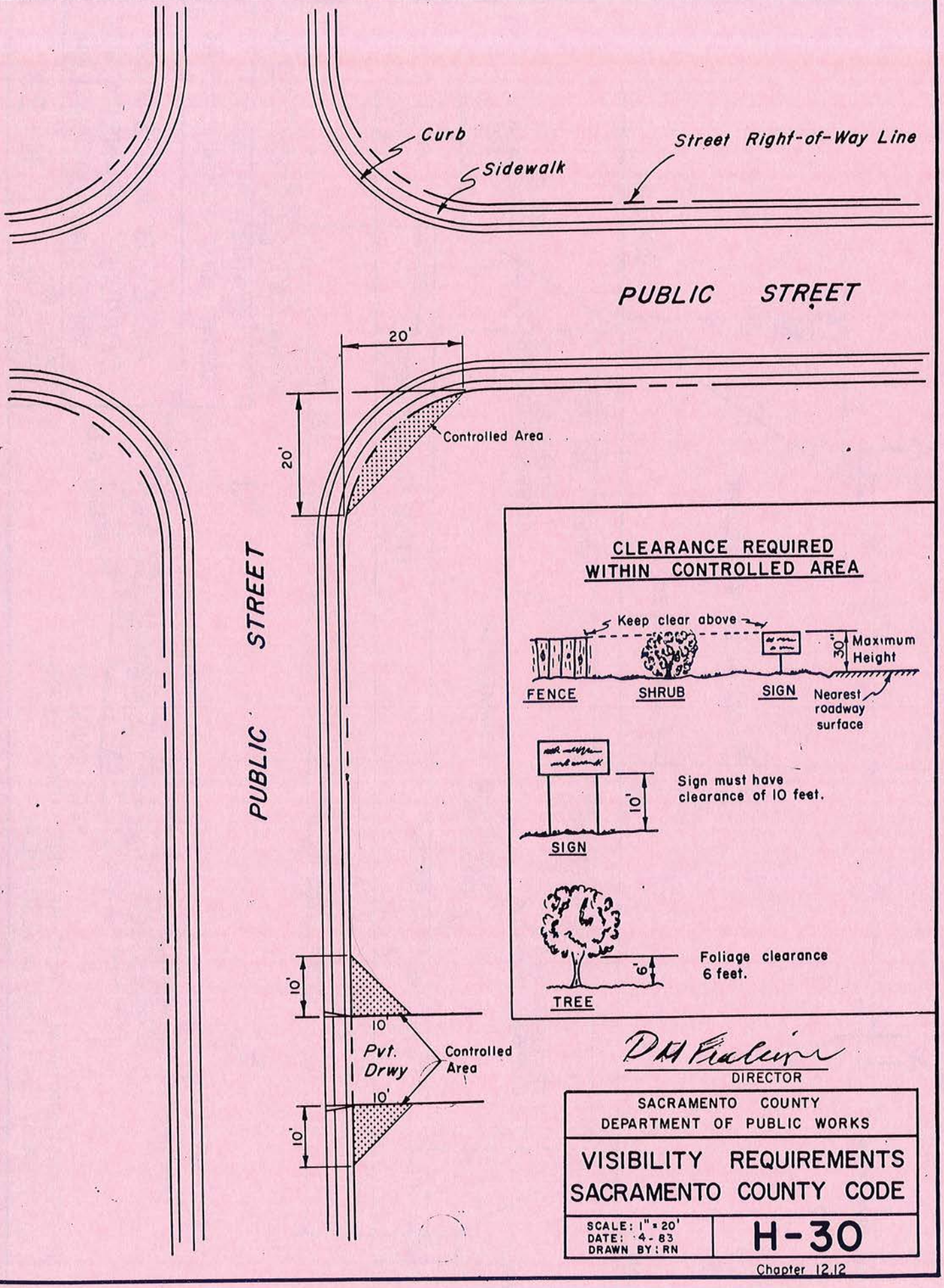
DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

ALLEY DETAILS AND DRIVEWAY TRANSITIONS
35 FOOT (45 FOOT) DRIVEWAY

SCALE: None
DATE: 1-89
DRAWN BY: B.F.

H-29


Curb
Sidewalk
Street Right-of-Way Line
PUBLIC STREET
20'
20'
Controlled Area
PUBLIC STREET
10'
10'
Pvt. Drwy
Controlled Area
10'
10'
CLEARANCE REQUIRED WITHIN CONTROLLED AREA
Keep clear above
30"
Maximum Height
FENCE
SHRUB
SIGN
Nearest roadway surface
10'
Sign must have clearance of 10 feet.
SIGN
6'
Foliage clearance 6 feet.
TREE
DIRECTOR
SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS
VISIBILITY REQUIREMENTS
SACRAMENTO COUNTY CODE
SCALE: 1" = 20'
DATE: 4-83
DRAWN BY: RN
H-30
Chapter 12.12

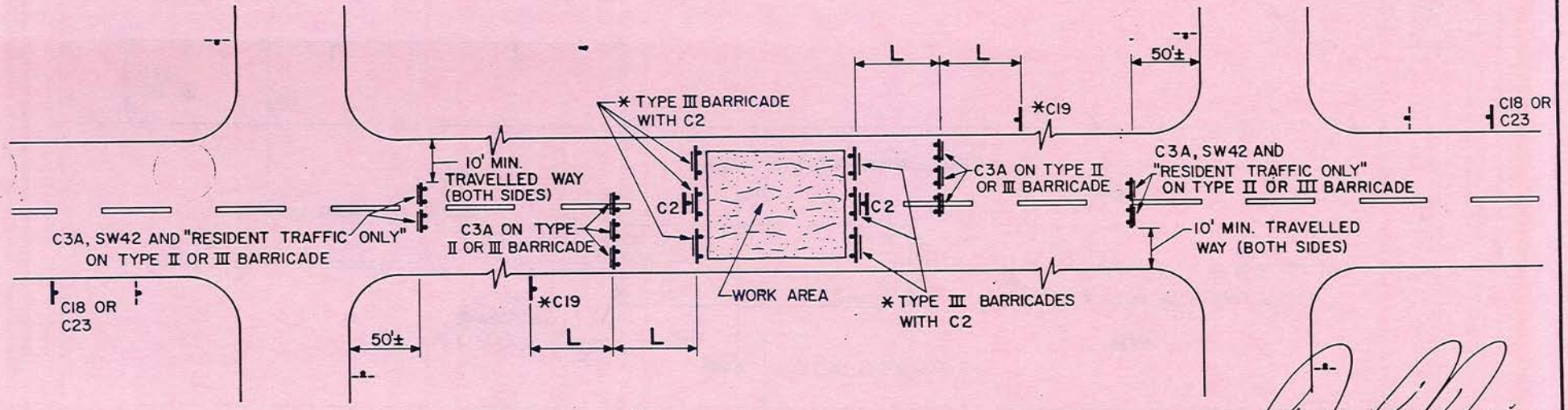
SPECIAL NOTE:

Field conditions could require deviations from these plans and accompanying notes. Deviations must be submitted to the engineer in writing prior to start of work.

NOTES:

1. Does not apply where there are emergency conditions. Under emergency conditions, equipment and personnel which are available should be utilized to implement a closure even though such closure does not meet the standards contained in this plan. As equipment or personnel become available an immediate effort should then be made to implement the standards shown on this plan.
2. All advance warning signs shall be reflectorized.
3. Warning (W) series signs used in work zones shall be black on orange.
4. Refer to sec. G6-09 of County Standard Spec. for sign size, etc..

SPECIAL NOTE: ONLY USED IF APPROVED ON PLANS. PROVIDE NOTICE TO CONSTRUCTION INSPECTION FOUR WORKING DAYS PRIOR TO CLOSURE.



S=POSTED LIMIT (mph)	L (ft.)
25	250
30	250
35	450
40	450
45	450
50	600
55	600

-▼- DETOUR SIGNS (C5) MAY BE REQUIRED BY TRAFFIC ENGINEER.

* USE WITH FLASHERS AT NIGHT

NOTE: COMPLETE CLOSURE OF ROAD SHOULD BE LOCATED WITH CONSIDERATION TO TURN AROUND SPACE AND ALLOWING ACCESS TO DRIVEWAYS.

for DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

TYPICAL ROAD CLOSURE SIGNING AND DELINEATION

SCALE: NONE
DATE: 10-86
DRAWN BY: G.C. D.L.

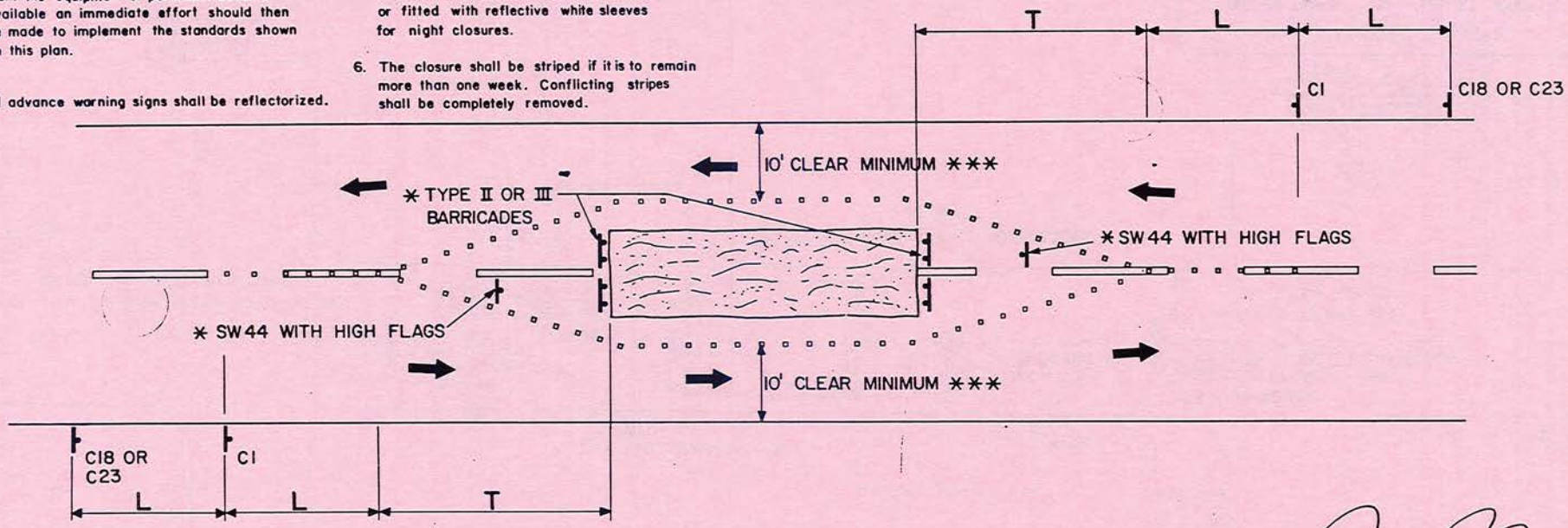
H-31

SPECIAL NOTE:

Field conditions could require deviations from these plans and accompanying notes.
Deviations must be submitted to the engineer in writing prior to start of work.

NOTES:

1. Does not apply where there are emergency conditions. Under emergency conditions, equipment and personnel which are available should be utilized to implement a closure even though such closure does not meet the standards contained in this plan. As equipment or personnel become available an immediate effort should then be made to implement the standards shown on this plan.
2. All advance warning signs shall be reflectorized.
3. Warning (W) series signs used in work zones shall be black on orange.
4. Refer to sec. G6-12 of County Standard Spec. for sign size, etc..
5. All cones shall be internally illuminated or fitted with reflective white sleeves for night closures.
6. The closure shall be striped if it is to remain more than one week. Conflicting stripes shall be completely removed.
7. The maximum spacing between channelizing devices outside of a taper should be approximately 50 feet.



TAPER (T) = S x W (WHERE S≥45 MPH)
TAPER (T) = $\frac{WS^2}{60}$ (WHERE S<45 MPH)
W = WIDTH OF OFFSET

* USE WITH FLASHERS AT NIGHT.

*** PROHIBIT PARKING AS NECESSARY TO MAINTAIN 10' MIN. LANES.

S=POSTED LIMIT (mph)	L (ft.)	CONE SPACING ALONG TAPER (max. ft.)
25	250	25
30	250	30
35	450	35
40	450	40
45	450	45
50	600	50
55	600	50

for DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

TYPICAL LANE CLOSURE SIGNING AND DELINEATION

TWO LANES
BOTH LANES REMAIN OPEN

SCALE: NONE
DATE: 10-86
DRAWN BY: G.C. D.L.

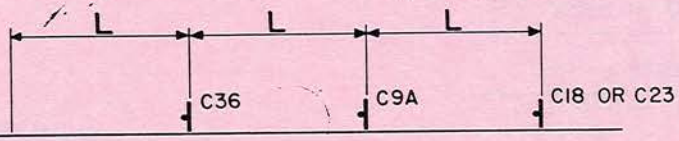
H-32

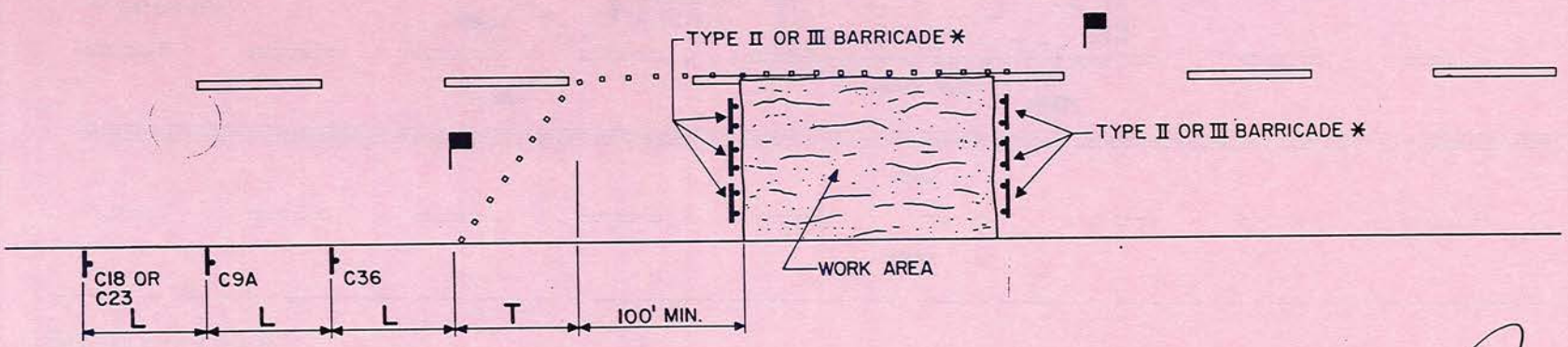
SPECIAL NOTE:

Field conditions could require deviations from these plans and accompanying notes. Deviations must be submitted to the engineer in writing prior to start of work.

NOTES:

1. Does not apply where there are emergency conditions. Under emergency conditions, equipment and personnel which are available should be utilized to implement a closure even though such closure does not meet the standards contained in this plan. As equipment or personnel become available an immediate effort should then be made to implement the standards shown on this plan.
2. All advance warning signs shall be reflectorized.
3. Warning (W) series signs used in work zones shall be black on orange.
4. Refer to sec. G6-12 of County Standard Spec. for sign size, etc..
5. All cones shall be internally illuminated or fitted with reflective white sleeves for night closures.
6. An additional advance flagger should be considered upstream on streets to warn traffic where queues may develop.
7. For use ONLY on minor, low volume (ADT≤ 5,000) streets during daylight hours.
8. During hours of darkness, flagger station shall be illuminated such that the flagger will be clearly visible to traffic. (5-07.3 Traffic Manual)
9. The closure shall be striped if it is to remain more than one week. Conflicting stripes shall be completely removed.
10. The maximum spacing between channelizing devices outside of a taper should be approximately 50 feet.





S=POSTED LIMIT (mph)	L (ft.)	CONE SPACING ALONG TAPER (max. ft.)
25	250	25
30	250	30
35	450	35
40	450	40
45	450	45
50	600	50
55	600	50

TAPER (T) = S x W (WHERE S≥45 MPH)
TAPER (T) = $\frac{WS^2}{60}$ (WHERE S<45 MPH)
W = WIDTH OF OFFSET
⚑ = FLAGMAN REQUIRED

* USE WITH FLASHERS AT NIGHT.

for DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

TYPICAL LANE CLOSURE SIGNING AND DELINEATION

TWO LANES - ONE LANE CLOSED
FLAG PERSON CONTROL

SCALE: NONE
DATE: 10-86
DRAWN BY: G.C. D.L.

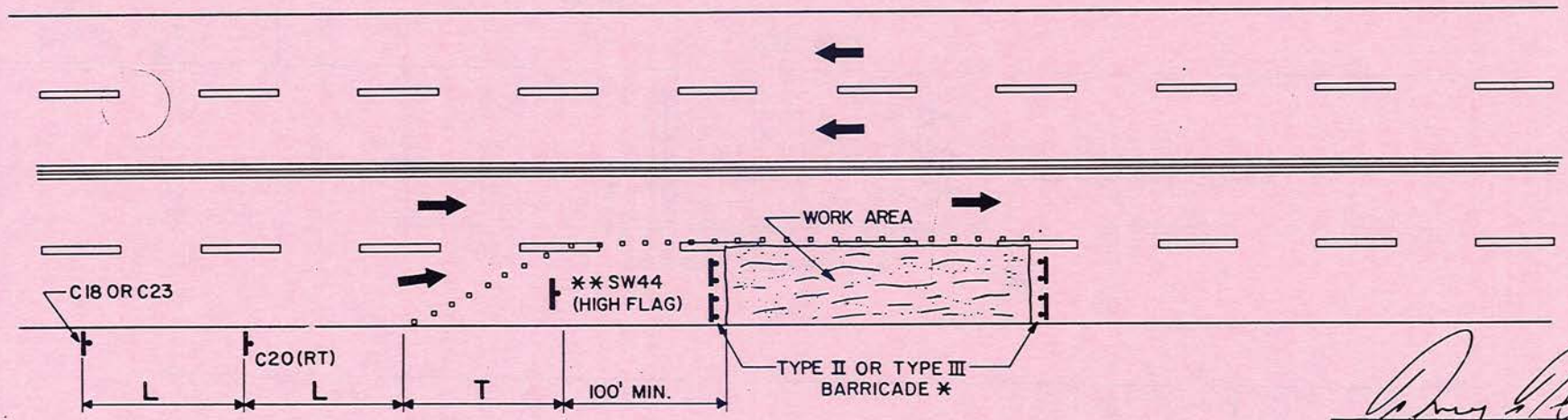
H-32A

SPECIAL NOTE:

Field conditions could require deviations from these plans and accompanying notes. Deviations must be submitted to the engineer in writing prior to start of work.

NOTES:

1. Does not apply where there are emergency conditions. Under emergency conditions, equipment and personnel which are available should be utilized to implement a closure even though such closure does not meet the standards contained in this plan. As equipment or personnel become available an immediate effort should then be made to implement the standards shown on this plan.
2. All advance warning signs shall be reflectorized.
3. Warning (W) series signs used in work zones shall be black on orange.
4. Refer to sec. G6-12 of County Standard Spec. for sign size, etc..
5. All cones shall be internally illuminated or fitted with reflective white sleeves for night closures.
6. The closure shall be striped if it is to remain more than one week. Conflicting stripes shall be completely removed.
7. The maximum spacing between channelizing devices outside of a taper should be approximately 50 feet.



for DIRECTOR

S=POSTED LIMIT (mph)	L (ft.)	CONE SPACING ALONG TAPER (max. ft.)
25	250	25
30	250	30
35	450	35
40	450	40
45	450	45
50	600	50
55	600	50

TAPER (T) = S x W (WHERE S≥45 MPH)
TAPER (T) = $\frac{WS^2}{60}$ (WHERE S<45 MPH)
W = WIDTH OF OFFSET

* USE WITH FLASHERS AT NIGHT.

** FLASHING ARROW SIGN MAY BE REQUIRED PER SECTION G6-09 OF COUNTY STANDARD SPEC..

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

TYPICAL LANE CLOSURE SIGNING AND DELINEATION

FOUR LANE – ONE LANE CLOSED

SCALE: NONE
DATE: 10-86
DRAWN BY: G.C. D.L.

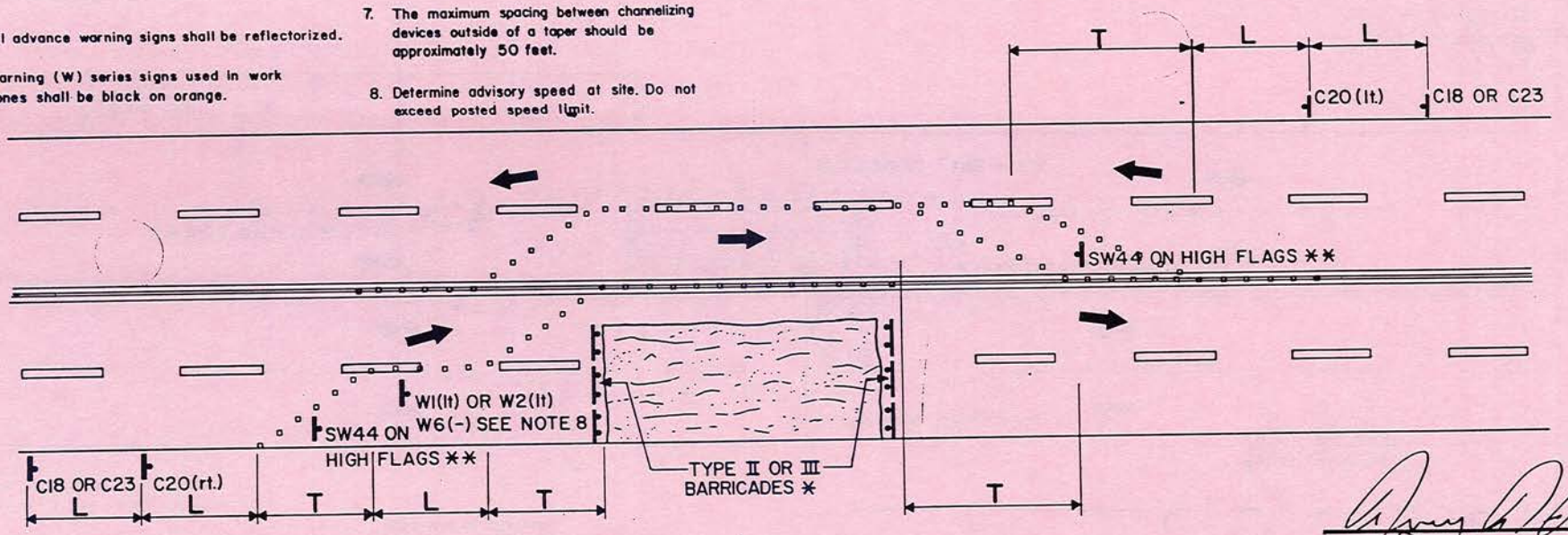
H-33

SPECIAL NOTE:

Field conditions could require deviations from these plans and accompanying notes. Deviations must be submitted to the engineer in writing prior to start of work.

NOTES:

1. Does not apply where there are emergency conditions. Under emergency conditions, equipment and personnel which are available should be utilized to implement a closure even though such closure does not meet the standards contained in this plan. As equipment or personnel become available an immediate effort should then be made to implement the standards shown on this plan.
2. All advance warning signs shall be reflectorized.
3. Warning (W) series signs used in work zones shall be black on orange.
4. Refer to sec. G6-12 of County Standard Spec. for sign size, etc..
5. All cones shall be internally illuminated or fitted with reflective white sleeves for night closures.
6. The closure shall be striped if it is to remain more than one week. Conflicting stripes shall be completely removed.
7. The maximum spacing between channelizing devices outside of a taper should be approximately 50 feet.
8. Determine advisory speed at site. Do not exceed posted speed limit.



S=POSTED LIMIT (mph)	L (ft.)	CONE SPACING ALONG TAPER (max. ft.)
25	250	25
30	250	30
35	450	35
40	450	40
45	450	45
50	600	50
55	600	50

TAPER (T) = S x W (WHERE S≥45 MPH)
TAPER (T) = $\frac{WS^2}{60}$ (WHERE S<45 MPH)
W = WIDTH OF OFFSET

* USE WITH FLASHERS AT NIGHT.

** FLASHING ARROW SIGN MAY BE REQUIRED PER SECTION G6-09 OF COUNTY STANDARD SPEC..

for DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

TYPICAL LANE CLOSURE SIGNING AND DELINEATION

FOUR LANE - TWO LANES CLOSED

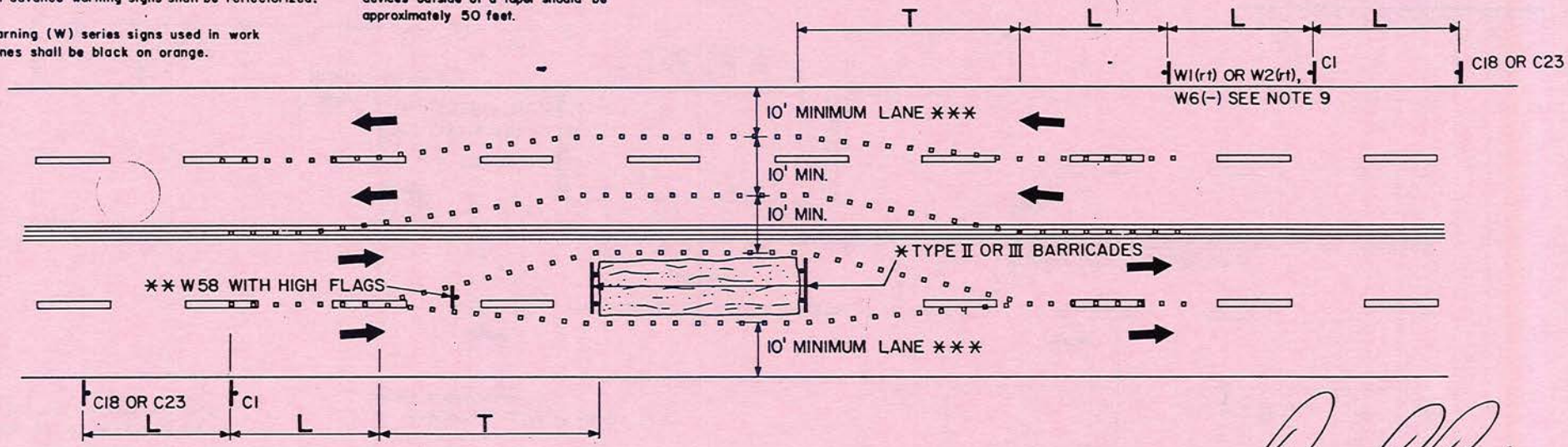
SCALE: NONE
DATE: 10-86
DRAWN BY: G.C. D.L.

H-33A

SPECIAL NOTE:

Field conditions could require deviations from these plans and accompanying notes. Deviations must be submitted to the engineer in writing prior to start of work.

1. Does not apply where there are emergency conditions. Under emergency conditions, equipment and personnel which are available should be utilized to implement a closure even though such closure does not meet the standards contained in this plan. As equipment or personnel become available an immediate effort should then be made to implement the standards shown on this plan.
2. All advance warning signs shall be reflectorized.
3. Warning (W) series signs used in work zones shall be black on orange.
4. Refer to sec. G6-12 of County Standard Spec. for sign size, etc..
5. All cones shall be internally illuminated or fitted with reflective white sleeves for night closures.
6. The closure shall be striped if it is to remain more than one week. Conflicting stripes shall be completely removed.
7. The maximum spacing between channelizing devices outside of a taper should be approximately 50 feet.
8. This closure assumes volumes in excess of single lane capacity.
9. Determine advisory speed at site. Do not exceed posted speed limit.



for DIRECTOR

S= POSTED LIMIT (mph)	L (ft.)	CONE SPACING ALONG TAPER (max. ft.)
25	250	25
30	250	30
35	450	35
40	450	40
45	450	45
50	600	50
55	600	50

TAPER (T) = S x W (WHERE S≥45 MPH)
TAPER (T) = $\frac{WS^2}{60}$ (WHERE S<45 MPH)
W = WIDTH OF OFFSET

*USE WITH FLASHERS AT NIGHT.

**FLASHING ARROW SIGN MAY BE REQUIRED PER SECTION G6-09 OF COUNTY STANDARD SPEC..

***PROHIBIT PARKING AS NECESSARY TO MAINTAIN 10' MIN. LANES.

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

TYPICAL LANE CLOSURE SIGNING AND DELINEATION

FOUR LANE - ALL LANES REMAIN OPEN

SCALE: NONE
DATE: 10-86
DRAWN BY: G.C. D.L.

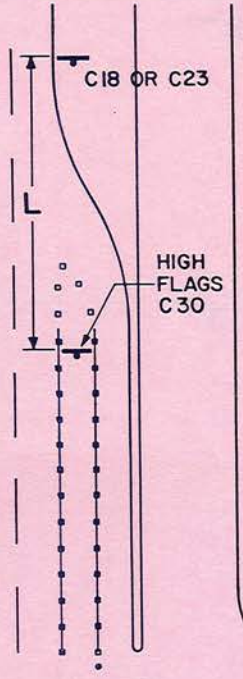
H-33B

SPECIAL NOTE:

Field conditions could require deviations from these plans and accompanying notes. Deviations must be submitted to the engineer in writing prior to start of work.

NOTES:

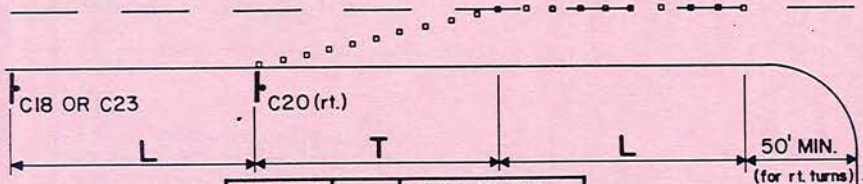
1. Does not apply where there are emergency conditions. Under emergency conditions, equipment and personnel which are available should be utilized to implement a closure even though such closure does not meet the standards contained in this plan. As equipment or personnel become available an immediate effort should then be made to implement the standards shown on this plan.
2. All advance warning signs shall be reflectorized.
3. Warning (W) series signs used in work zones shall be black on orange.
4. Refer to sec. G6-12 of County Standard Spec. for sign size, etc..
5. All cones shall be internally illuminated or fitted with reflective white sleeves for night closures.
6. The closure shall be striped if it is to remain more than one week. Conflicting stripes shall be completely removed.
7. The maximum spacing between channelizing devices outside of a taper should be approximately 50 feet.



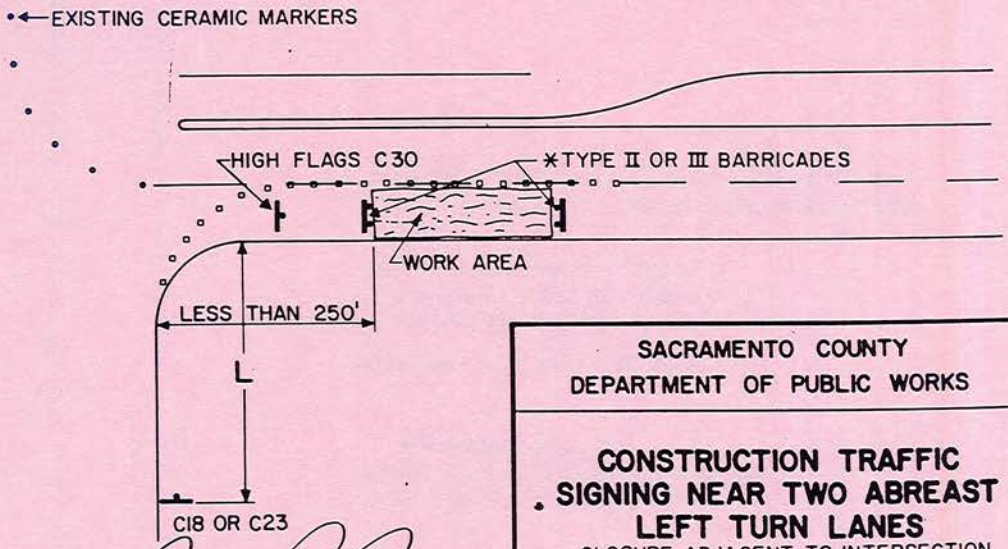
NOTE: CORRESPONDING LEFT TURN POCKET AND THRU LANE MUST BE BLOCKED TO TRAFFIC.

TAPER (T) = S x W (WHERE S≥45 MPH)
TAPER (T) = $\frac{WS^2}{60}$ (WHERE S<45 MPH)
W = WIDTH OF OFFSET

*USE WITH FLASHERS AT NIGHT.



S=POSTED LIMIT (mph)	L (ft.)	CONE SPACING ALONG TAPER (max. ft.)
25	250	25
30	250	30
35	450	35
40	450	40
45	450	45
50	600	50
55	600	50



for DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

CONSTRUCTION TRAFFIC SIGNING NEAR TWO ABREAST LEFT TURN LANES

CLOSURE ADJACENT TO INTERSECTION

SCALE: NONE
DATE: 10-86
DRAWN BY: G.C. D.L.

H-34

SPECIAL NOTE:

Field conditions could require deviations from these plans and accompanying notes. Deviations must be submitted to the engineer in writing prior to start of work.

NOTES:

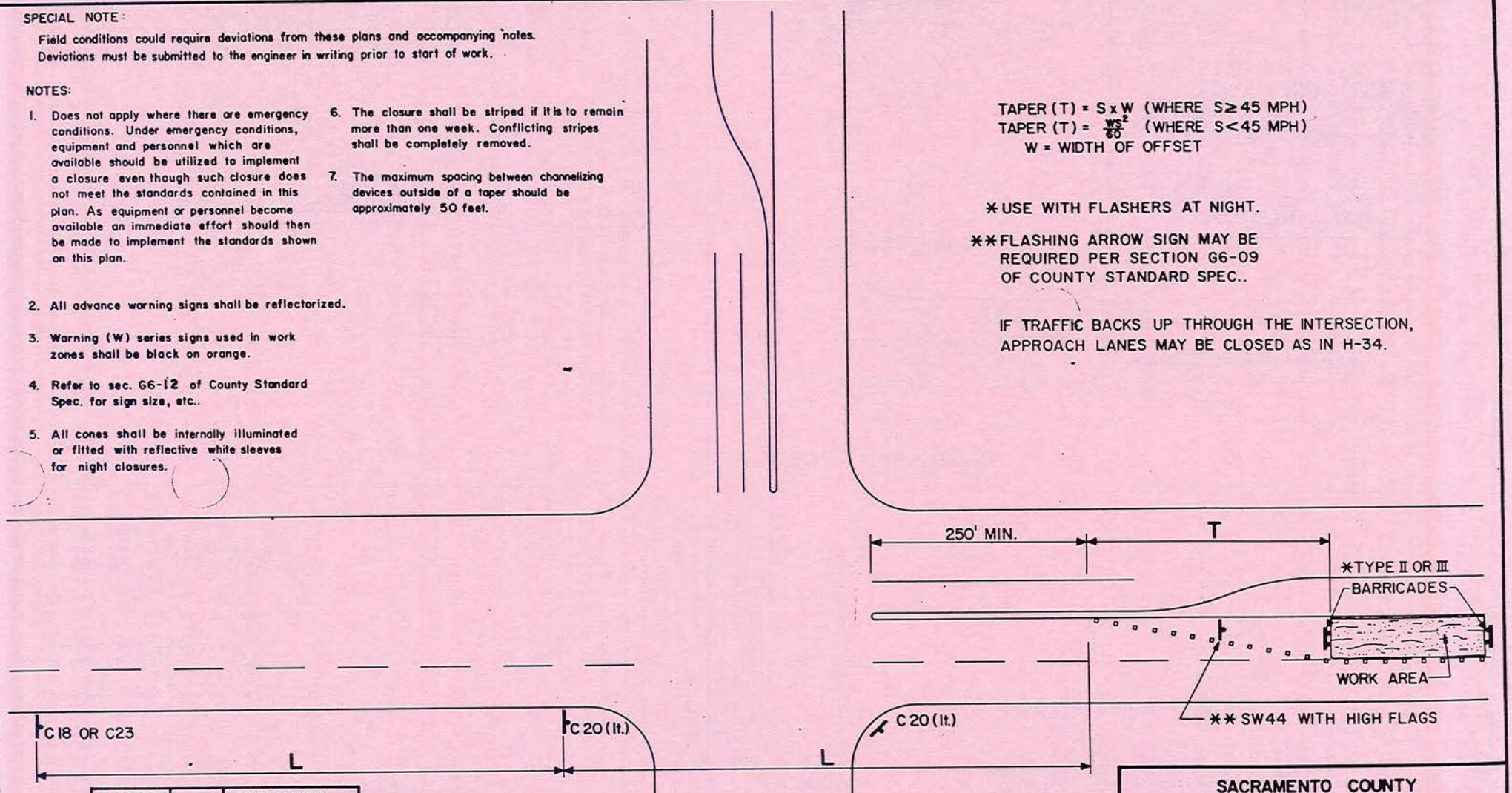
1. Does not apply where there are emergency conditions. Under emergency conditions, equipment and personnel which are available should be utilized to implement a closure even though such closure does not meet the standards contained in this plan. As equipment or personnel become available an immediate effort should then be made to implement the standards shown on this plan.
2. All advance warning signs shall be reflectorized.
3. Warning (W) series signs used in work zones shall be black on orange.
4. Refer to sec. G6-12 of County Standard Spec. for sign size, etc..
5. All cones shall be internally illuminated or fitted with reflective white sleeves for night closures.
6. The closure shall be striped if it is to remain more than one week. Conflicting stripes shall be completely removed.
7. The maximum spacing between channelizing devices outside of a taper should be approximately 50 feet.

TAPER (T) = S x W (WHERE S≥45 MPH)
TAPER (T) = $\frac{WS^2}{60}$ (WHERE S<45 MPH)
W = WIDTH OF OFFSET

*USE WITH FLASHERS AT NIGHT.

**FLASHING ARROW SIGN MAY BE REQUIRED PER SECTION G6-09 OF COUNTY STANDARD SPEC..

IF TRAFFIC BACKS UP THROUGH THE INTERSECTION, APPROACH LANES MAY BE CLOSED AS IN H-34.



S=POSTED LIMIT (mph)	L (ft.)	CONE SPACING ALONG TAPER (max. ft.)
25	250	25
30	250	30
35	450	35
40	450	40
45	450	45
50	600	50
55	600	50

For DIRECTOR

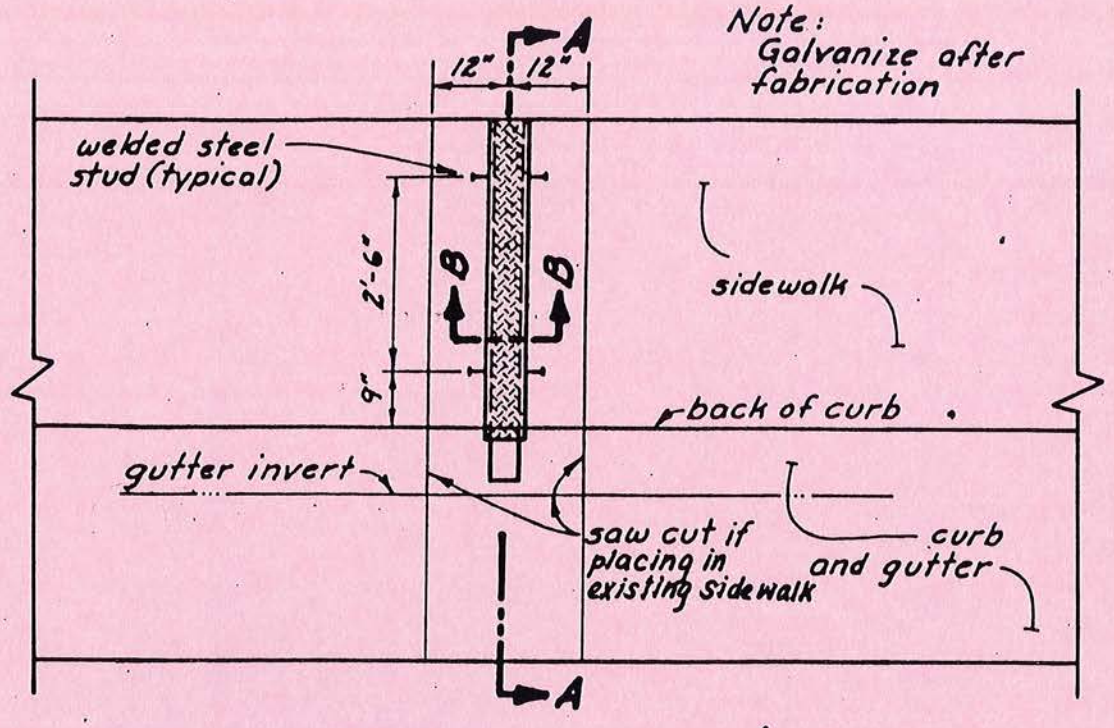
SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

CONSTRUCTION TRAFFIC SIGNING NEAR TWO ABREAST LEFT TURN LANES

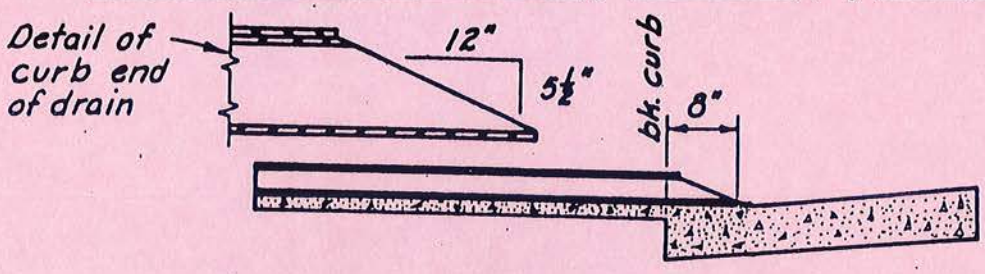
CLOSURE NEAR INTERSECTION

SCALE: NONE
DATE: 10-86
DRAWN BY: G.C. D.L.

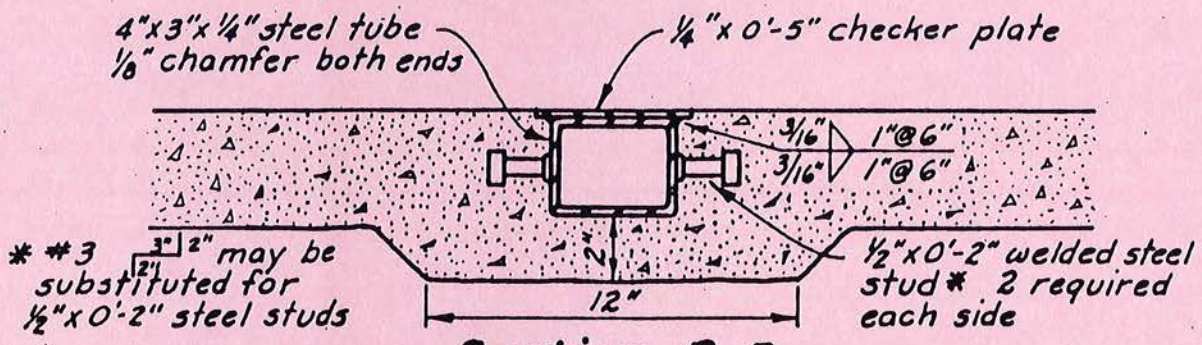
H-34A



Plan View of Curb, Gutter, & Sidewalk



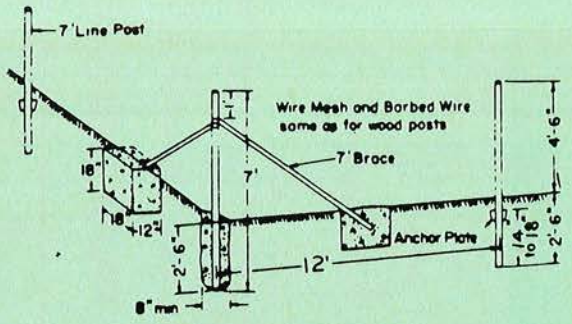
Section A-A
(FOR TYPE 1 or 1A CURB)



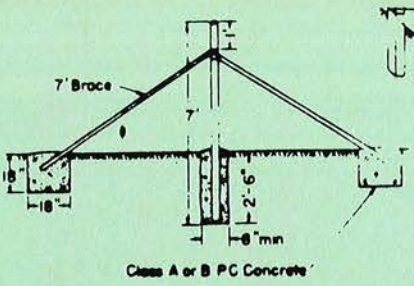
Section B-B

for DIRECTOR

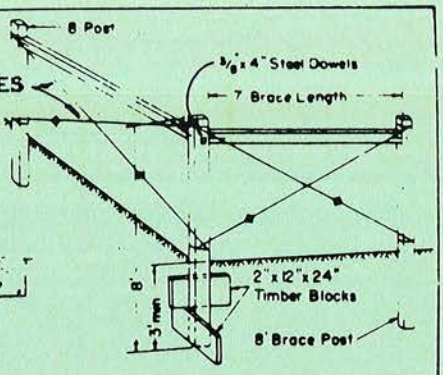
SACRAMENTO COUNTY DEPARTMENT OF PUBLIC WORKS	
UNDER SIDEWALK DRAIN	
DRAWN BY: M.T. SCALE: NONE DATE: 7-88	H-35



END, CORNER AND GATE POST ASSEMBLY

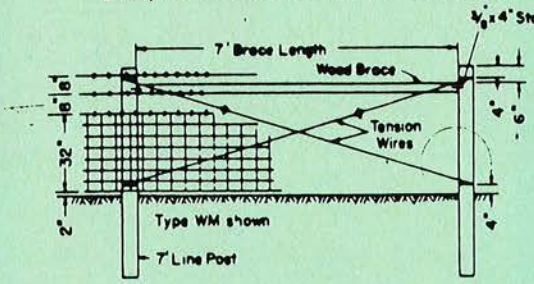


PULL POST ASSEMBLY
at 500' maximum intervals

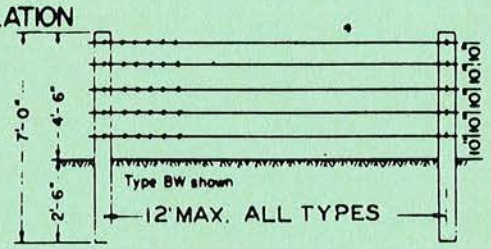


END, CORNER AND GATE POST ASSEMBLY

METAL POST INSTALLATION



PULL POST ASSEMBLY
at 1,000' maximum intervals
(for both BW and WM)

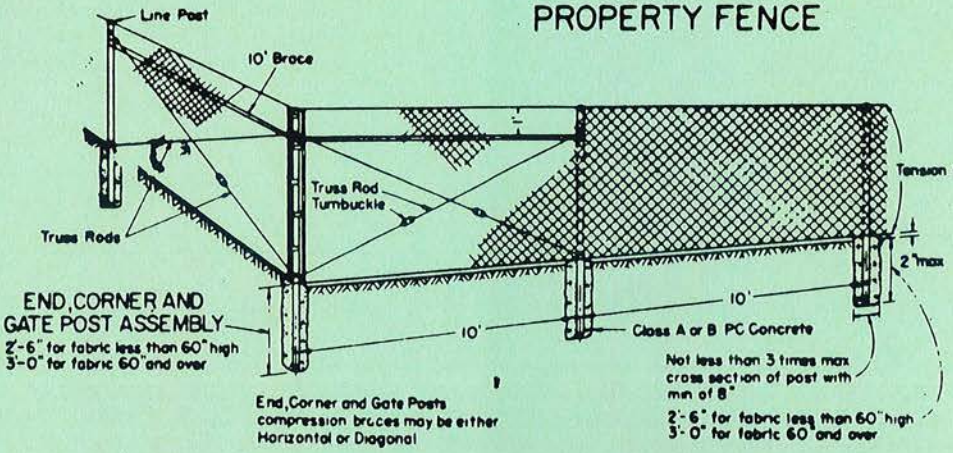


LINE POSTS

WOOD POST INSTALLATION

Type BW = 5 lines of barbed wire
Type WM = Wire mesh and 3 lines of barbed wire

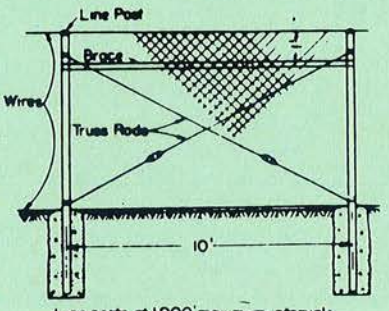
PROPERTY FENCE



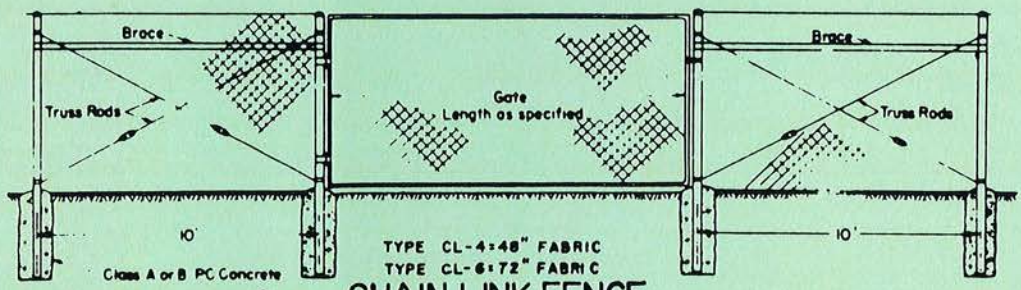
END, CORNER AND GATE POST ASSEMBLY
2'-6" for fabric less than 60" high
3'-0" for fabric 60" and over

End, Corner and Gate Posts compression braces may be either Horizontal or Diagonal

Not less than 3 times max cross section of post with min of 8"
2'-6" for fabric less than 60" high
3'-0" for fabric 60" and over

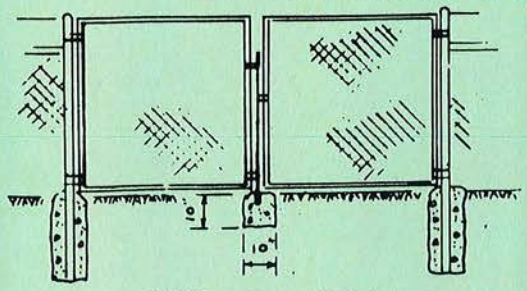


Line posts at 1,000' maximum intervals braced and trussed in both directions



TYPE CL-4: 48" FABRIC
TYPE CL-6: 72" FABRIC

CHAIN LINK FENCE
FREEWAY OR PROPERTY



DOUBLE GATE

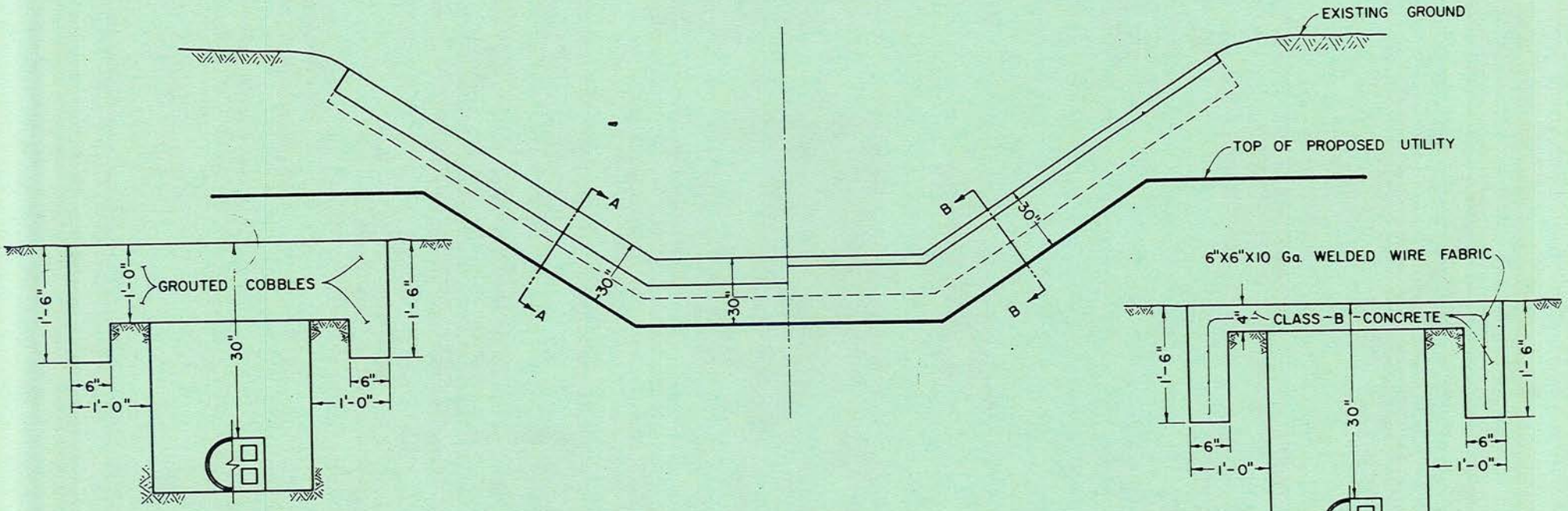
W C Wanchop
DEPUTY DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

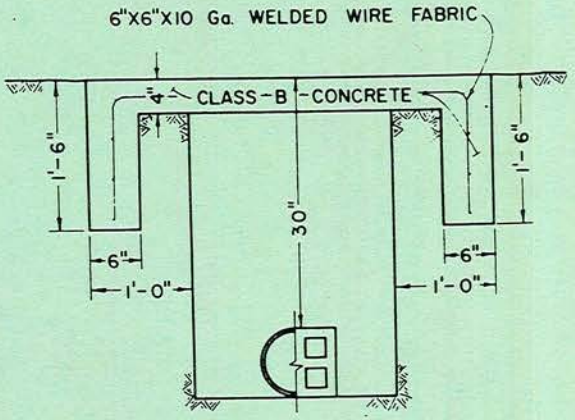
STANDARD FENCE DETAILS

Scale NONE
Date 5-87
Drawn By

R-1



SECTION A-A



SECTION B-B

NOTES:

1. ALL UTILITY CROSSINGS OF EXISTING STREAMS SHALL BE AT LEAST 30" BELOW EXISTING CHANNEL SIDES AND BOTTOMS. DEEPER PLACEMENT MAY BE REQUIRED IF FUTURE CHANNEL IMPROVEMENTS ARE ANTICIPATED.
2. THE CUT SHALL BE SEALED AS SHOWN WITH GROUTED COBBLES OR CLASS B CONCRETE TO A WIDTH 1' EACH SIDE OF THE UTILITY TRENCH. ALL NATURAL STREAMS, AS SHOWN ON THE NATURAL STREAMS PLAN, SHALL UTILIZE GROUTED COBBLES.
3. CONSTRUCTION IS TO CONFORM TO SECTION SS-37 AND SS-83 OF THE COUNTY CONSTRUCTION SPECIFICATIONS WITH CUT OFF WALLS CONFORMING TO STANDARD DRAWING R-21.

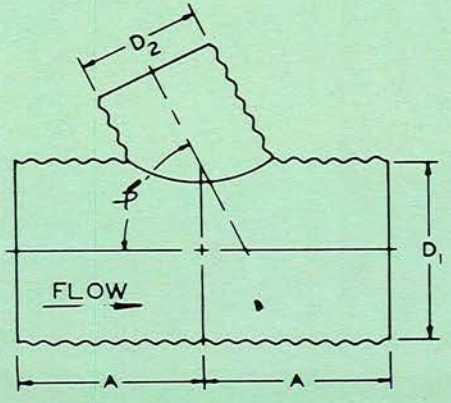
W. C. Wanlass
DEPUTY DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

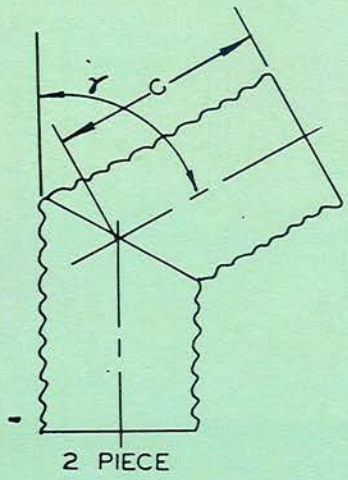
UTILITY STREAM CROSSING

SCALE: NONE
DATE: 4-83
DRAWN BY: R. WALKER

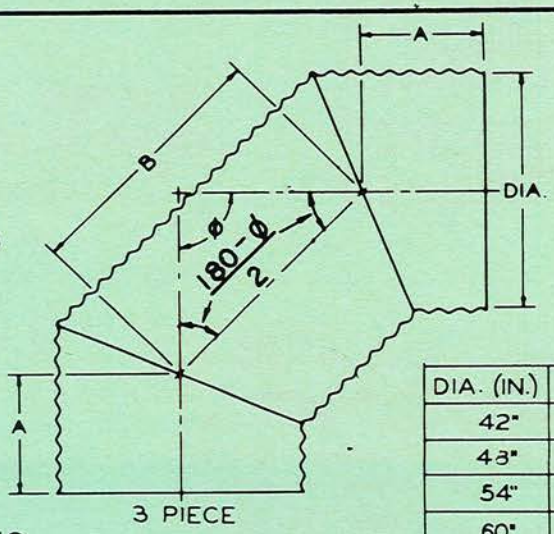
R-2



LATERALS



2 PIECE



3 PIECE

ELBOWS

D1	A (IN.)
24" TO 36"	D2/2 + 14"
42"	"
48"	"
60"	"
66"	"
72"	"
78"	"
84"	"

ELBOWS

DIA. (IN.)	A (IN.)	B (IN.)	C (IN.)
42"	24"	48"	36"
43"	"	"	"
54"	32"	"	48"
60"	"	60"	"
66"	"	"	"
72"	40"	"	60"
78"	"	"	"
84"	"	"	"

NOTES:
1. LATERALS MAY BE FABRICATED TO MATCH TOPS, INVERTS, OR CENTERS OF MATING PIPES AS INDICATED ON THE PLANS.
2. LENGTHS SHOWN ARE MINIMUM LENGTHS.
3. PIPE STRENGTH REQUIREMENTS TO BE DETERMINED FROM COUNTY OF SACRAMENTO IMPROVEMENT STANDARDS.
4. MINIMUM LENGTHS SHALL BE ADJUSTED AS REQUIRED TO PROVIDE FOR COUPLING BANDS.
5. γ SHALL NOT EXCEED 45°
6. β SHALL NOT EXCEED 90°

W. C. Vanderwerf
DEPUTY DIRECTOR

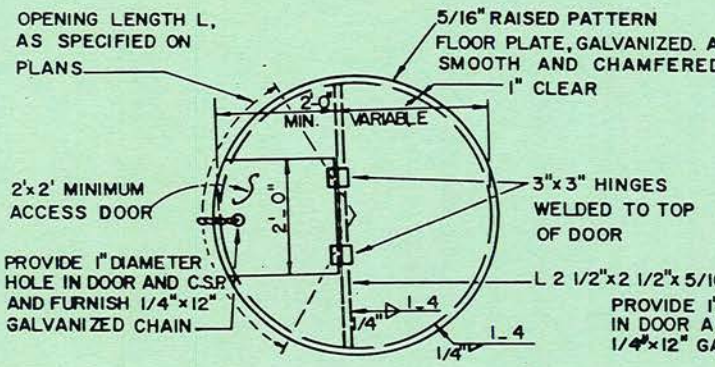
SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

CORRUGATED PIPE FITTINGS

SCALE NONE
DATE 5-87
DRAWN BY.

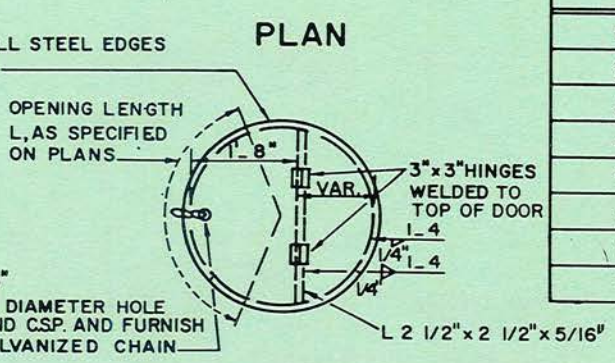
R-3

PLAN



42" DIAMETER TO 72" DIAMETER
C.S.P. INLET

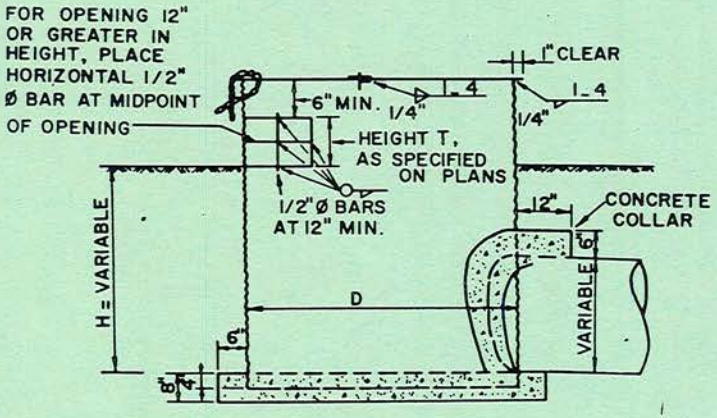
PLAN



24" DIAMETER TO
36" DIAMETER
C.S.P. INLET

RISER DIAMETER, D	H, MAX.	HEIGHT T, MAX.	GAGES (MINIMUM)
24"	4'	8"	0.079"
30"	4'	8"	0.079"
36"	5'	8"	0.109"
42"	8'	12"	0.109"
48"	8'	12"	0.109"
54"	10'	18"	0.109"
60"	10'	18"	0.109"
72"	10'	18"	0.109"

SECTION



24" DIAMETER TO 72" DIAMETER
C.S.P. INLET

NOTE:

1. LOCATIONS, HEIGHTS, AND LENGTHS OF OPENINGS SHALL BE AS SHOWN ON THE PLANS.
2. AREA OF OPENING SHALL NOT BE LESS THAN AREA OF OUTFALL PIPE.
3. OUTFALL PIPE TO BE CUT FLUSH WITH INSIDE OF RISER.
4. NOT TO BE USED AS A JUNCTION STRUCTURE.
5. DIAMETER OF RISER PIPE SHALL BE AT LEAST ONE SIZE LARGER THAN OUTFALL PIPE.
6. TO BE USED ONLY WITH THE SPECIFIC APPROVAL OF THE DIRECTOR.

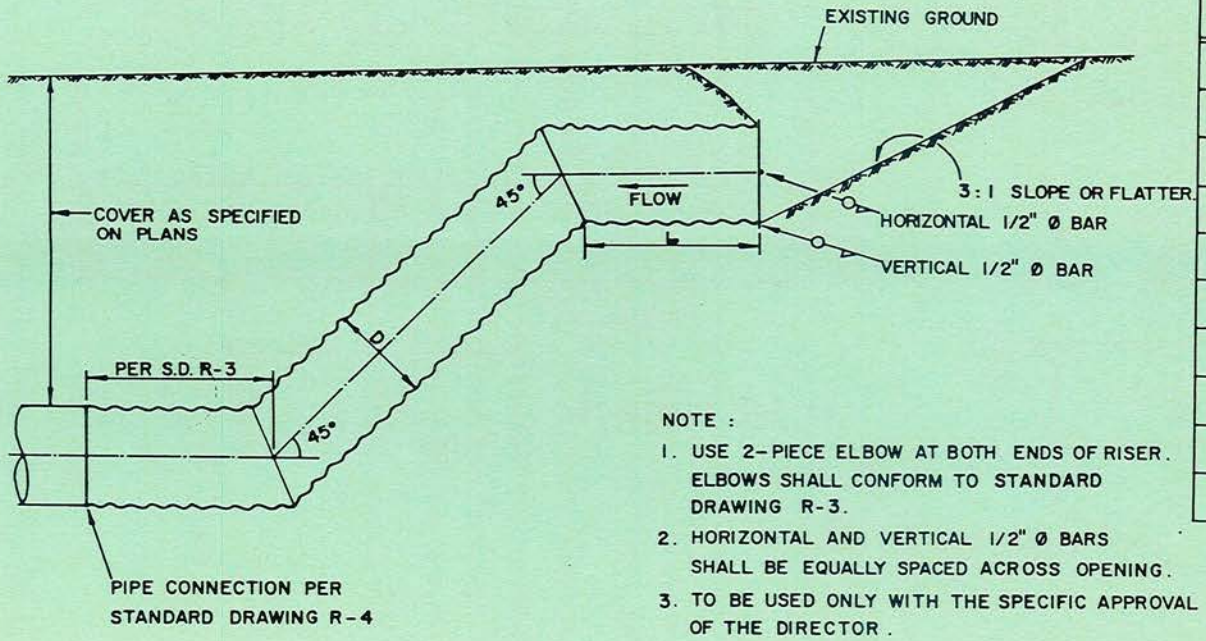
W C Wardlow
DEPUTY DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

CORRUGATED STEEL PIPE DRAINAGE INLET TYPE I

SCALE : NONE
DATE : 5-88
DRAWN BY : H.B

R-3A



RISER DIAMETER, D	LENGTH OF HORIZONTAL C.S.P., L	HORIZONTAL 1/2" Ø BAR	VERTICAL 1/2" Ø BAR
10"	1'-0"	-	
12"	1'-0"	-	
15"	1'-0"	-	1
18"	1'-6"	-	1
21"	1'-6"	-	1
24"	1'-6"	-	2
30"	2'-0"	1	2
36"	3'-0"	1	3
42"	4'-0"	1	3
48"	4'-0"	2	4

NOTE :

1. USE 2-PIECE ELBOW AT BOTH ENDS OF RISER. ELBOWS SHALL CONFORM TO STANDARD DRAWING R-3.
2. HORIZONTAL AND VERTICAL 1/2" Ø BARS SHALL BE EQUALLY SPACED ACROSS OPENING.
3. TO BE USED ONLY WITH THE SPECIFIC APPROVAL OF THE DIRECTOR.

W C Wardlow

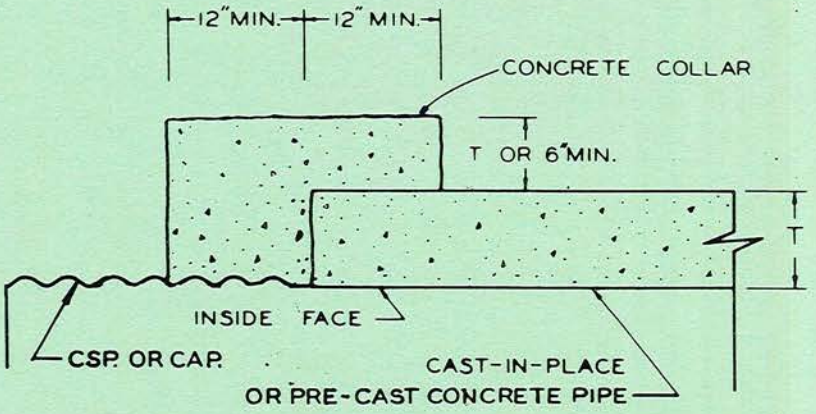
DEPUTY DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

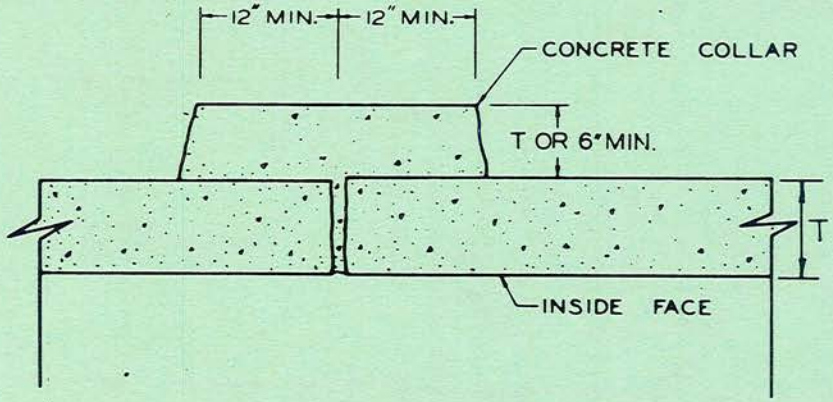
CORRUGATED STEEL PIPE DRAINAGE INLET TYPE H

SCALE : NONE
DATE : 5-88
DRAWN BY: H.B

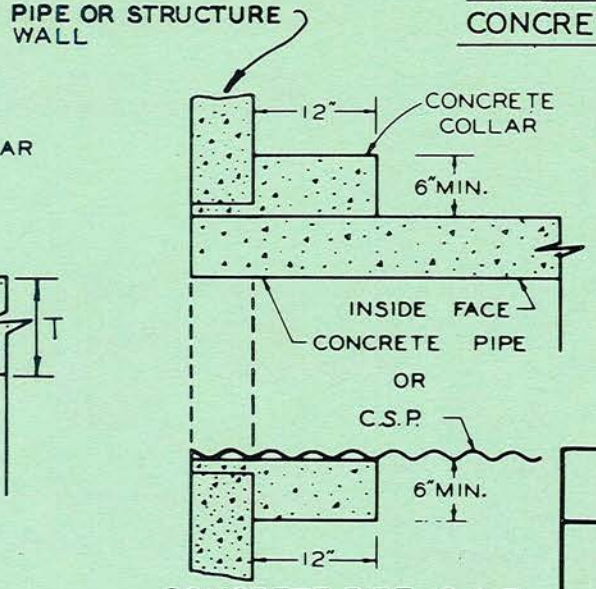
R-3B



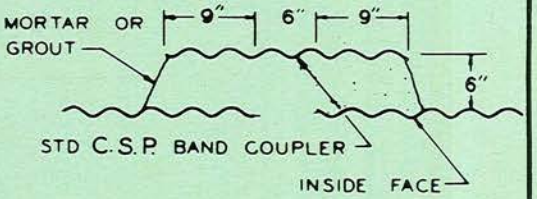
CAST-IN-PLACE OR PRE-CAST CONCRETE PIPE TO CSP OR CAP



CONCRETE PIPE TO CONCRETE PIPE WITHOUT STANDARD JOINT



CONCRETE PIPE, C.A.P C.S.P. INTO EXISTING PIPE OR STRUCTURE



PIPES OF DISSIMILAR METALS

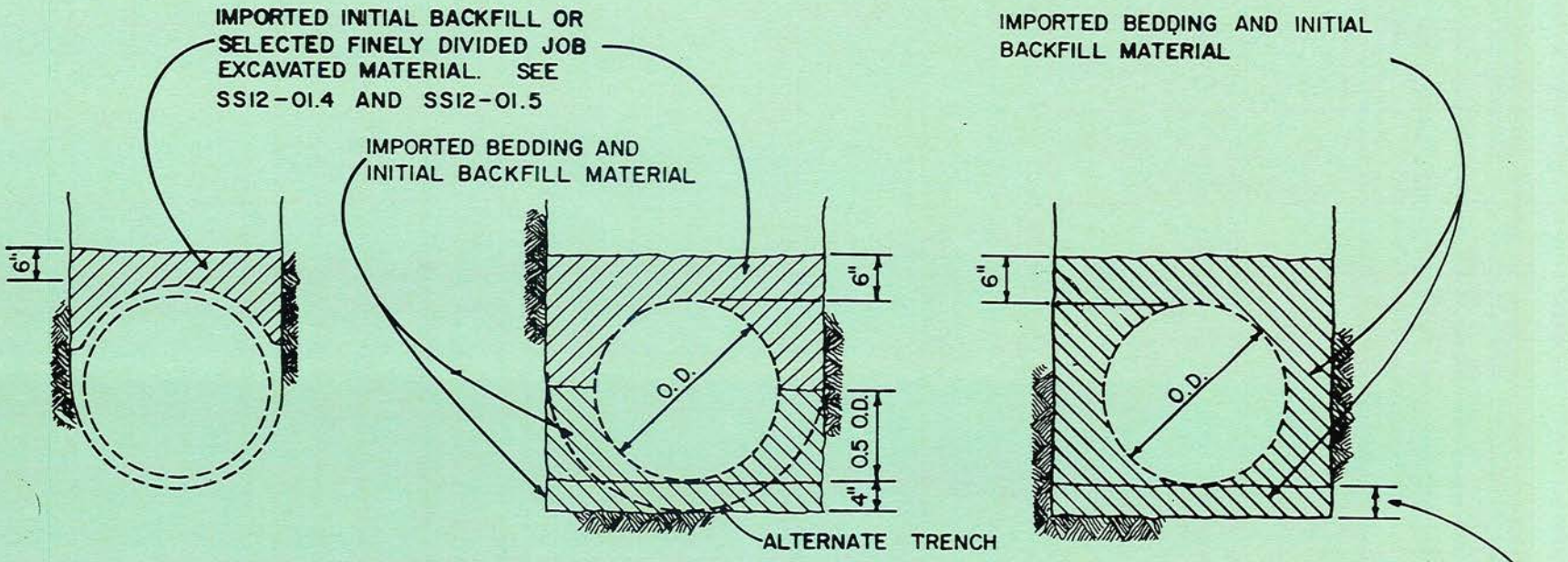
SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

PIPE CONNECTIONS

SCALE NONE
DATE 5-87
DRAWN BY

R-4

DEPUTY DIRECTOR



CAST-IN-PLACE CONCRETE PIPE

PIPES 24" OR GREATER IN DIAMETER

PIPES LESS THAN 24" IN DIAMETER

NOTES:

1. INITIAL BACKFILL MATERIAL SHALL BE THOROUGHLY COMPACTED AROUND PIPE BY SHOVEL SLICING OR TAMPING PER SS12-01.4 AND SS12-01.5.
2. TRENCH WIDTH SHALL CONFORM TO SS10-03.
3. BEDDING AND INITIAL BACKFILL MATERIAL SHALL CONFORM TO SS12-01.4 AND SS12-01.5.
4. BEDDING AND INITIAL BACKFILL FOR PVC & RIBBED METAL PIPE SHALL BE CRUSHED ROCK. SAND & GRAVEL WILL NOT BE PERMITTED.

W. C. Landers

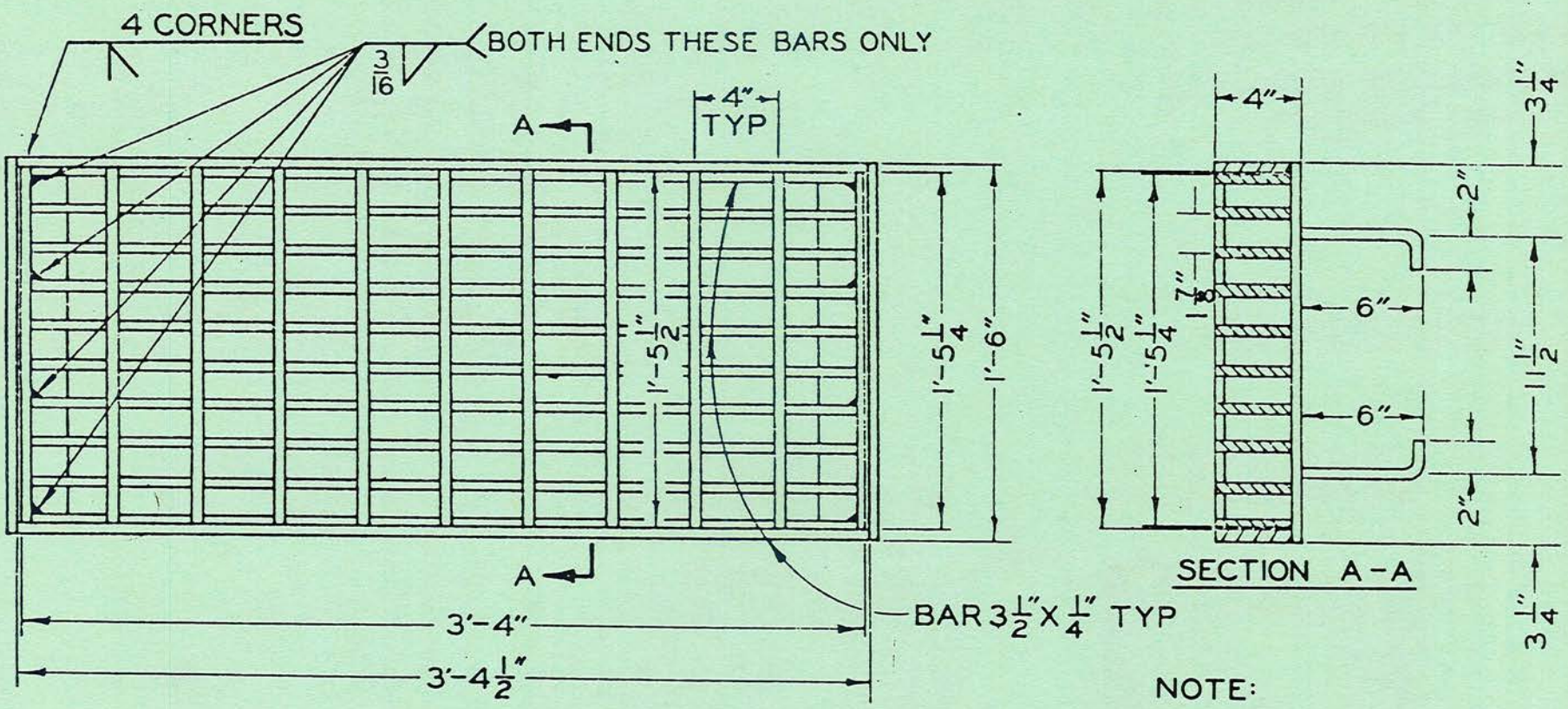
DEPUTY DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

PIPE BEDDING AND INITIAL BACKFILL (DRAINAGE)

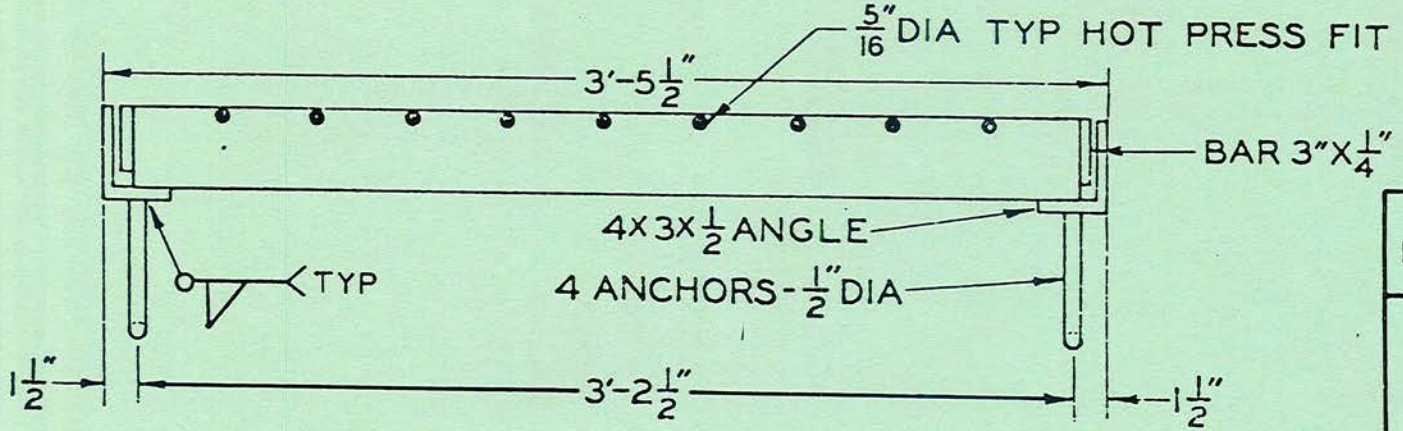
SCALE: NONE
DATE: 11-86
DRAWN BY:

R-4A



NOTE:

AT THE CONTRACTOR'S OPTION, END SPACING OF $\frac{5}{16}$" CROSS RODS MAY BE 2". INTERIOR SPACING SHALL REMAIN 4".



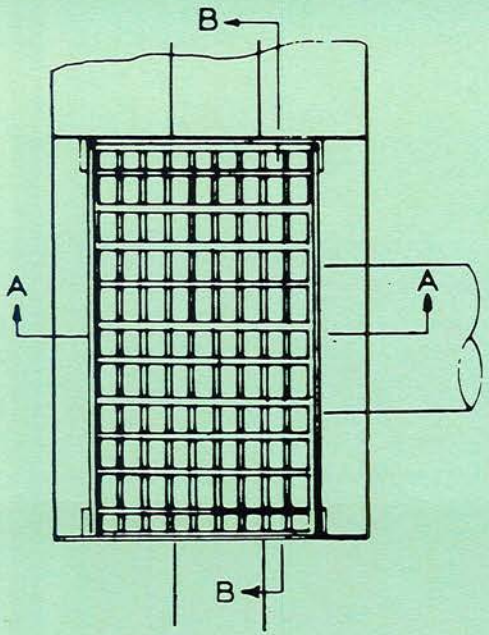
W C Wandler
DEPUTY DIRECTOR

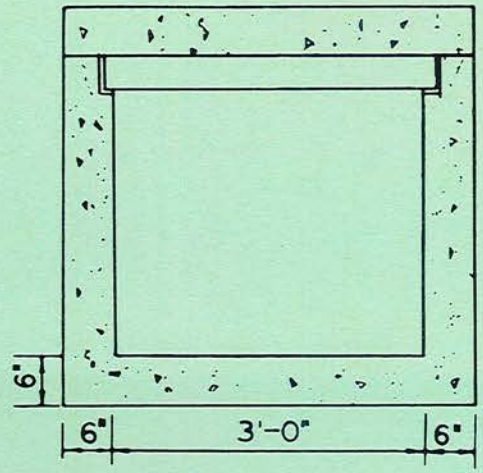
SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

DROP INLET FRAME & GRATE FOR TYPE A, B, & C DROP INLETS

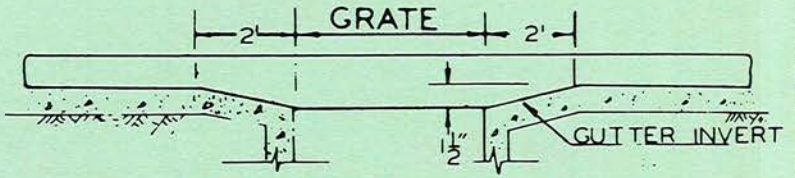
SCALE: NONE
DATE: 12-86
DRAWN BY: D.A.B

R-5

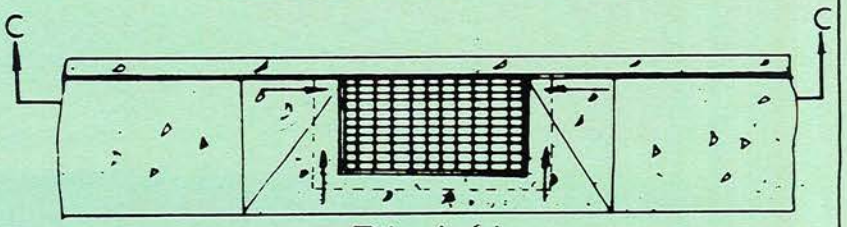




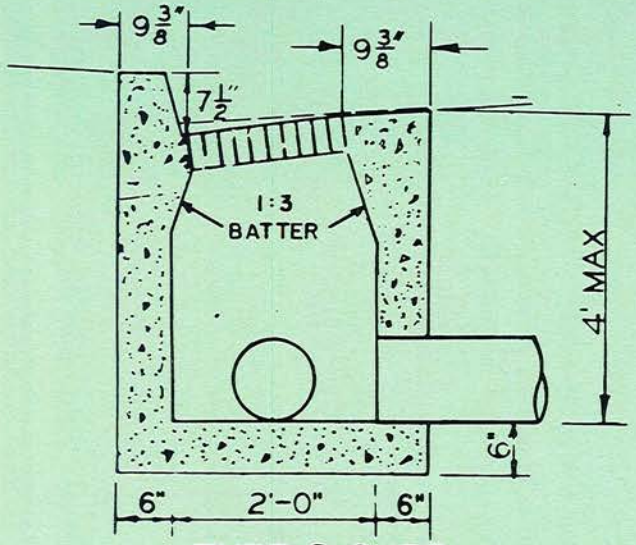
SECTION B-B



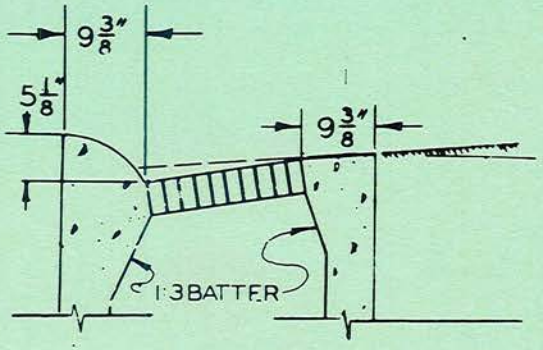
SECTION C-C



PLAN
STANDARD DEPRESSION



TYPE 2 CURB



TYPE 1 or 1A CURB

SECTION A-A

NOTES

1 DEPRESSION IS STANDARD FOR ALL INLETS

2 SEE FRAME & GRATE DETAIL STANDARD DRAWING R-5

3 BOTTOM OF INLET SHALL BE PLACED PRIOR TO OR AT THE SAME TIME AS SIDE WALLS

W. C. Wandler

DEPUTY DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

DROP INLET

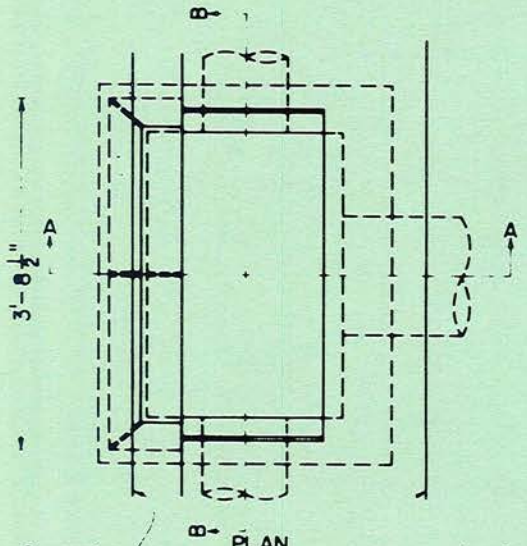
TYPE A

SCALE NONE
DATE: 12-86
DRAWN BY

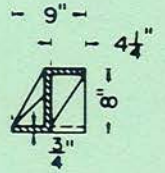
R-6

NOTES

1 See notes Drawing R-6
2 Bottom of inlet shall be placed prior to or at the same time as side walls
3 Frame and grate shall conform to Drawing R-5
4 Open-back hood shall be cast iron

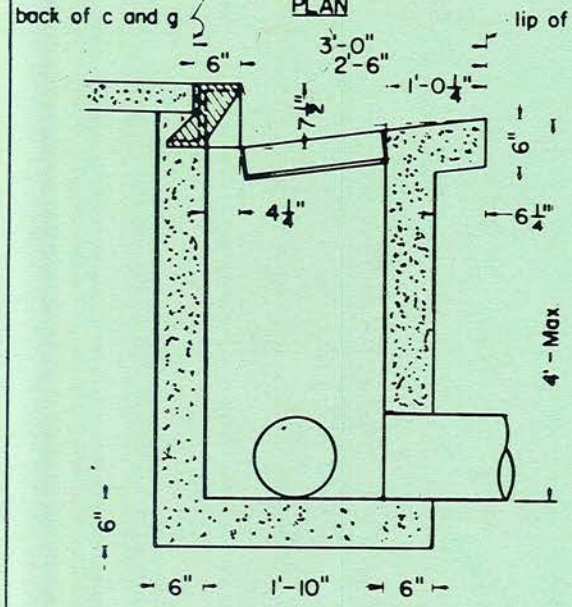


PLAN

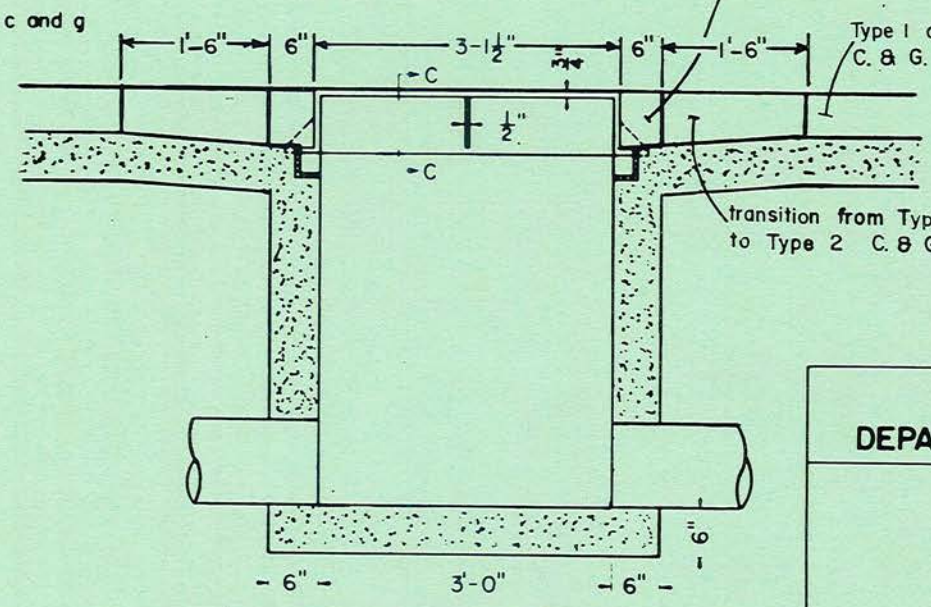


SECTION C-C
Open-back hood

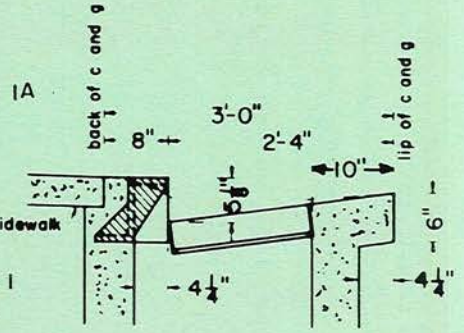
Construct 6" of vertical curb before beginning transition on Type 1 or 1A C. & G.



SECTION A-A
Type 2 c. and g.



SECTION B-B



SECTION A-A
Type 1 c and g

DEPUTY DIRECTOR

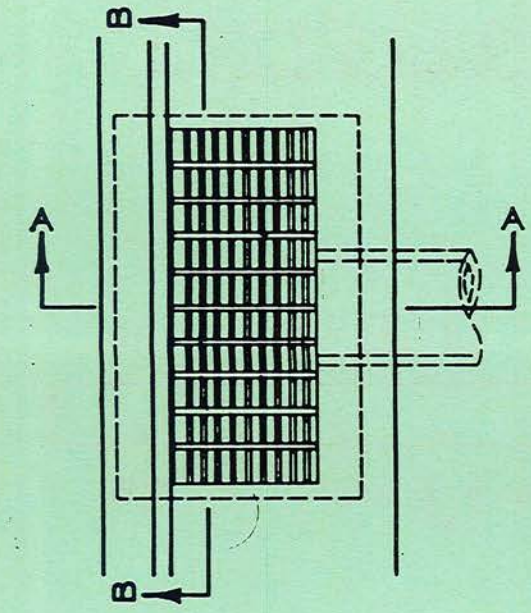
SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

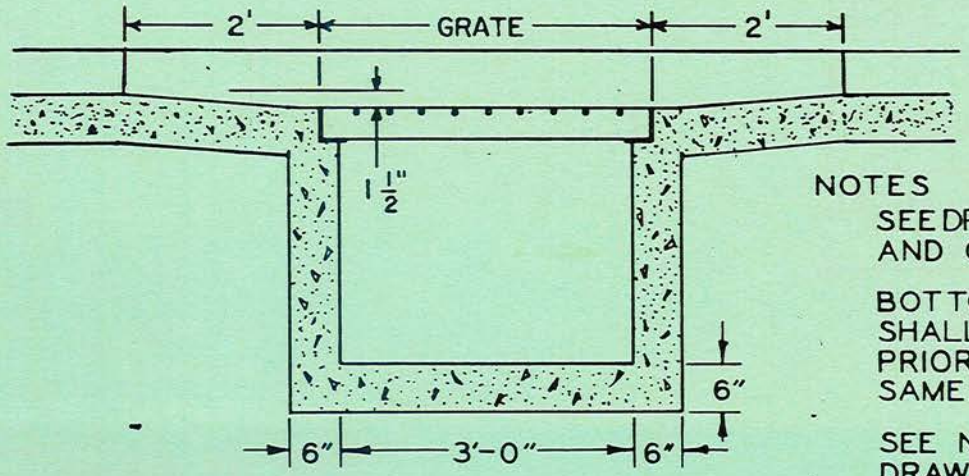
DROP INLET

TYPE B

SCALE ½"=1'
DATE 12-86
DRAWN BY R.A.W

R-7





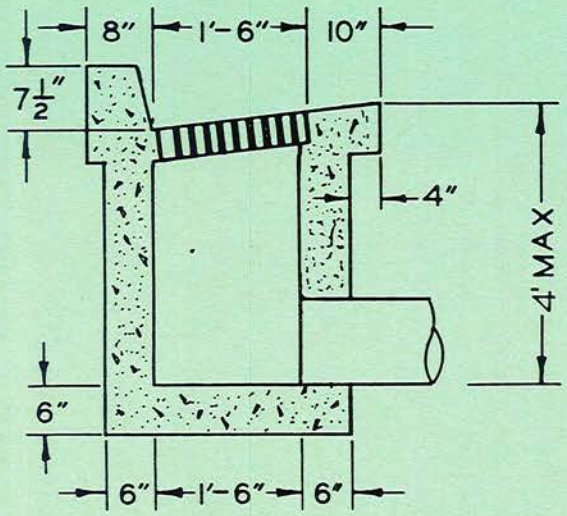
SECTION B-B

NOTES

SEE DRAWING R-5 FOR FRAME AND GRATE DETAILS

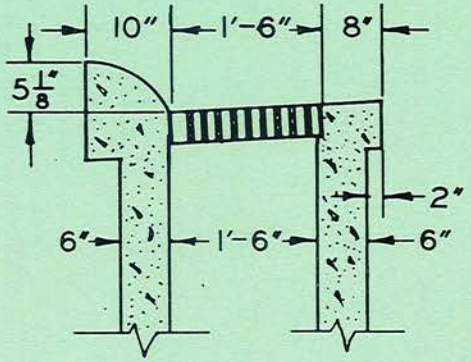
BOTTOM OF INLET SHALL BE PLACED PRIOR TO OR AT THE SAME TIME AS SIDE WALLS

SEE NOTE NO. 1 OF DRAWING R-6 FOR GUTTER DEPRESSION



TYPE 2 CURB

SECTION A-A



TYPE 1 or 1A CURB

DEPUTY DIRECTOR

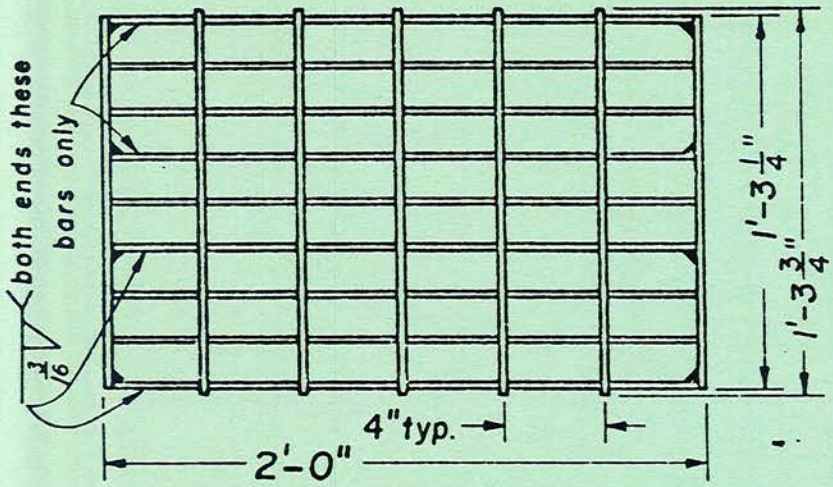
SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

DROP INLET

TYPE C

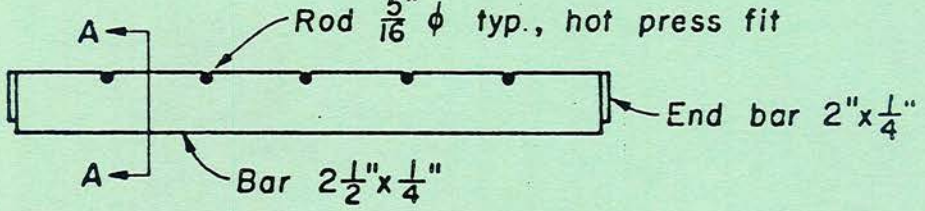
SCALE: NONE
DATE: 12-86
DRAWN BY: D.A.B.

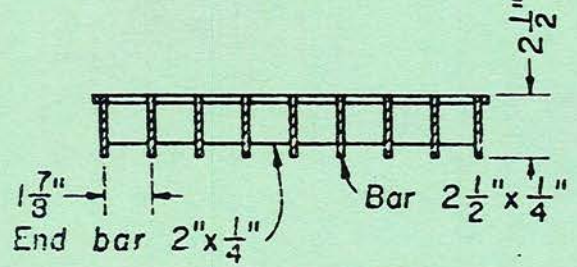
R-8



NOTES:

1. Installed grate shall be permanently secured to inlet structure with 12" length of $\frac{1}{4}$" galvanized chain.
2. At the Contractor's option, end spacing of $\frac{5}{16}$" cross rods may be 2". Interior spacing shall remain 4".





SECTION A-A

W C Wanlass

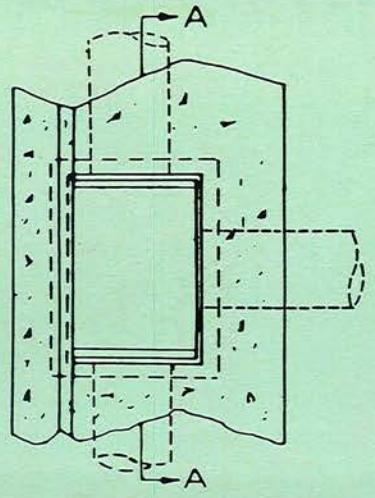
DEPUTY DIRECTOR

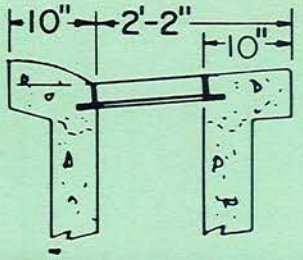
SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

DROP INLET GRATE FOR
• TYPE D and E D.I.'s

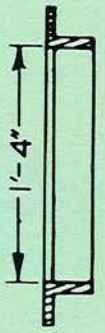
Scale: none
Date: 12-86
Drawn By: R.A.W.

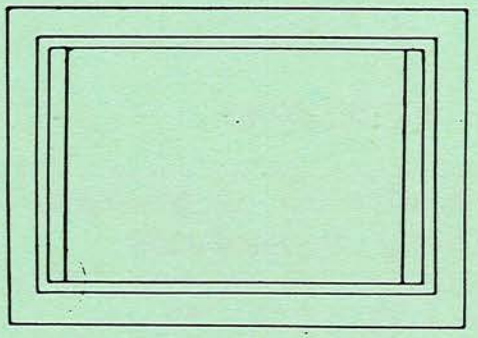
R-9

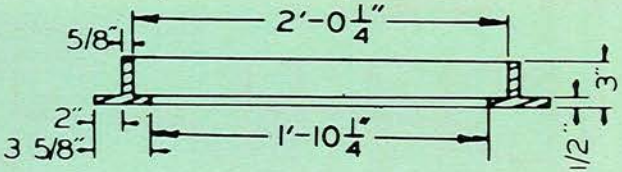


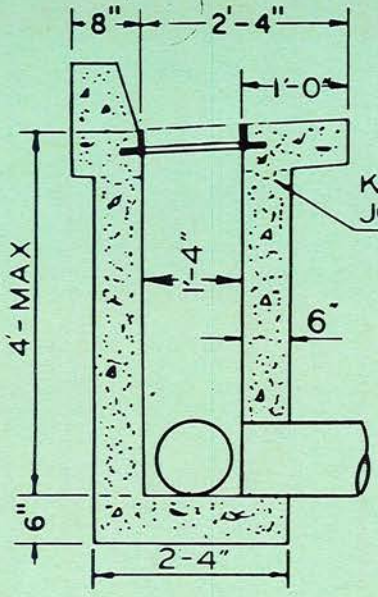


TYPE 1 or 1A CURB

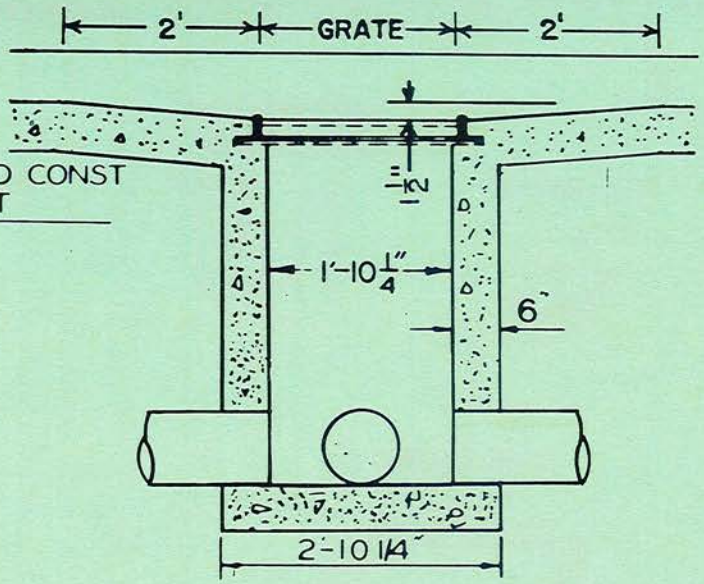








TYPE 2 VERTICAL CURB



SECTION A-A

NOTES

SEE NOTE NO. 1 OF DRAWING R-6 FOR GUTTER DEPRESSION

SEE DRAWING R-9 FOR FRAME & GRATE DETAIL.

12" LENGTH OF 1/4" GALVANIZED CHAIN TO BE PERMANENTLY AFFIXED TO THE GRATE AND ONE CORNER OF THE INLET FRAME ADJACENT TO THE CURB

Bottom of inlet shall be placed prior to or at the same time as side walls

Richard Shaw
DEPUTY DIRECTOR

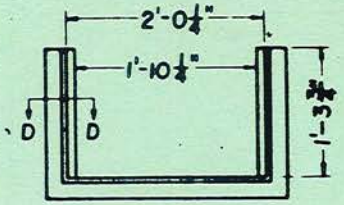
SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

DROP INLET

TYPE D

Scale NONE
Date: 12-86
Drawn By

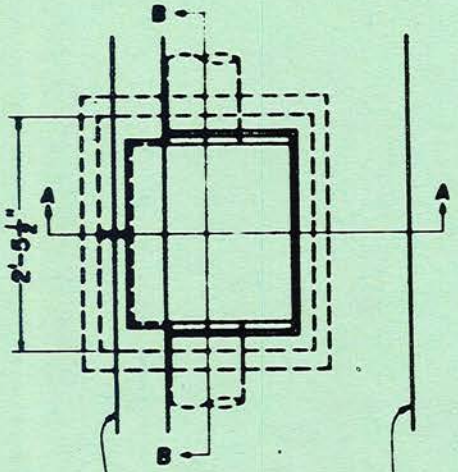
R-10

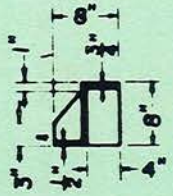


GRATE FRAME

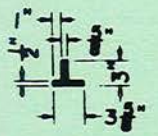
NOTES:

1. See notes Drawing R-6
2. Bottom of inlet shall be placed prior to or at the same time as side walls.
3. See Drawing R-9 for grate detail.
4. This structure is to serve only to pick up gutter drainage or as a junction box for small pipes in a longitudinal direction only
5. 12" length of ¼" galvanized chain to be permanently affixed to the grate and one corner of the inlet frame adjacent to the curb.
6. Open-back hood and grate frame shall be cast iron.



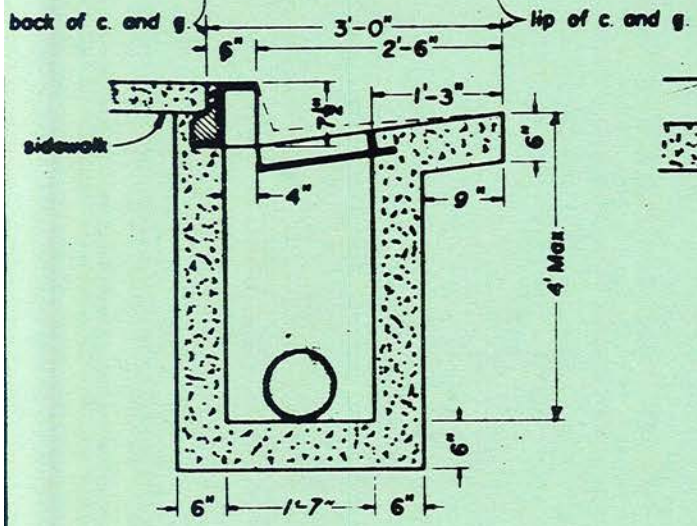


SECTION C-C
Open-back hood

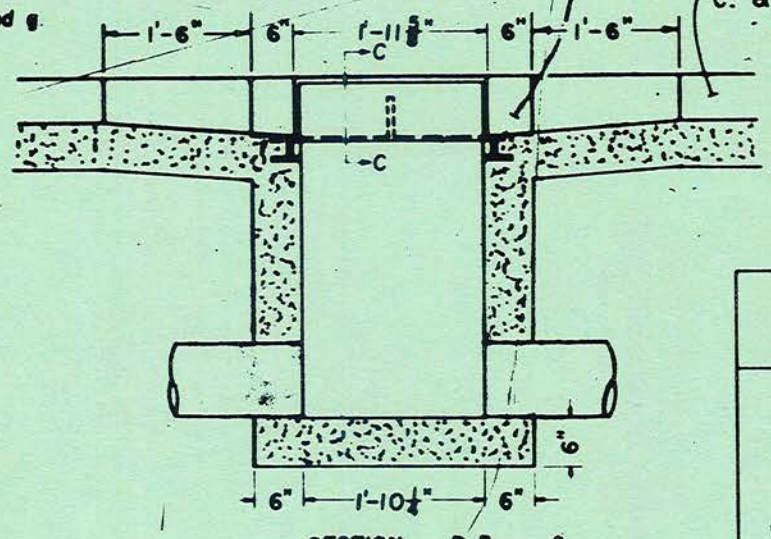


SECTION D-D

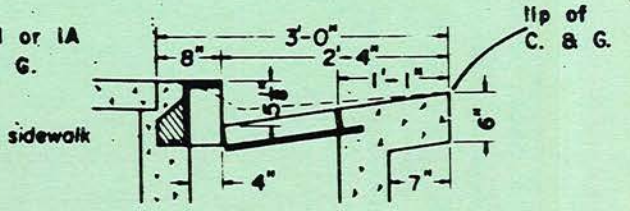
Construct 6" of vertical curb before beginning transition on Type 1 or 1A C. & G.



SECTION A-A
Type 2 c. and g



SECTION B-B
Type 2 c. and g.



SECTION A-A
Type 1 or 1A c. and g.

See Section A-A, type 2 c&g, for conc. box details

W C Wandler
DEPUTY DIRECTOR

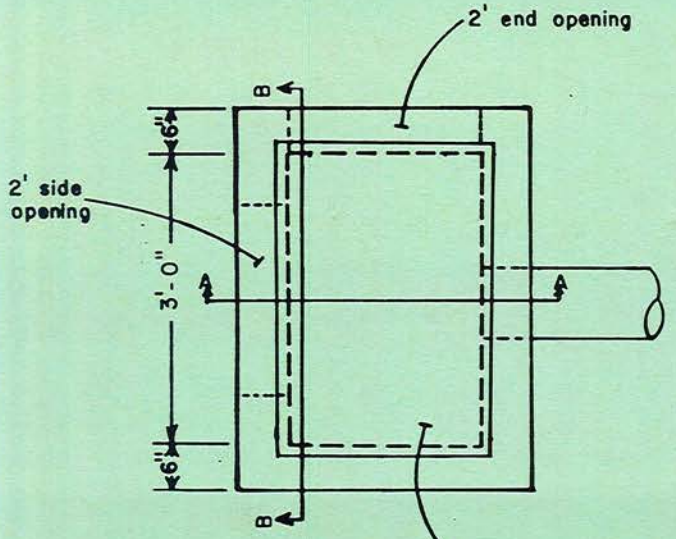
SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

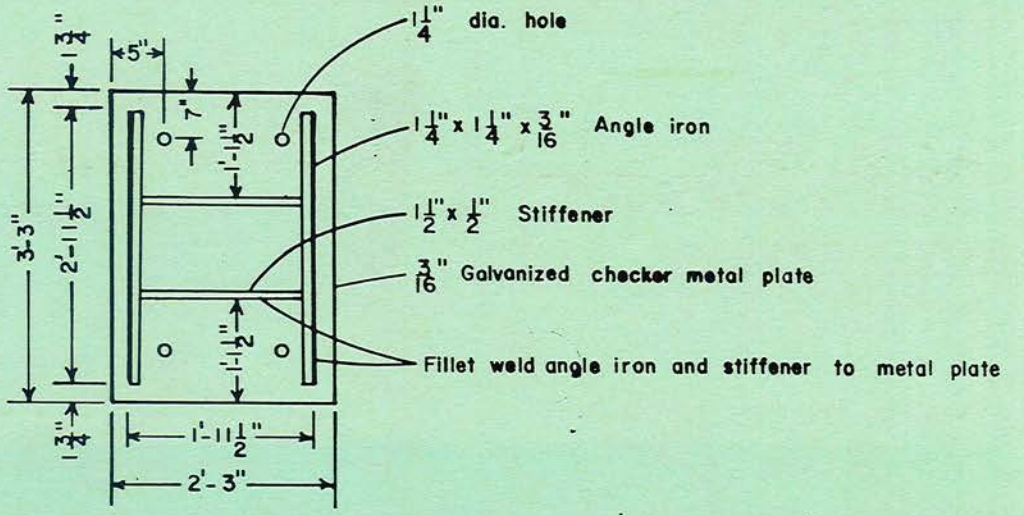
DROP INLET

TYPE E

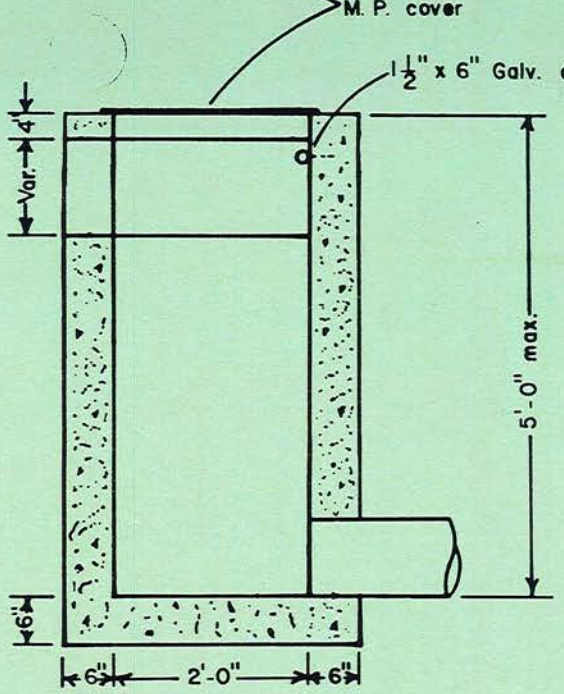
SCALE: NONE
DATE: 12-86
DRAWN BY: R.A.W.

R-11

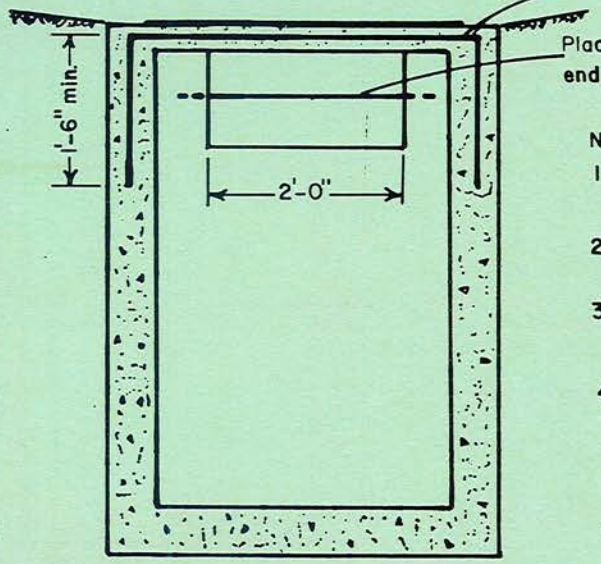




Metal cover (underside)



Section A-A



Section B-B

Notes:

1. Provide ¼" x 18" galv. chain weld to cover and eye bolt.
2. Provide end or side openings as shown on plan or cross section.
3. Top of all walls to be finished to a flat plane to provide even bearing for plate cover.
4. Metal cover shall be galvanized.

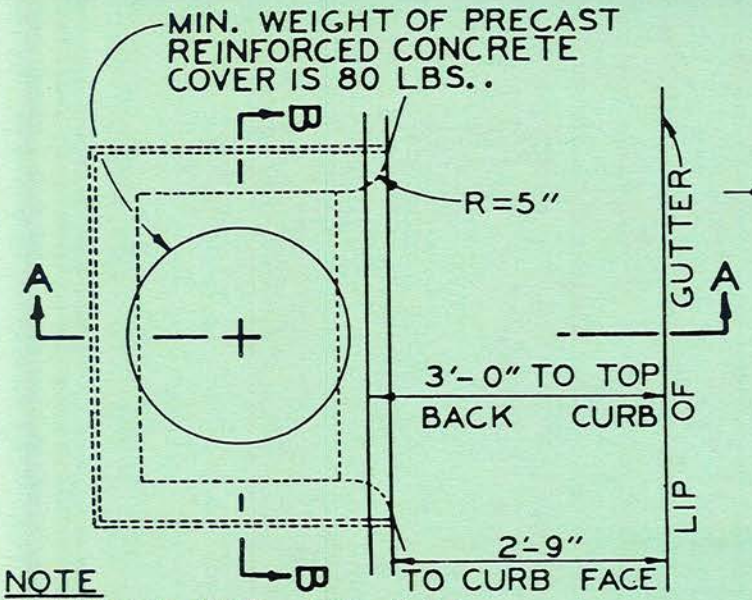
W. C. Chandler
Deputy Director

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

DROP INLET
TYPE F

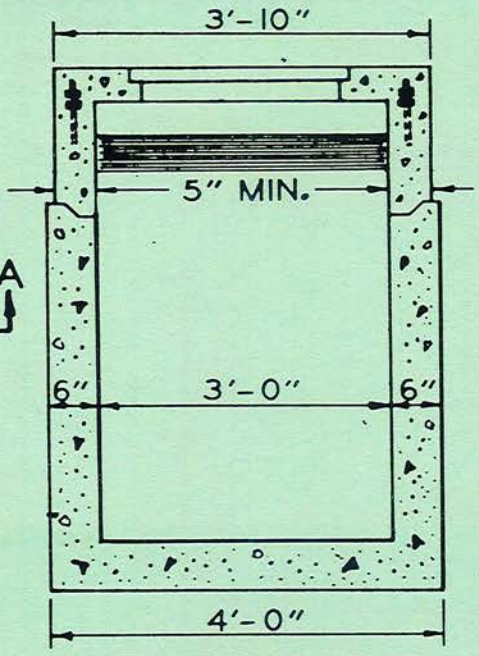
Scale: None
Date: 12-86

R-12

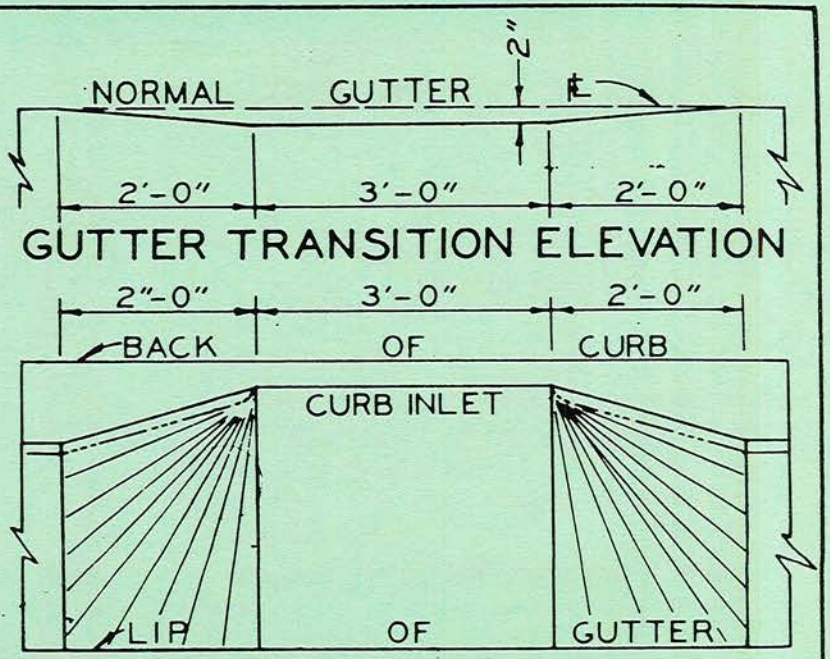


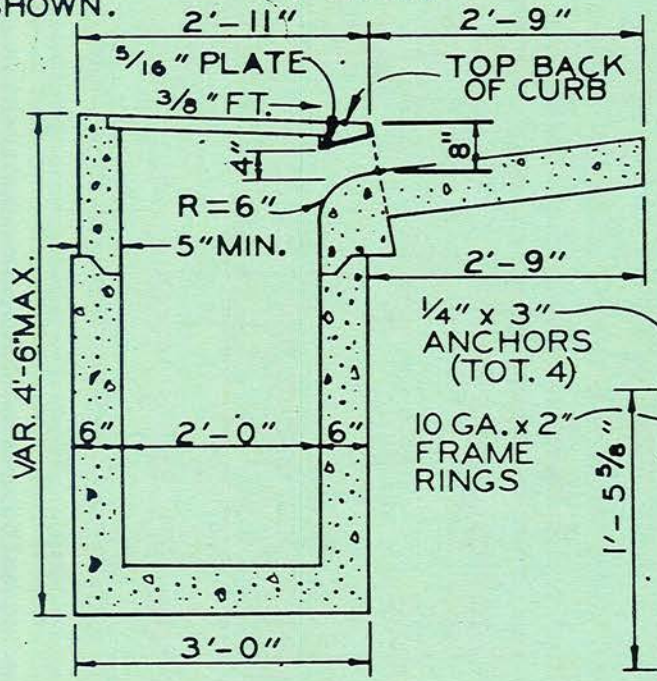
NOTE
SIDEWALK NOT SHOWN.

PLAN



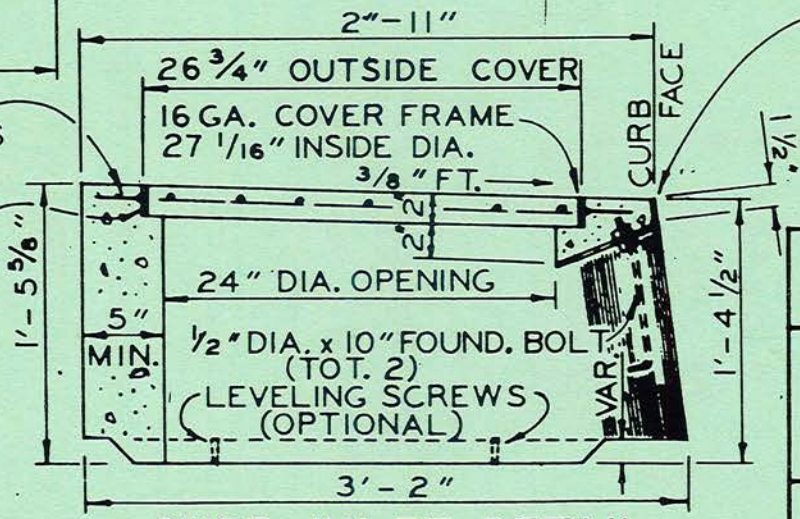
SECTION B-B



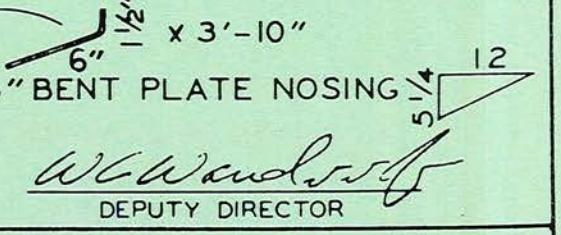


SECTION A-A

NOTES
1. CURB INLET ASSEMBLY MAY BE PRECAST CONCRETE, FIBER GLASS FORMLINER WITH CLASS "B" P.C.C. OR FORMED AND CAST-IN-PLACE P.C.C..
2. ALL METAL SHALL BE HOT DIPPED GALVANIZED. ASTM A123



CURB INLET DETAIL



W. C. Wandler
DEPUTY DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

DROP INLET

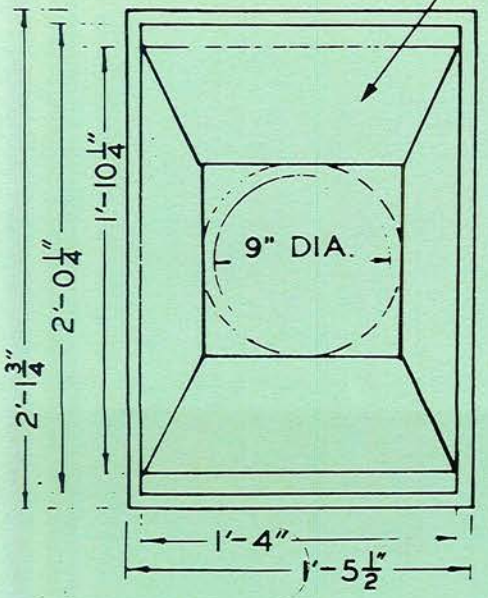
TYPE G

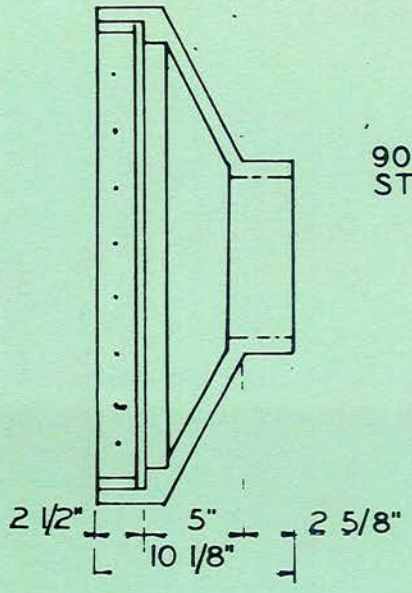
Type 2 C. & G. Only

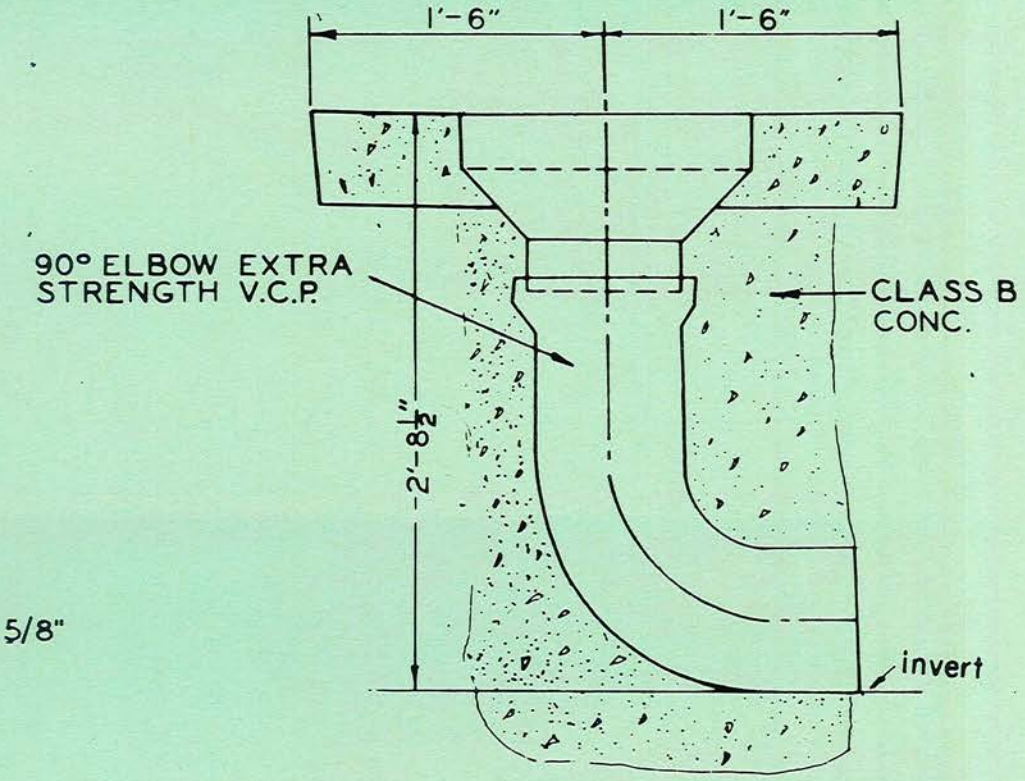
SCALE: NONE
DATE: 5-87
DRAWN BY:

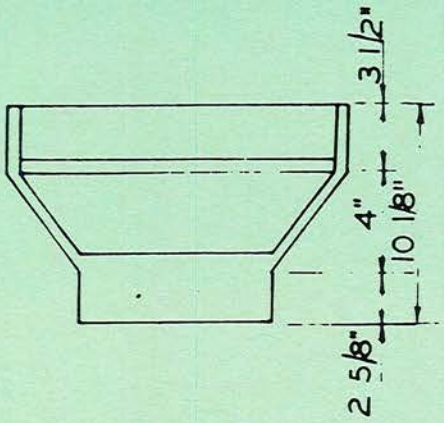
R-13

Std. grate for type D and E drop inlets. See R-9









NOTE: THIS STRUCTURE TO BE USED ONLY TO PICK UP ON SITE DRAINAGE ON PRIVATE PROPERTY

W C Wanderwerk
DEPUTY DIRECTOR

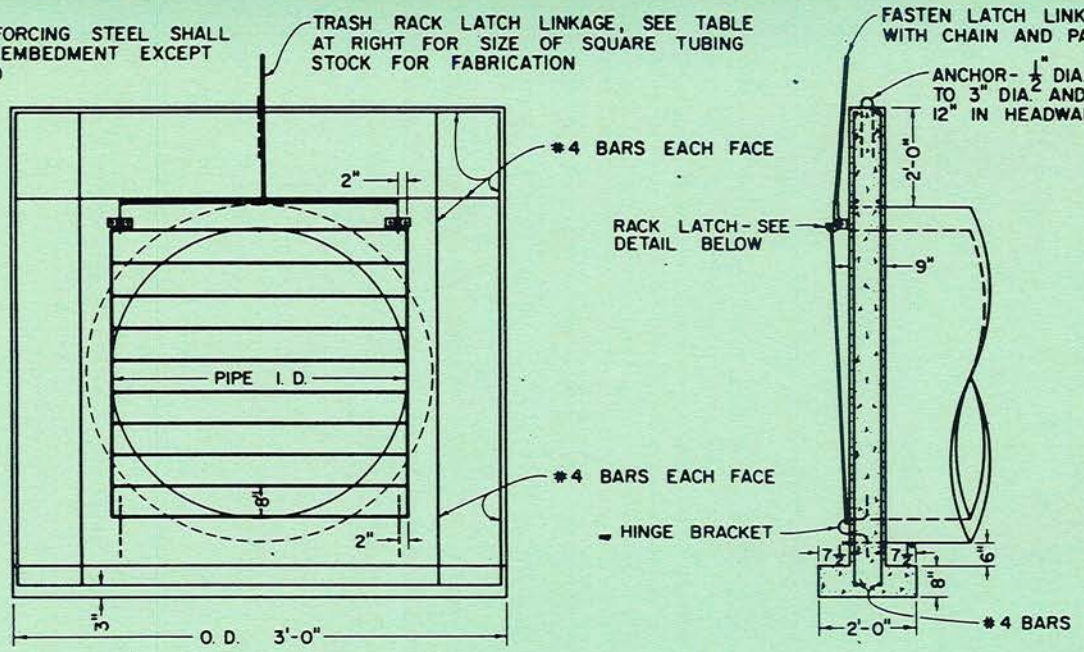
SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

GUTTER DRAIN

SCALE: NONE
DATE: 5-87
DRAWN BY:

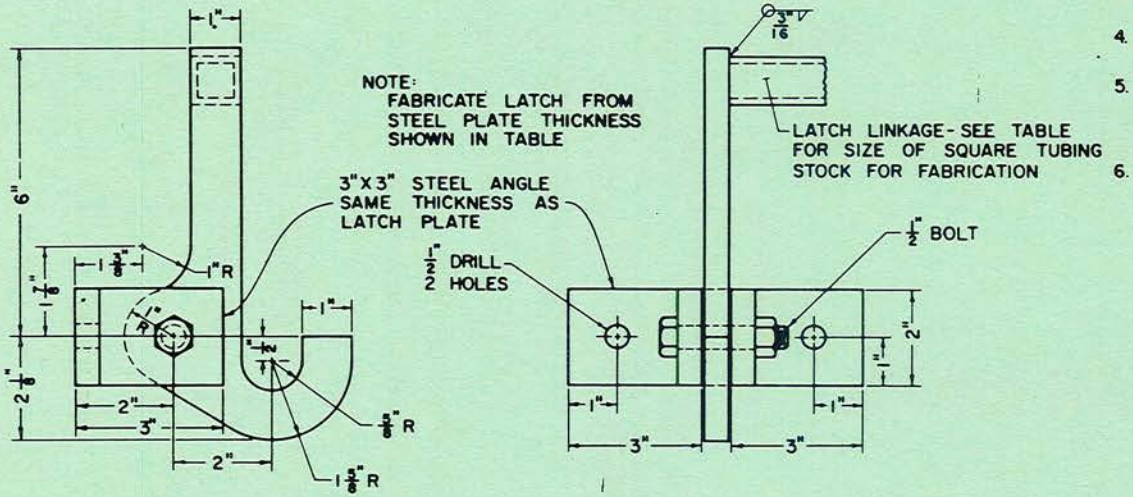
R-14

NOTE:
ALL REINFORCING STEEL SHALL HAVE 2" EMBEDMENT EXCEPT AS NOTED



PIPE SIZE	RACK BAR SIZE	LATCH PLATE THICKNESS	LATCH LINKAGE SIZE
21"	#4	1/4"	1", .095" THICK
24"	"	"	"
27"	#5	"	"
30"	"	3/8"	"
33"	#6	"	"
36"	"	"	1", .133" THICK
42"	#7	"	"
48"	"	1/2"	"
54"	"	"	"
60"	#8	"	"
66"	"	"	"
72"	"	"	"
84"	"	"	"

NOTE:
1. ENTIRE RACK TO BE WELDED REINFORCING STEEL OR ROUND BARS OF EQUAL DIA. WITH HORIZONTAL BARS BEING 8" CENTER TO CENTER.
2. USE CLASS "B" CONCRETE.
3. ROOM SHALL BE PROVIDED DOWNSTREAM TO LAY RACK FLAT.
4. FASTEN LATCH BRACKET TO HEADWALL WITH 1/2"x6" BOLTS WITH HEX NUTS, OR 1/2" EXPANSION BOLTS.
5. WHEN RACK IS IN THE CLOSED POSITION, THE BOTTOM RACK BAR SHALL BE TIGHT AGAINST THE TOP OF THE HINGE BRACKET SO THAT THE RACK CANNOT BE LIFTED OFF THE LATCH.
6. FABRICATE HINGE BRACKET FROM #4 RE-BAR.



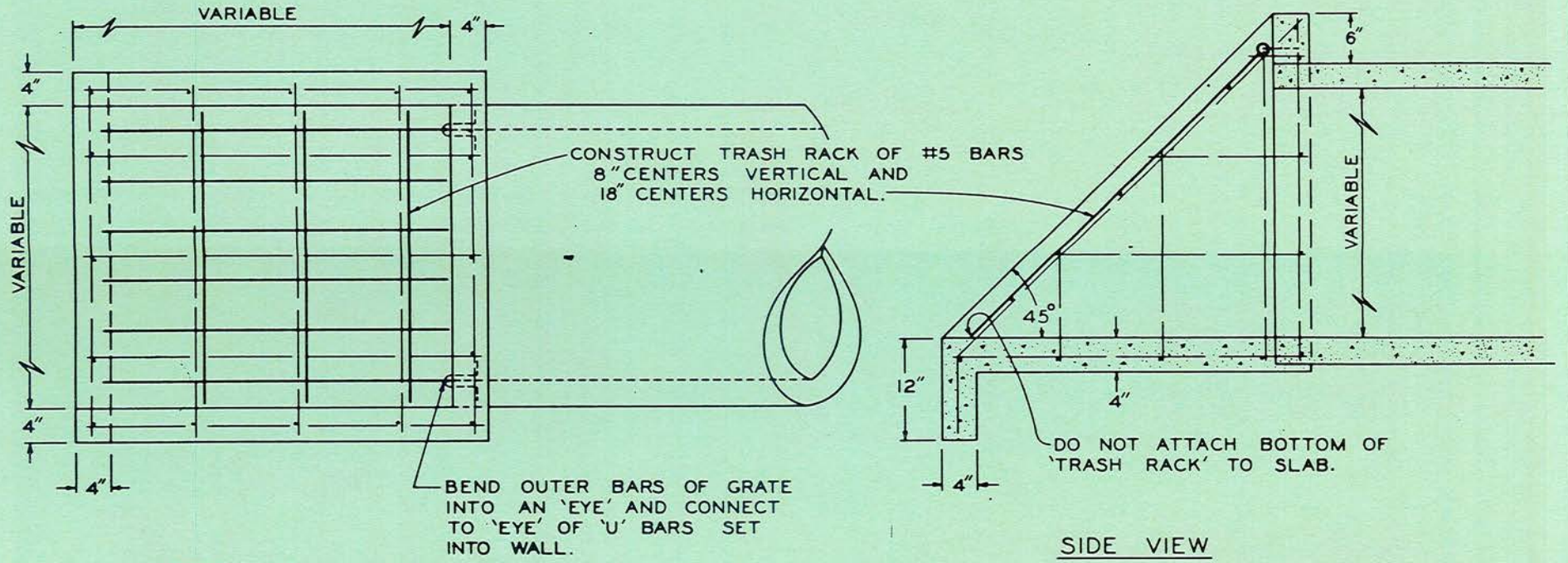
W. C. Anderson Jr.
DEPUTY DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

PIPE OUTFALL
ACCESS CONTROL RACK

SCALE: NONE
DATE: 5-87
DRAWN BY: R. WALKER

R-15



TOP VIEW

SIDE VIEW

NOTE:

ALL REINFORCING TO BE #4 @ 12"

USE . CLASS 'B' CONCRETE

DEPUTY DIRECTOR

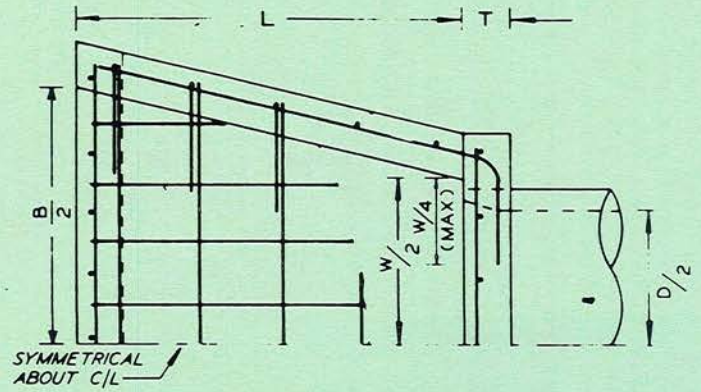
SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

PIPE INLET STRUCTURE AND TRASH RACK

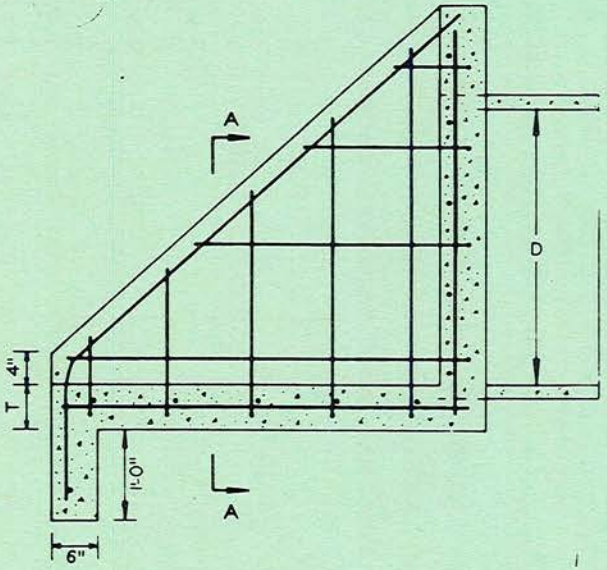
30" PIPE & SMALLER

SCALE: NONE
DATE: 5-87
DRAWN BY:

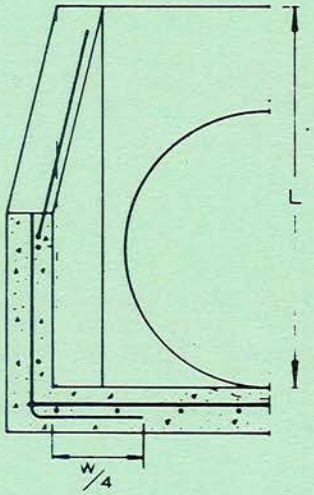
R-16



TOP VIEW



SIDE VIEW



HALF SECTION A-A

DIMENSIONS & REINFORCING

D	W	B	L	T	ALL REINFORCING
33"	3'-5"	5'-3"	4'-0"	6"	#5 @ 12"
36"	3'-8"	5'-8"	4'-2"	6"	#5 @ 12"
42"	4'-4"	6'-4"	4'-8"	6"	#5 @ 12"
48"	4'-10"	7'-2"	5'-2"	8"	#6 @ 12"
54"	5'-4"	8'-0"	6'-0"	8"	#6 @ 12"
60"	6'-0"	8'-10"	6'-6"	8"	#6 @ 12"

NOTES

1. "B" MAY BE REDUCED IF REQUIRED BY CHANNEL DIMENSIONS.
2. REINFORCING BAR SPACING SHOWN IS MAXIMUM SPACING.
3. USE CLASS 'B' CONCRETE.

REDUCED

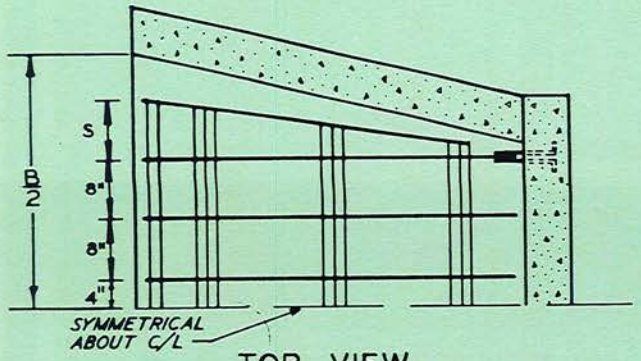
W. W. Wanket
DEPUTY DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

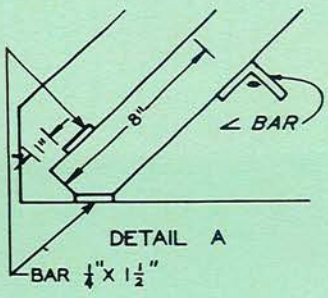
PIPE INLET STRUCTURE

SCALE NONE
DATE 5-87
DRAWN BY

R-17

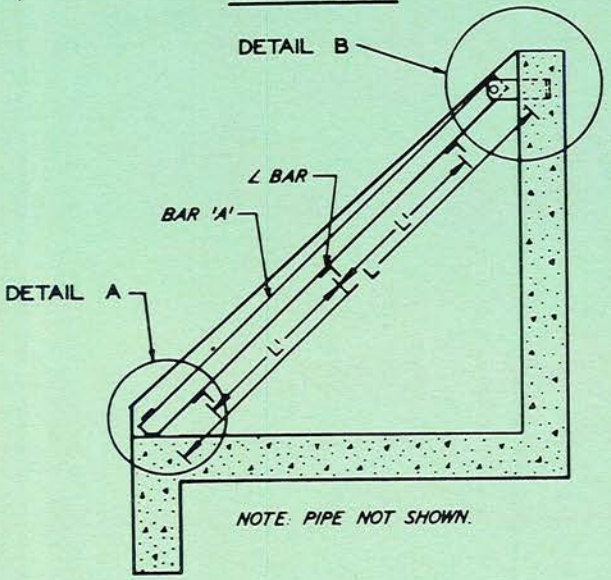


TOP VIEW

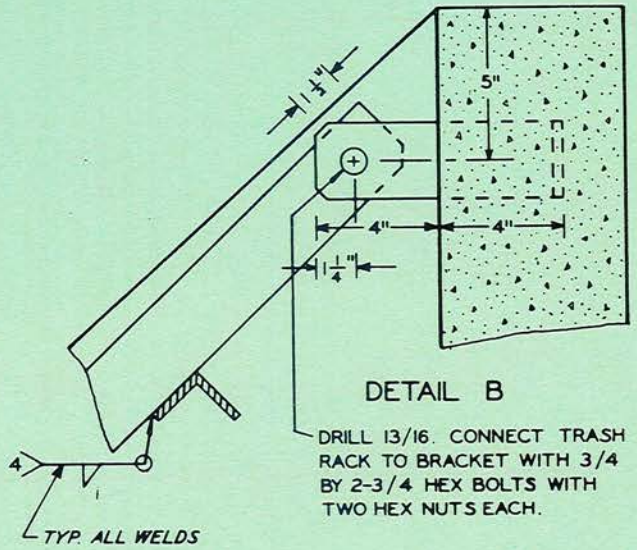


TRASH RACK DIMENSIONS

DIA.	NUMBER & SIZE		L	L'	S	H
	BAR A	∠ BAR				
33"	8-3/8 x 2 1/2	3-2x2x1/4	5'-1"	1'-10"	8"	3'-8"
36"	〃	〃	5'-4"	1'-11"	8"	3'-10"
42"	9-3/8 x 2 1/2	〃	5'-11"	2'-3"	9"	4'-4"
48"	〃	4-2x2x1/4	6'-7"	1'-9"	10"	4'-10"
54"	10-3/8 x 3	4-3x3x1/4	7'-9"	2'-1 1/2"	10 1/2"	5'-8"
60"	11-3/8 x 3 1/2	〃	8'-5"	2'-4"	11"	6'-2"



SIDE VIEW



DETAIL B

DRILL 13/16. CONNECT TRASH RACK TO BRACKET WITH 3/4 BY 2-3/4 HEX BOLTS WITH TWO HEX NUTS EACH.

NOTES:

1. THIS TRASH RACK MAY BE USED WITH PIPE INLET STRUCTURES.
2. MATERIAL TO CONFORM TO ASTM DESIGNATION A-36.
3. 'S' MAY VARY WITH 'B' SEE PLATE
4. ALL FILLET WELDS TO BE 3/16".
5. 2 HINGES REQUIRED FOR 33, 36 & 42 INCH PIPES. 3 HINGES REQUIRED FOR 48, 54 & 60 INCH PIPES.

W. Wanderscheid

DEPUTY DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

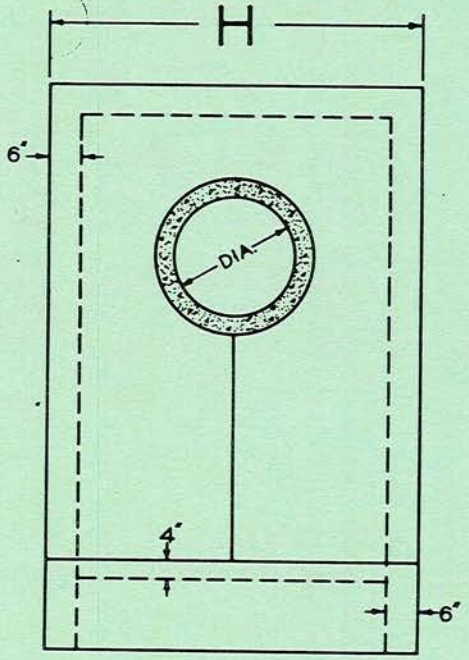
TRASH RACK
33" PIPE & LARGER

SCALE: NONE
DATE: 5-87
DRAWN BY:

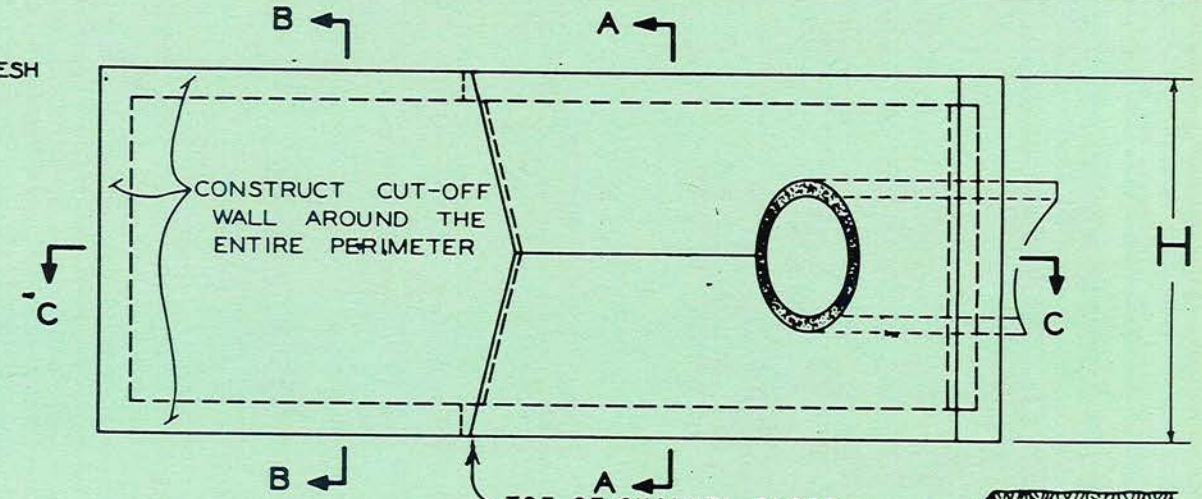
R-18

SECTION A-A

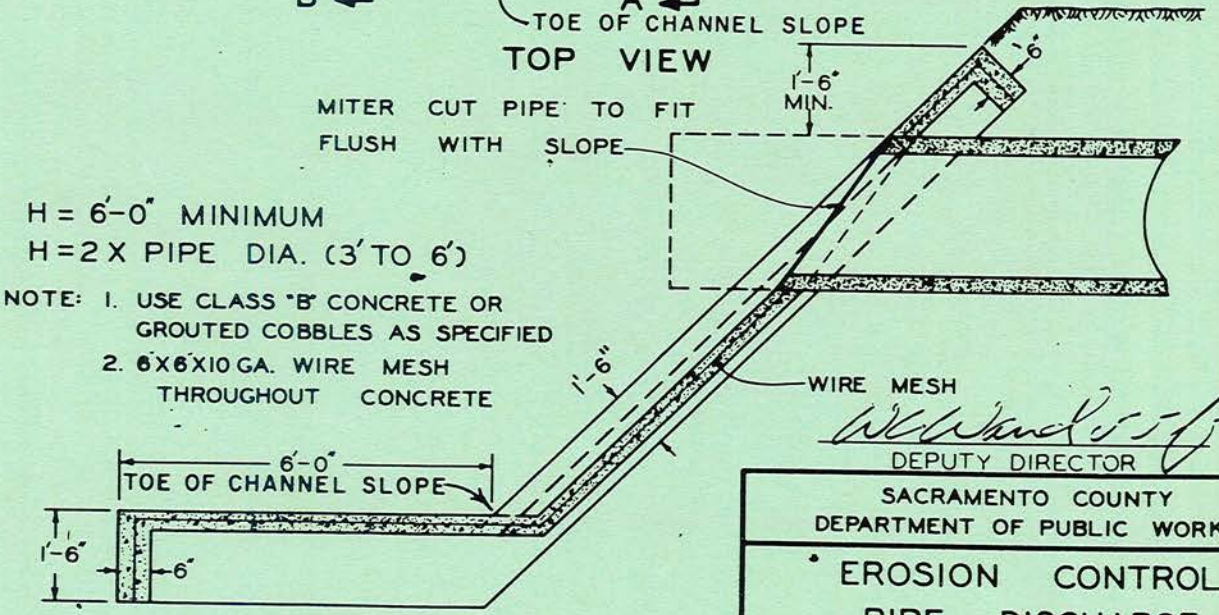
SECTION B-B



FRONT VIEW



TOP VIEW



H = 6'-0" MINIMUM
H = 2 X PIPE DIA. (3' TO 6')

NOTE: 1. USE CLASS "B" CONCRETE OR GROUTED COBBLES AS SPECIFIED
2. 6X6X10 GA. WIRE MESH THROUGHOUT CONCRETE

SECTION C-C

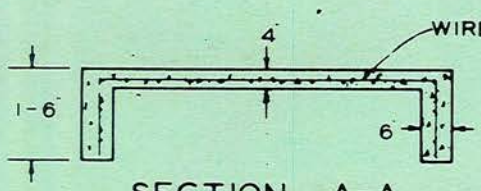
DEPUTY DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

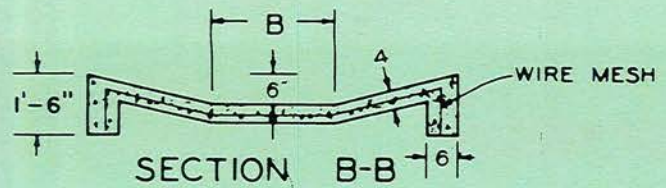
EROSION CONTROL PIPE DISCHARGE

SCALE: NONE
DATE: 5-87
DRAWN BY:

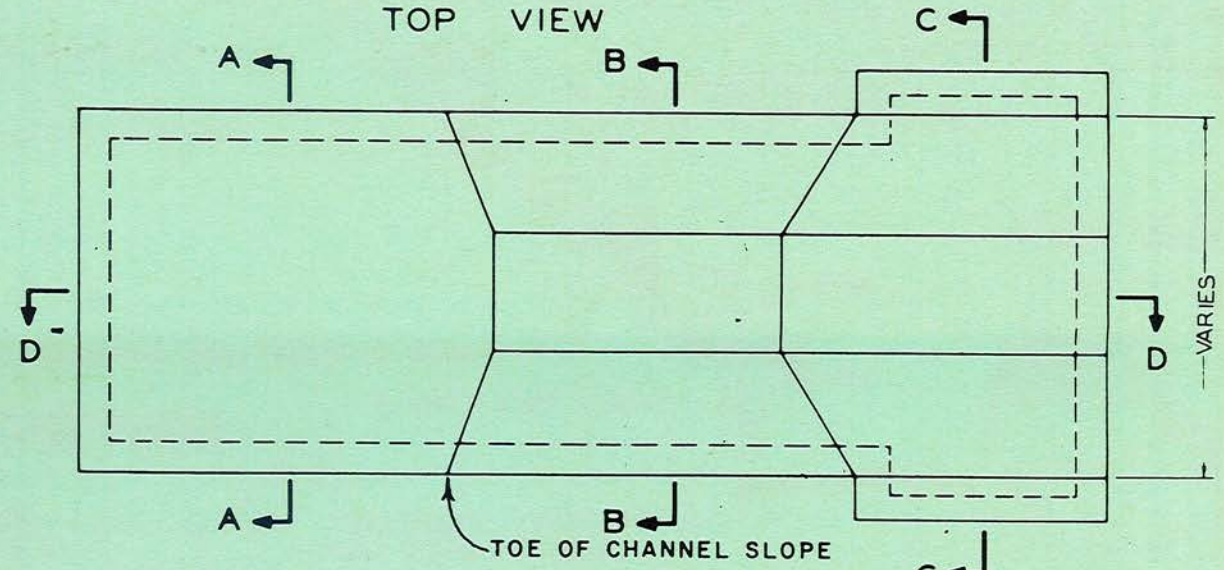
R-19

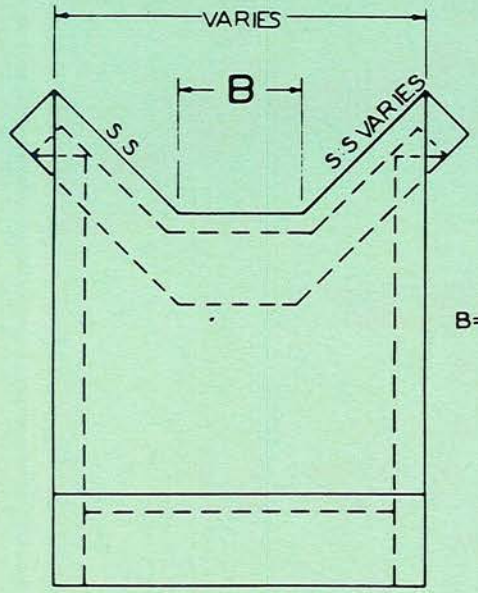


SECTION A-A



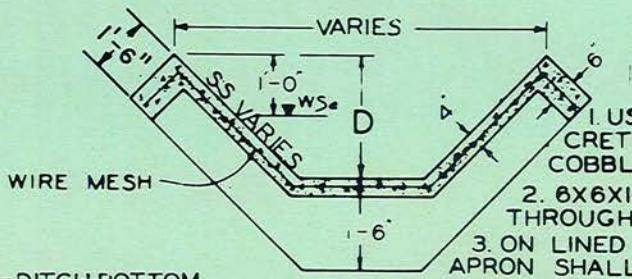
SECTION B-B





FRONT VIEW

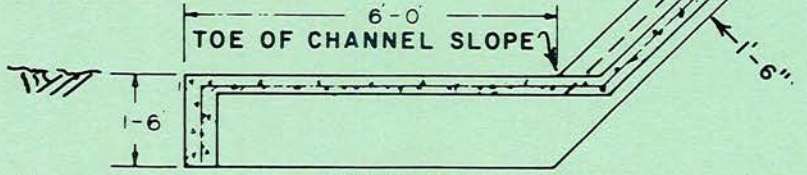
B=DITCH BOTTOM WIDTH OR AS SHOWN ON PLANS



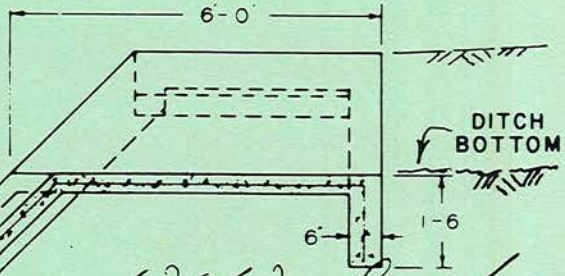
SECTION C-C

NOTE

1. USE CLASS "B" CONCRETE OR GROUTED COBBLES AS SPECIFIED
2. 6X6X10 GA WIRE MESH THROUGHOUT CONCRETE
3. ON LINED CHANNELS APRON SHALL CONNECT TO SIDE LINING



SECTION D-D



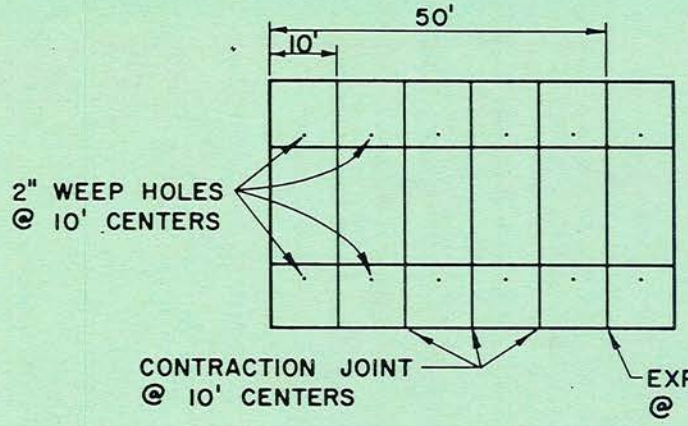
DEPUTY DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

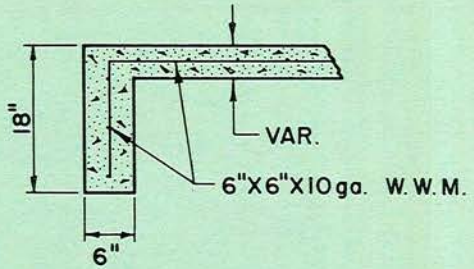
EROSION CONTROL DITCH DISCHARGE

SCALE NONE
DATE 5-87
DRAWN BY

R-20

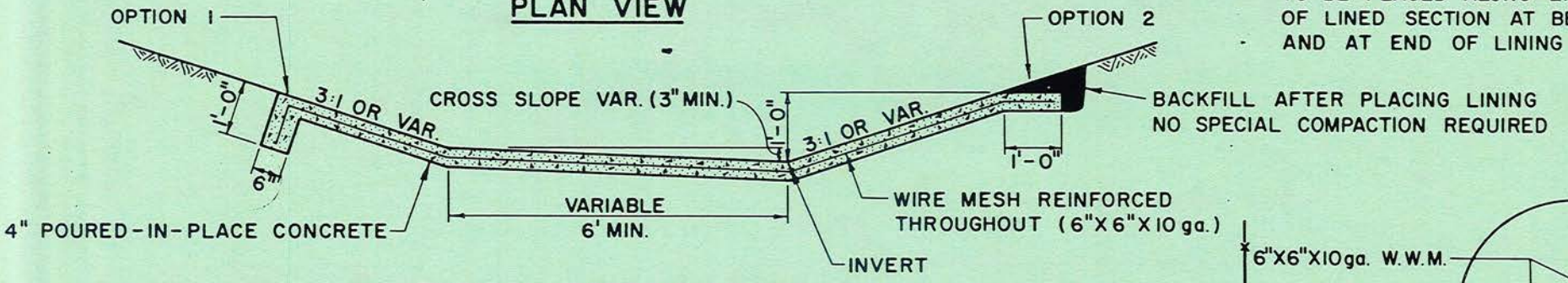


PLAN VIEW

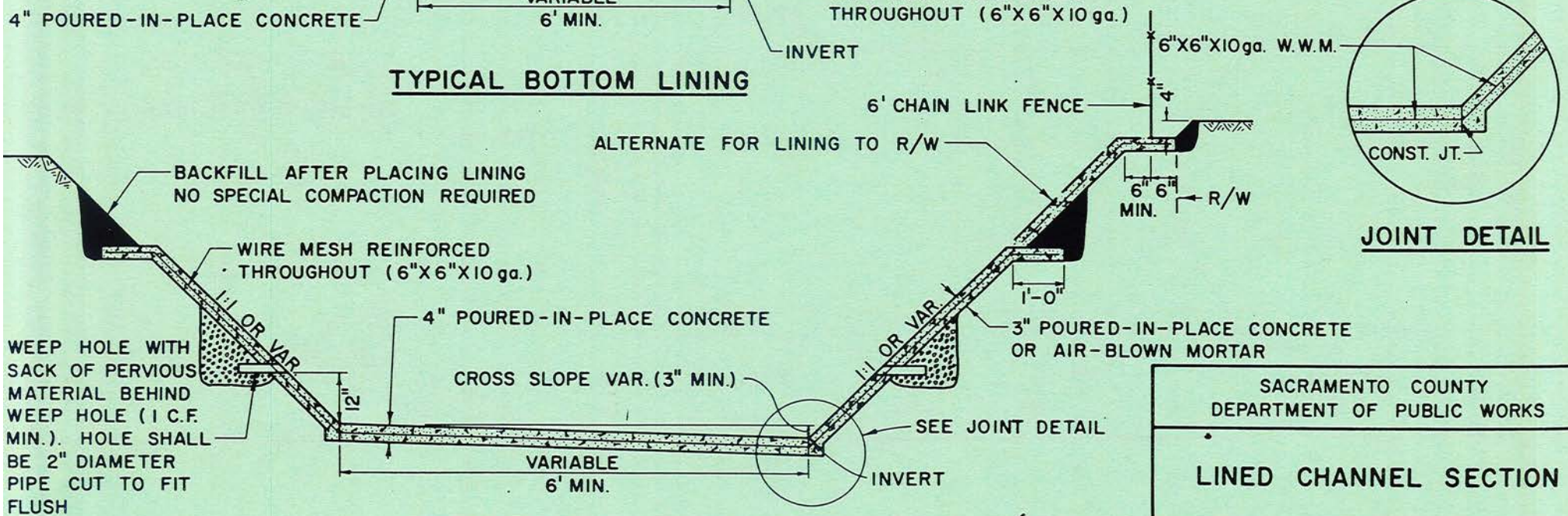


CUTOFF WALL

TO BE PLACED ALONG ENTIRE END OF LINED SECTION AT BEGINNING AND AT END OF LINING



TYPICAL BOTTOM LINING



TYPICAL FULL LINING

JOINT DETAIL

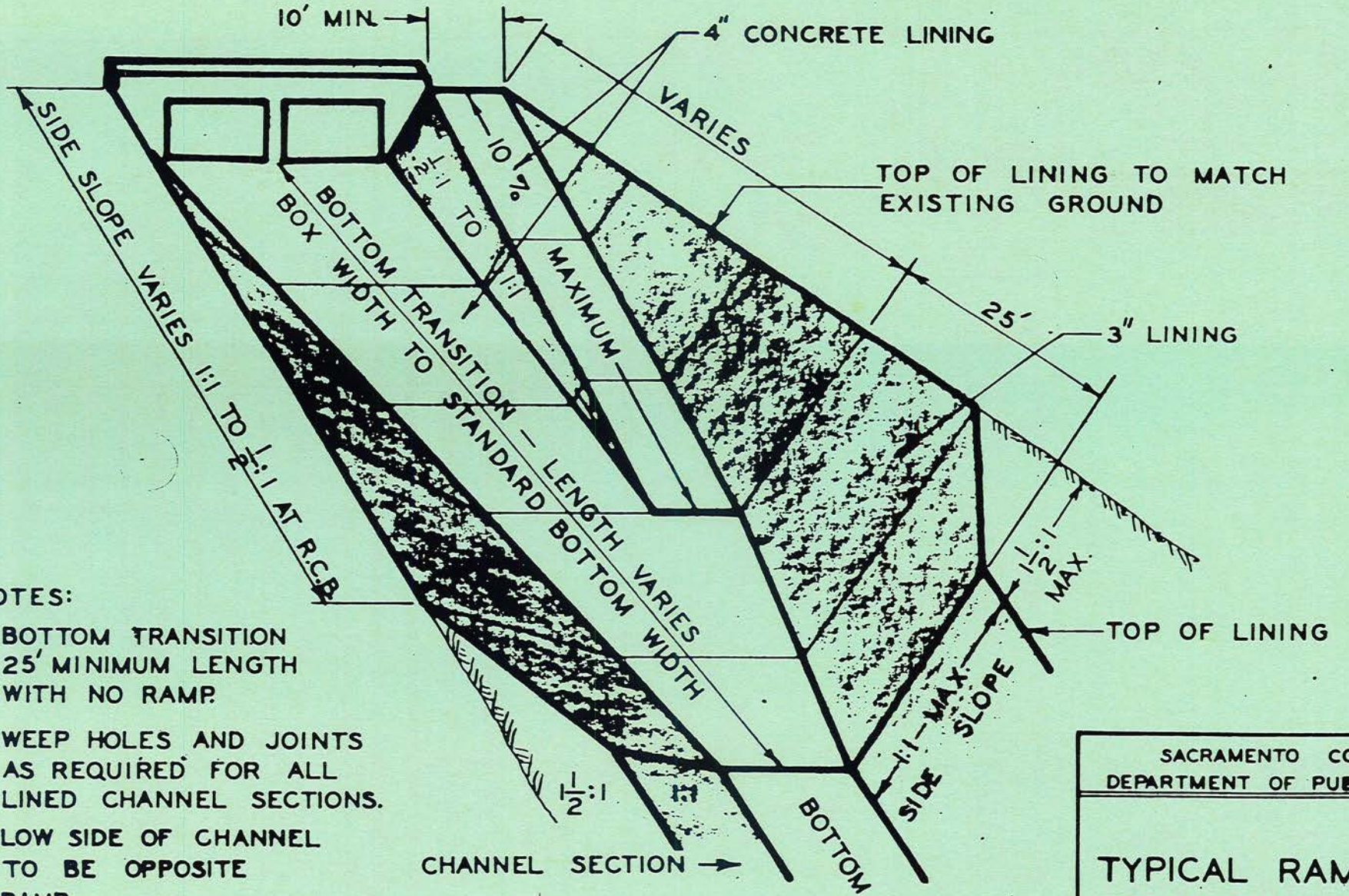
DEPUTY DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

LINED CHANNEL SECTION

SCALE: NONE
DATE: 8-88
DRAWN BY: R. WALKER

R-21



NOTES:

BOTTOM TRANSITION 25' MINIMUM LENGTH WITH NO RAMP.

WEEP HOLES AND JOINTS AS REQUIRED FOR ALL LINED CHANNEL SECTIONS.

LOW SIDE OF CHANNEL TO BE OPPOSITE RAMP.

SIDE SLOPE LINING MAY BE DELETED ON CHANNELS WITH BOTTOM LINING ONLY

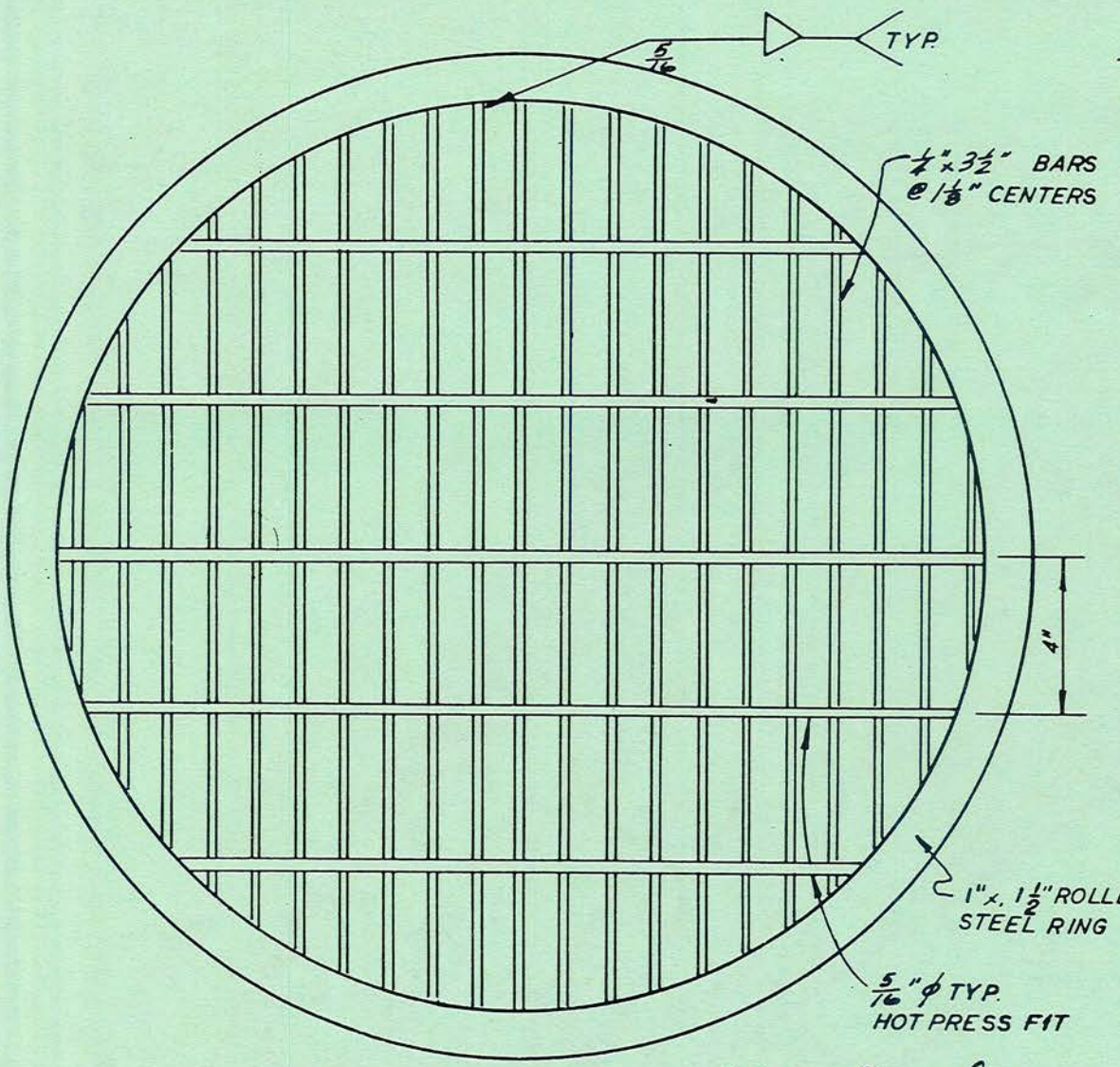
DEPUTY DIRECTOR

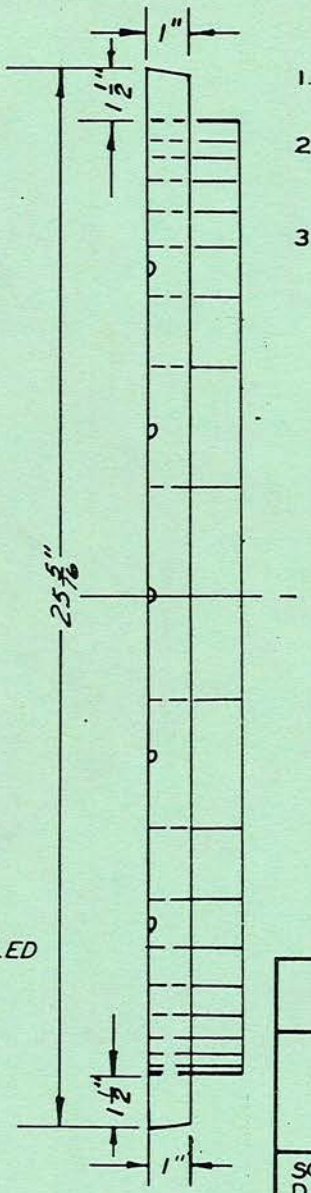
SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

TYPICAL RAMP & TRANSITION DETAIL

SCALE NONE
DATE 5-87
DRAWN BY

R-22





1. MANHOLE COVER SHALL FIT FRAME SHOWN ON DRAWING R-24.
2. SEATING SURFACES SHALL BE MACHINED AS SHOWN IN DETAIL ON DRAWING R-24.
3. THIS COVER MAY BE USED ONLY WITH APPROVAL OF ENGINEER.

GALVANIZE AFTER FABRICATION

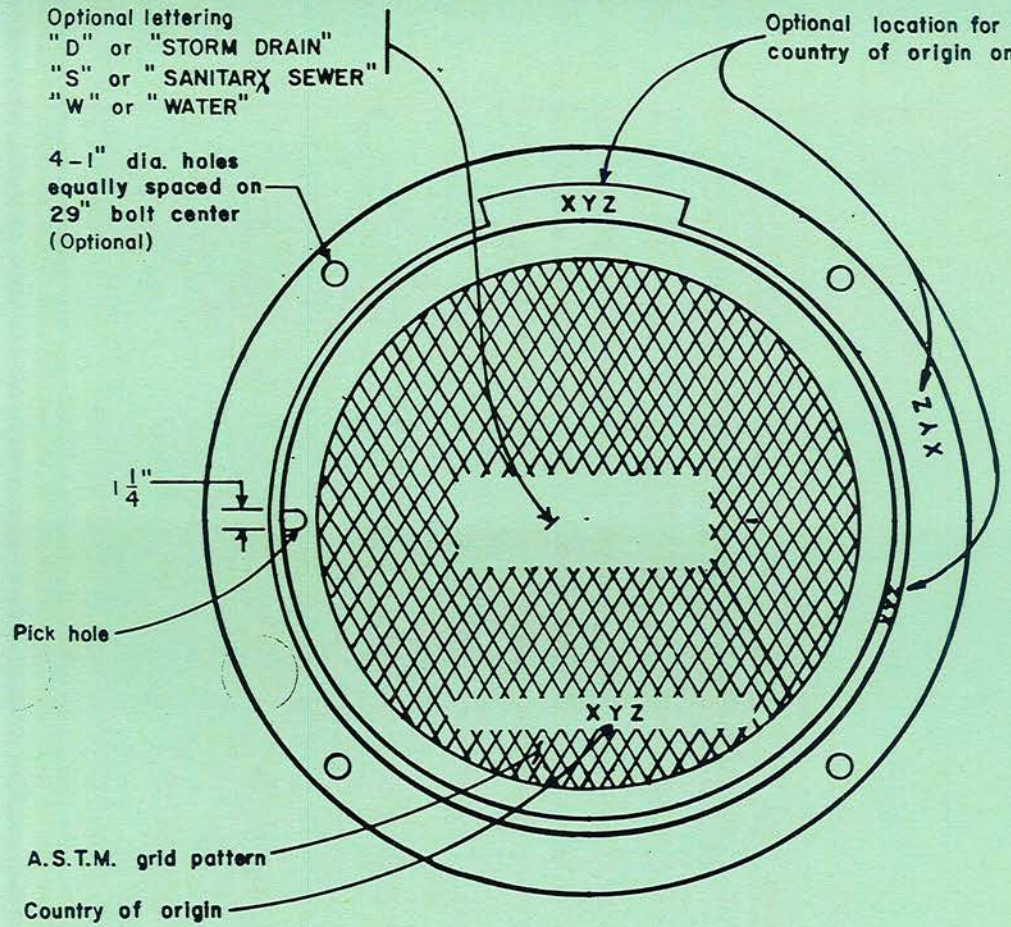
W C Wardlow
DEPUTY DIRECTOR

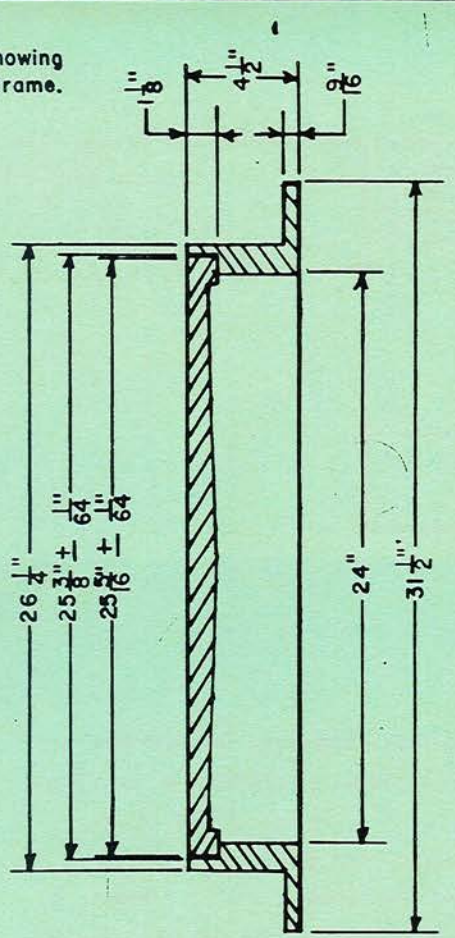
SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

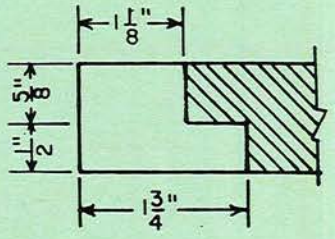
GRATE TYPE MANHOLE COVER

SCALE: NONE
DATE: 12-86

R-23

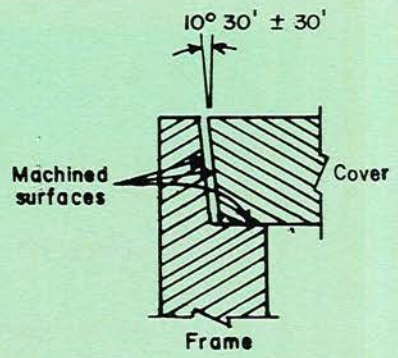






Pick hole

Section through center of hole



Seating surfaces shall be closely machined to the dimensions shown. Tolerances on machined surfaces shall not exceed 1/64".

Note:

1. Country of origin shall be clearly and permanently shown on top surface of the frame and cover in accordance with the Trade and Tariff Act of 1984.
2. Date of manufacture shall be clearly and permanently indicated on the cover and the top of the frame.

ITEM	APPROX. WT. (lbs.)
Assy.	270 ± 15
Frame	140 ± 10
Cover	130 ± 5

Material: cast iron

W C Wanderer

Deputy Director

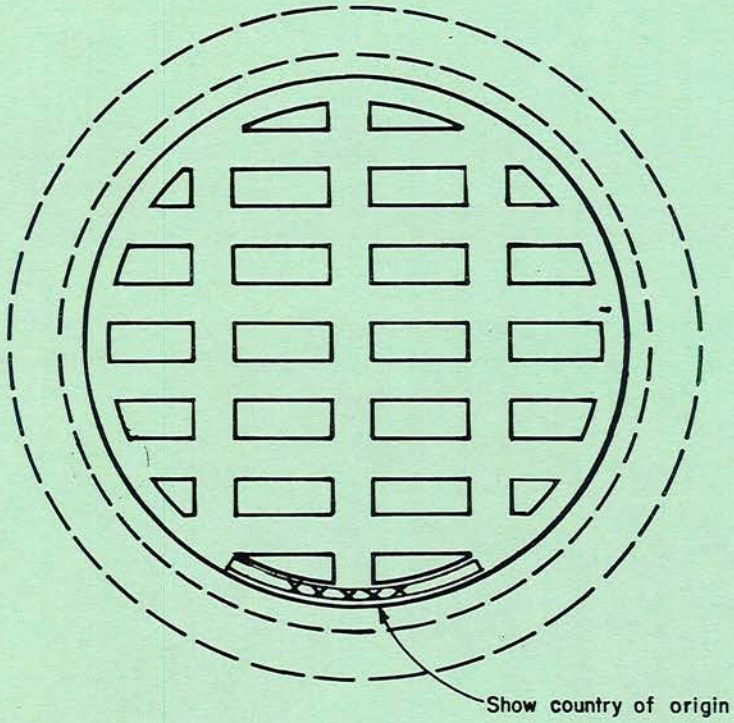
SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

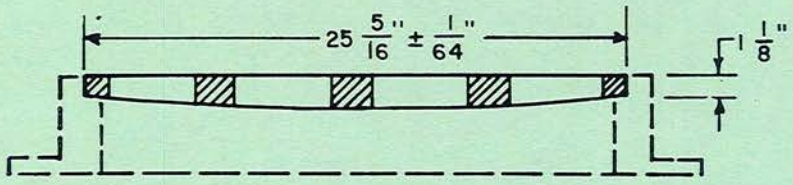
STANDARD 24"

MANHOLE FRAME & COVER

Scale: None
Date: 12-86
Drawn:

R-24





1. Manhole cover shall fit frame as shown on drawing R-24.
2. Seating surfaces shall be machined as shown on drawing R-24.
3. Manhole cover shall not be used in any location subject to vehicular traffic.
4. Minimum area of drainage opening shall be 150 square inches.
5. Maximum length of individual openings shall be 4 1/2". Maximum width of individual openings shall be 1 1/2".
6. Minimum length of full rectangular openings shall be 3 1/2"; minimum width shall be 1 1/4".
7. Maximum weight shall be 150 lbs. Minimum weight shall be 130 lbs.
8. Number of openings may vary from that shown on the drawing.
9. Country of origin shall be clearly shown on the top surface of the manhole frame and cover in accordance with the Trade and Tariff Act of 1984.
10. Date of manufacture shall be clearly cast, stamped, etched or engraved on the manhole cover.

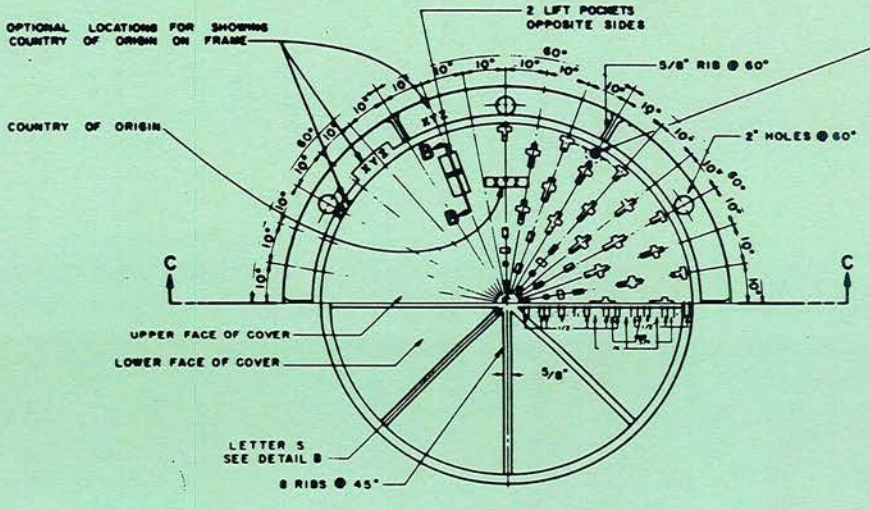
W C Wanlass
DEPUTY DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

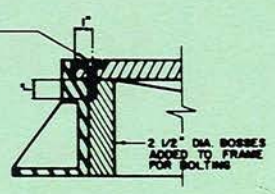
DRAINAGE GRATE
MANHOLE COVER

SCALE: NONE
DATE: 12-86
DRAWN BY: S.L.H.

R-24A



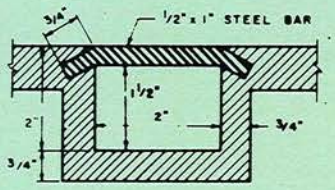
PLAN



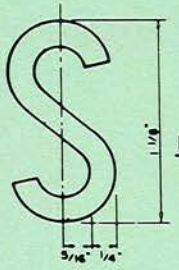
BOLT DOWN COVER DETAIL
NO SCALE

NOTES:

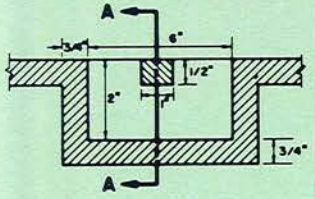
1. COUNTRY OF ORIGIN SHALL BE CLEARLY AND PERMANENTLY SHOWN ON TOP SURFACE OF THE FRAME AND COVER IN ACCORDANCE WITH THE TRADE AND TARIFF ACT OF 1984.
2. DATE OF MANUFACTURE SHALL BE CLEARLY AND PERMANENTLY INDICATED ON THE COVER AND THE TOP OF THE FRAME.
3. BOLT DOWN COVER AND NEOPRENE GASKET DETAILS APPLICABLE ONLY WHERE SPECIFIED.



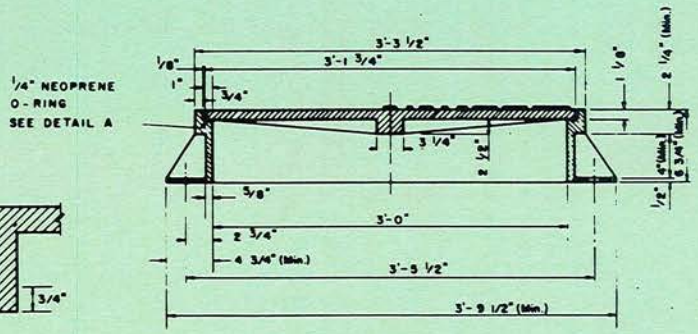
SECTION A-A
NO SCALE



DETAIL B
NO SCALE

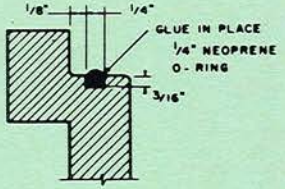


SECTION B-B
NO SCALE



SECTION C-C

STANDARD 36" MANHOLE FRAME & COVER
NO SCALE



DETAIL A
NO SCALE

W C Wanderer

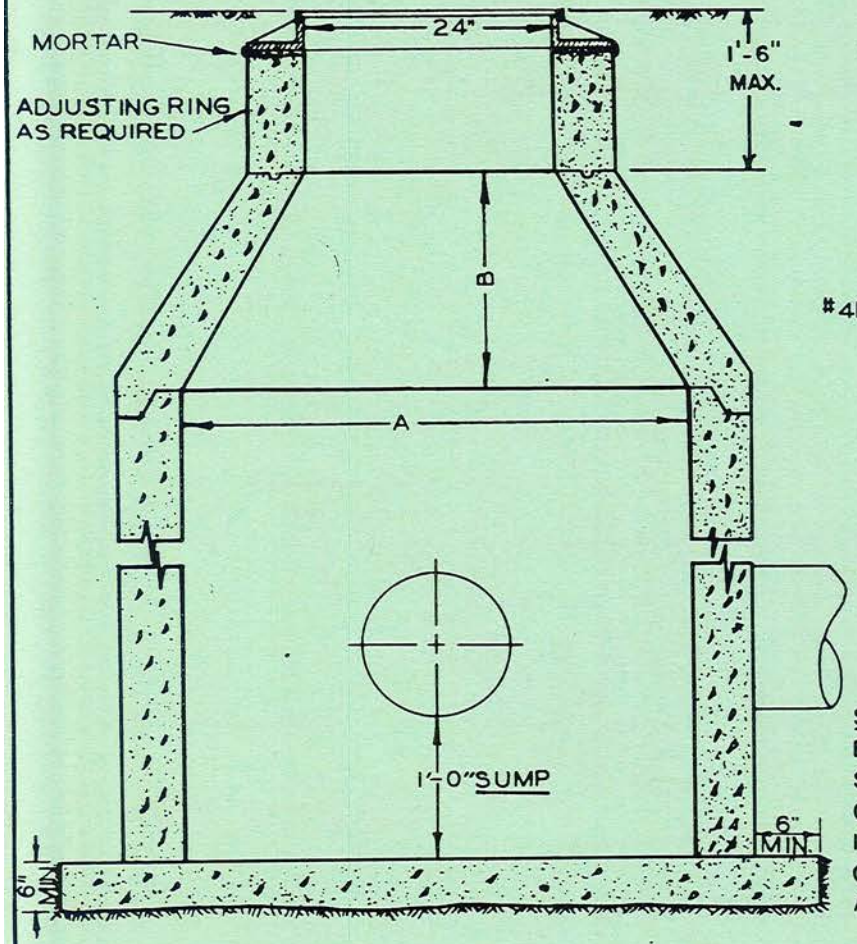
DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

STANDARD 36" SEWER MANHOLE FRAME & COVER

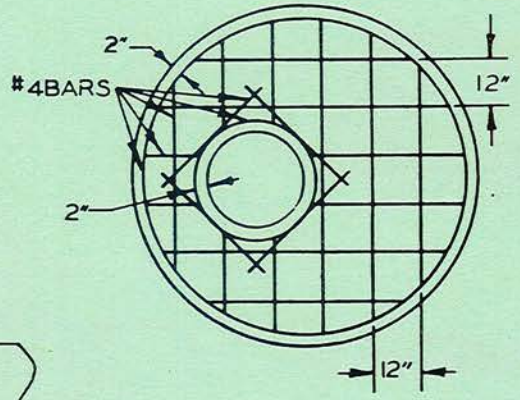
NO SCALE
DATE: AUG. , 1988
DRAWN BY: R.A.E.

R-24B

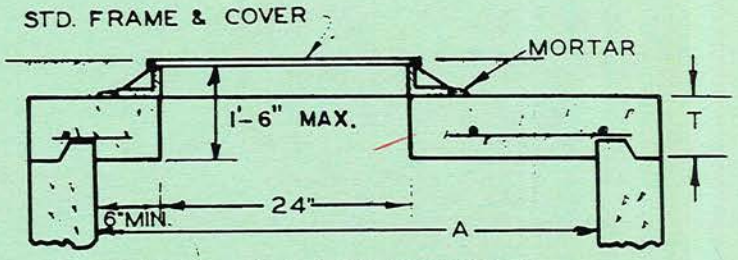


NOTE:
ECCENTRIC CONES SHALL BE USED WHERE SPECIFIED ON THE PLANS

JOINTS MAY BE EITHER KEYED OR TONGUE AND GROOVE



FLAT SLAB TOP



FLAT SLAB SHALL BE USED WHEN DEPTH DOES NOT PERMIT USE OF TAPER UNIT

TABLE OF DIMENSIONS

M.H.	A	B	T MIN.
48"	48"	16"	8"
60"	60"	28"	9"
72"	72"	–	10"

DIMENSION "B" IS A MINIMUM DIMENSION AND MAY BE GREATER IF DEPTH PERMITS.

RISER SECTIONS. CONES. AND ADJUSTING RINGS SHALL CONFORM TO ASTM DESIGNATION C-478

FRAME SHALL BE SECURED TO RISER OR FLAT SLAB TOP WITH CEMENT MORTAR

SUMP SHALL BE 1'-0" DEEP, MEASURED FROM INVERT OF OUTFALL PIPE. SUMP NOT REQUIRED IF DIAMETER OF OUTFALL PIPE IS 24" OR LARGER, OR IF M.H. IS NOT WITHIN PUBLIC R/W OR OTHER AREA WITH VEHICULAR ACCESS.

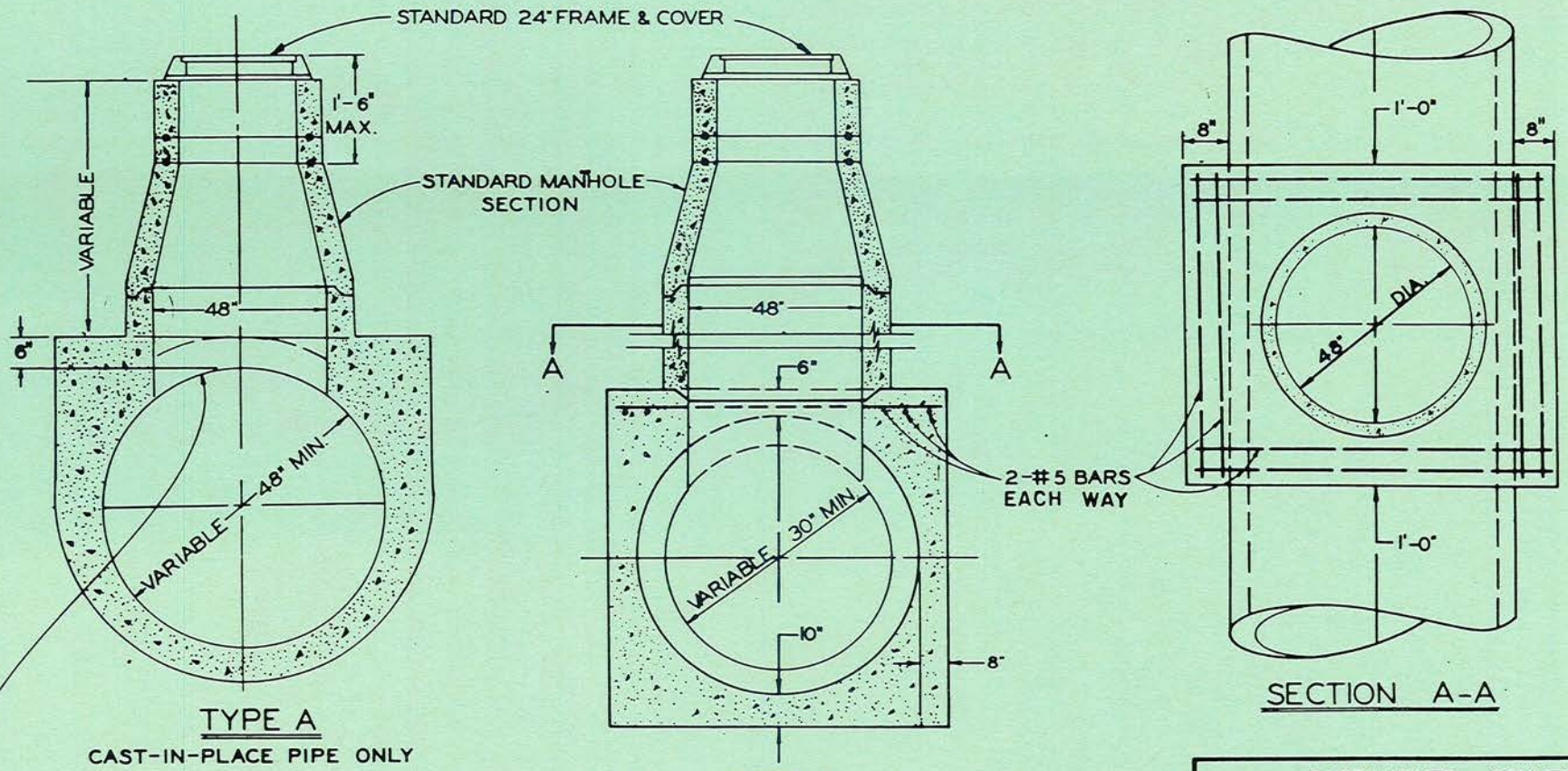
DEPUTY DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

STANDARD PRECAST MANHOLE - DRAINAGE -

SCALE: NONE
DATE: 12-86
DRAWN BY:

R-25



TYPE A

CAST-IN-PLACE PIPE ONLY

NOTE:
REMOVE CONCRETE IN MANHOLE OPENING AND CONSTRUCT RISER BASE WHILE CONCRETE IS STILL FRESH.

PLACE RISER SECTION AFTER CONCRETE HAS SET.

TYPE B

1. ALL PIPE OTHER THAN CAST-IN-PLACE PIPE.
2. CAST-IN-PLACE PIPE LESS THAN 48" DIA.

SECTION A-A

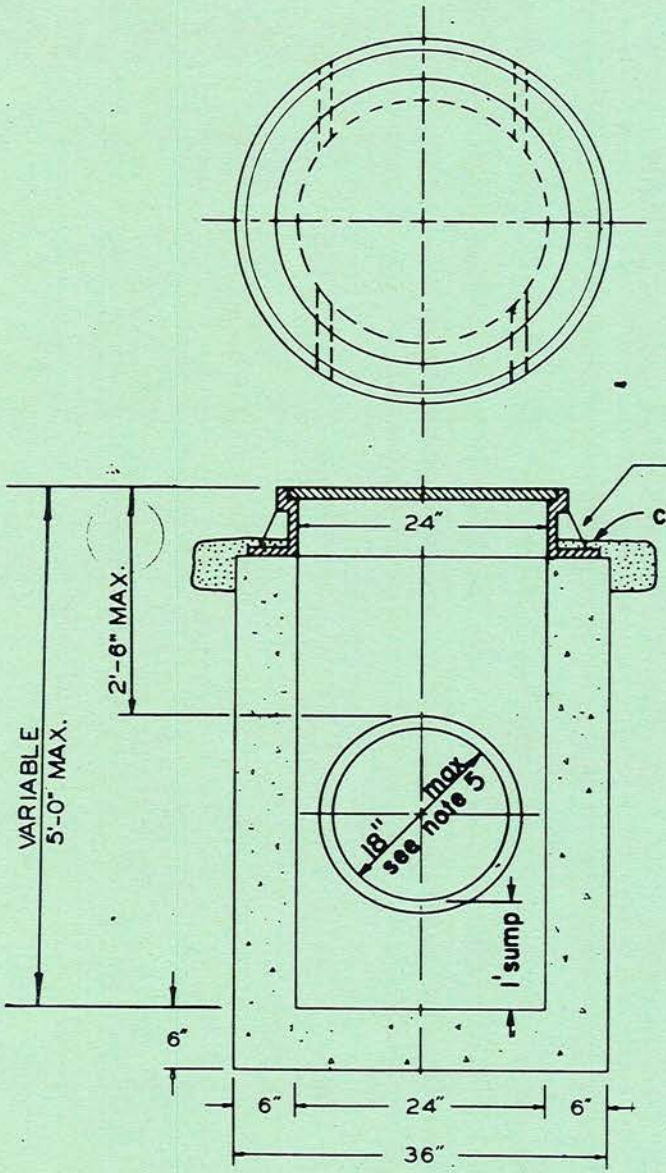
W. C. Wardlow
DEPUTY DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

TYPE A & B
SADDLE MANHOLE

SCALE: NONE
DATE: 5-87
DRAWN BY:

R-26



NOTES:

1. USED WHERE TOP OF PIPE IS LESS THAN 30" BELOW SURFACE.
2. WALL THICKNESS OF MANHOLE DOES NOT APPLY WHEN CLASS II R.C.P. IS USED.
3. USE CLASS "B" CONCRETE OR CLASS II R.C.P.
4. WHEN MANHOLE IS CAST-IN-PLACE, WALL THICKNESS SHALL NOT VARY MORE THAN 1 INCH FROM THAT SHOWN
5. WHEN USED AT ANGLE POINTS, MAX. PIPE SIZE TO BE 12 INCHES.
6. **1' sump to be measured from invert of outfall pipe.**
7. SUMP NOT REQUIRED WHEN MANHOLE LOCATED IN AREA WITHOUT VEHICULAR ACCESS.

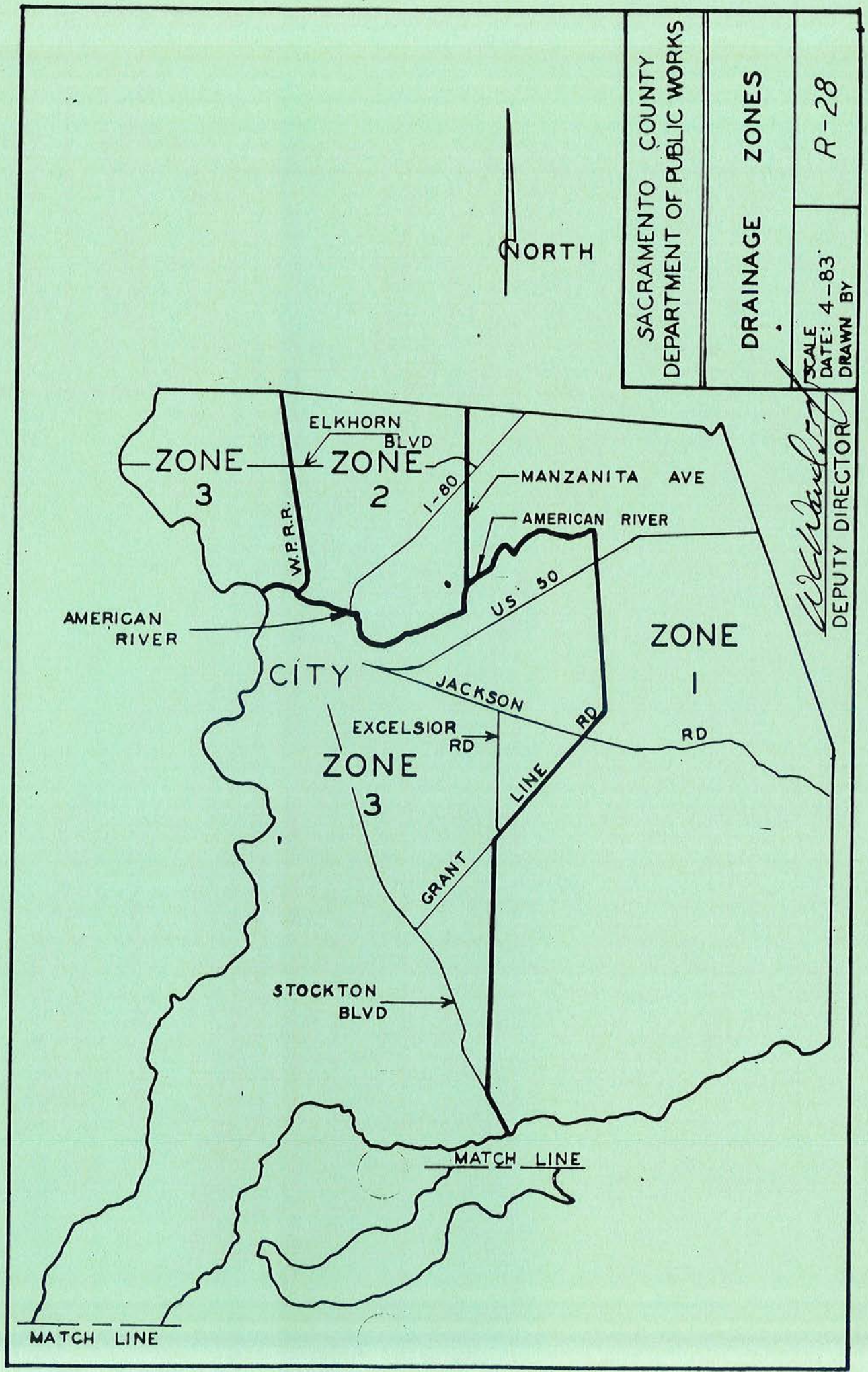
DEPUTY DIRECTOR

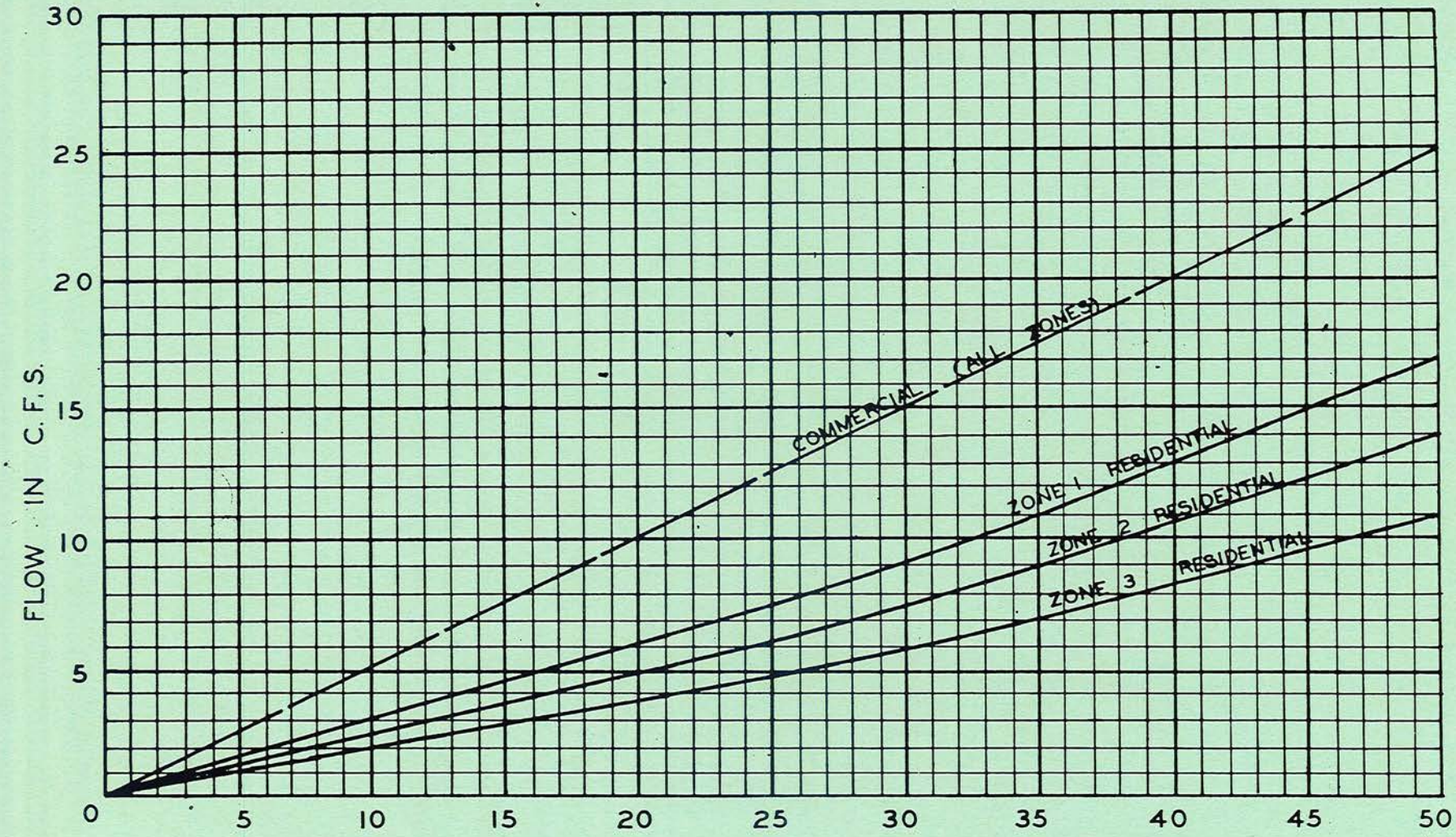
SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

24" MANHOLE

SCALE NONE
DATE 5-87
DRAWN BY

R-27


SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS
DRAINAGE ZONES
R-28
SCALE
DATE: 4-83
DRAWN BY
DEPUTY DIRECTOR
NORTH
ZONE 3
ZONE 2
ZONE 1
ZONE 3
CITY
ELKHORN BLVD
MANZANITA AVE
AMERICAN RIVER
W.P.R.R.
I-80
US 50
AMERICAN RIVER
JACKSON RD
EXCELSIOR RD
GRANT LINE RD
STOCKTON BLVD
MATCH LINE
MATCH LINE



NOTE: SEE NOTE, DRAWING R-30 FOR COMPUTING MULTIPLE FAMILY RUNOFF VALUES.

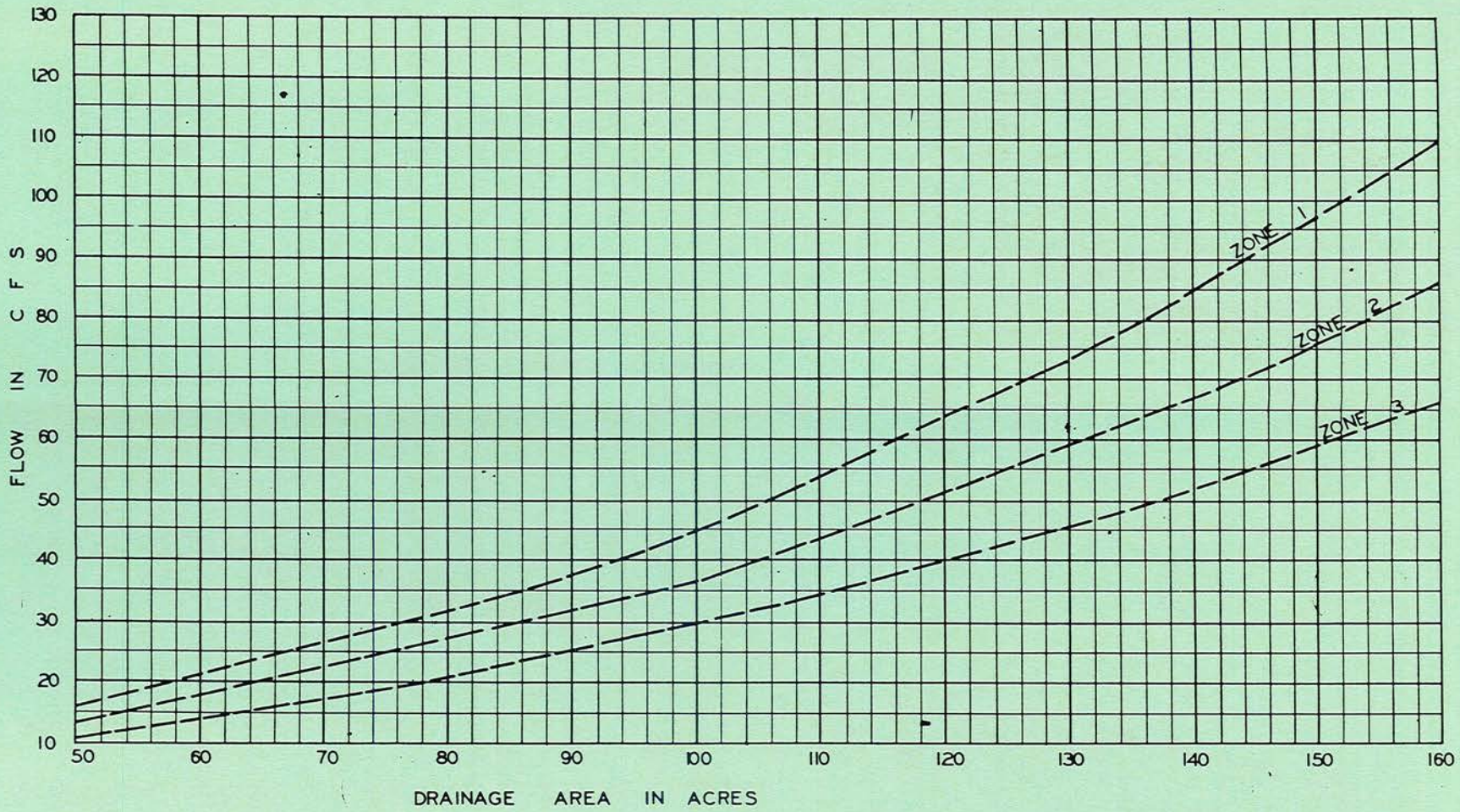
DEPUTY DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

DESIGN RUNOFF

SCALE:
DATE: 4-83
DRAWN BY:

R-29



NOTE: DESIGN RUNOFF FOR MULTIPLE FAMILY DEVELOPMENT SHALL BE BASED ON THE FOLLOWING FORMULA:

$$Q_m = Q_r + (Q_c - Q_r)\frac{I-50}{40}$$

WHERE:

RD-7 I=60
RD-10 I=70
RD-20 I=80
RD-30 I=90

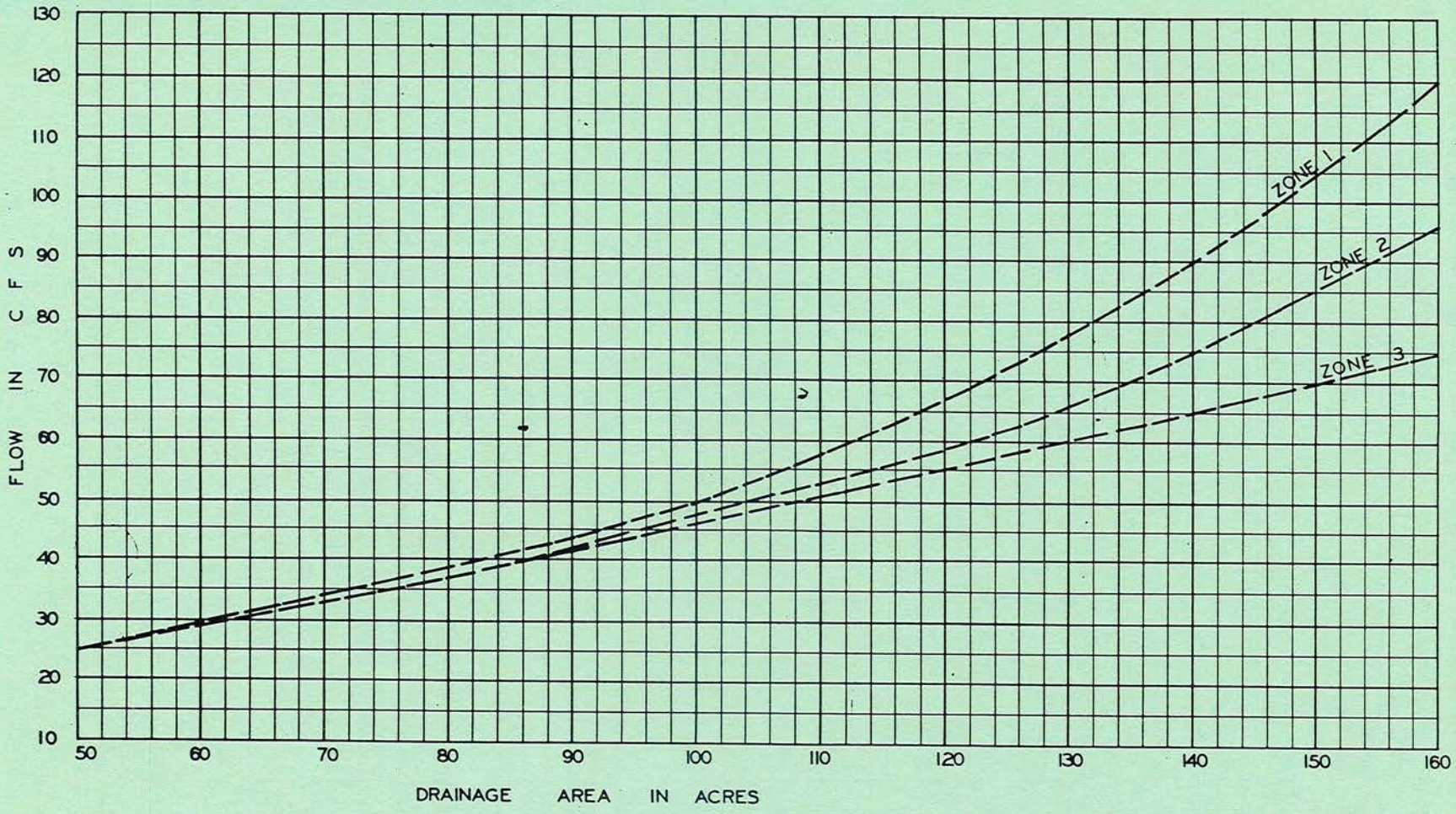
W. C. Wanderlich
DEPUTY DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

DESIGN RUNOFF
RESIDENTIAL

SCALE: NONE
DATE: 4-83
DRAWN BY: L.C.LEE

R-30



SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

DESIGN RUNOFF
COMMERCIAL

DEPUTY DIRECTOR

SCALE: NONE
DATE: 4-83
DRAWN BY: L.C. LEE

R-31

MAXIMUM TRENCH DEPTH

MEASURED SURFACE TO BOTTOM OF TRENCH IN FEET

DIAMETER	C-14 CONC. PIPE -CLASS-			REINFORCED CONCRETE PIPE & ASBESTOS CEMENT PIPE -CLASS-					VCP E.S.	CAST IN PLACE
	1	2	3	I	II	III	IV	V		
10	12	17	29	NOT PERMITTED				NO LIMIT	30	NO LIMIT
12	12	17	21		8	12	30		26	
15	12	17	20		10	15	35		26	
18	11	17	19		11	16	38		29	
21	11	17	19		12	17	39		29	
24	11	16	19		12	18	39		24	
27	11	16	18		13	19	39		19	
30	11	15	17		14	19	38		19	
33	11	15	16		14	20	38		20	
36	10	13	14		13	17	27	69	NOT PERMITTED	
42	NOT PERMITTED				14	18	29	62		
48					15	19	30	60		
54					16	20	31	58		
60				14	16	21	31	57		45
66				15	17	22	32	56		35
72				15	18	23	33	56		30

NOTES: All depths shown for flexible pavement and trench width equal to O.D. of pipe plus 16" for pipe 33" and smaller in inside diameter. Trench width equals O.D. of pipe plus 24" for pipe 36" and larger in inside diameter. Trench width measured at top of pipe.

MINIMUM COVER

MEASURED SURFACE TO TOP OF PIPE IN INCHES

TYPE	CLASS	MIN. COVER	
		STREET	OFF ST
C-14 CONC. PIPE	1	30	12
	2	27	12
	3	24	12
REIN. CONCRETE AND ASBESTOS CEMENT	I	27	12
	II	24	12
	III	18	12
	IV	12	12
	V	12	12
VCP	E S	24	12
CAST IN PLACE CONC PIPE	——	12	12

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

CONCRETE PIPE, REINFORCED CONCRETE PIPE, ASBESTOS CEMENT PIPE, VITRIFIED CLAY PIPE, AND CAST-IN-PLACE CONCRETE PIPE COVER REQ

DEPUTY DIRECTOR | DATE: 4-83 | R-32

MAXIMUM TRENCH DEPTH

MEASURED SURFACE TO BOTTOM OF TRENCH IN FEET

DIA. INCHES \ THICKNESS	CORRUGATED STEEL "C.S.P." **					CORRUGATED ALUMINUM "C.A.P." **				
	0.064"	0.079"	0.109"	0.136"	0.168"	0.060"	0.075"	0.105"	0.135"	0.165"
10	100					100				
12	99					91	99			
15	99					73	91	99		
18	99					60	76	99		
21	99	99				52	65	91		
24	93	99				45	57	79	99	
30	74	93	99			52	45	63	82	
36	62	78	99	99		43	38	53	68	
42	53	66	93	99		36	46	45	58	
48	46	58	81	99	99	32	40	39	51	62
54	47	52	72	93	99	28	35	50	41	51
60	43	53	65	84	99	25	32	45	33	42
66	39	48	68	76	93	—	28	41	53	34
72	35	42	62	70	85	—	26	37	48	26

MINIMUM COVER IN STREETS

MEASURED SURFACE TO TOP OF PIPE IN INCHES

42' TO 60' R/W STREETS		MAJOR STREETS	
CSP	CAP	CSP	CAP
6	12	9	12
		9	15
6		10	18
8		12	20
8	12	14	24
8	15	16	24

NOTES:

1) ** - NORMAL PIPE CORRUGATION PROFILE IS 2 2/3" X 1/2". THE CORRUGATION OF THE PIPES WITHIN THE SHADED AREA SHALL HAVE PROFILE OF 3" X 1".

2) WHEN FLOW VELOCITY EXCEEDS FIVE (5) f.p.s. NEXT THICKER GAUGE SHALL BE PROVIDED.

3) MINIMUM OFF STREET COVER SHALL BE TWELVE (12) INCHES UNLESS OTHERWISE APPROVED.

DEPUTY DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

CORRUGATED STEEL AND ALUMINUM PIPE COVER REQUIREMENTS

DATE: 2 - 89

R-33

MAXIMUM TRENCH DEPTH MEASURED SURFACE TO BOTTOM OF TRENCH IN FEET								MINIMUM COVER MEASURED SURFACE TO TOP OF PIPE IN INCHES			
PIPE DIA. INCHES	RIBBED STEEL "R.S.P."			RIBBED ALUMINUM "R.A.P."				TRAVELED WAY *		UNTRAVELED WAY	
	0.064"	0.079"	0.109"	0.060"	0.075"	0.105"	0.135"	R.S.P.	R.A.P.	R.S.P.	R.A.P.
24	36	50	67	21	29	49	64	18	24	12	12
30	30	40	56	17	24	40	51	18	24	12	12
36	26	35	48	14	21	34	44	18	24	12	12
42	23	31	41	13	18	30	37	18	24	15	15
48	21	28	38	12	17	26	34	18	24	15	15
54	20	26	34		15	25	31	18	24	15	15
60	19	25	32		14	23	28	20	24	15	15
66		22	30			21	26	22	24	15	15
72		22	28			20	25	24	24	18	18
78			27				23	26	26	18	18
84			27				22	28	28	18	18
90			25					30		18	

* MINIMUM COVER IN TRAVELED WAY SHALL BE AS SHOWN ABOVE, OR THICKNESS OF ROAD STRUCTURAL SECTION PLUS ONE FOOT, WHICHEVER VALUE IS GREATER.

DEPUTY DIRECTOR

SACRAMENTO COUNTY
DEPT OF PUBLIC WORKS

RIBBED PIPE COVER REQUIREMENTS

DATE: 2-89

R-33A

REV. 8-86

SIZE DESIGNATION

DIAMETER	ASTM DESIGNATION
8"—15"	D3034, SDR35
18"—27"	F679 OR F794 OR D2241, SDR51
30"—48"	F794

COVER REQUIREMENTS

ASTM DESIGNATION	MAXIMUM COVER (FT.)	MINIMUM COVER TRAVELED WAY * (FT.)	MINIMUM COVER UNTRAVELED WAY (FT.)
D3034, SDR35	14	2	1
F679	14	2 OR PIPE DIA.	1
F794, SERIES 46	14	2 OR PIPE DIA.	1
F794, SERIES 10	10	3 OR PIPE DIA.	1
D2241, SDR51	10	3 OR PIPE DIA.	1

NOTE:

* USE LARGER VALUE.

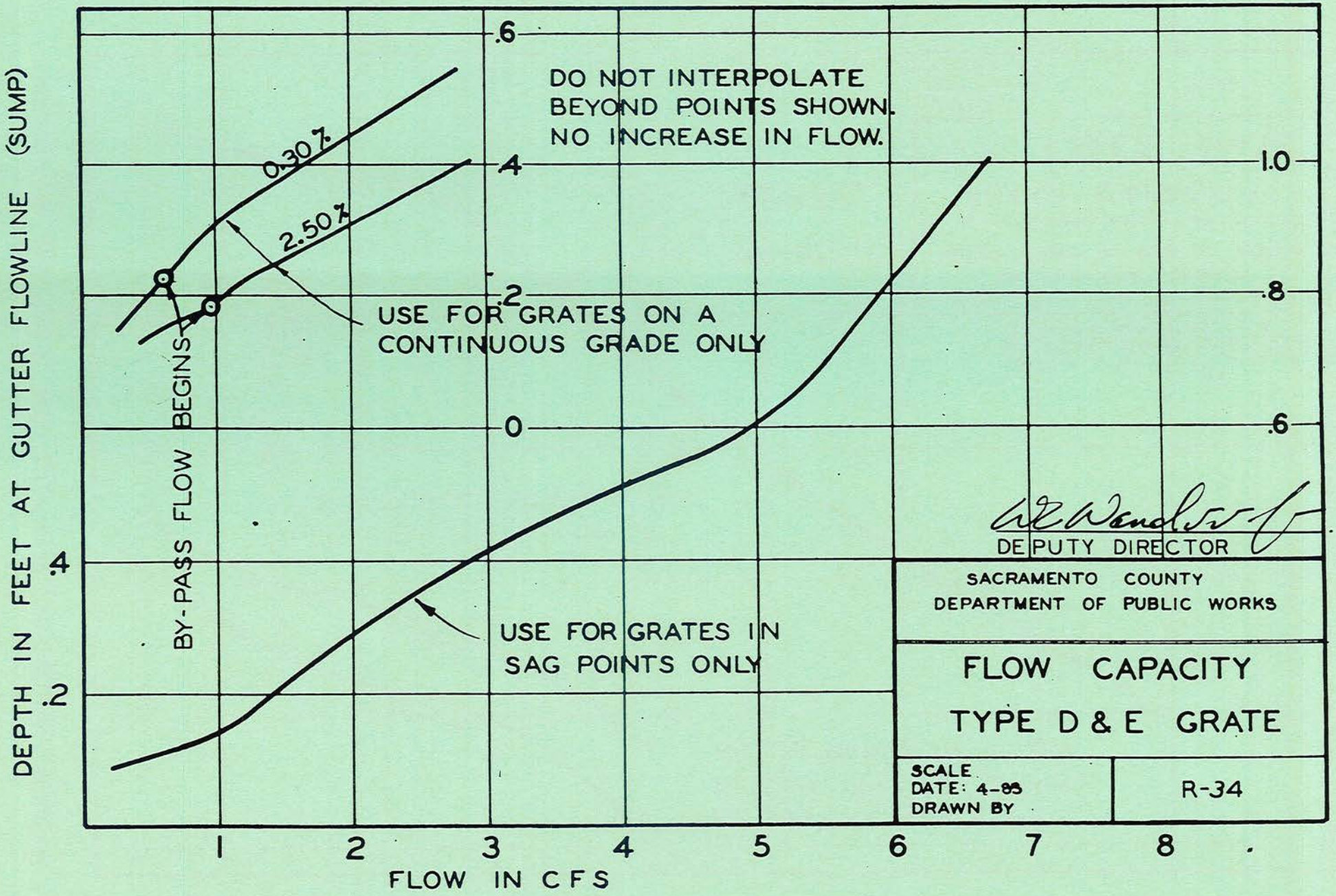
DEPUTY DIRECTOR

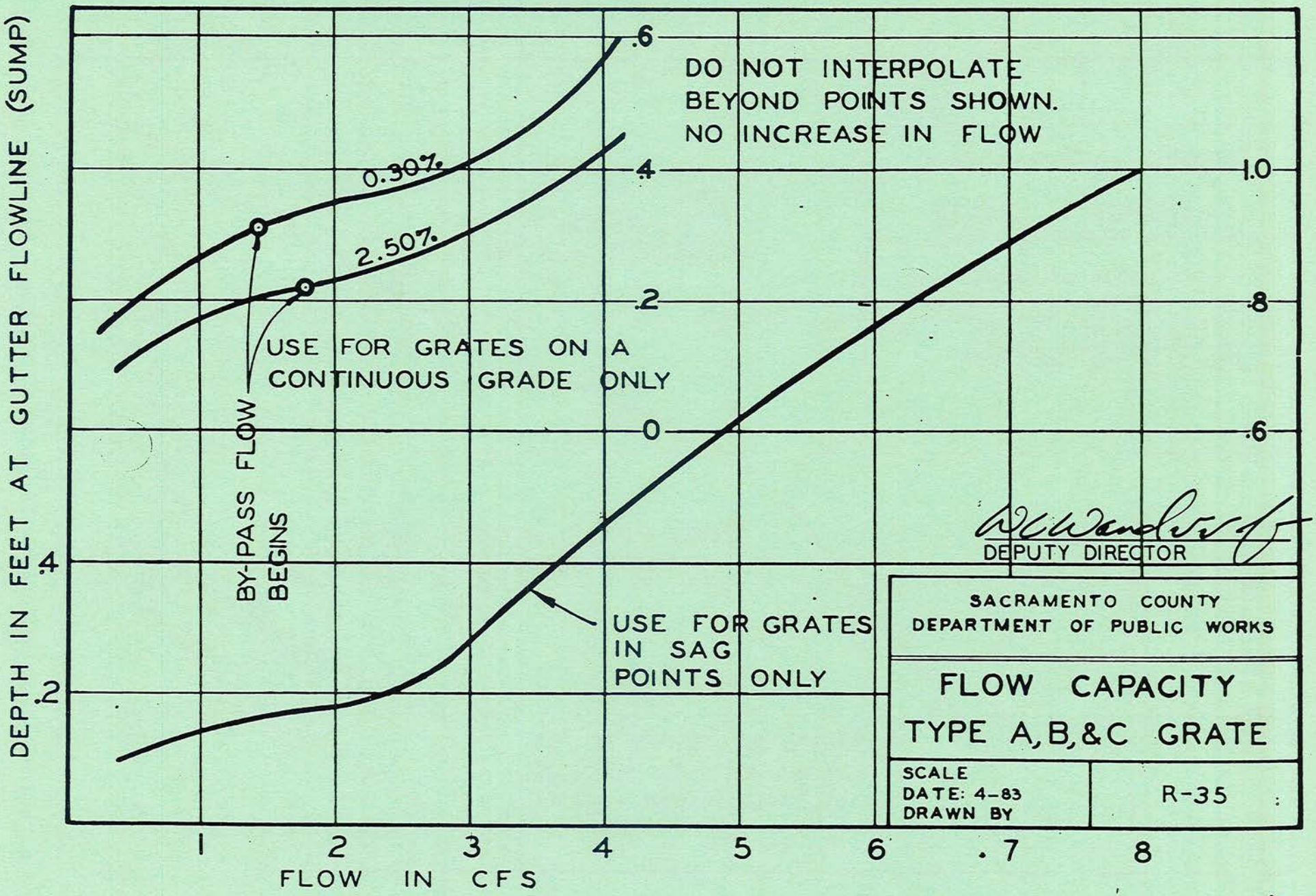
SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

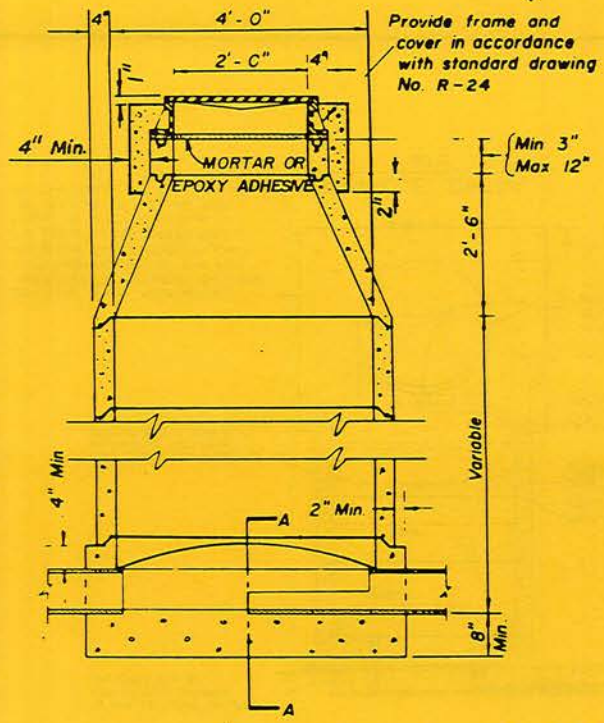
POLYVINYLCHLORIDE PIPE DESIGNATION AND COVER REQUIREMENTS

DATE: 9-86

R-33B

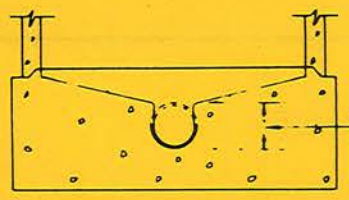

DEPTH IN FEET AT GUTTER FLOWLINE (SUMP)
FLOW IN CFS
.6
.4
.2
0
.4
.2
.6
.8
1.0
1
2
3
4
5
6
7
8
DO NOT INTERPOLATE
BEYOND POINTS SHOWN.
NO INCREASE IN FLOW.
0.30%
2.50%
BY-PASS FLOW BEGINS
USE FOR GRATES ON A
CONTINUOUS GRADE ONLY
USE FOR GRATES IN
SAG POINTS ONLY
DEPUTY DIRECTOR
SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS
FLOW CAPACITY
TYPE D & E GRATE
SCALE
DATE: 4-85
DRAWN BY
R-34


DEPTH IN FEET AT GUTTER FLOWLINE (SUMP)
.2
.4
.6
0
.2
.4
1.0
.8
.6
DO NOT INTERPOLATE
BEYOND POINTS SHOWN.
NO INCREASE IN FLOW
0.30%
2.50%
USE FOR GRATES ON A
CONTINUOUS GRADE ONLY
BY-PASS FLOW
BEGINS
USE FOR GRATES
IN SAG
POINTS ONLY
1
2
3
4
5
6
.7
8
FLOW IN CFS
DEPUTY DIRECTOR
SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS
FLOW CAPACITY
TYPE A, B, &C GRATE
SCALE
DATE: 4-83
DRAWN BY
R-35

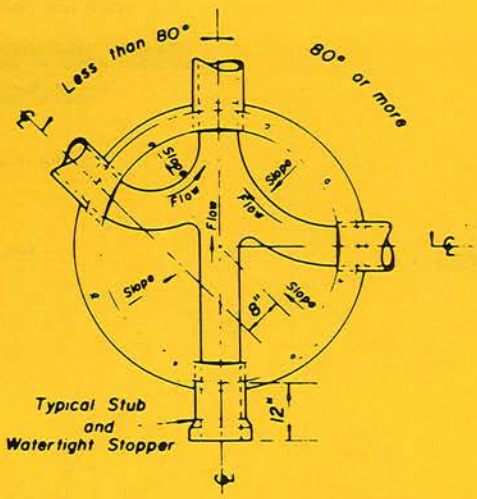


STANDARD MANHOLE 48"

For Sanitary Sewers 24" diameter or less

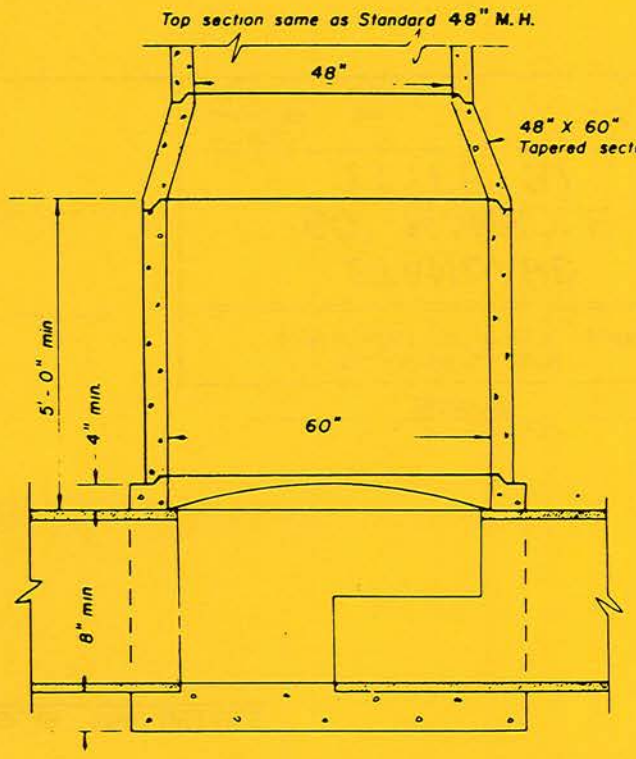


SECTION A-A



Typical Stub and Watertight Stopper

PLAN VIEW OF MANHOLE SHOWING INTERSECTING SEWERS



STANDARD 60" MANHOLE (TYPE A)

W. W. Wandler

DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

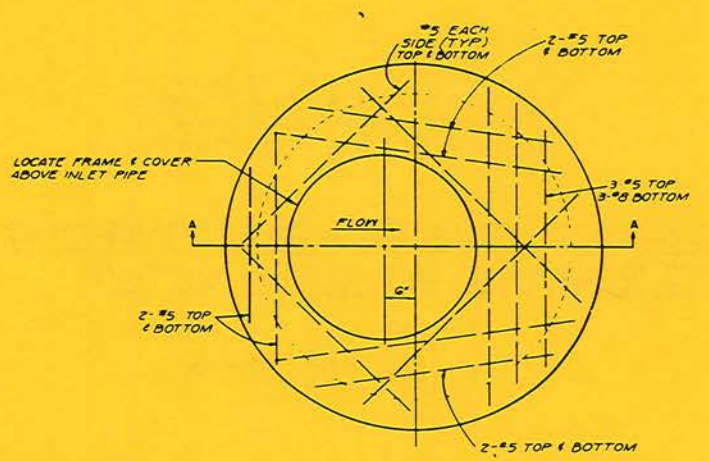
STANDARD 48" & 60" SEWER MANHOLES (TYPE A)

NO SCALE
DATE: AUG. , 1988
DRAWN BY K L G

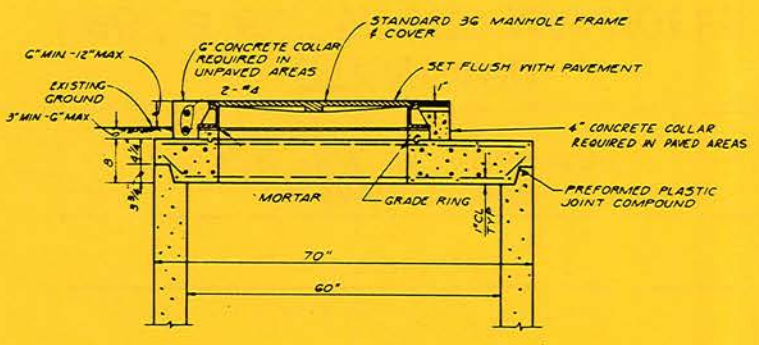
S-1

General Notes:

1. Class A concrete shall be used for manhole bases.
2. Pipe may stop at inside face of Manhole or may be continuous thru Manhole. If pipe laid continuous, top half shall be broken away after base is poured.
3. Joints for the barrel section shall be tongue and groove. All joints must either be made with preformed plastic sealing gaskets or by buttering the joint space with mortar.
4. Connection of the pipe to the manhole may be made using a resilient connector conforming to ASTM standard C923 such as Kor-N-Seal, A-Lok, or equal.



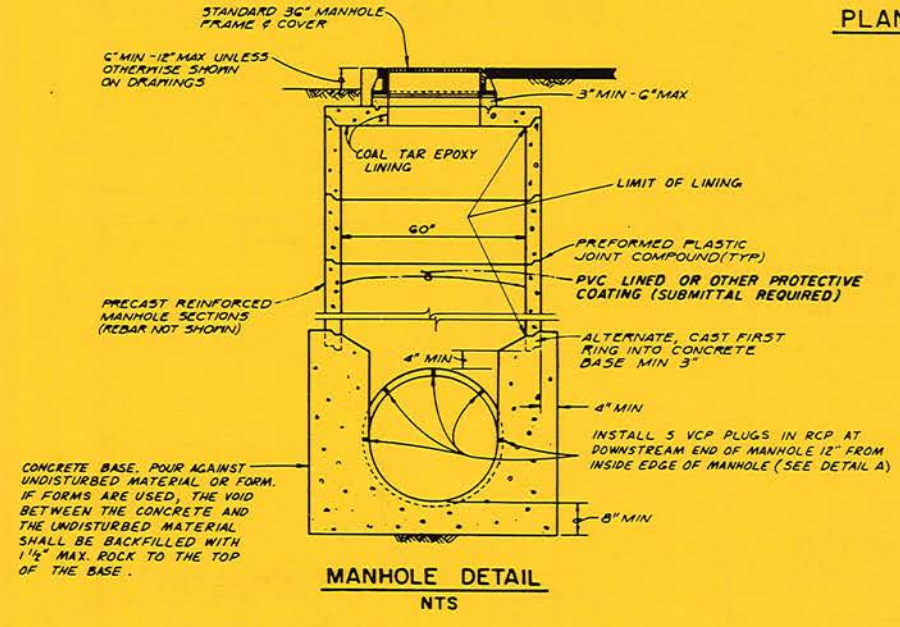
PLAN



SECTION A-A

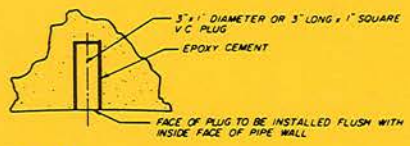
STANDARD SLAB TOP DETAILS

NTS



MANHOLE DETAIL

NTS



DETAIL A

NTS

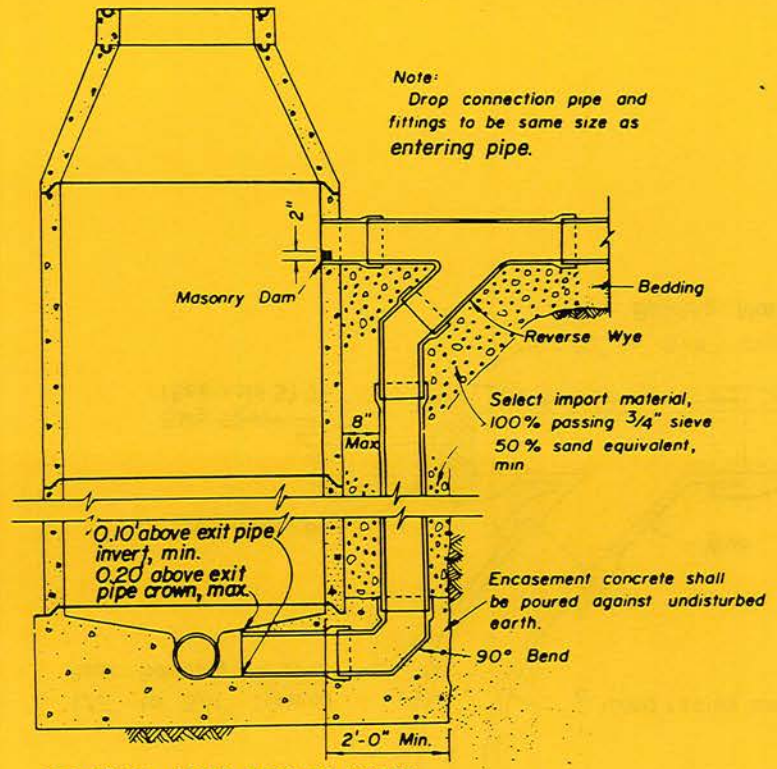
DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

STANDARD 60" MANHOLE (TYPE B)

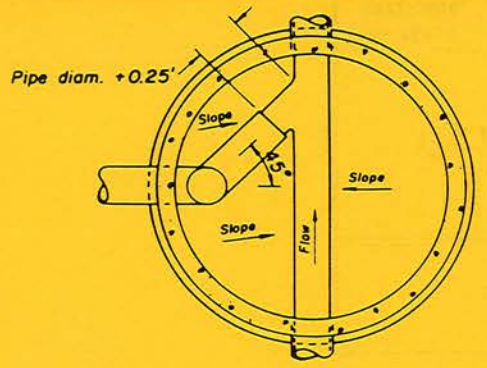
NO SCALE
DATE: AUG. , 1988
DRAWN BY: R.A.E.

S-1A



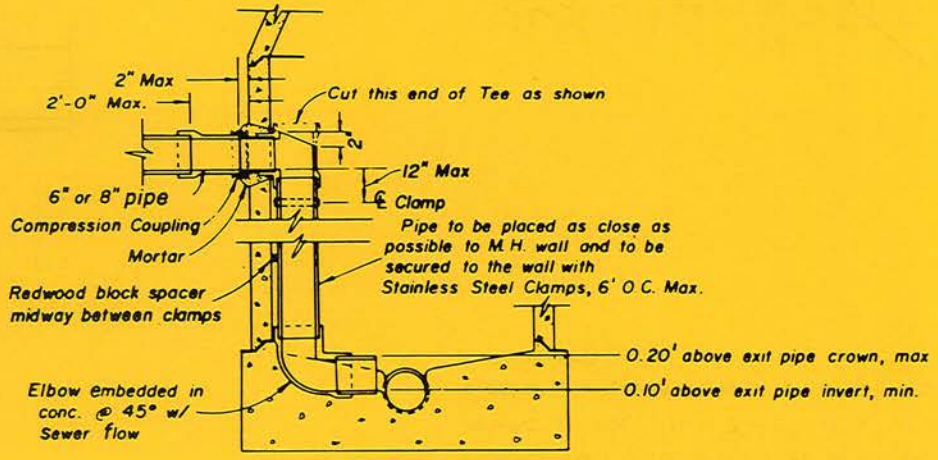
FOR 10" OR LARGER DROP OR WHERE SPECIFICALLY INDICATED ON THE DRAWINGS

OUTSIDE DROP CONNECTION



PLAN

Note:
1. All inside Drop piping to be P.V.C. or ABS.
2. Cement all joints.
3. Drop connection pipe and fittings to be same size as entering pipe.
4. Clamps to be 1 1/2" x 12 ga stainless steel, anchored to M.H. wall with 2 – 1/2" cadmium plated bolts.



PROFILE

INSIDE DROP CONNECTION

W C Wanderer

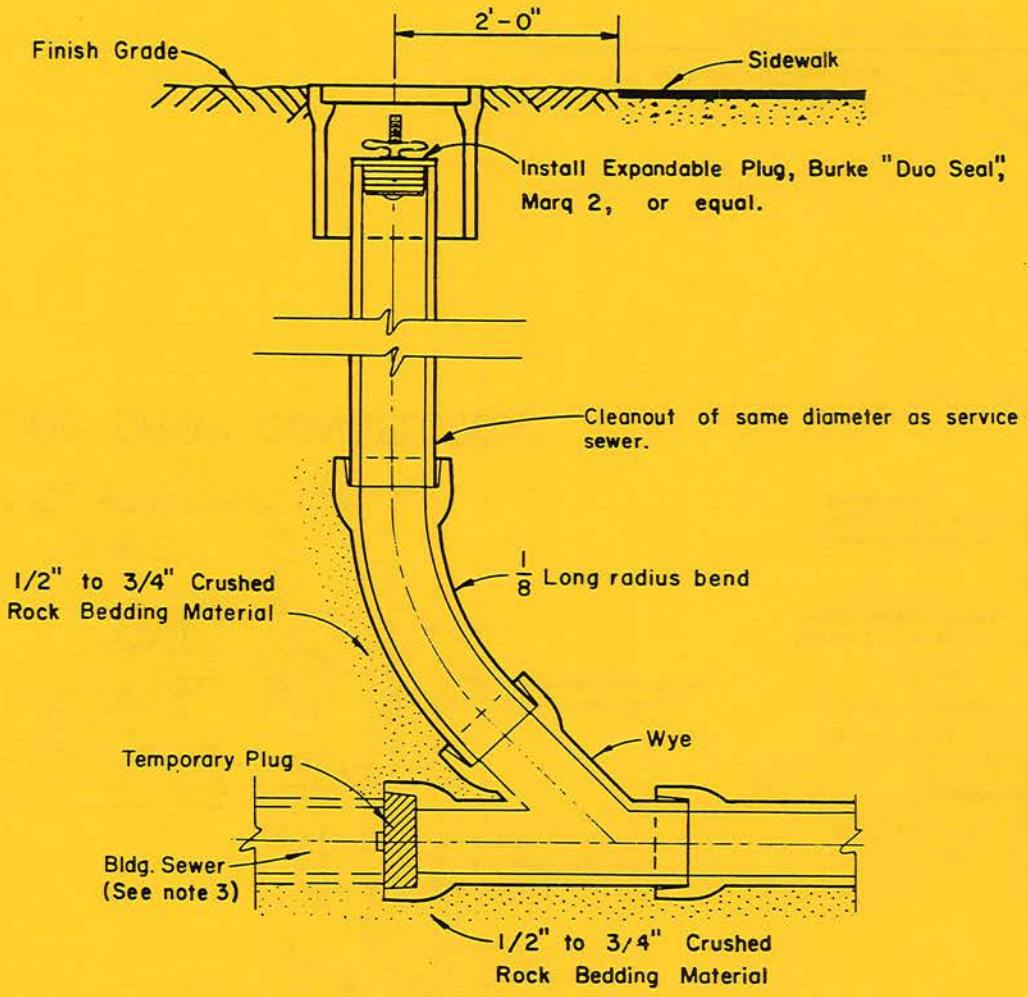
DEPUTY DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

DROP CONNECTIONS

NO SCALE
DATE AUGUST, 1988
DRAWN BY K L G

S – 2



1. For 4" services, install round, non-traffic type, concrete or PVC valve box and cover, marked "Sewer." Box inside diameter to be a minimum of 7" and a maximum of 10".

2. For services 6" or larger, install round, concrete, traffic type valve box with cast iron cover to be marked "Sewer".

3. If water main is to be installed at the back of sidewalk, extend service to 7'-0" back of sidewalk; cleanout to grade to remain 2'-0" from back of sidewalk.

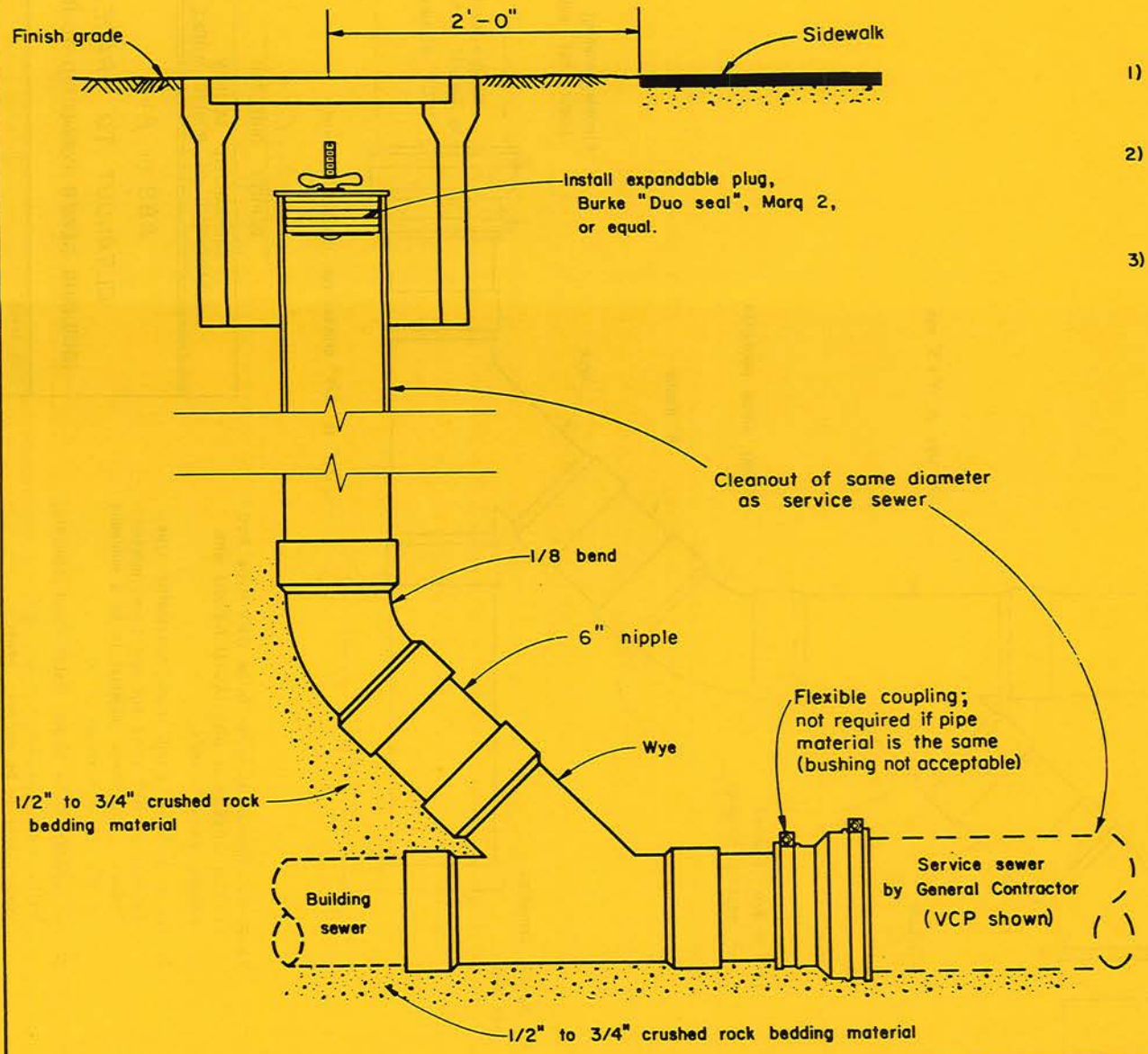
DEPUTY DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

VCP
CLEANOUT TO GRADE

NO SCALE
DATE: AUG. , 1988
DRAWN BY: K.L.G.

S-3



1) Cleanout to grade to be plastic DWV type PVC (ASTM D2665) or ABS (ASTM D2661) with solvent weld joints.
2) For 4" services, install round, non-traffic type, concrete or PVC valve box and cover, marked "Sewer". Box inside diameter to be a minimum of 7" and a maximum of 10".
3) For services 6" or larger, install round, concrete, traffic type valve box with cast iron cover. Cover to be marked "Sewer".

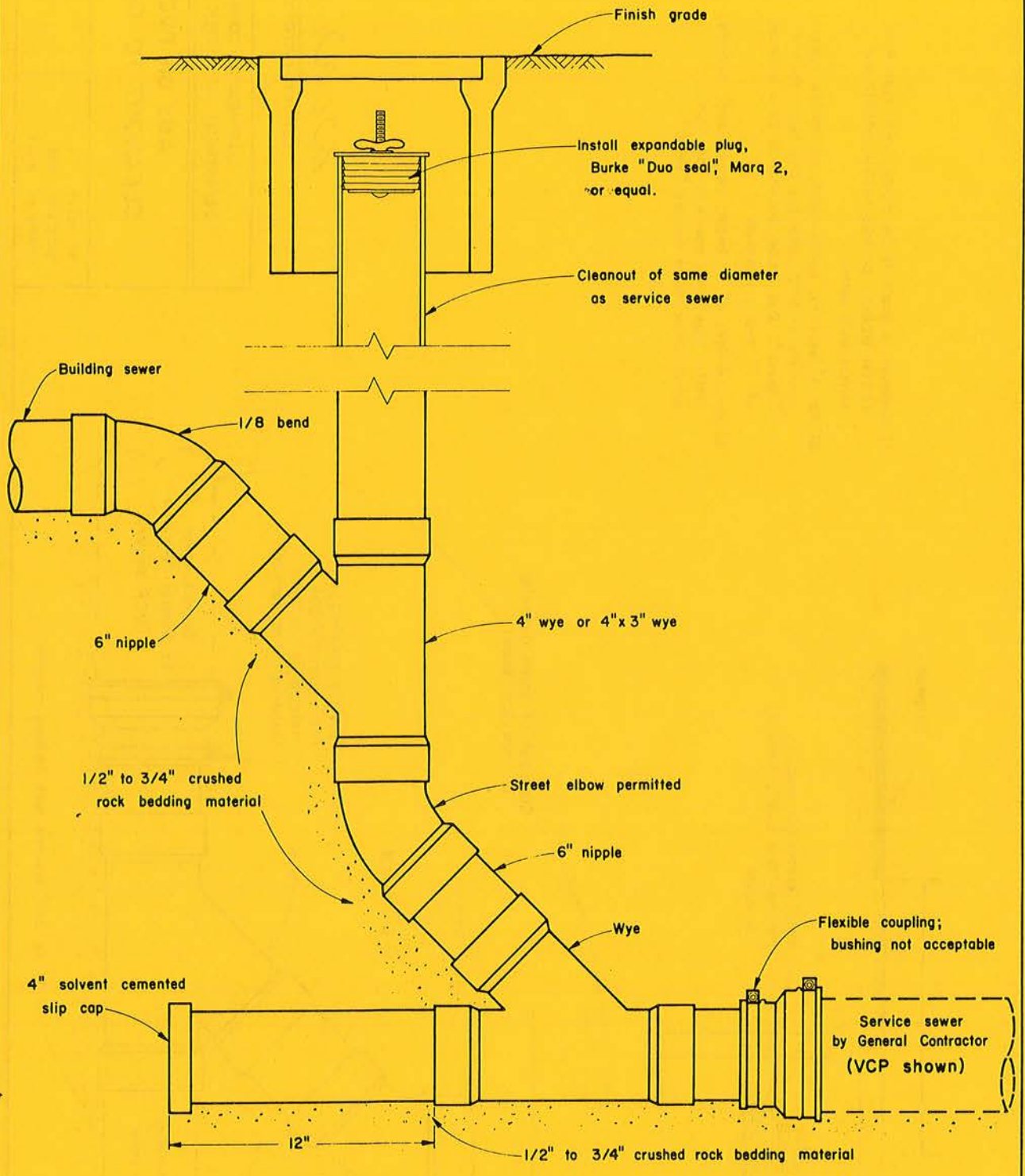
DEPUTY DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

ABS OR PVC
CLEANOUT TO GRADE

NO SCALE
DATE: AUG. , 1988
DRAWN BY: R. A. E.

S-3A



DEPUTY DIRECTOR

1) Plastic cleanout to grade to be DWV type PVC (ASTM D2665) or ABS (ASTM D2661) with solvent cement joints.

2) For 4" services, install round, non-traffic type, concrete or PVC valve box and cover, marked "Sewer". Box inside diameter to be a minimum of 7" and a maximum of 10".

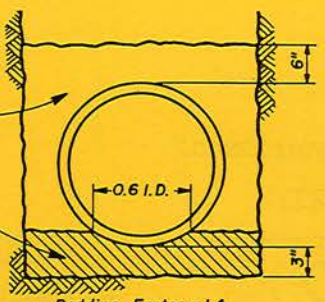
3) For services 6" or larger, install round, concrete, traffic type valve box with cast iron cover. Cover to be marked "Sewer".

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

ABS or PVC
CLEANOUT TO GRADE
(BUILDING SEWER CONNECTED TO RISER)

NO SCALE
DATE: AUG, 1988
DRAWN BY: J. H. N.

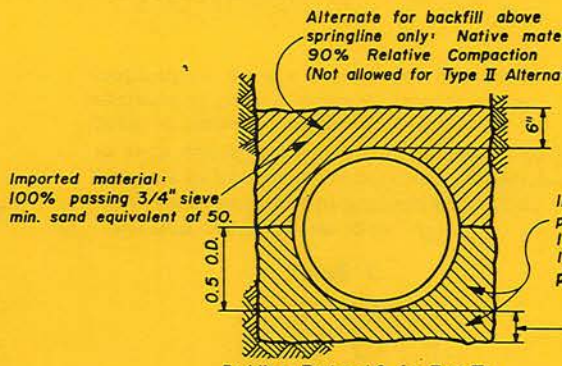
S-3A (ALT.)



Bedding Factor = 1.4

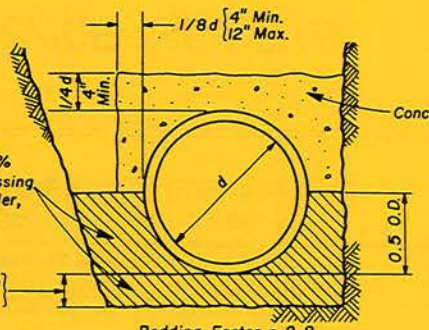
TYPE I

(This type of bedding is to be used only for 10 inch or smaller pipe unless written approval is granted by the Department of Public Works)



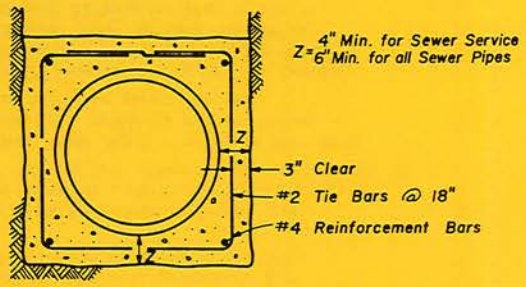
Bedding Factor = 1.9 for Type II; Variable for Type II Alternate (See Notes 3 and 4)

TYPE II



Bedding Factor = 2.8

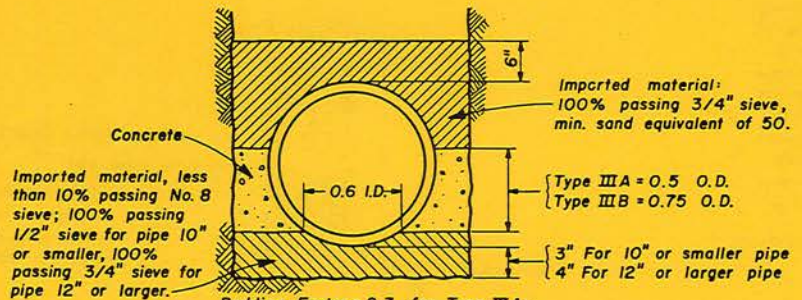
TYPE IV
(See Note 4)



COMPLETE ENCASEMENT DETAIL

GENERAL NOTES:

1) See Sections SS 12-01, 04, and 05 for backfill limits.
2) Minimum depth of bedding material under pipe bells shall be 1 1/2 inches.
3) For Type II Alternate, bedding and initial backfill shall be crushed stone to a height 12 inches above top of pipe with a sieve analysis listed as Size #67 in ASTM Designation D448, except that 100 percent shall pass the 3/4 inch sieve. Calculations must be submitted for the Engineer's approval and to determine the appropriate bedding factor for the situation. Design Method No. 38 as published by the American Concrete Pipe Association shall be the basis for the calculations. Maximum allowable Bedding Factor is 2.2.
4) Types II Alternate, III, IV may be used only when construction conditions have resulted in the allowable trench width for Type II being exceeded. Written approval of the Engineer is necessary.



Bedding Factor = 2.3 for Type IIIA; 2.7 for Type IIIB

TYPE III
(See Note 4)

W C Wandler

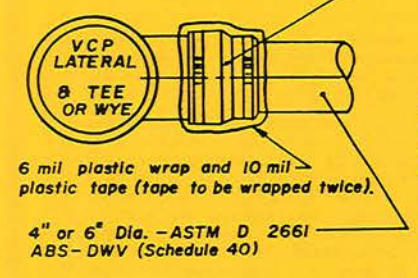
DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

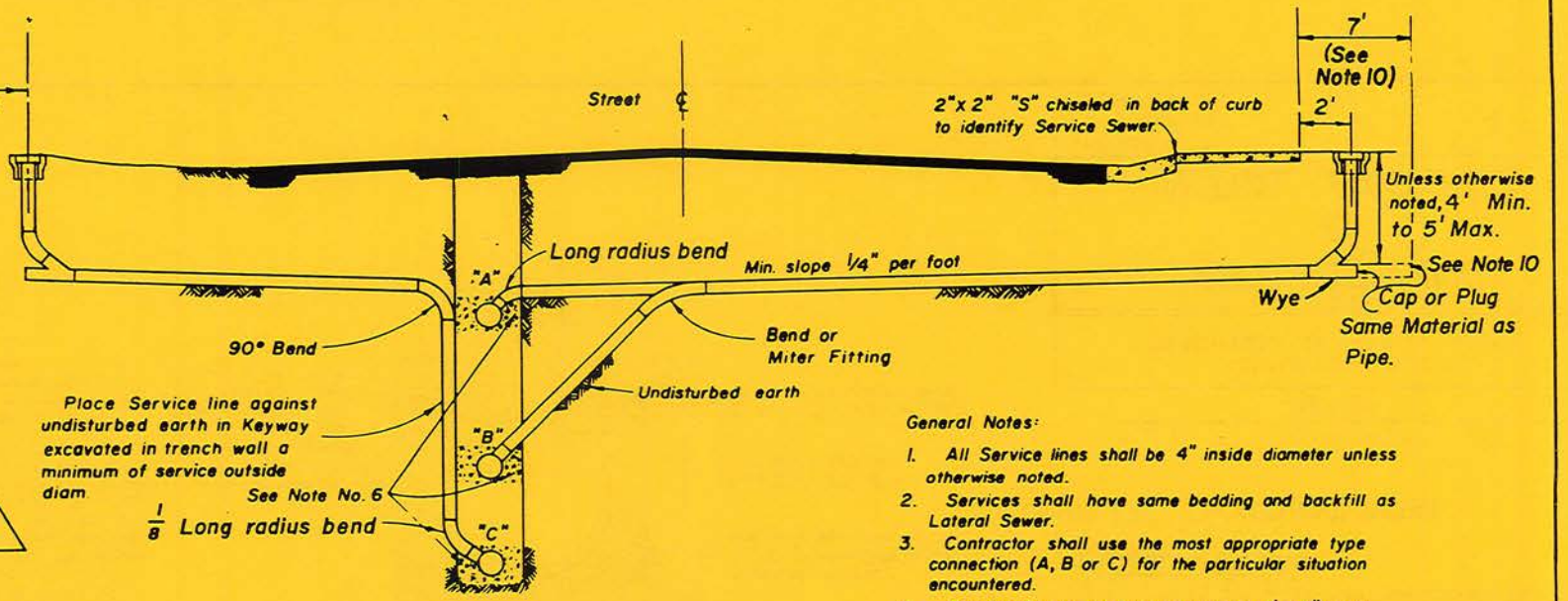
PIPE BEDDING & INITIAL BACKFILL

NO SCALE
DATE: JULY, 1988
DRAWN BY: R.A.E.

S-4



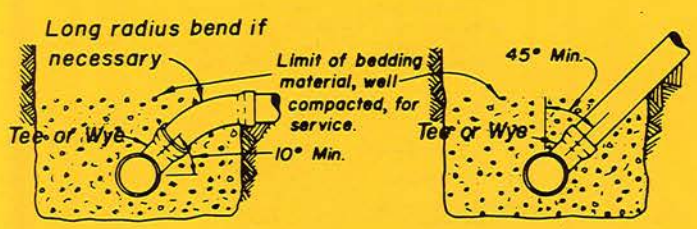
ALTERNATE ABS SERVICE SEWER CONNECTION TO VCP



ELEVATIONS

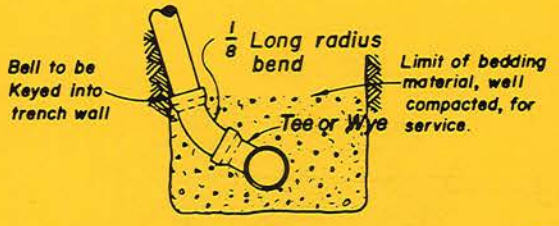
General Notes:

1. All Service lines shall be 4" inside diameter unless otherwise noted.
2. Services shall have same bedding and backfill as Lateral Sewer.
3. Contractor shall use the most appropriate type connection (A, B or C) for the particular situation encountered.
4. Service Sewer shall have minimum 4'-0" cover at Property Line whenever Lateral depth and Service Sewer Slope of 1/4" per foot (Minimum) permit. See note 10.
5. When the Lateral Sewer depth is such that minimum cover at Property Line cannot be met, the minimum slope of 1/4" per foot shall govern the cover.
6. Place concrete 12" wide or well compacted bedding material 18" wide under the Tee or Wye, the fitting, and unsupported pipe. When bedding material is used, place additional bedding material to top of bend, the full width of the trench.
7. Min. specified cover at the property line shall be measured from existing ground surface or edge of adjacent roadway, Whichever is Lower.
8. A specific elevation at the property line, when shown on the plans or designated by the Engineer, shall govern.
9. Miter fittings shall be Max 45°



TYPE A

TYPE B



TYPE C

CONNECTION DETAILS

10. Minimum depth of cover to be 5'-0" where water main is to be installed at back of sidewalk as part of the subdivision improvements. In such cases, service is to be extended to 7' back of sidewalk; cleanout to grade to remain 2' of back of sidewalk and optional installation of 4"x 4" post not allowable.

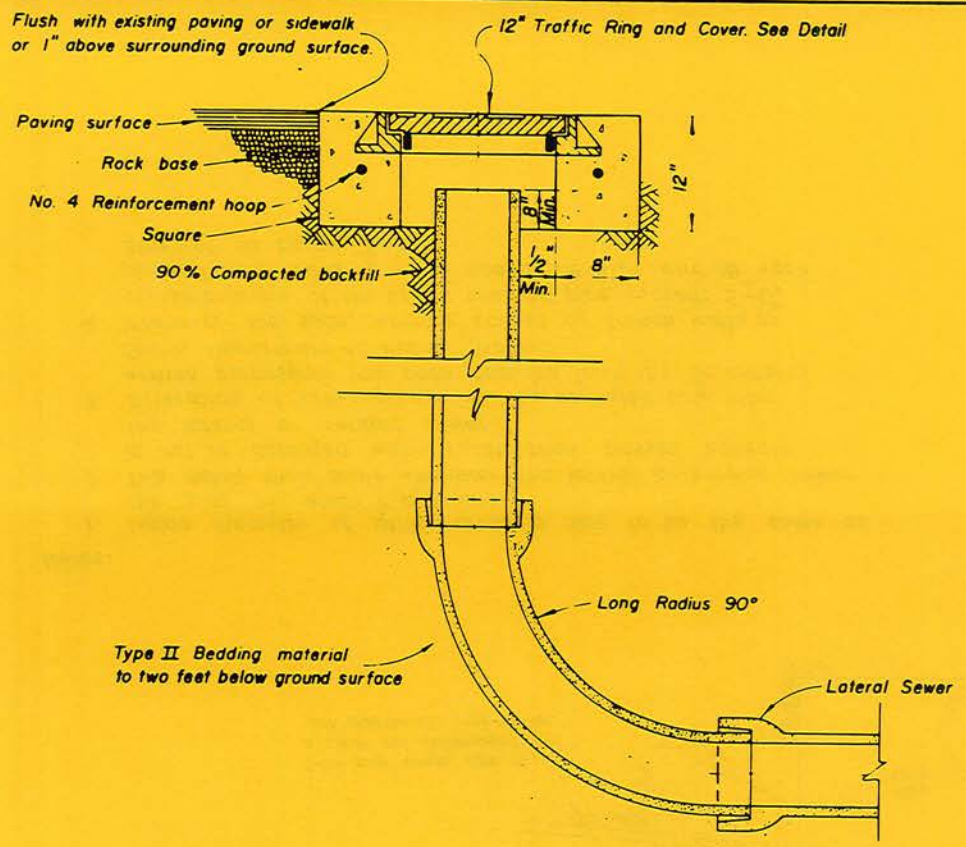
DEPUTY DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

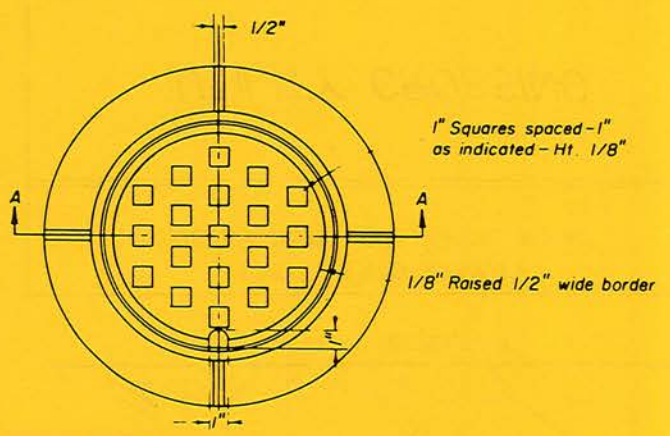
SERVICE SEWERS

NO SCALE
DATE AUG. , 1988
DRAWN BY K.L.G.

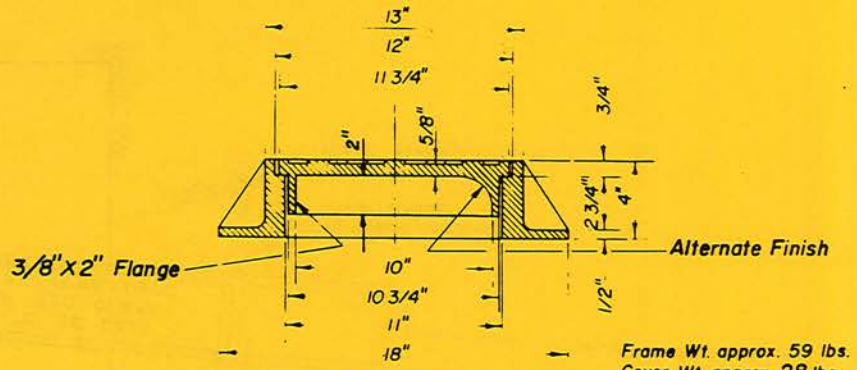
S-5



FLUSHING BRANCH



TYPICAL 12" TRAFFIC RING & COVER



Frame Wt. approx. 59 lbs.
Cover Wt. approx. 28 lbs.

SECTION A-A

NOTE

All pipe and fittings shall be the same size and material as the horizontal pipe to which they connect. Joint shall be as specified for the type of pipe used.

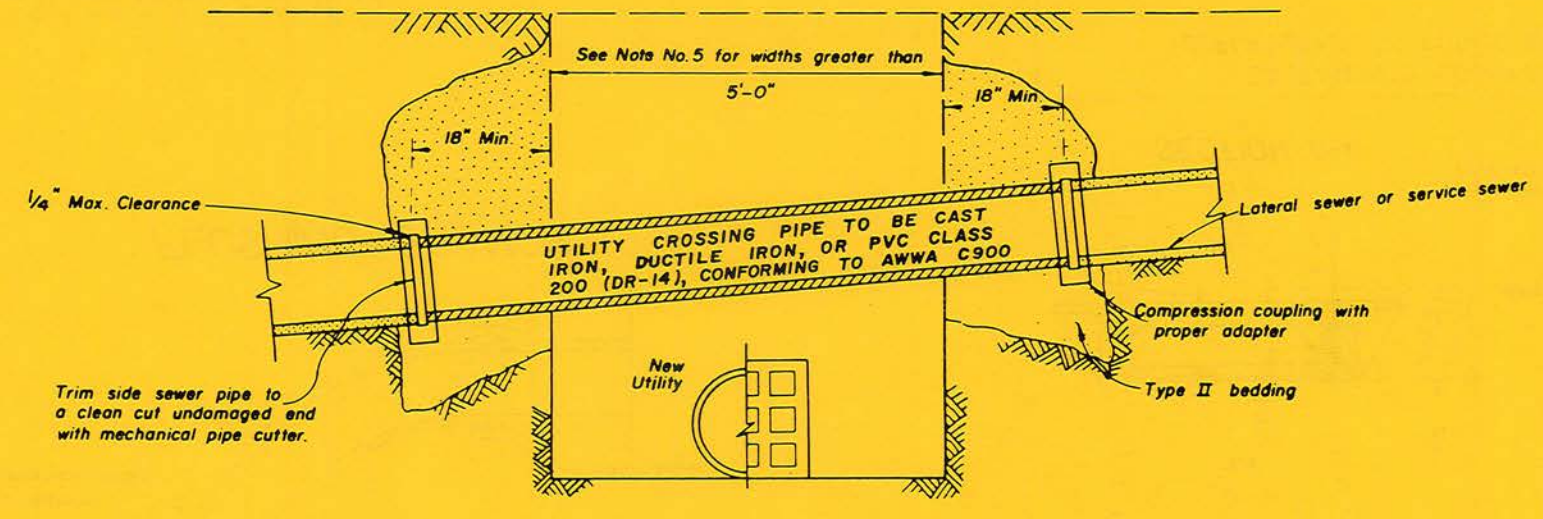
DEPUTY DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

FLUSHING BRANCH

NO SCALE
DATE APRIL, 1983
DRAWN BY K L G

S-6



Notes:

1. Inside diameter of utility crossing pipe to be the same as the pipe to which it connects.
2. This detail shall apply whenever the lateral or service sewer is cut or damaged when construction passes beneath the lateral or service sewer.
3. Alteration of sewer grades will be permitted only after written permission has been received from the Sacramento County Department of Public Works.
4. Whenever the span, whether caused by trench width or crossing angle of the utility crossing pipe exceeds 5'-0", place Type II bedding to 6" above the pipe and 18" each side of its center line.

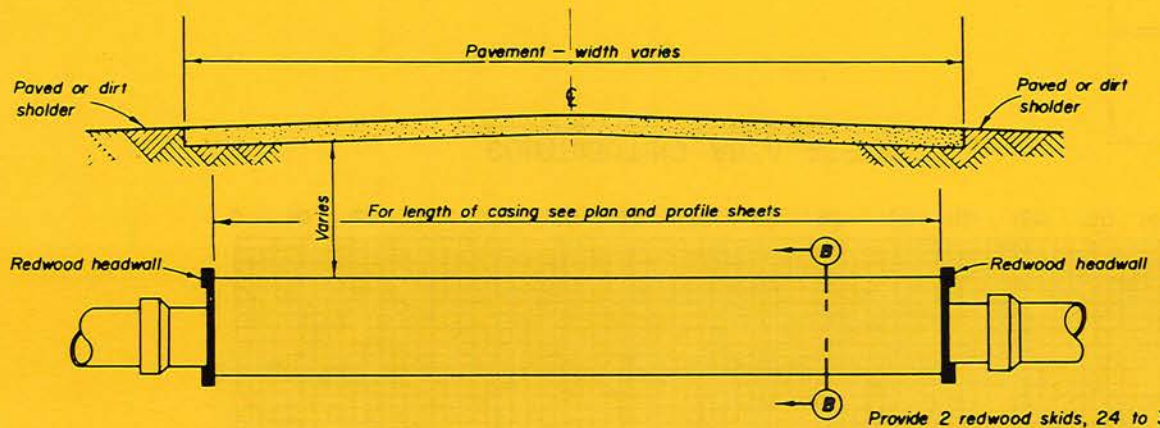
DEPUTY DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

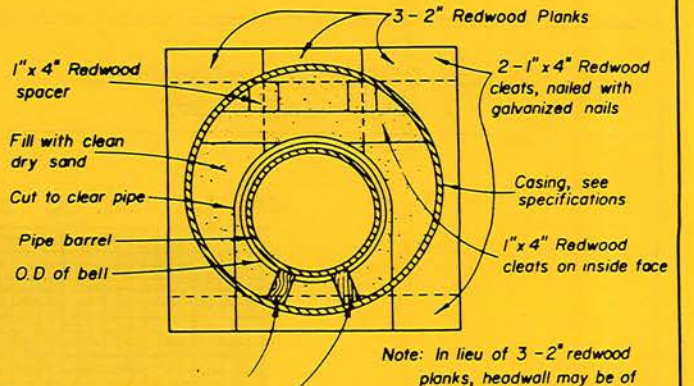
UTILITY CROSSING

NO SCALE
DATE AUG., 1988
DRAWN BY K L G

S-7



PROFILE



Note: In lieu of 3 – 2" redwood planks, headwall may be of redwood plywood of thickness approved by the Engineer

SECTION B – B

Provide 2 redwood skids, 24 to 30 inches in length, near the center of each section of conducted V.C. sewer pipe

Conducted water pipe or A.C. sewer pipe shall have two pairs of skids, each 24 to 30 inches in length, centered approximately one – fifth the pipe length from each end.

Skids to be of size such that bell clears conductor. Skid height not to be more than 50% more than width. Skids are to be secured to pipe by straps, one at each end. Groove skids for strap clearance.

W K Wanderer

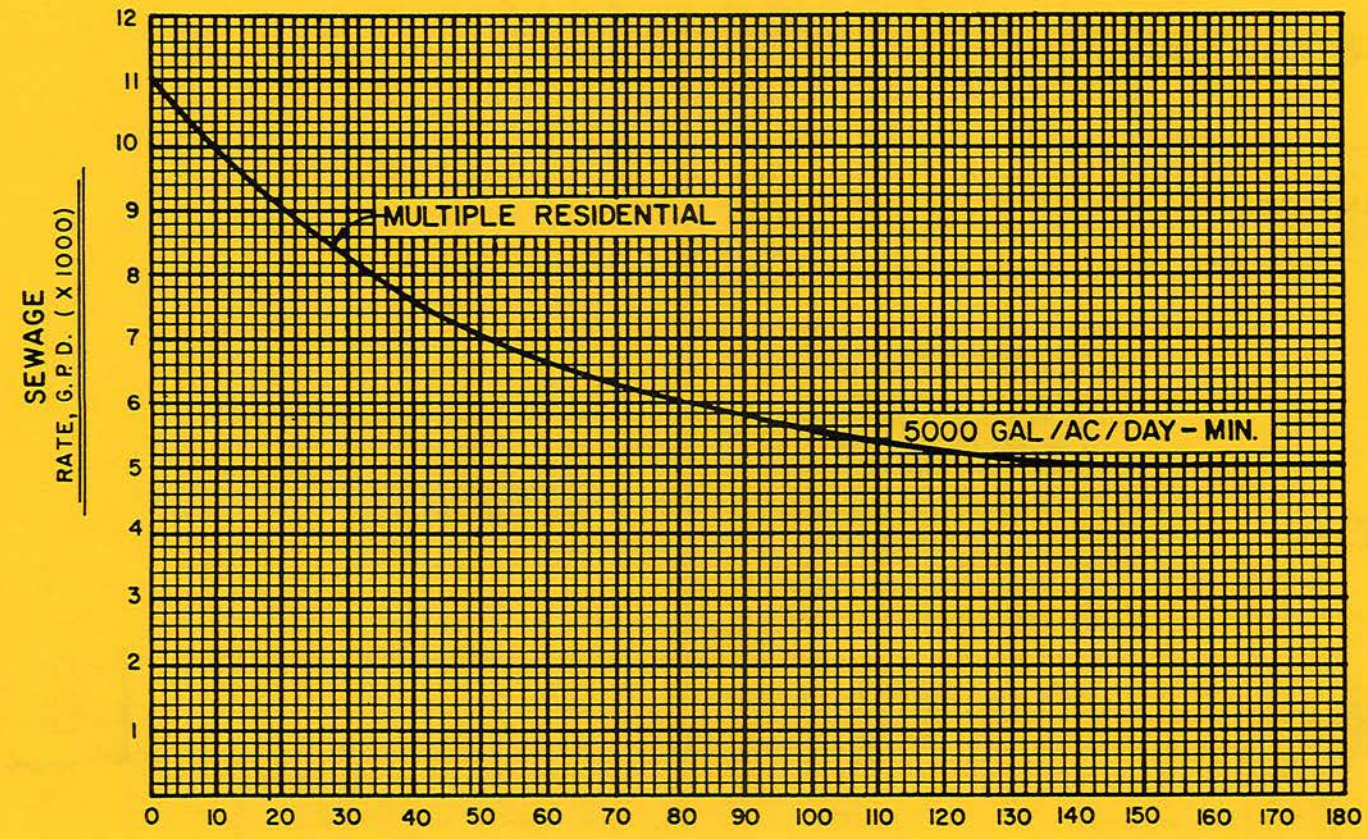
DEPUTY DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

CONDUCTOR CASING DETAIL

NO SCALE
DATE APRIL, 1983
DRAWN BY K L G

S – 8



SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

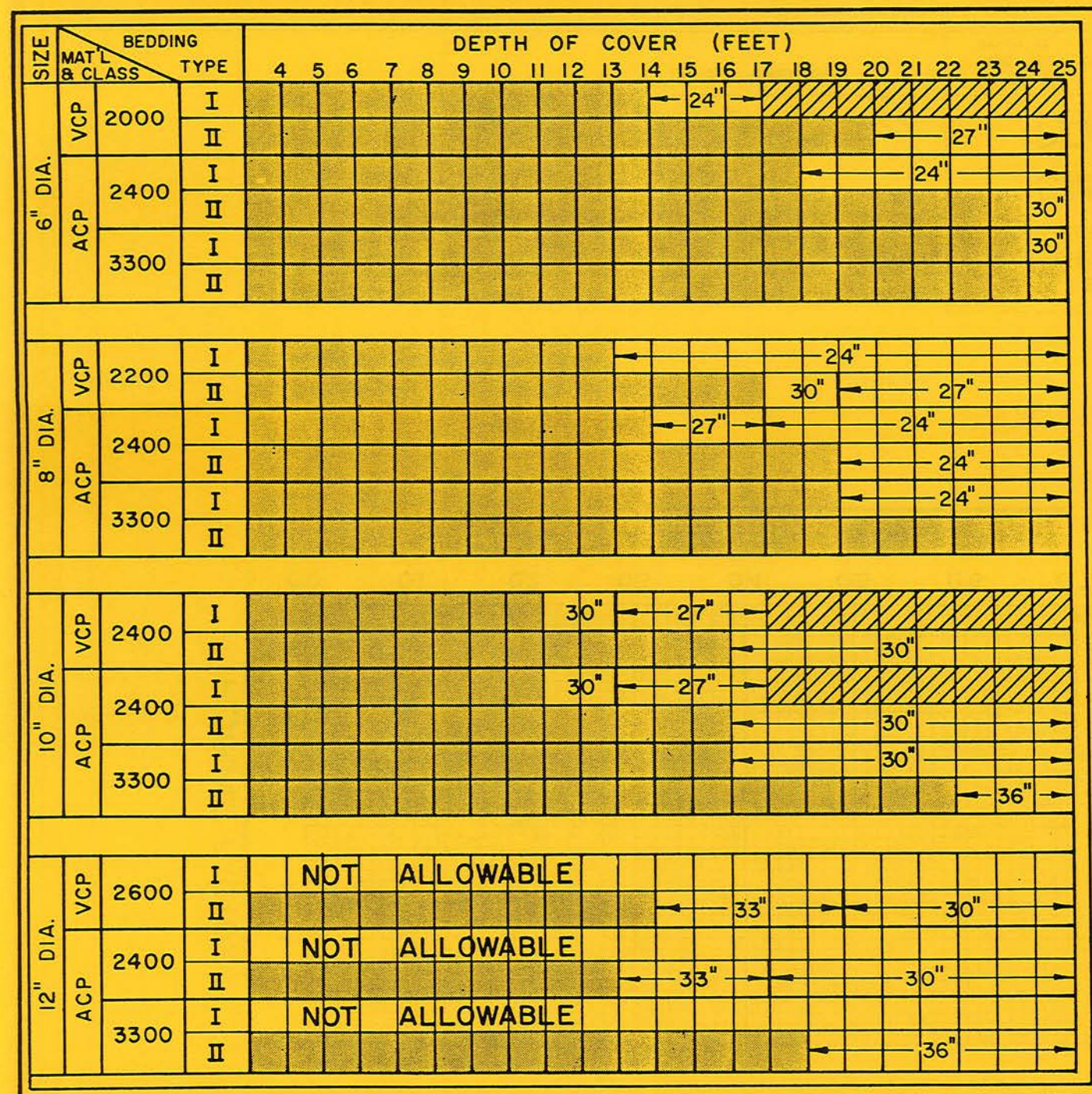
ESTIMATED AVERAGE SEWAGE FLOW

MULTIPLE RESIDENTIAL ZONED AREAS

DEPUTY DIRECTOR

NO SCALE
DATE: APRIL, 1983
DRAWN BY: PJR

S-9



27" MAXIMUM TRENCH WIDTH MEASURED AT TOP OF PIPE

NO LIMIT ON TRENCH WIDTH

PIPE CLASS, BEDDING TYPE AND DEPTH OF COVER NOT ACCEPTABLE

NOTE: FOR DEPTHS LESS THAN 3 FEET OR MORE THAN 25 FEET, SEE SECTION 7-6F

CALCULATIONS BASED ON SOIL WT. = 120 lb/ft^3 SATURATED CLAY ($K\mu = 0.110$)

W C Wanderer

DEPUTY DIRECTOR

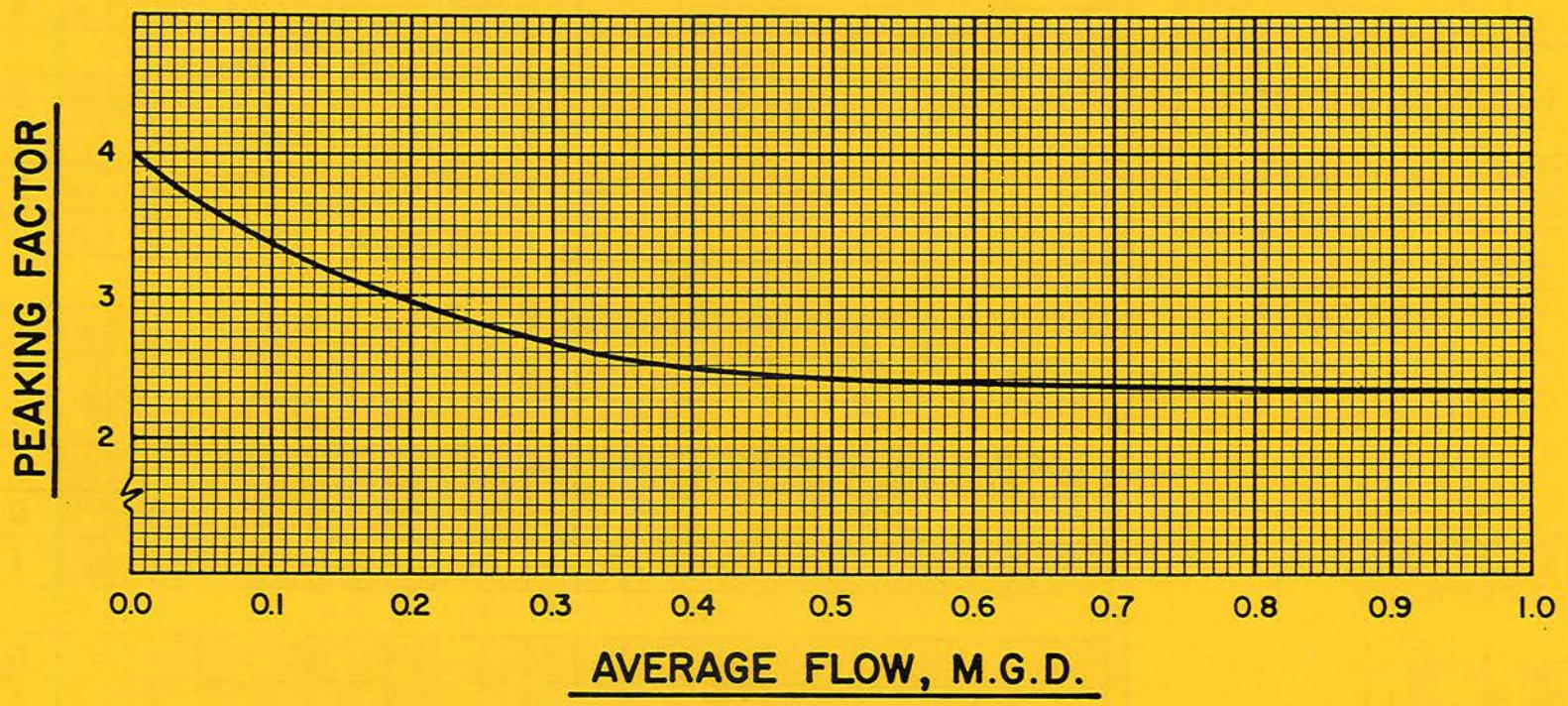
SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

MAXIMUM TRENCH WIDTH

DATE: JANUARY, 1988
DRAWN BY: R. A. E.

S-10

WS



W.K. Wanderlich

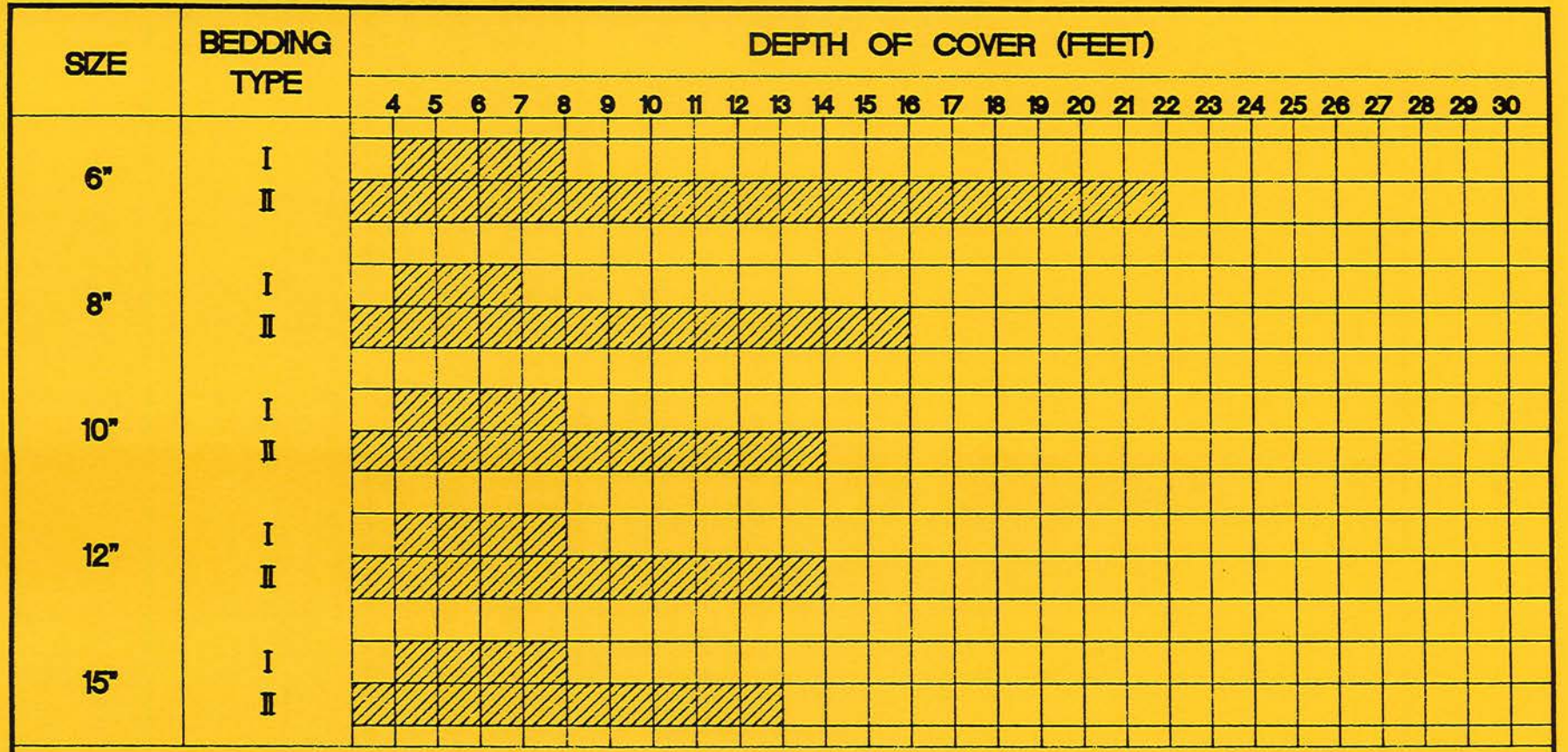
DEPUTY DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

SANITARY SEWER PEAKING FACTORS

NO SCALE
DATE : APRIL, 1983
DRAWN BY : N.N.

S-11



LEGEND: ▨ Designates depths where pipe can be used with the bedding type shown.

W C Wanbon

DEPUTY DIRECTOR

Calculations are based on a soil weight of 120 lbs/ft.^{3} using the prism load equation; and on a maximum allowable deflection of 3%.

Native soils within the area of the pipe zone shall have a minimum E' of 150 psi.

Type I bedding calculations are based on an E' = 40 psi.

Type II bedding calculations are based on an E' = 1500 psi.

When DWV solid wall pipe is used for 4" or 6" service sewers, Type II bedding must be used.

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

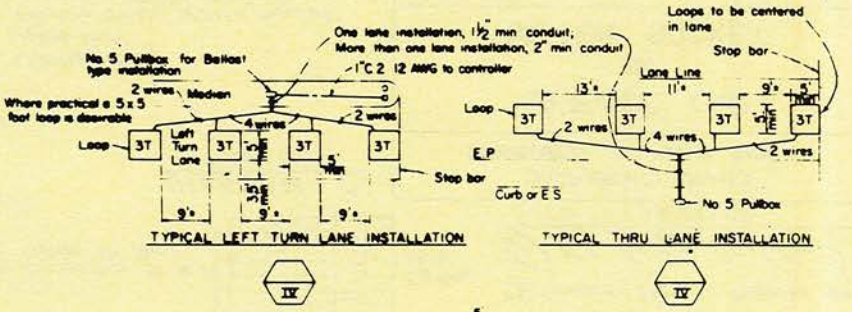
DEPTH OF COVER vs BEDDING TYPE
ABS/PVC COMPOSITE (TRUSS) PIPE

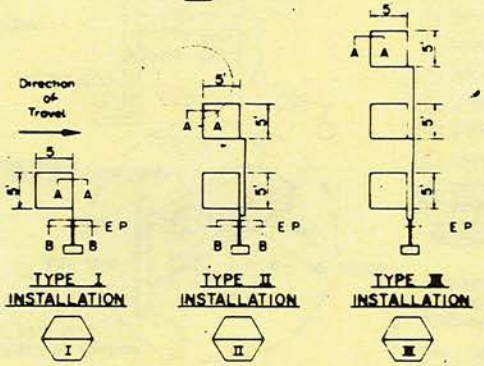
NO SCALE
DATE: SEPTEMBER/1988
DRAWN BY: R.A.E.

S-12

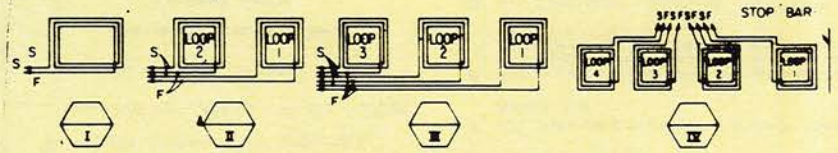
LOOP INSTALLATION PROCEDURE

1. Saw slots in pavement for loop conductors as shown in details. Blow out and dry thoroughly with compressed air.
2. Install termination pull box.
3. Install #12 AWG loop conductor in slots using a 3/16" to 1/4" thick wood paddle (see "Loop Winding Patterns"). Allow additional length for the run to termination pull box plus 5 feet of slack in pull box. This additional length of conductors for each loop circuit shall be twisted together into a pair (at least 2 turns per foot) before being run to pull box.
4. Identify loop circuit pairs. Identify start of conductor.
5. Splice loop conductors to lead-in cable (where required) or tape ends of conductor and seal (after testing) to prevent entrance of moisture. All splices shall be soldered using non-corrosive flux solder.
6. Test each loop circuit at controller cabinet (or, if these are not installed, test at termination pull box) before filling slots. Perform a resistance test between each circuit and ground. Insulation resistance shall be not less than 100 megohms. Test each loop circuit for continuity. Loop circuit resistance shall not exceed 0.5 ohms plus 0.35 ohms per 100 feet of lead-in cable.
7. Fill slots as shown in details.
8. No more than four loop detector conductors shall be installed in one sawed slot.
9. Lead-in cable shall not be spliced between the termination pull box and the controller cabinet.
10. Distance between side of loop and lead-in saw cut shall be 1'-0" minimum. Distance between lead-in saw cuts shall be 6" minimum.
11. **Width of saw cuts shall be 1/8" to 3/16" wider than the thickness of the conductor.**
12. **Depth of saw cuts shall be such that the minimum sealant cover shall be 1/2" with an additional 1/8" to 1/4" gap from top of sealant to surface of pavement.**



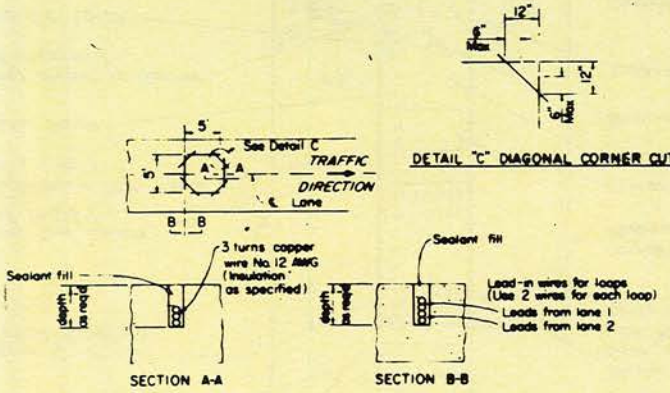


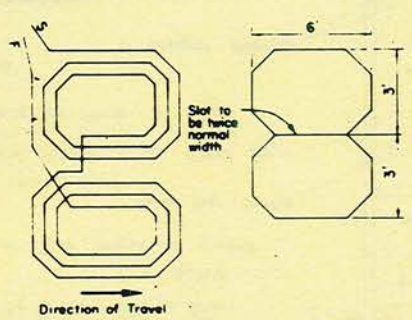
DETECTOR LAYOUTS AND DIMENSIONS



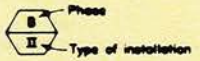
LOOP WINDING PATTERNS

Conductor identification shall include the following:
1 Sensor number and phase 2 Loop number 3 Start (S) or finish (F)





QUADRUPOLE WINDING PATTERN
(Use only when specified)



DETECTOR LEGEND

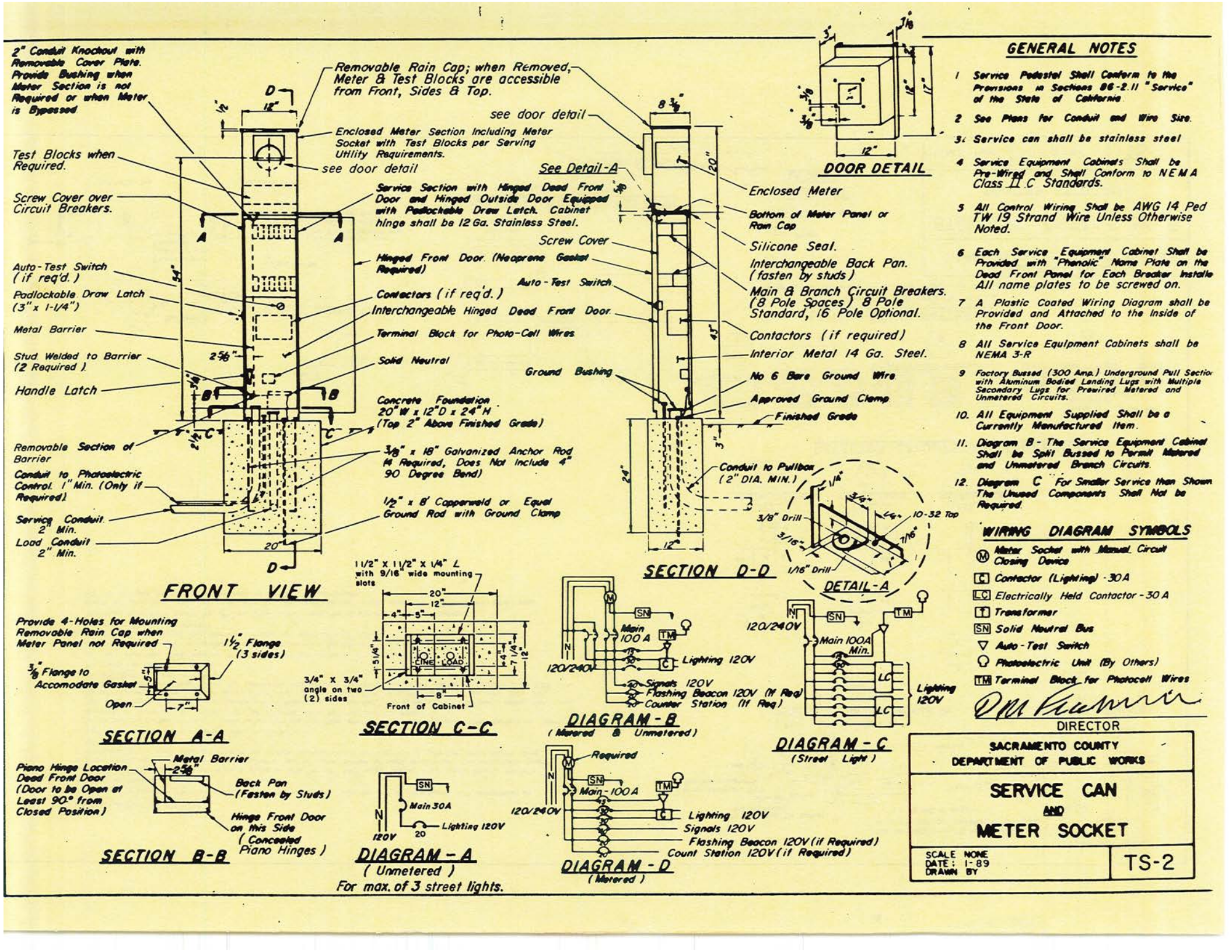
DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

STANDARD DETAILS NO. 5

INDUCTION DETECTORS

SCALE: None	DATE 5-87	TS-1



GENERAL NOTES

1. Service Pedestal Shall Conform to the Provisions in Sections 86-2.11 "Service" of the State of California.
2. See Plans for Conduit and Wire Size.
3. Service can shall be stainless steel.
4. Service Equipment Cabinets Shall be Pre-Wired and Shall Conform to NEMA Class II C Standards.
5. All Control Wiring Shall be AWG 14 Ped TW 19 Strand Wire Unless Otherwise Noted.
6. Each Service Equipment Cabinet Shall be Provided with "Phenolic" Name Plate on the Dead Front Panel for Each Breaker Installe All name plates to be screwed on.
7. A Plastic Coated Wiring Diagram shall be Provided and Attached to the Inside of the Front Door.
8. All Service Equipment Cabinets shall be NEMA 3-R
9. Factory Bussed (300 Amp.) Underground Pull Sectio with Aluminum Bodied Landing Lugs with Multiple Secondary Lugs for Prewired Metered and Unmetered Circuits.
10. All Equipment Supplied Shall be a Currently Manufactured Item.
11. Diagram B - The Service Equipment Cabinet Shall be Split Bussed to Permit Metered and Unmetered Branch Circuits.
12. Diagram C For Smaller Service than Shown The Unused Components Shall Not be Required.

WIRING DIAGRAM SYMBOLS

- (M) Meter Socket with Manual Circuit Closing Device
- [C] Contactor (Lighting) - 30A
- [LC] Electrically Held Contactor - 30A
- [T] Transformer
- [SN] Solid Neutral Bus
- ▽ Auto-Test Switch
- Photoelectric Unit (By Others)
- [TM] Terminal Block for Photocell Wires

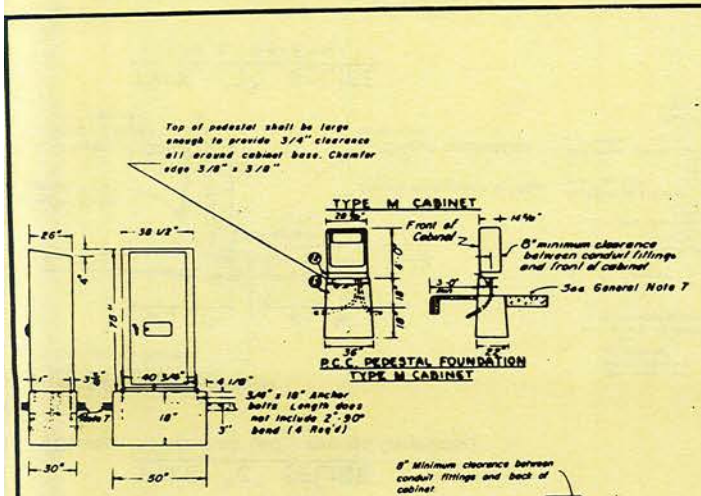
DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

SERVICE CAN AND METER SOCKET

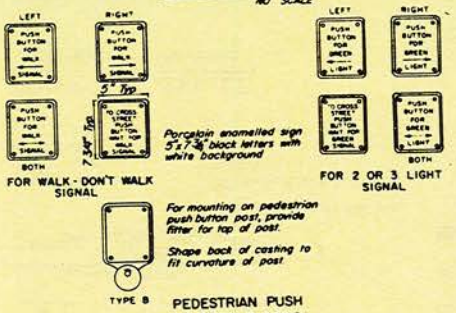
SCALE NONE
DATE: 1-89
DRAWN BY

TS-2

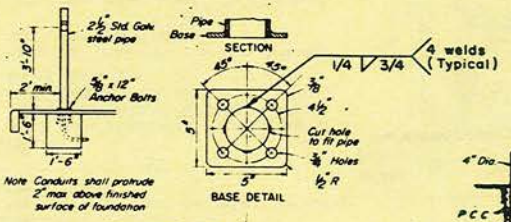


P.C.C. PEDESTAL FOUNDATION
TYPE M CABINET

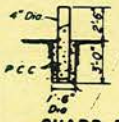
Modified Type "M" Cabinet Base
NO SCALE



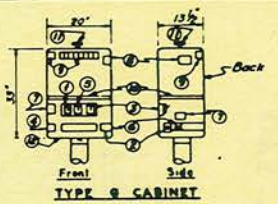
PEDESTRIAN PUSH BUTTON & SIGNS



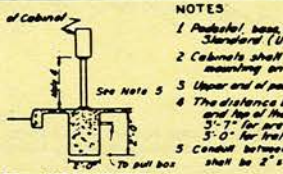
PEDESTRIAN PUSH BUTTON POST



GUARD POST
NO SCALE



TYPE G CABINET

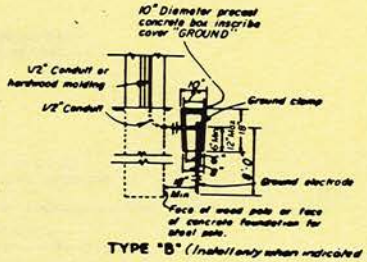


PEDESTAL AND FOUNDATION
TYPE G AND PRE-TIMED CONTROLLER CABINETS

NOTES
1. Pedestal, base, and foundation details similar to Type I-B Standard (Unless otherwise specified)
2. Cabinets shall be provided with slip fitter to permit mounting on 4 ½" O.D. pedestal
3. Upper end of pedestal shall be 4½" O.D.
4. The distance between the bottom of the controller cabinet and top of the foundation shall be:
   3'-7" for pre-timed controllers
   5'-0" for traffic actuated controllers
5. Conduit between foundation and adjacent pull box shall be 2" size minimum.

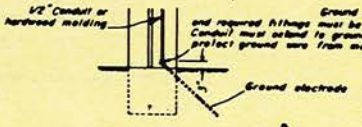
GENERAL INSTALLATION NOTES - ALL CABINETS

1. All Cabinet dimensions are nominal.
2. Foundations shall be located to provide 5'-0" minimum clearance between face of curb and front of cabinet.
3. One anchor bolt shall be bonded to conduit or ground wire.
4. For telephone interconnect a 1½" conduit shall be installed inside the steel or P.C.C. pedestal to a point 1 inch above the floor of the cabinet or finished surface of the P.C.C. pedestal. Conduit shall terminate in a No. 3½ pullbox adjacent to the foundation
5. Approved waterproof seal to be applied to base of Type "R" & Mod "M" cabinet & concrete foundation.
6. In unpaved areas, a raised P.C.C. pad of 2'-6" X 3'-0" X 0'-4" for Type G, M, Mod "M" and Pre-timed controller cabinets and of 4'-1" X 3'-0" X 0'-4" for Type "R" cabinets shall be placed in front of each controller cabinet.
7. In all unpaved areas top of foundation for G, R, Mod "M" and Pre-timed controller cabinets shall be 6" above surrounding grade. In paved areas top of foundation for G and Pre-timed controller cabinets shall be level with surrounding grade. For all others it shall be 3" above paved areas.
8. Anchor bolts, nuts and washers shall be galvanized.
9. All conduits shall be bonded together, in the cabinet.
10. Locations shown for equipment is typical only.
11. A ½ inch diameter drain hole shall be formed in the Type "R" & Mod "M" controller base. All cabinets shall be leveled so that the cabinet door will open and close easily.



TYPE "B" (Installed only when indicated on plans)

Notes
When water pipe is used for ground, wire shall be enclosed in galvanized rigid conduit, or equivalent mechanical protection
Rod or pipe electrodes shall be driven to a depth of at least 8 ft below surrounding grade



TYPE "A"

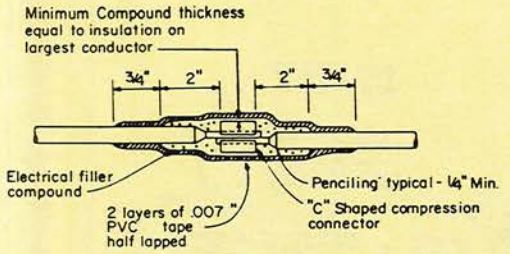
SERVICE GROUNDING
NO SCALE

DEPUTY DIRECTOR

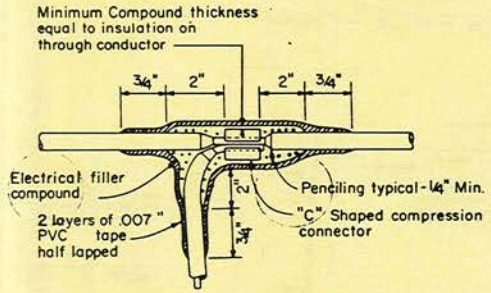
SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

STANDARD DETAILS NO. 7
CONTROLLER CABINETS AND MISCELLANEOUS DETAILS

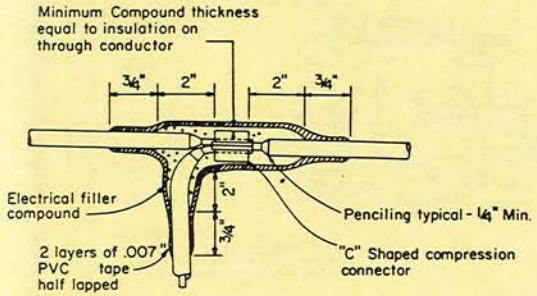
SCALE NONE | DATE 3-89 | TS-2A



TYPE "S" SPLICE
(Between 2 Free-Ends)



TYPE "C" SPLICE
(Between 1 Free-End and 1 through Conductor)



TYPE "T" SPLICE
(For 3 Free-Ends)

NOTE:
Pressure sleeve type connectors may be used for type "S" and "T" splices.

INSULATING METHOD
Low Voltage Circuits (0-600 Volts)

METHOD "A"

Apply electrical filler compound and low voltage tape as shown.

OR

METHOD "B"

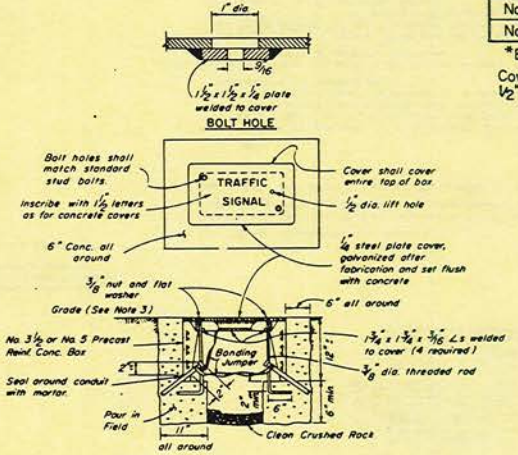
1. Use 2 layers of electrical insulating pad of minimum thickness of 1/8" each or 2 layers, half lapped, synthetic, oil resistant, self fusing rubber tape.
2. Apply .007" thick PVC tape to a thickness equal to original insulation.

High Voltage Circuits (0-600 Volts)

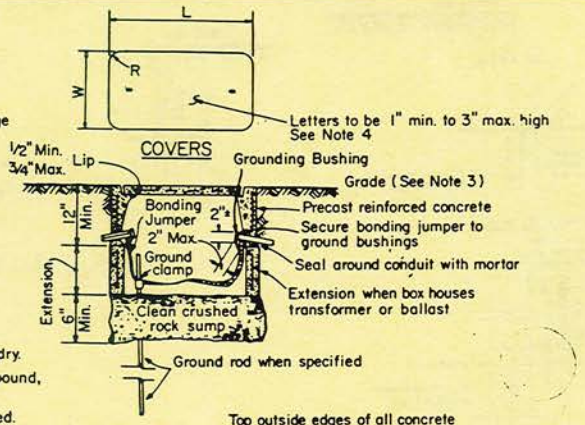
1. Apply one coat of rubber cement and allow to dry.
2. Apply high voltage tape in place of filler compound, to a thickness equal to original insulation.
3. Apply 2 layers of PVC tape, half lapped.

GENERAL NOTES

1. All dimensions are nominal and minimal.
2. Rubber tapes shall be rolled after application.
3. When PVC tape is used as final layer, paint finished splice with electrical insulating coating.



PULLBOX
WITH STEEL
TRAFFIC COVER



NO. 3 1/2
NO. 5 & NO. 6
(Not to Scale)

Top outside edges of all concrete covers and pull boxes shall have a 1/4" min. radius.

DIMENSION TABLE

Pull Box	CONCRETE BOX		CONCRETE COVER				PLASTIC BOX		PLASTIC COVER			
	Min * Thickness	Min. Depth Box and Extension	L**	W**	R	Min. Thickness	Min.* Thickness	Min. Depth Box and Extension	L**	W**	R	Edge Thickness
No. 3 1/2	1"	No Extension	15 5/16"	9 15/16"	1 5/32"	1 5/8"	5/16"	No Extension	15 3/8"	10"	1 5/32"	1 3/4"
No. 5	1"	22"	20 5/8"	10 1/2"	1 5/32"	1 7/8"	5/16"	20"	23"	13 11/16"	1 1/4"	2"
No. 6	1 1/2"	24"	30 5/8"	17 5/8"	1 1/2"	1 7/8"	3/8"	20"	30 1/2"	17 5/8"	1 3/8"	2"

*Excluding conduit web. **Top dimension.

Cover of dimensions shown shall fit flush with top of box with a 1/8" maximum clearance all around, except that corners may be 1/2" maximum clearance.

NOTES ON PULL BOXES

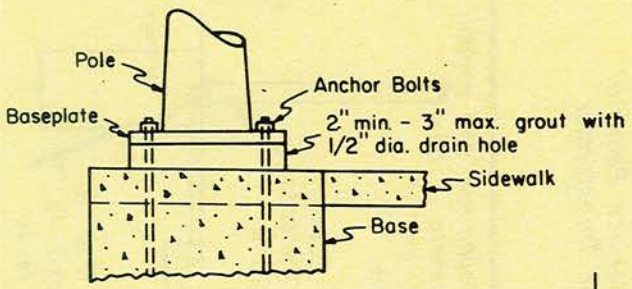
1. Use steel cover and special concrete footing, as shown, when box is to be installed where subject to traffic loads. Steel cover shall have embossed non-skid pattern when box is placed in paved or sidewalk areas.
2. Steel reinforcing shall be as regularly used in the standard products of the respective manufacturer.
3. Top of pull boxes shall be flush with surrounding grade or top of adjacent curb, except that in unpaved areas where pull box is not immediately adjacent to and protected by a concrete foundation, pole or other protective construction, the box shall be placed with its top 0.10 foot above surrounding grade. Where practicable, pull boxes shown in the vicinity of curbs shall be placed adjacent to the back of curb, and pull boxes shown adjacent to standards shall be placed on side of foundation facing traffic, unless otherwise noted.
4. Pull box covers shall be marked as follows:
   (a) "TRAFFIC SIGNAL" Where pull box contains traffic signal conductors with or without street lighting conductors.
   (b) "STREET LIGHTING" Where pull box contains street lighting conductors only. "HIGH VOLTAGE" shall be added, where street lighting voltage is above 600 volts.
   (c) "SERVICE" For pull box where riser conduits from utility pole terminate.
5. Bonding jumpers for metal covers shall be a minimum of 36" long. Metal covers shall be electrically bonded to the conduit ground.

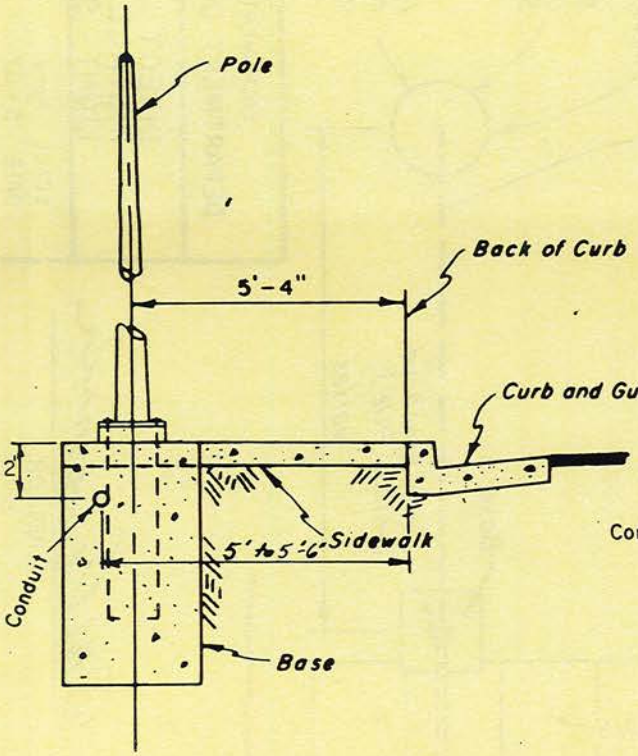
Don Vicchiarini
DEPUTY DIRECTOR

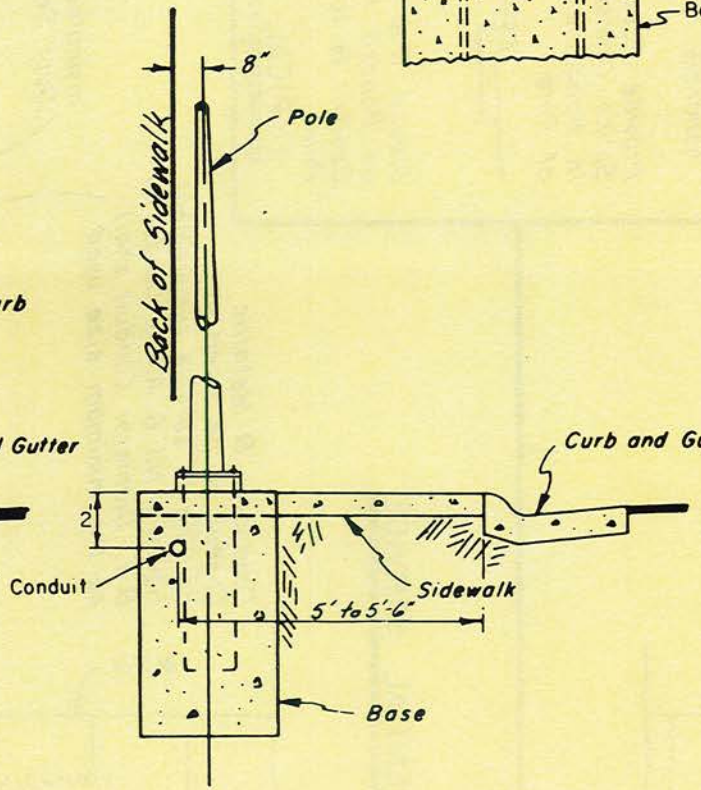
SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

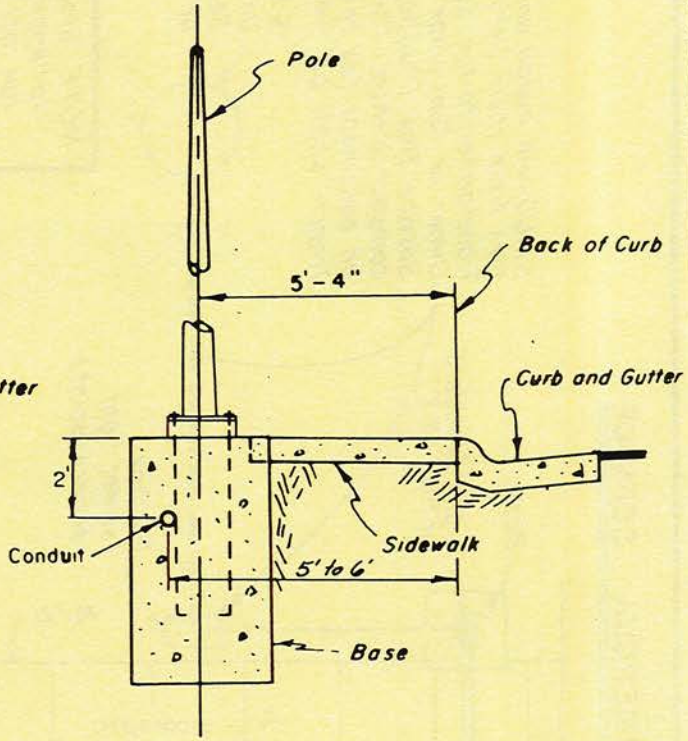
STANDARD DETAILS NO. 4
PULLBOXES AND SPLICING

SCALE: None	DATE: 3-89	TS-2B









6' SIDEWALK

VARIABLE SIDEWALK WIDTH (OVER 6')

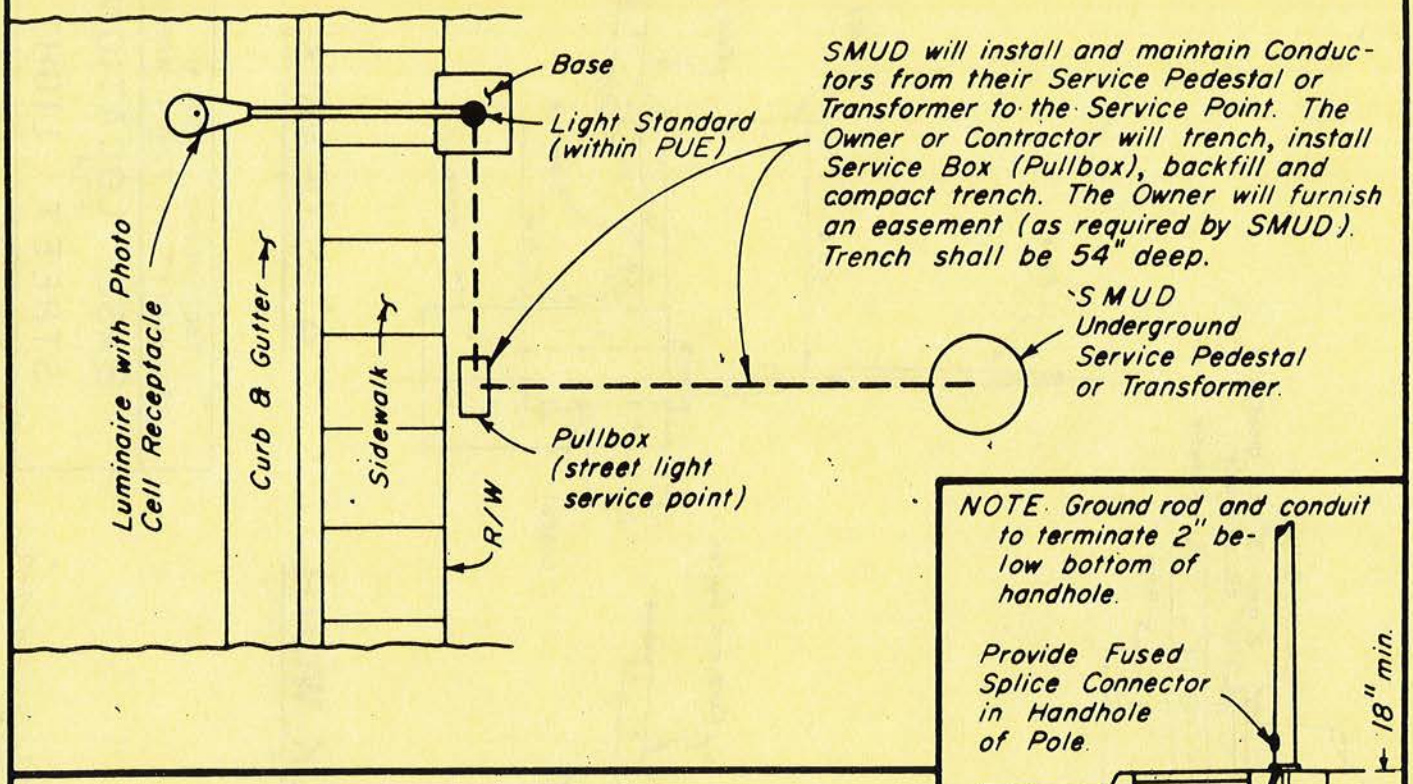
4' SIDEWALK

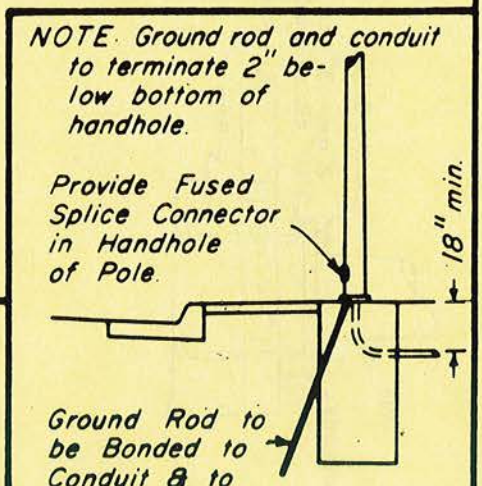
Note: If conduit is located beneath the sidewalk, it may be placed at 18" depth instead of 2'.

DIRECTOR

SACRAMENTO COUNTY DEPARTMENT OF PUBLIC WORKS	
BASE LOCATION FOR STREET LIGHT	
SCALE NONE DATE: 1-89 DRAWN BY:	TS-3

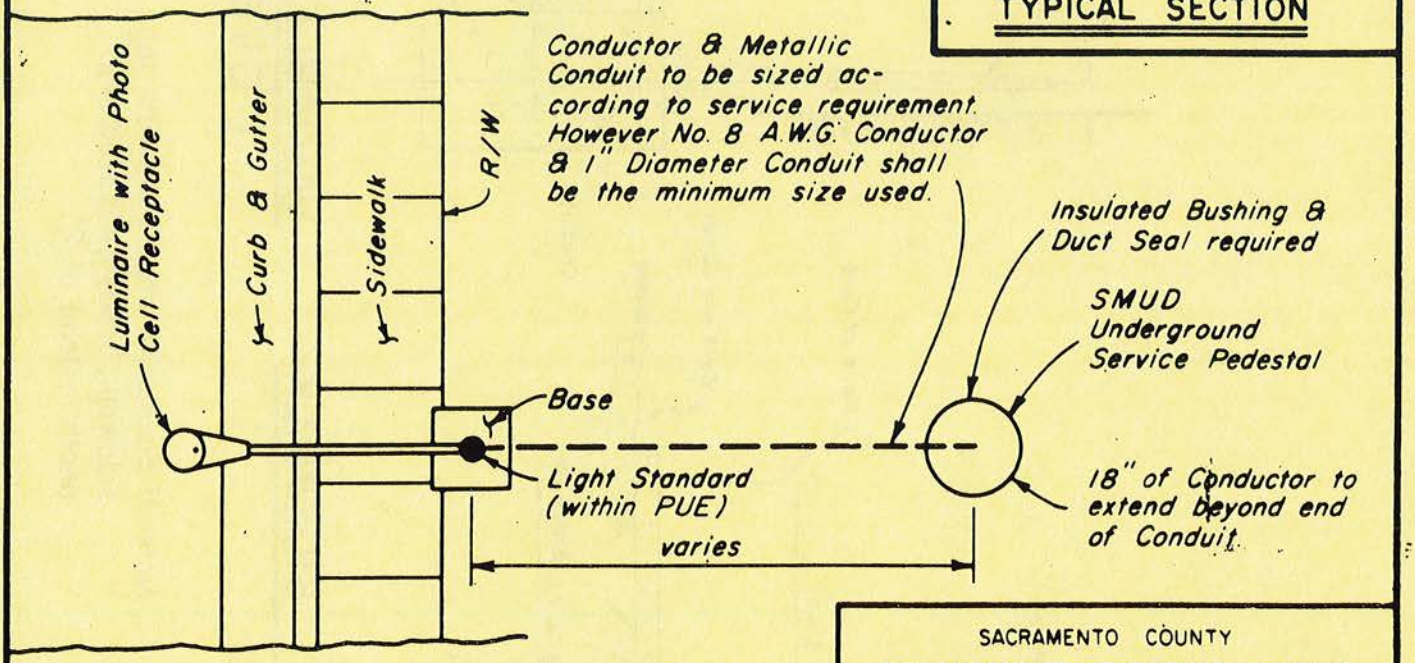
COMMERCIAL SERVICE





TYPICAL SECTION

RESIDENTIAL SERVICE



SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

DIRECT SERVICE INSTALLATION TO LIGHT STANDARD

DIRECTOR

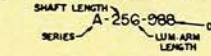
SCALE None
DATE : 5-87

TS-4

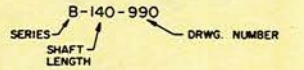
PLAG	ITEM NO.	QUANTITY THIS DWG.	DESCRIPTION

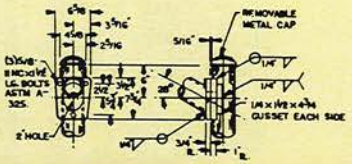
NOTES:

1. 1) 2 EACH GALV. FLAT WASHERS REQ'D. PER ANCHOR BOLT
2. 2) "A" SERIES CATALOG NUMBERING PROCEDURE

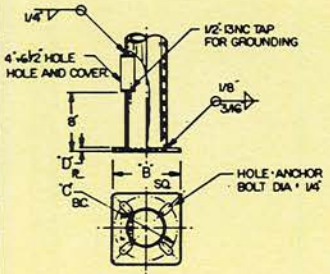


3. 3) "B" SERIES CATALOG NUMBERING PROCEDURE

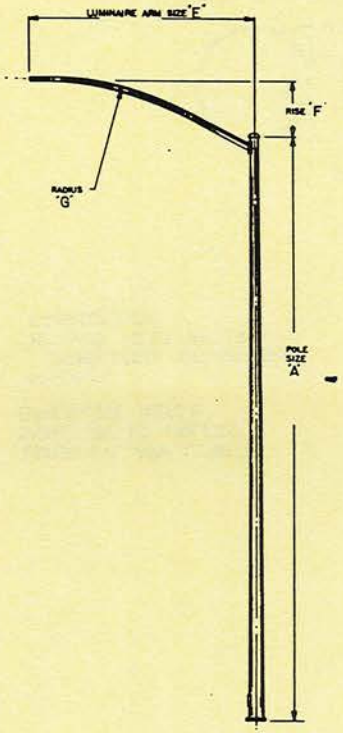




LUMINAIRE ARM DETAIL



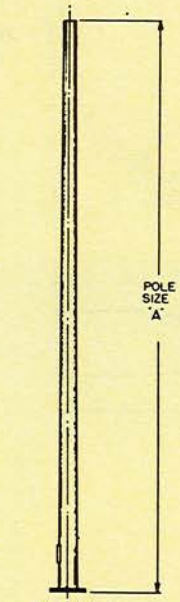
BASE DETAIL



"A" SERIES

"A" SERIES								
CATALOG NUMBER	POLE DATA "A"	POLE DATA TOP OD x BASE OD x GA	BASE PLATE DATA "B"	BASE PLATE DATA "C"	BASE PLATE DATA "D"	ANCHOR BOLTS	"E"
A-250-988	25'-0"	3 3/8" x 7 11/16" x 10	11 1/2"	11 1/2"	3/4"	1" x 36" x 4"	6" THRU 18
A-260-988	26'-0"	3 3/8" x 7 1/2" x 10	11 1/2"	11 1/2"	1"	1" x 36" x 4"	6" THRU 18
A-280-988	28'-0"	3 3/8" x 7 3/4" x 10	11 1/2"	11 1/2"	1"	1" x 36" x 4"	6" THRU 18
A-300-988	30'-0"	3 3/8" x 8" x 10	11 1/2"	11 1/2"	1"	1" x 36" x 4"	6" THRU 18

LUMINAIRE ARM DATA			
"E"	END OD x BASE OD x GA	"F"	"G"
6'-0"	2 3/8" x 3 3/8" x 10	1'-6"	7'-5"
8'-0"	2 3/8" x 3 11/16" x 10	2'-3"	7'-5"
10'-0"	2 3/8" x 3 3/8" x 10	2'-8"	13'-3"
12'-0"	2 3/8" x 4 5/16" x 10	3'-5"	13'-3"
15'-0"	2 3/8" x 4 3/4" x 10	4'-3"	18'-3"
18'-0"	2 3/8" x 4 3/4" x 10	5'-3"	13'-3"



"B SERIES"

"B" SERIES						
CATALOG NUMBER	POLE DATA "A"	POLE DATA TOP OD x BASE OD x GA	BASE PLATE DATA "B"	BASE PLATE DATA "C"	BASE PLATE DATA "D"	ANCHOR BOLTS
B-200-991	20'-0 2/16"	x 5 1/4" x 10	10"	9 1/2"	1"	1" x 36" x 4"

Foundation Dimensions		
	Base Dimensions	
	SQUARE	ROUND
"A" Series	2'6" x 2'6" x 5'	30" x 6'6"
"B" Series	2' x 2' x 4'	30" x 3'6"

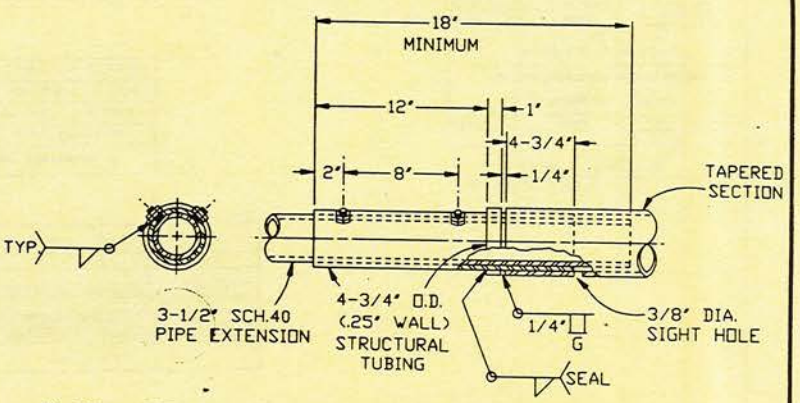
DEPUTY DIRECTOR

SYMBOL	REVISION	DATE	BY	APPV'D.

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS
"A SERIES" & "B SERIES" POLE

DRAWN	9-87	DWG NO.	TS-5
APPV'D.		991A	

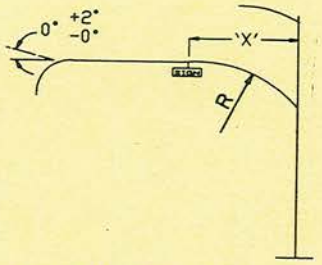
FOR SIGNAL ARM DATA TABLE SEE TS-6A



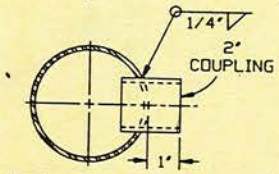
SLIP JOINT ARM CONNECTION DETAIL

NOTES:

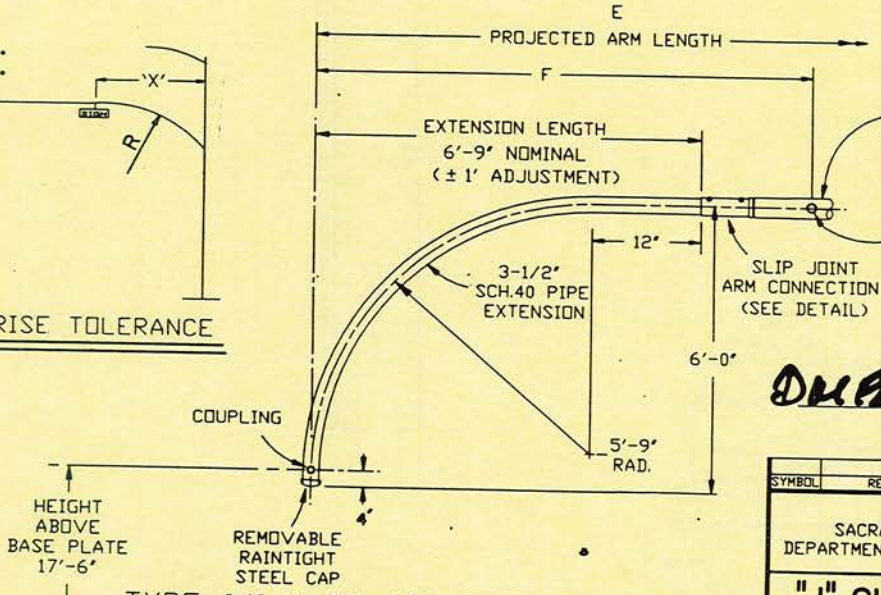
1. PIPE EXTENSION TO BE GALVANIZED.
2. LENGTHEN STRUCTURAL TUBING AS REQUIRED ON 33'-35', 41'-45' ARMS UP TO 60' MAX. SIGHT HOLE TO REMAIN AT 18' FROM END OF TUBING.
3. SLIP JOINT ARM CONNECTION REQUIRES (2) 3/4' DIA. HOLES AT 45 DEGREES FROM TOP TO ACCEPT (1) 5/8'-11NC x 1 1/2' LONG STAINLESS STEEL HEX. SOCKET SET SCREW, (1) STAINLESS STEEL LOCK NUT AND (1) HEAVY HEX. NUT. (TYPICAL-2 LOCATIONS).
4. REFER TO CALTRANS STANDARD PLAN SHEETS ES-6J THROUGH ES-6R FOR DESCRIPTION OF COLUMN HEADINGS IN DATA TABLE.
5. ALTERNATIVE DETAILS APPROVED BY THE ENGINEER MAY BE SUBSTITUTED FOR THE ARM CONNECTIONS AND CONFIGURATIONS SHOWN.
6. LUMINAIRE ARM LENGTH SHALL BE 15' UNLESS OTHERWISE NOTED.
7. MATERIAL:
   ARM: STEEL OF 48,000psi MINIMUM YIELD AFTER FABRICATION.



ARM RISE TOLERANCE



COUPLING DETAIL



TYPE "J" MAST ARM EXTENSION DETAIL

DIRECTOR

SYMBOL	REVISION	DATE	BY	APPVD

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

"J" SIGNAL ARM

DRAWN D.C.F. 2-88
APPV'D

TS-6

SIGNAL ARM DATA TABLE

CALTRANS POLE DESIGNATION W/ LUMINAIRE	CALTRANS POLE DESIGNATION W/O LUMINAIRE	E PROJECT ARM LEN	F MIN. SPACING	ARM DIAMETER		ARM THICKNESS	I BOLT CIRCLE	HS CAP SCREWS	J PLATE SIZE	K ARM PLATE THICKNESS	L POLE PLATE THICKNESS	⌓ (DEGREES)	X MAX.	R ARM RADIUS
				END	BASE									
24-4-70	23-4-70	33'-0"	14'-0"	5 1/4"	9"	.2391"	12"	1 1/4"-7NCx3"	12"	1 1/4"	1 1/2"	23	10'-6"	21'-0"
24-4-70	23-4-70	34'-0"	14'-0"	5 1/4"	9"	.2391"	12"	1 1/4"-7NCx3"	12"	1 1/4"	1 1/2"	23	10'-6"	21'-0"
24-4-70	23-4-70	35'-0"	14'-0"	5 1/4"	9"	.2391"	12"	1 1/4"-7NCx3"	12"	1 1/4"	1 1/2"	23	10'-6"	21'-0"
26-4-70	27-4-70	36'-0"	14'-0"	5 1/4"	9 3/8"	.2391"	13"	1 1/4"-7NCx3"	13"	1 1/2"	1 1/2"	21	10'-6"	37'-0"
26-4-70	27-4-70	37'-0"	14'-0"	5 1/4"	9 3/16"	.2391"	13"	1 1/4"-7NCx3"	13"	1 1/2"	1 1/2"	21	10'-6"	37'-0"
26-4-70	27-4-70	38'-0"	14'-0"	5 1/4"	9 3/4"	.2391"	13"	1 1/4"-7NCx3"	13"	1 1/2"	1 1/2"	21	10'-6"	37'-0"
26-4-70	27-4-70	39'-0"	14'-0"	5 1/4"	9 7/8"	.2391"	13"	1 1/4"-7NCx3"	13"	1 1/2"	1 1/2"	21	10'-6"	37'-0"
26-4-70	27-4-70	40'-0"	15'-0"	5 1/4"	10"	.2391"	13"	1 1/4"-7NCx3"	13"	1 1/2"	1 1/2"	21	10'-6"	37'-0"
26-4-70	27-4-70	41'-0"	15'-0"	5 1/4"	10 1/16"	.2391"	13"	1 1/4"-7NCx3"	13"	1 1/2"	1 3/4"	15	13'-0"	37'-0"
26-4-70	27-4-70	42'-0"	15'-0"	5 1/4"	10 1/16"	.2391"	13"	1 1/4"-7NCx3"	13"	1 1/2"	1 3/4"	15	13'-0"	37'-0"
26-4-70	27-4-70	43'-0"	15'-0"	5 1/4"	10 1/16"	.2391"	13"	1 1/4"-7NCx3"	13"	1 1/2"	1 3/4"	15	13'-0"	37'-0"
26-4-70	27-4-70	44'-0"	15'-0"	5 1/4"	10 1/16"	.2391"	13"	1 1/4"-7NCx3"	13"	1 1/2"	1 3/4"	15	13'-0"	37'-0"
26-4-70	27-4-70	45'-0"	15'-0"	5 1/4"	10 1/16"	.2391"	13"	1 1/4"-7NCx3"	13"	1 1/2"	1 3/4"	15	13'-0"	37'-0"
29-5-70	28-5-70	46'-0"	15'-0"	5 1/4"	10 3/4"	.2391"	15 3/4"	1 1/2"-6NCx3 1/2"	15"	1 3/4"	1 3/4"	15	14'-0"	37'-0"
29-5-70	28-5-70	47'-0"	15'-0"	5 1/4"	10 15/16"	.2391"	15 3/4"	1 1/2"-6NCx3 1/2"	15"	1 3/4"	1 3/4"	15	14'-0"	37'-0"
29-5-70	28-5-70	48'-0"	15'-0"	5 1/4"	11 1/16"	.2391"	15 3/4"	1 1/2"-6NCx3 1/2"	15"	1 3/4"	1 3/4"	15	14'-0"	37'-0"
29-5-70	28-5-70	49'-0"	15'-0"	5 1/4"	11 3/16"	.2391"	15 3/4"	1 1/2"-6NCx3 1/2"	15"	1 3/4"	1 3/4"	15	14'-0"	37'-0"
29-5-70	28-5-70	50'-0"	15'-0"	5 1/4"	11 5/16"	.2391"	15 3/4"	1 1/2"-6NCx3 1/2"	15"	1 3/4"	1 3/4"	15	14'-0"	37'-0"
29-5-70	28-5-70	51'-0"	15'-0"	5 1/4"	11 1/2"	.2391"	15 3/4"	1 1/2"-6NCx3 1/2"	15"	1 3/4"	1 3/4"	15	14'-0"	37'-0"
29-5-70	28-5-70	52'-0"	15'-0"	5 1/4"	11 5/8"	.2391"	15 3/4"	1 1/2"-6NCx3 1/2"	15"	1 3/4"	1 3/4"	15	14'-0"	37'-0"
29-5-70	28-5-70	53'-0"	15'-0"	5 1/4"	11 3/4"	.2391"	15 3/4"	1 1/2"-6NCx3 1/2"	15"	1 3/4"	1 3/4"	15	14'-0"	37'-0"
29-5-70	28-5-70	54'-0"	15'-0"	5 1/4"	11 7/8"	.2391"	15 3/4"	1 1/2"-6NCx3 1/2"	15"	1 3/4"	1 3/4"	15	14'-0"	37'-0"
29-5-70	28-5-70	55'-0"	15'-0"	5 1/4"	12"	.2391"	15 3/4"	1 1/2"-6NCx3 1/2"	15"	1 3/4"	1 3/4"	15	14'-0"	37'-0"

Sample Plan Nomenclature: J 26-4-70 (43)

- J — Indicates "J" Signal Arm (See TS 6)
- 26-4-70 — State Standard Plans pole designation
- (43) — Projected arm length

DM Fraham
DIRECTOR

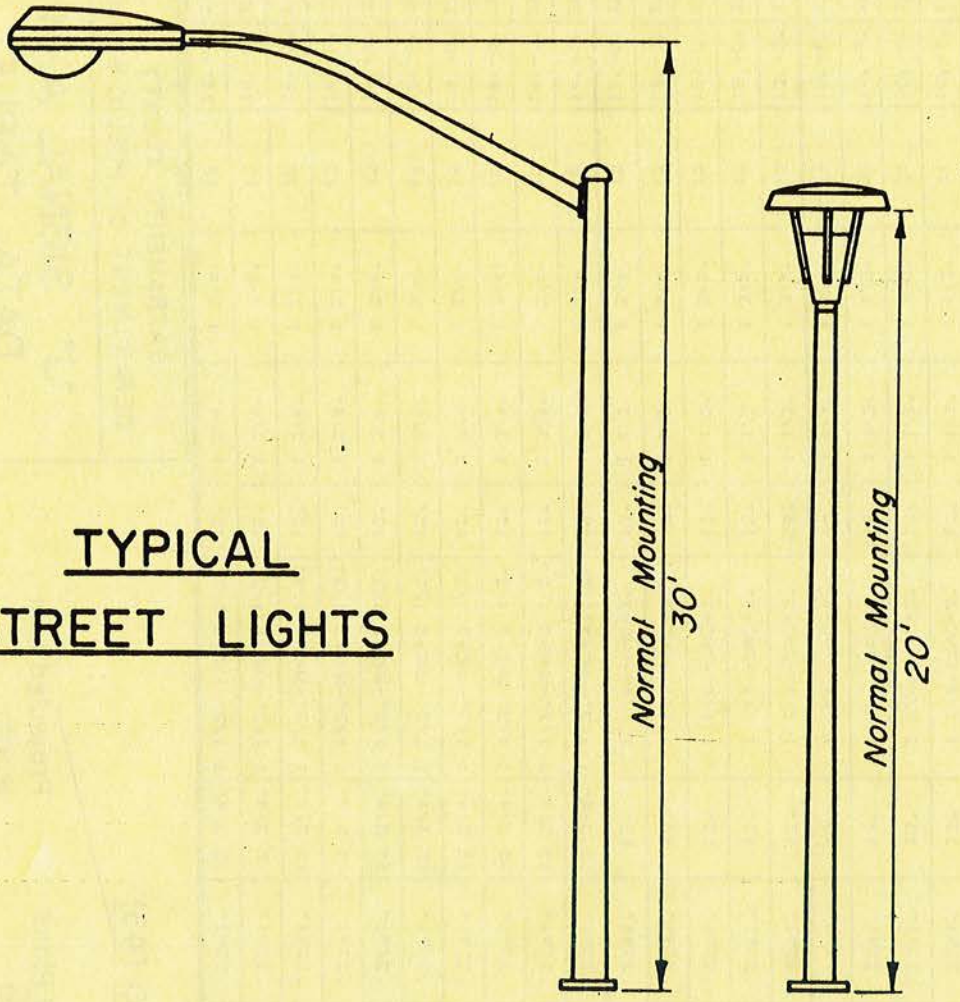
SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

"J" SIGNAL ARM DATA TABLE

DRAWN BY: B.K.P.
SCALE: NONE
DATE: 7-88

TS-6A

TYPICAL STREET LIGHTS



TYPE "A" TYPE "B"

SYMBOLS

PROPOSED	EXISTING	
⊟—◯	⊡—◯	..... Type "A"
◯	◯	..... Type "B"
▭	⊏⊐	..... Pullbox
———	- - - -	..... Conduit
□	⊡	..... Pedestal and Service Can
⬡	⬡	..... Utility Service Pedestal
-o-	-o-	..... Wood Pole

DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

STREET LIGHTING
POLES AND SYMBOLS

DATE: 3-89
DR. BY: B. F.
SCALE: None

TS-7

STREET CLASSIFICATION	ST. TYPE & R/W WIDTH	TYPE STREET LIGHT	NORMAL MOUNTING HEIGHT	AVERAGE MAINTAINED FOOTCANDLE	MAINTENANCE FACTOR
SPECIAL THOROUGHFARE	130'	A	30'	.57	.65
THOROUGHFARE	100',108',110'	A	30'	.58,.56,.54	.65
ARTERIAL	84'	A	30'	.36	.65
	80'	A	30'	.38	.65
COLLECTOR	66'	A	30'	.29	.65
	62'	B	20'	.15	.70
	60'	A	30'	.26	.65
	* 56'	B	20'	.14	.70
RESIDENTIAL	50'	B	20'	.13	.70
	42'	B	20'	.12	.70
	40'	B	20'	.12	.70
PEDESTRIAN LANE	—	B	14'	.17	.70

1. Lumens used to calculate the Average Maintained Footcandle shall be 80% of initial lumen valve rated by the lamp manufacturer.

* 2. Use 60 foot street lighting design for 56 foot industrial streets.

Douglas M. Kamman
DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

STREET LIGHTING DESIGN CRITERIA

DATE: 1-89
DR. BY: B. F. / M. T.
SCALE: None

TS-8

STREET CLASSIFICATION	STREET TYPE AND R/W WIDTH	TYPE STREET LIGHT	NORMAL MOUNTING HEIGHT	HIGH PRESSURE SODIUM LAMP WATTAGE	FRONT ON LOT	BACK ON LOT	LIGHT DISTRIBUTION PATTERN MIDBLOCK LOCATION
					SPACING (ONE SIDE ONLY)		
SPECIAL THOROUGHFARE	130'	A	30'	250	180	180	III
THOROUGHFARE	100',108',110'	A	30'	250	220	220	III
ARTERIAL	80',84'	A	30'	150	220	250	III
					SPACING (BOTH SIDES)		
COLLECTOR	66'	A⊕	30'	150	180'		II
	62'	B	20'	100	150'		
	60'	A⊕	30'	150	220'		II
	✳ 56'	B	20'	100	180'		
RESIDENTIAL	50'	B	20'	100	200'		II
	42'	B	20'	100	240'		II
	40'	B	20'	100	240'		II

1. Lamp wattage shown is for high pressure sodium lamp only. Design criteria must be submitted for all other lamps.

2. Spacing may be adjusted ±10% to allow for driveways.

3. Back-on lot spacing may be adjusted to 330 ft. if both sides of the street are lighted.

✳ 4. Use 60 foot street lighting design for 56 foot industrial streets.

⊕ 5. Single family and duplex family zoning shall be type "B" street light (100 watt). 20' mounting height.

Douglas M. Vanni
DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

STREET LIGHT POLE SPACING GUIDE

DATE: 1-89
DR. BY: B. F. M.T.
SCALE: None

TS-9

TYPICAL VOLTAGE DROP CALCULATION FOR 2-WIRE SYSTEM

VOLTAGE DROP (Copper Conductor) = $\frac{D \times A \times N \times 22}{\text{Circular Mils}}$

D = Length of section, in feet.

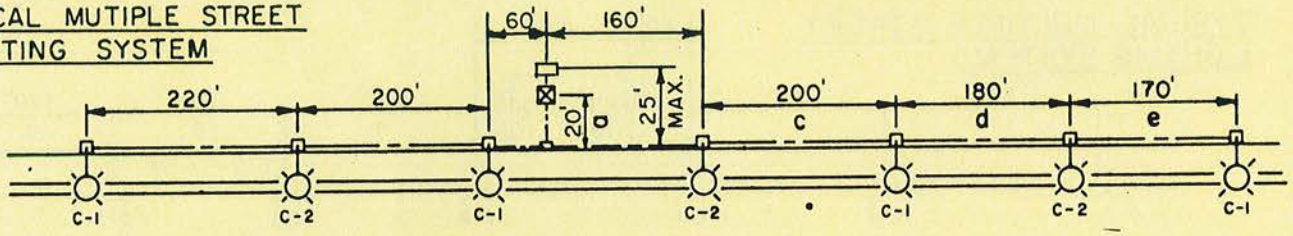
A = Line operating amperes drawn by one light.

N = Number of lights in the circuit beyond the section.

SIZE WIRE	AREA (Circular Mils)
14	4,110
12	6,530
10	10,380
8	16,510
6	26,250
4	41,740

LINE OPERATING AMPERES FOR HIGH PRESSURE SODIUM LUMINAIRES
100 Watts..... 1.25 Amps
150 Watts..... 1.80 Amps
250 Watts..... 2.90 Amps

TYPICAL MUTIPLE STREET LIGHTING SYSTEM



EXAMPLE CALCULATION:

FIND TOTAL VOLTAGE DROP IN CIRCUIT #1:
(115 volt system)

Voltage drop calculations

Section a = $\frac{20\ (2.9 \times 4)\ (22)}{10,380}$ = **0.49**

Section b + c = $\frac{360\ (2.9 \times 2)\ (22)}{10,380}$ = **4.43**

Section d + e = $\frac{350\ (2.9 \times 1)\ (22)}{10,380}$ = **2.15**

TOTAL VOLTAGE DROP = **7.07**

LEGEND

- 250w. High Pressure Sodium Luminaire
- C-1 Circuit #1
- Service Can
- Conduit w/#10 A.W.G. Conductors
- Service Point Pullbox (Adjacent to Service Can)

NOTES:

1. Design must be based on a two (2) wire system, even though three (3) wires (w/ a single common wire) are actually used.
2. Maximum voltage drop allowed = 8.05 volts.

Douglas M. Lamm
DIRECTOR

SACRAMENTO COUNTY DEPARTMENT OF PUBLIC WORKS

2-WIRE STREET LIGHT WIRE SIZE AND VOLTAGE DROP CALCULATION

DRAWN BY: M.T.
SCALE: NONE
DATE: 1-89

TS-10

TYPICAL VOLTAGE DROP CALCULATION FOR 3-WIRE SYSTEM

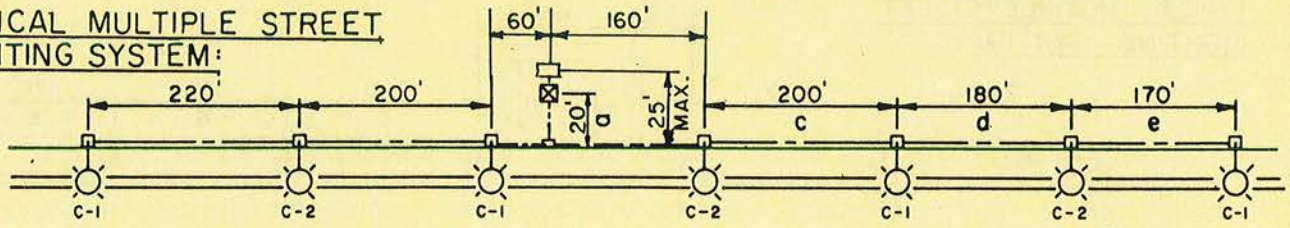
$$\text{VOLTAGE DROP (Copper Conductor)} = \frac{D \times A \times N \times 22}{\text{Circular Mils}}$$

D = Length of section, in feet.
A = Line operating amperes drawn by one light.
N = Number of lights in the circuit beyond the section.

SIZE WIRE	AREA (Circular Mils)
14	4,110
12	6,530
10	10,380
8	16,510
6	26,250
4	41,740

LINE OPERATING AMPERES FOR HIGH PRESSURE SODIUM LUMINAIRES
100 Watts..... 1.25 Amps
150 Watts..... 1.80 Amps
250 Watts..... 2.90 Amps

TYPICAL MULTIPLE STREET LIGHTING SYSTEM:



EXAMPLE CALCULATION:

FIND TOTAL VOLTAGE DROP IN CIRCUIT #1:
(115 volt system)

Voltage drop calculations:

Section a = $\frac{20\ (2.9 \times 4)(11)}{}$ = 0.39

Section b + c = $\frac{360\ (2.9 \times 2)(11)}{}$ = 3.52

Section d + e = $\frac{350\ (2.9 \times 1)(11)}{}$ = 1.71

TOTAL VOLTAGE DROP = 5.62

LEGEND

- 250w. High Pressure Sodium Luminaire
- C-1 — Circuit #1
- Service Can
- Conduit w/#10 A.W.G. Conductors
- Service Point Pullbox (Adjacent to Service Can)

NOTE:

1. Maximum voltage drop allowed = 7.0 volts

DIRECTOR

SACRAMENTO COUNTY DEPARTMENT OF PUBLIC WORKS

3-WIRE STREET LIGHT WIRE SIZE AND VOLTAGE DROP CALCULATION

DRAWN BY: M.T.
SCALE: NONE
DATE: 1-89

TS-11

CONDUIT SIZING

CONDUIT SIZE	1"	1½"	2"	2½"	3"	3½"
EQUIVALENT NUMBER OF #14 A.W.G. CONDUCTORS*	8	19	31	44	69	91

* 1 - #12 Conductor = 1.2 - #14 Conductors
1 - #10 Conductor = 1.5 - #14 Conductors
1 - #8 Conductor = 2.3 - #14 Conductors
1 - #6 Conductor = 3 - #14 Conductors
1 - #4 Conductor = 4 - #14 Conductors

CIRCUIT BREAKER SIZING

CONDUCTOR SIZE A.W.G.	MAXIMUM CIRCUIT BREAKER AMPERAGE
#2	100
#4	80
#6	50
#8	40
#10	30

NOTE:
The breaker size shall be determined from the smallest conductor in the circuit.

DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

STREET LIGHT
CONDUIT AND
BREAKER SIZING

DATE: 3-89
SCALE: NONE

TS-12

2-WIRE SYSTEM

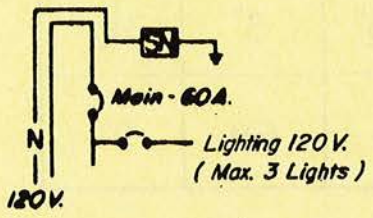


DIAGRAM - A
(Unmetered)

Use on multiple lighting systems with maximum of 3 lights. All lights shall have photo cells.

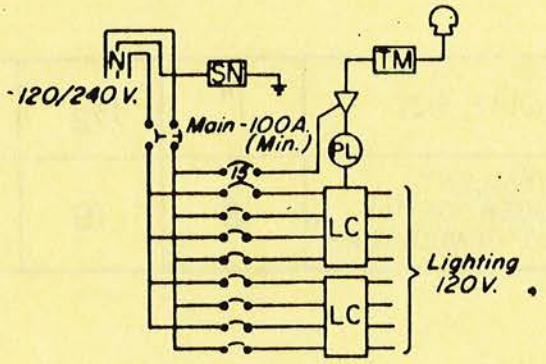


DIAGRAM - C

Use on multiple lighting systems with four or more lights.

3-WIRE SYSTEM

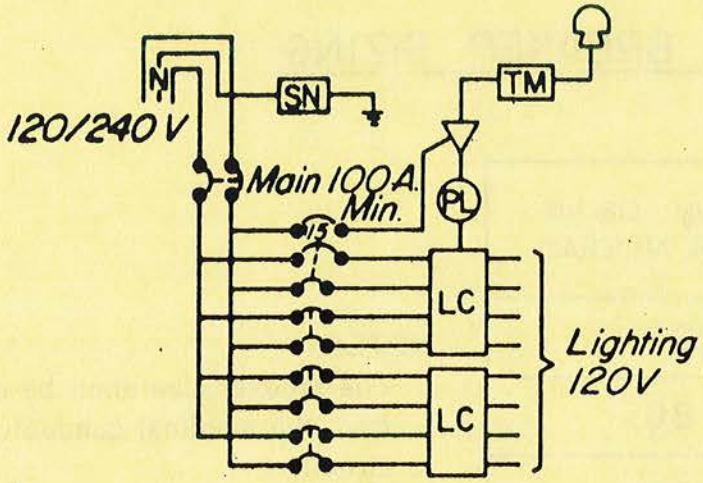


DIAGRAM - E

Use on multiple lighting systems with four or more lights.

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

STREET LIGHT
SERVICE WIRING DIAGRAMS

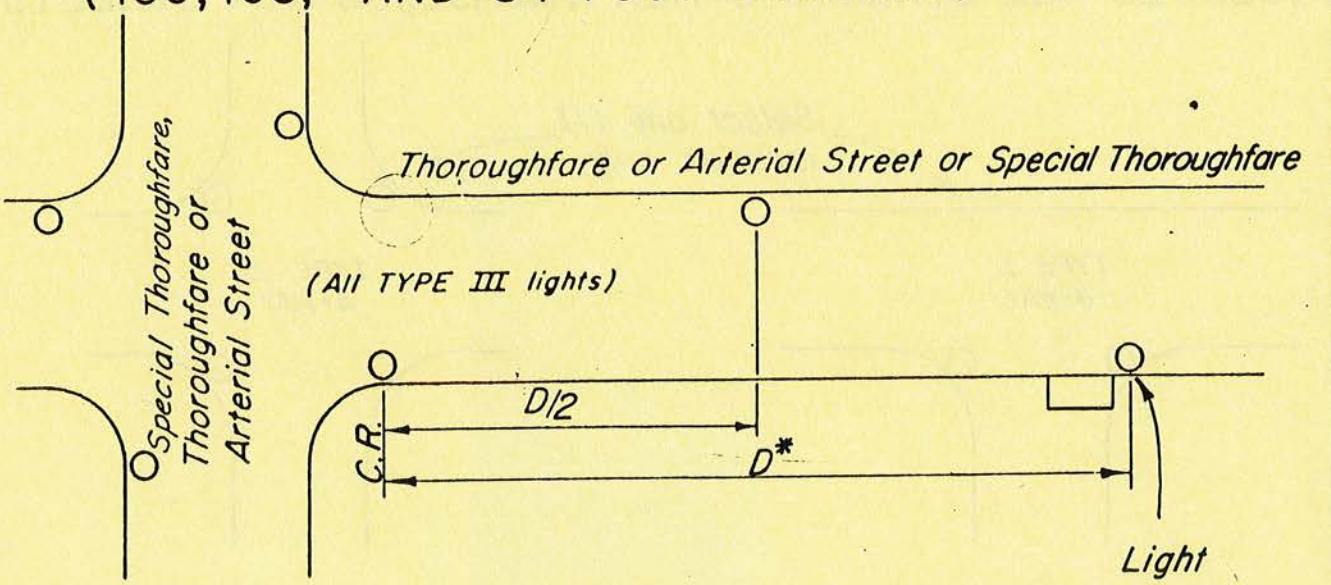
DIRECTOR

DATE: 4-83
DR. BY: B. F.
SCALE: None

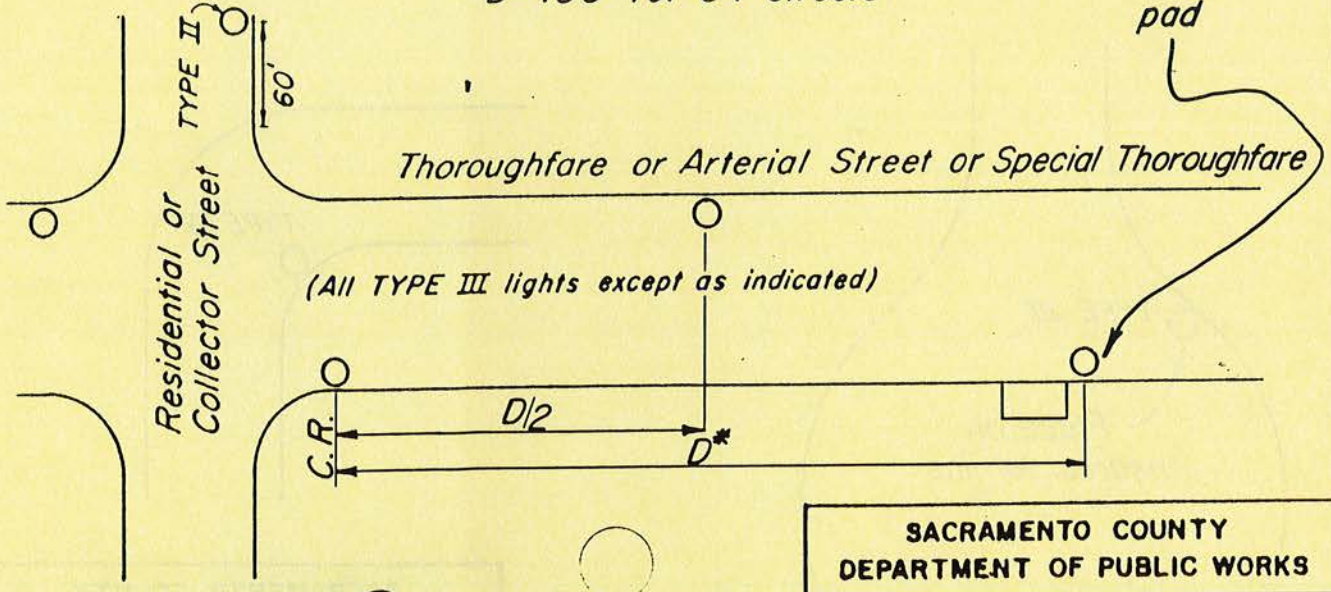
TS-13

STREET LIGHT PLACEMENT ON SPECIAL THOROUGHFARES, THOROUGHFARES & ARTERIALS

(130, 108, AND 84 FOOT STREETS)



* See Std. Drawing H-24 & H-24A
D = 180' for 130' & 108' streets
D = 155' for 84' streets



Douglas M. Wanner
DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

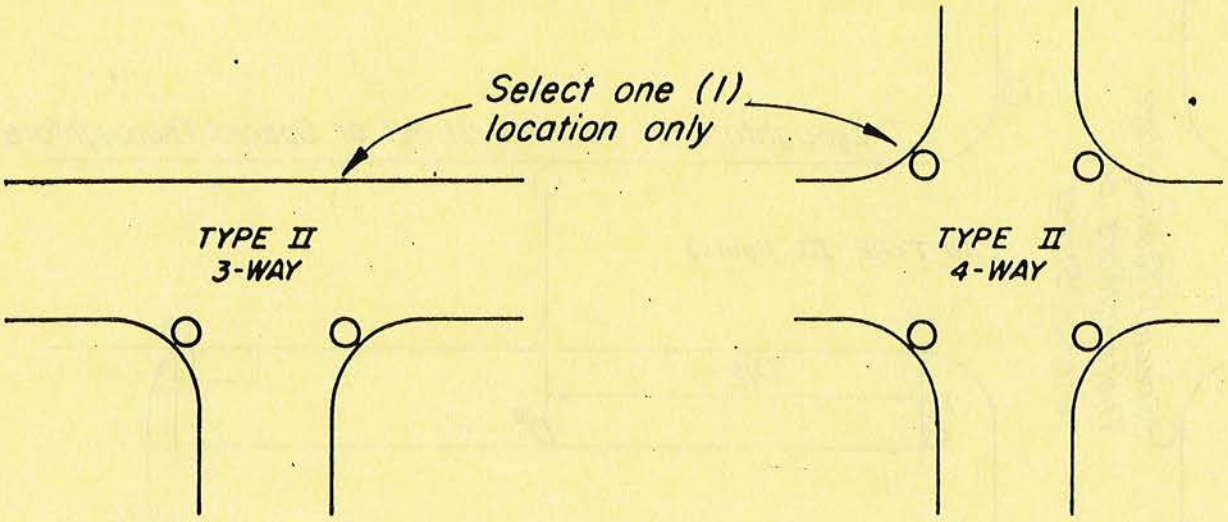
TYPICAL STREET LIGHT LOCATIONS THOROUGHFARES & ARTERIALS

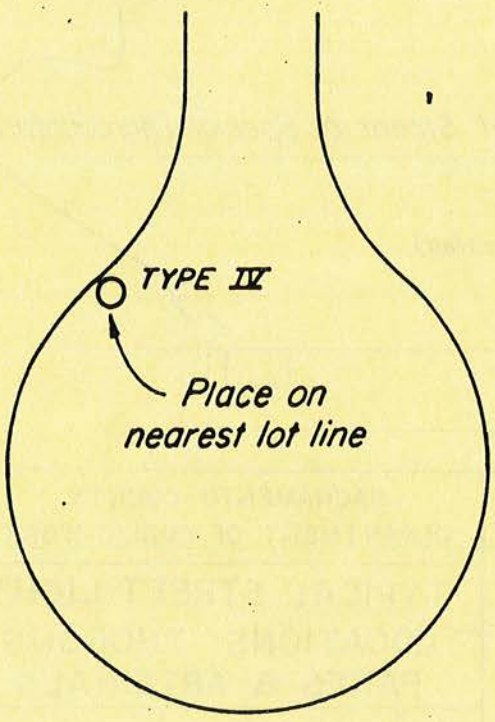
DRAWN BY: M.T.
SCALE: NONE
DATE: 1-89

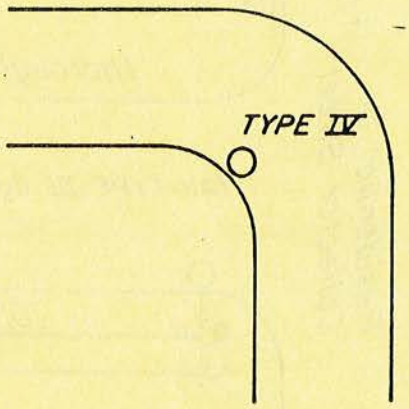
TS-14

STREET LIGHT PLACEMENT ON COLLECTOR & RESIDENTIAL STREETS

(INCLUDES ALL STREETS OTHER THAN 130,108' & 84' STREETS)







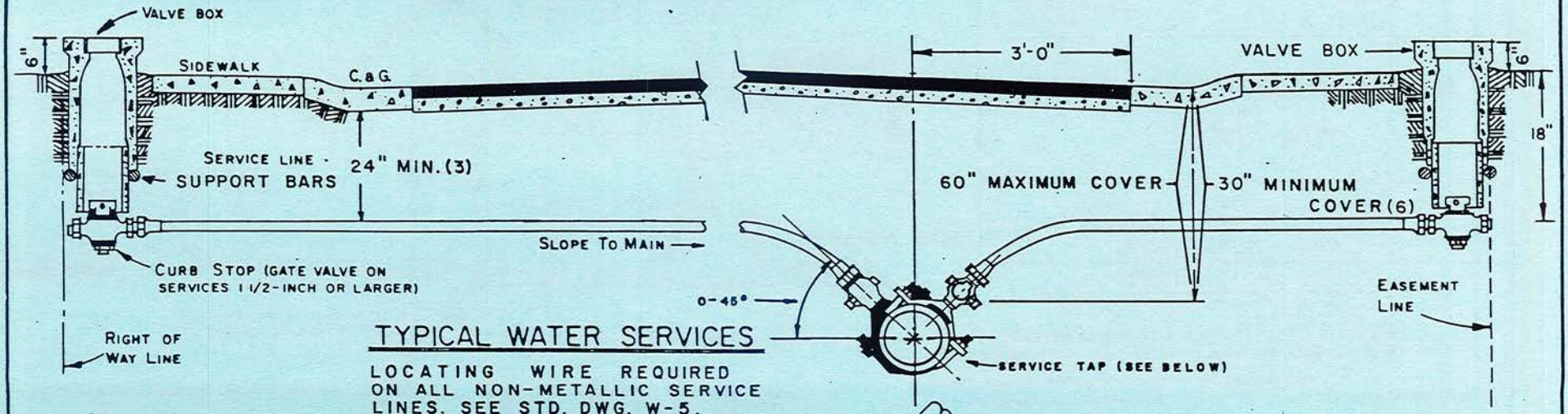
SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

TYPICAL STREET LIGHT LOCATIONS COLLECTOR AND RESIDENTIAL

Douglas M. Kamman
DIRECTOR

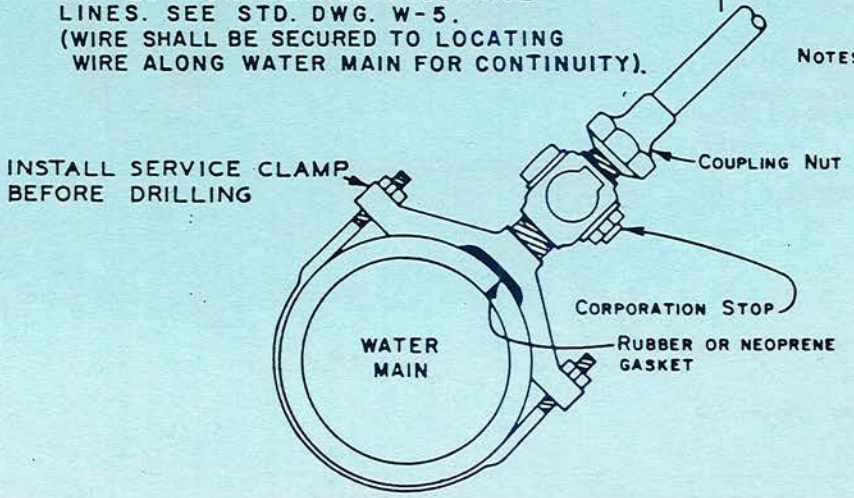
DATE: 1-89
DR. BY: B. F. / M.T.
SCALE: None

TS-15



TYPICAL WATER SERVICES

LOCATING WIRE REQUIRED ON ALL NON-METALLIC SERVICE LINES. SEE STD. DWG. W-5. (WIRE SHALL BE SECURED TO LOCATING WIRE ALONG WATER MAIN FOR CONTINUITY).



SERVICE TAP

NOTES:
(1) CORPORATION STOP, CURB STOP (OR GATE VALVE), AND SERVICE LINE TO BE SAME SIZE.

(2) SERVICE CLAMPS SHALL BE SINGLE STRAP FOR UP TO 1" SERVICES, DOUBLE STRAP FOR LARGER SIZES, EXCEPT WHERE SIZE OF TAP EXCEEDS MANUFACTURERS' RECOMMENDED LIMIT FOR SIZE OF MAIN. FOR THIS SITUATION, A SPECIAL FITTING WILL BE SPECIFIED.

(3) INCREASE MIN. CLEARANCE OF WATER SERVICE UNDER C&G TO 36" WHERE SERVICE LINE CROSSES SELECT SYSTEM ROADWAY, WHICH WILL BE SO SPECIFIED.

(4) SERVICE SADDLES, CORPORATION STOPS, COUPLING NUTS, AND ALL APPURTENANCES SHALL BE BRONZE.

(5) SEE SS-90 FOR FURTHER SPECIFICATIONS.

(6) 36" MIN. COVER IN STREET R/W'S GREATER THAN 50'.

W. C. Wanderer

FOR DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

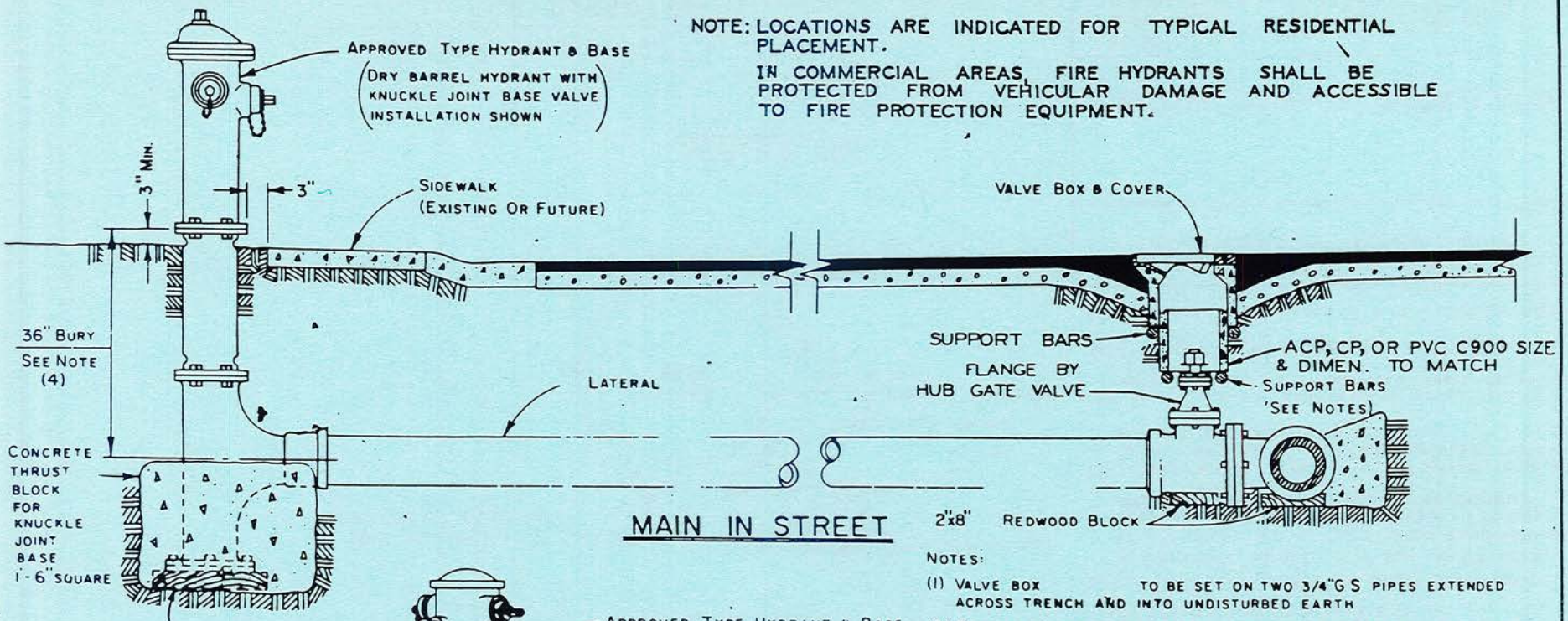
WATER SERVICE INSTALLATION

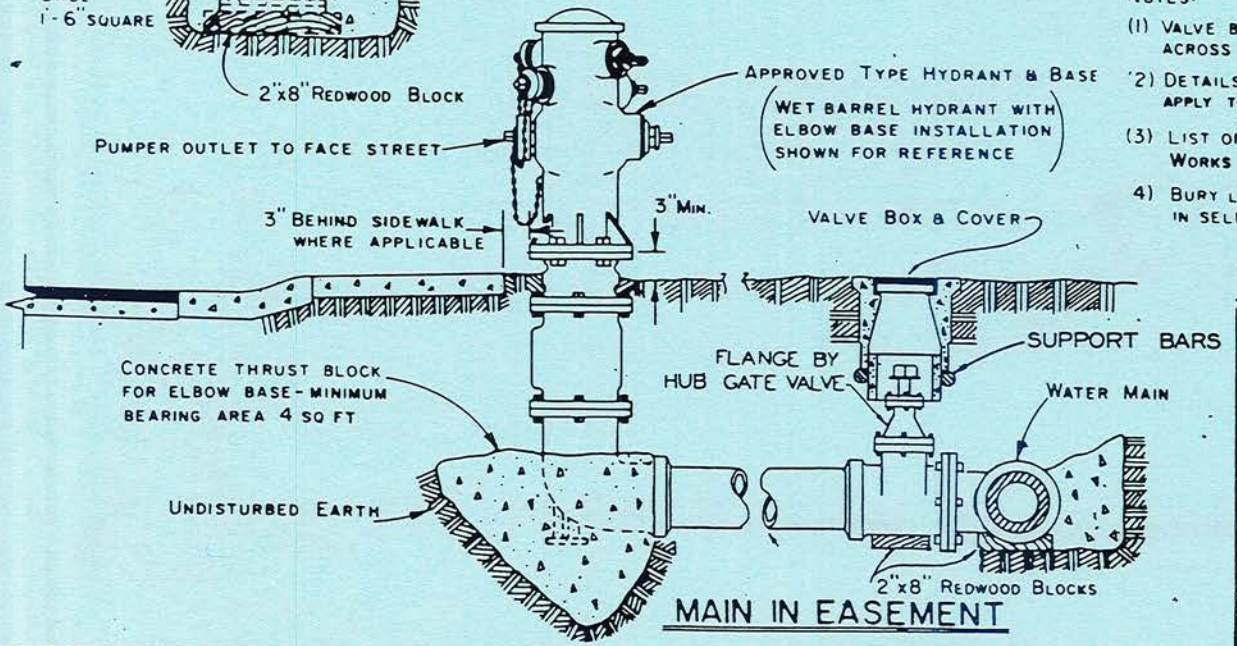
NO SCALE
DATE: 4-88
DRAWN BY: CA

W-1

NOTE: LOCATIONS ARE INDICATED FOR TYPICAL RESIDENTIAL PLACEMENT.

IN COMMERCIAL AREAS, FIRE HYDRANTS SHALL BE PROTECTED FROM VEHICULAR DAMAGE AND ACCESSIBLE TO FIRE PROTECTION EQUIPMENT.





NOTES:

(1) VALVE BOX TO BE SET ON TWO 3/4"G S PIPES EXTENDED ACROSS TRENCH AND INTO UNDISTURBED EARTH

(2) DETAILS SHOWN FOR VALVES ON HYDRANT LATERALS SHALL ALSO APPLY TO VALVES ON MAINS

(3) LIST OF APPROVED MATERIALS MAY BE OBTAINED FROM DEPT. OF PUBLIC WORKS (TYPES SHOWN ARE FOR ILLUSTRATION ONLY).

4) BURY LENGTH TO BE 42" WHERE LATERAL TO HYDRANT IS INSTALLED IN SELECT SYSTEM ROADWAY. WHICH WILL BE SO SPECIFIED.

DEPUTY DIRECTOR

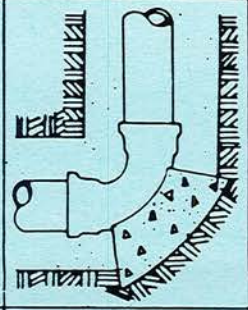
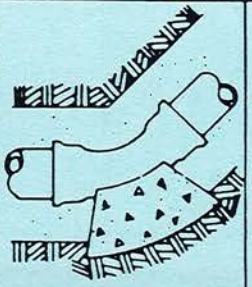
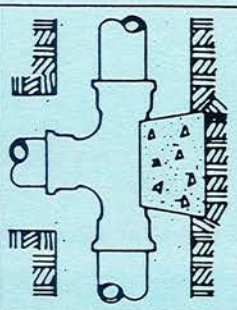
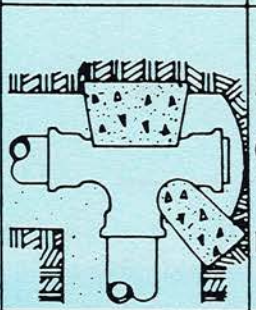
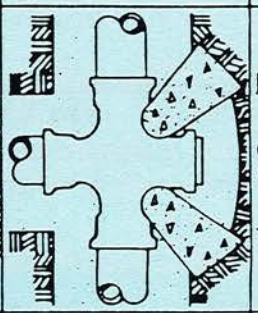
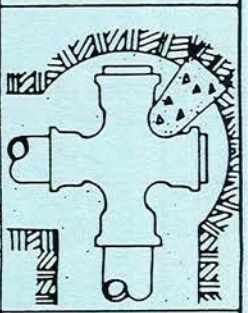
SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

TYPICAL VALVE AND FIRE HYDRANT INSTALLATION

NO SCALE
DATE: 5-87
DRAWN BY:

W-2

REQUIRED BEARING AREA — TOTAL SQUARE FEET

SIZE OF PIPE	TYPE OF FITTING: 90° BEND	45° BEND	11 1/4° OR 22 1/2° BEND	TEE OR DEAD END	TEE W/PLUG	CROSS W/PLUG	CROSS W/PLUGS
TYPICAL INSTALLATION							
4"	2	1	1	2	2	2	2
6"	4	2	1	3	4	4	4
8"	7	4	2	5	7	7	7
10"	12	6	3	8	12	12	12
12"	16	10	5	12	16	16	16

NOTES:

(1) THRUST BLOCKS TO BE CONSTRUCTED OF CLASS "B" CONCRETE.

(2) AREAS GIVEN ARE FOR CLASS 150 PIPE AT TEST PRESSURE OF 150 P.S.I. IN SOIL WITH 2,000 P.S.F. BEARING CAPACITY. INSTALLATIONS USING DIFFERENT PIPE, TEST PRESSURES, AND/OR SOIL TYPES SHOULD ADJUST AREAS ACCORDINGLY, SUBJECT TO APPROVAL OF ENGINEER.

(3) BLOCKS TO BE POURED AGAINST UNDISTURBED SOIL.

(4) JOINTS AND FACE OF PLUGS TO BE KEPT CLEAR OF CONCRETE.

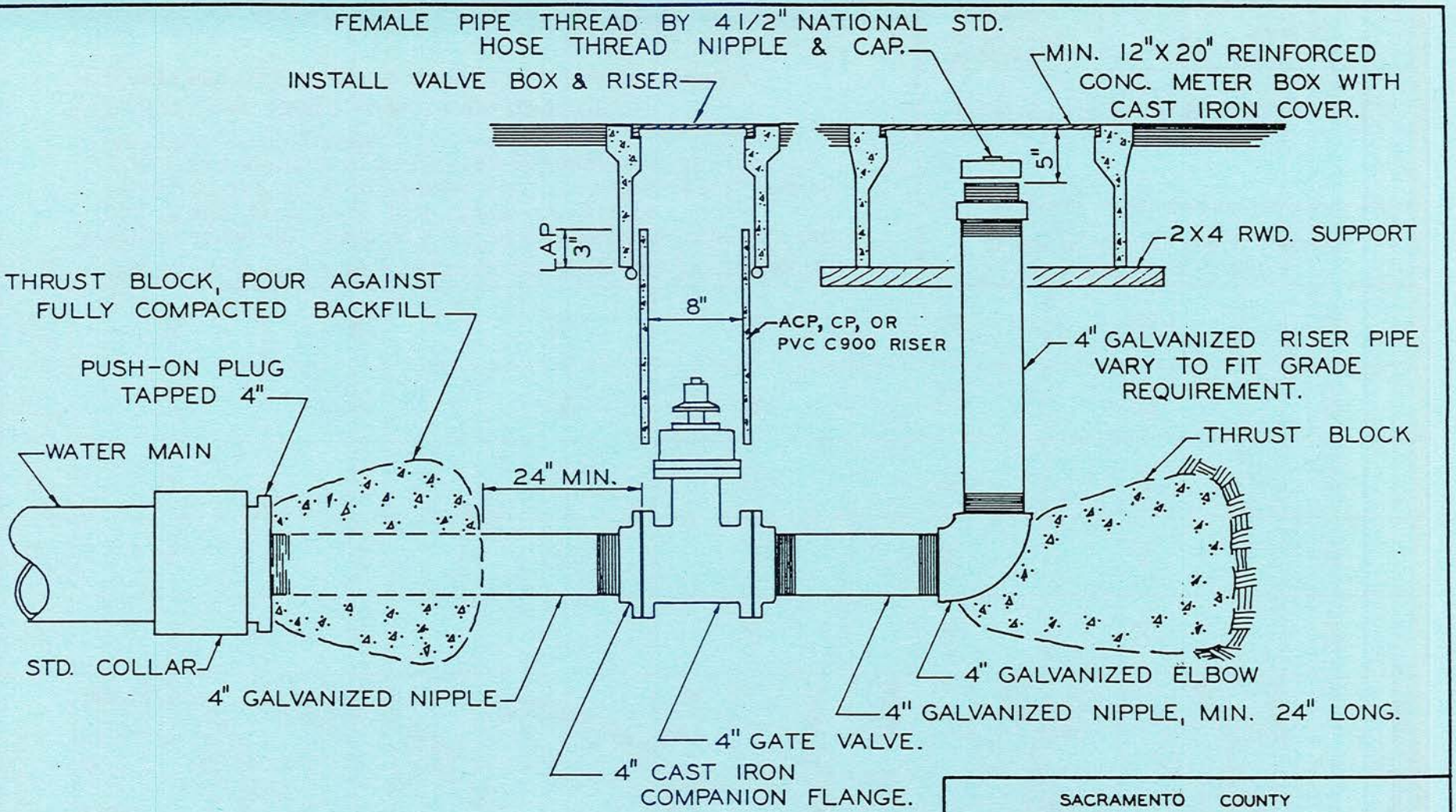
DEPUTY DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

THRUST BLOCK BEARING AREA

NO SCALE
DATE: 5-87
DRAWN BY:

W - 3



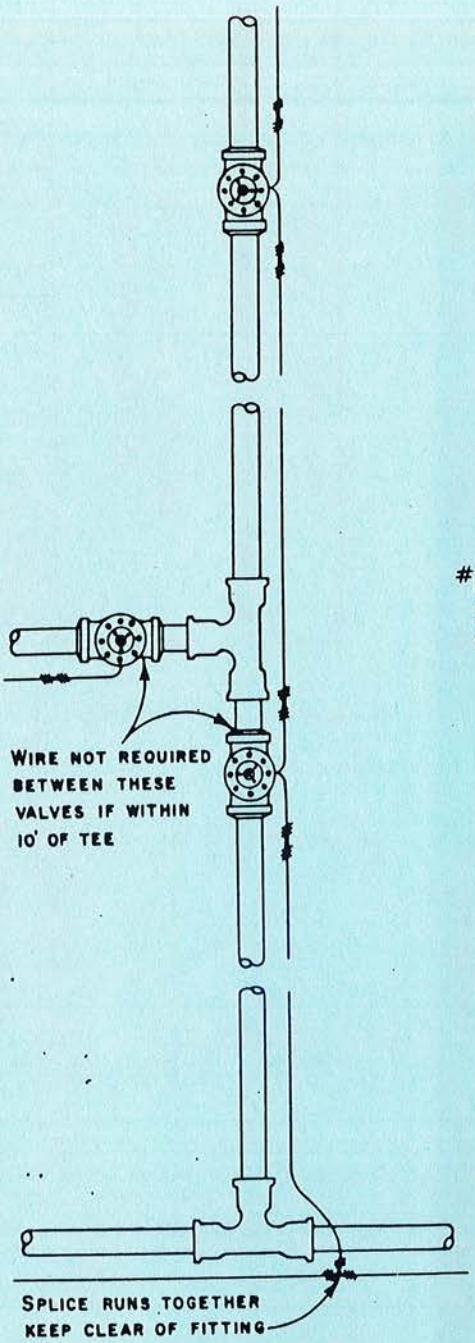
SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

BLOW OFF VALVE

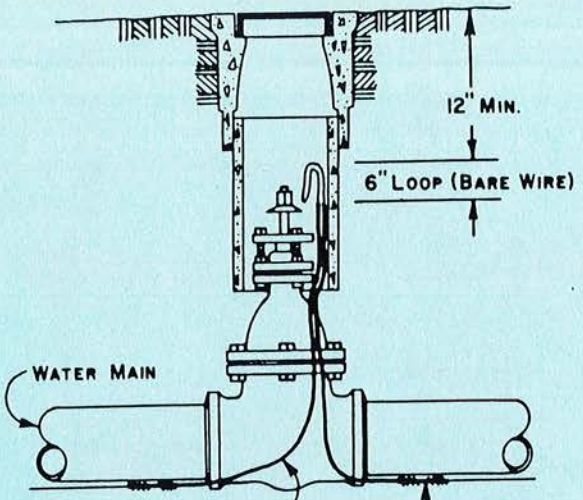
W. C. Woodworth
DEPUTY DIRECTOR

NO SCALE
DATE: 5-87
DRAWN BY:

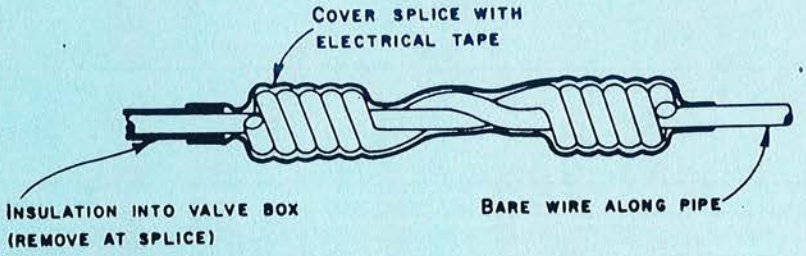
W-4



TYPICAL LAYOUT



VALVE DETAIL



SPLICE DETAIL

DEPUTY DIRECTOR

NOTES:

(1) WIRE TO BE CONTINUOUS BETWEEN VALVE BOXES, EXCEPT AS NOTED.
(2) BARE WIRE NOT TO TOUCH VALVES OR FITTINGS.
(3) LOCATING WIRE TO BE LAID AT BOTTOM OF TRENCH, NEXT TO PIPE.

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

LOCATING WIRE FOR WATER MAINS AND SERVICES

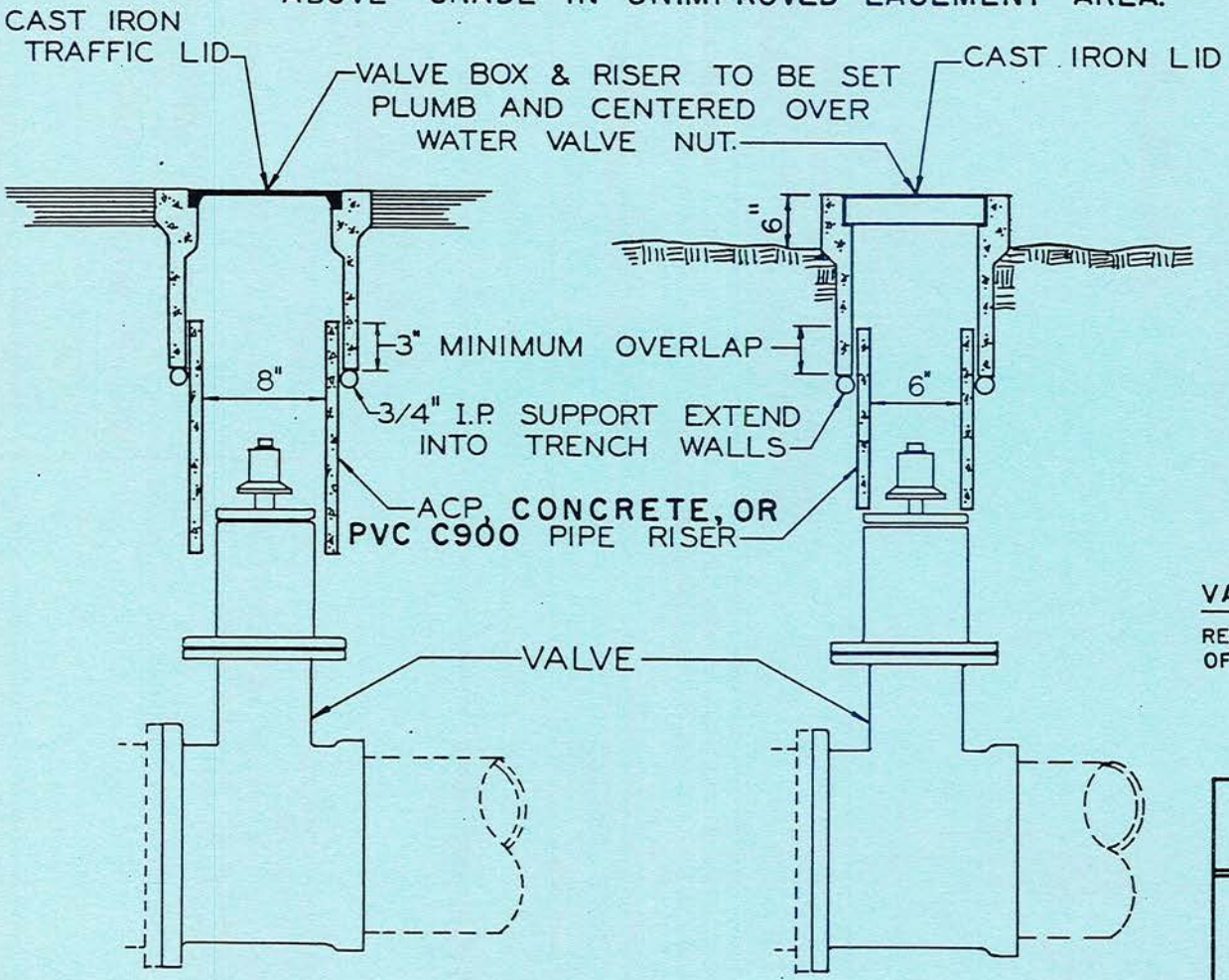
NO SCALE
DATE: 5-87
DRAWN BY:

W - 5

TRAFFIC VALVE BOX

NON-TRAFFIC VALVE BOX

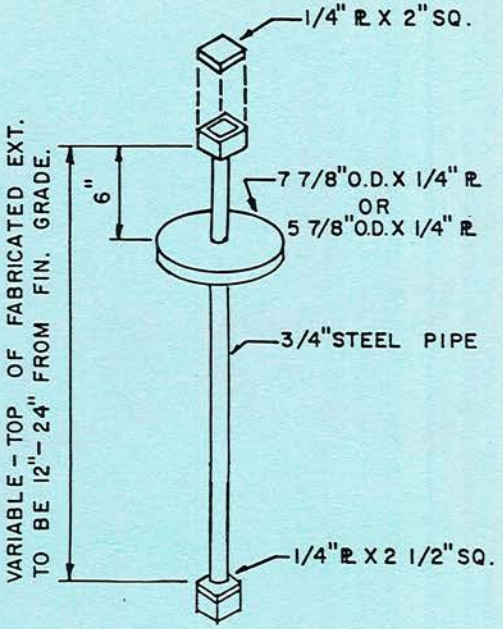
NOTE: SET VALVE BOX TO FINAL FINISHED GRADE OR 6" ABOVE GRADE IN UNIMPROVED EASEMENT AREA.



NOTE - USE 8" RISER IN TRAFFIC AREA AND 6" RISER IN NON-TRAFFIC AREA. VALVE BOX SHALL BE CLOSE FIT OVER RISER.

W C Wanderer

FOR DIRECTOR



VALVE OPERATING NUT EXTENSION

REQUIRED WHERE VALVE NUT IS IN EXCESS OF 30" DEEP BELOW FINISH GRADE.

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

VALVE BOX & RISER INSTALLATION

NO SCALE
DATE: 5 - 87
DRAWN BY:

W-6

METER - 1" OR LESS

① THREADED METER ANGLE VALVE.

② WATER METER, THREADED ENDS.

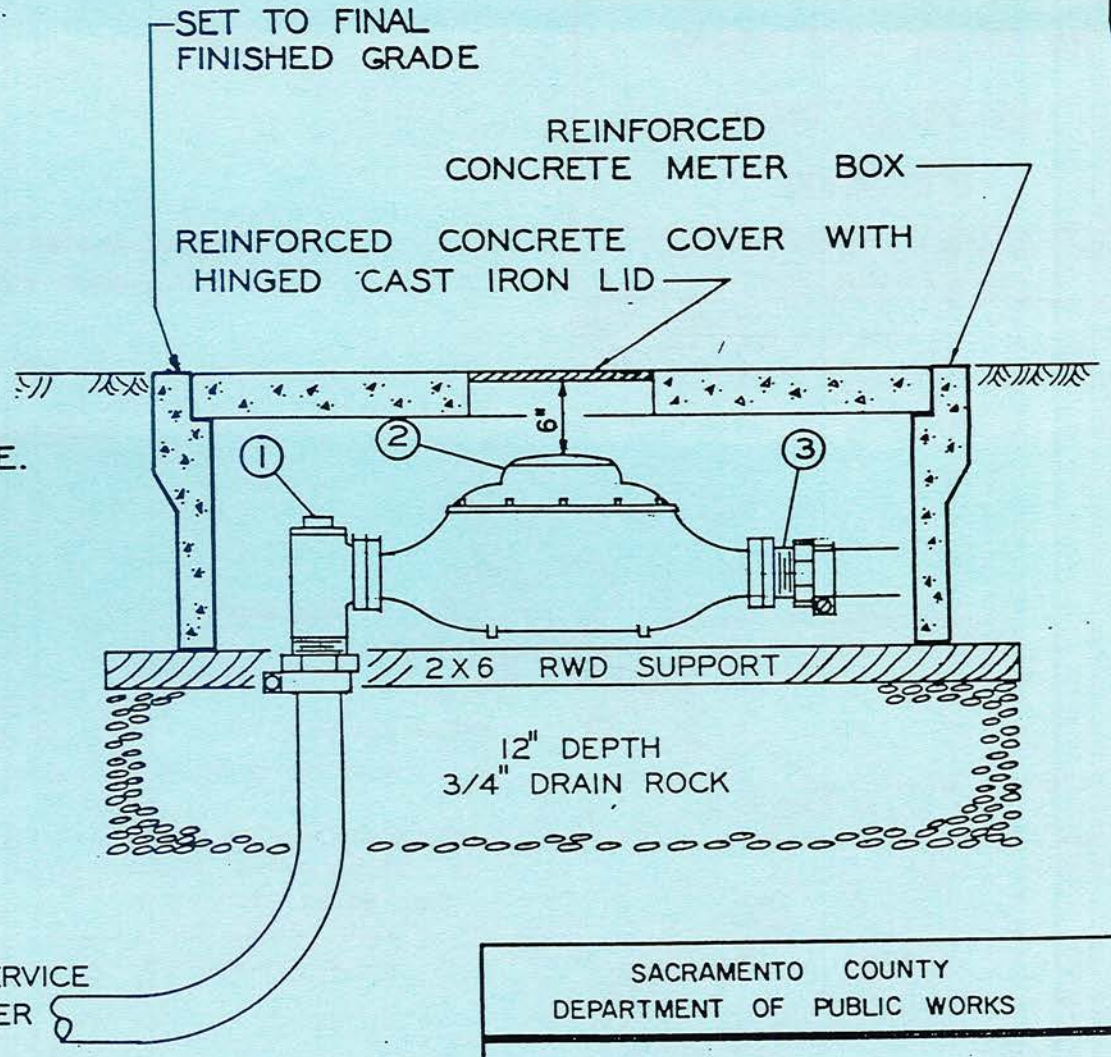
③ THREADED METER COUPLING.

METER - 1 1/2" OR 2"

① OVAL FLANGED ANGLE METER VALVE.

② 1 1/2" OR 2" WATER METER, OVAL FLANGED ENDS.

③ OVAL FLANGED METER COUPLING.



FOR WATER METER SERVICE CONNECTION TO WATER MAIN, SEE SD. W-1

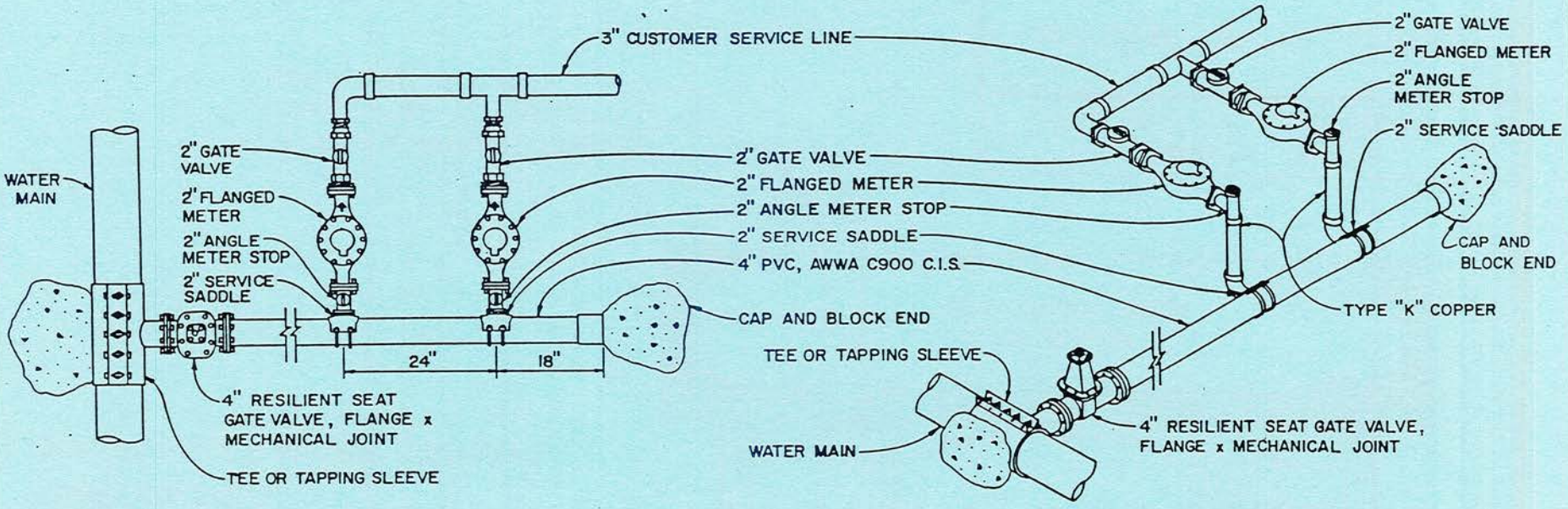
DEPUTY DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

METERED WATER SERVICE

NO SCALE
DATE: 1-88
DRAWN BY: B. BURFORD

W-7



NOTES:

1. REINFORCED CONCRETE METER BOX REQUIRED FOR EACH METER. SEE STD. DWG. W-7 FOR INSTALLATION.
2. FOR TYPICAL 2" METER INSTALLATION, SEE STD. DWG. W-7.
3. METERS TO BE PLACED WITHIN AN EASEMENT.
4. TYPICAL LINE DRAWING. ACTUAL INSTALLATION MAY VARY IN THE FIELD.
5. TAPPING SLEEVE TO BE APPROVED BY SACRAMENTO COUNTY WATER MAINTENANCE DISTRICT.
6. METERS TO CONFORM TO S.S. 91A.

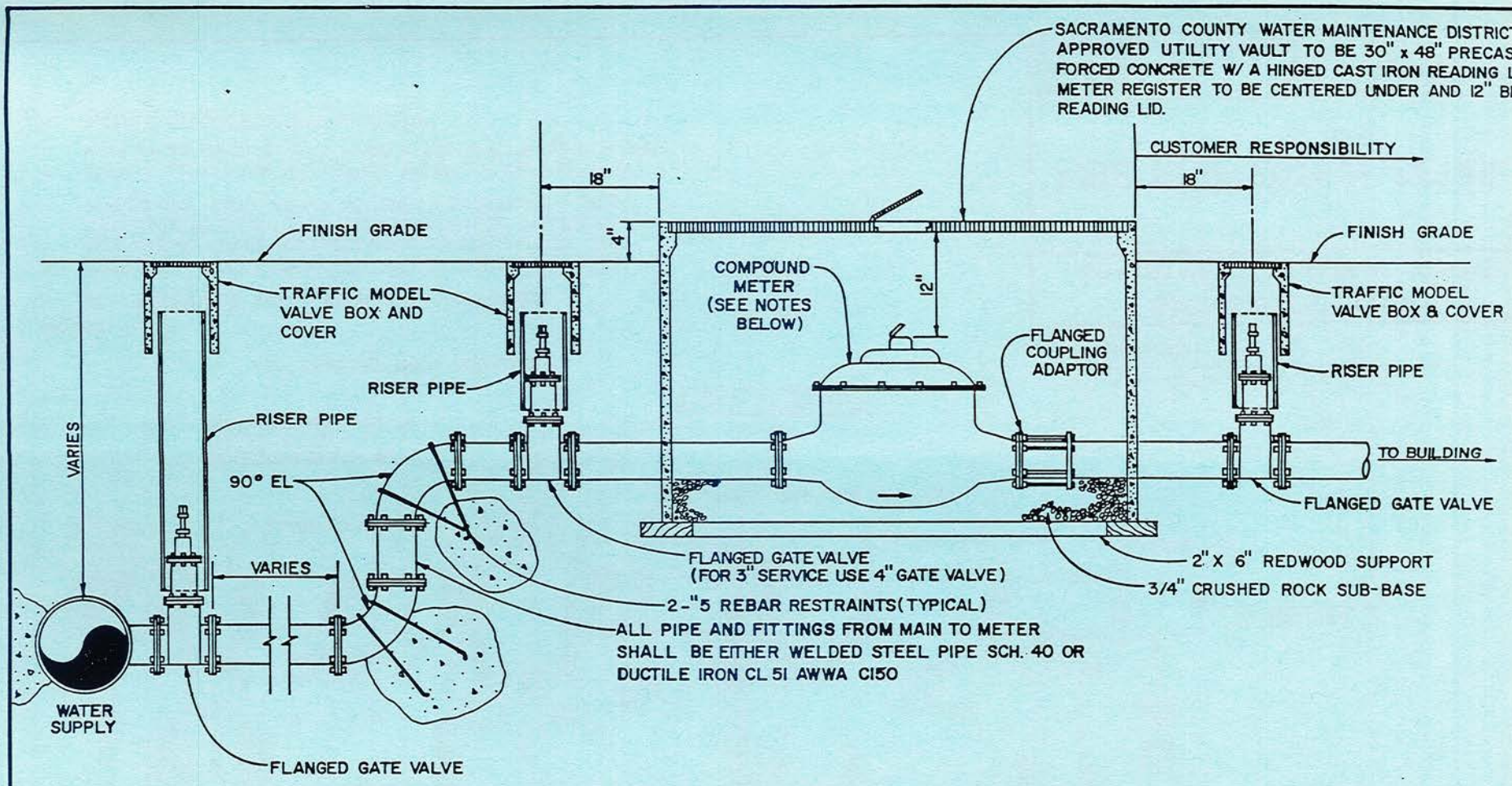
W C Wardlaw

DEPUTY DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

MANIFOLD
DUAL 2" METER
INSTALLATION DETAIL

NO SCALE DATE: 5-88 DRAWN BY: B. BURFORD	W-8



NOTES

1. COMPOUND METER MUST BE APPOVED BY S.C.W.M.D. COMPOUND METER TO CONFORM TO S.S.91 B.
2. ALL JOINTS BETWEEN MAIN AND METER SHALL BE FLANGE CONNECTED.
3. THRUST BLOCKS TO BE CONSTRUCTED PER ST'D. DWG. W-3.
4. TYPICAL LINE DRAWING. ACTUAL INSTALLATION WILL VARY WITH FIELD CONDITIONS.
5. INSTALL TRACER WIRE PER S.S.92-05.

W C Wendorf

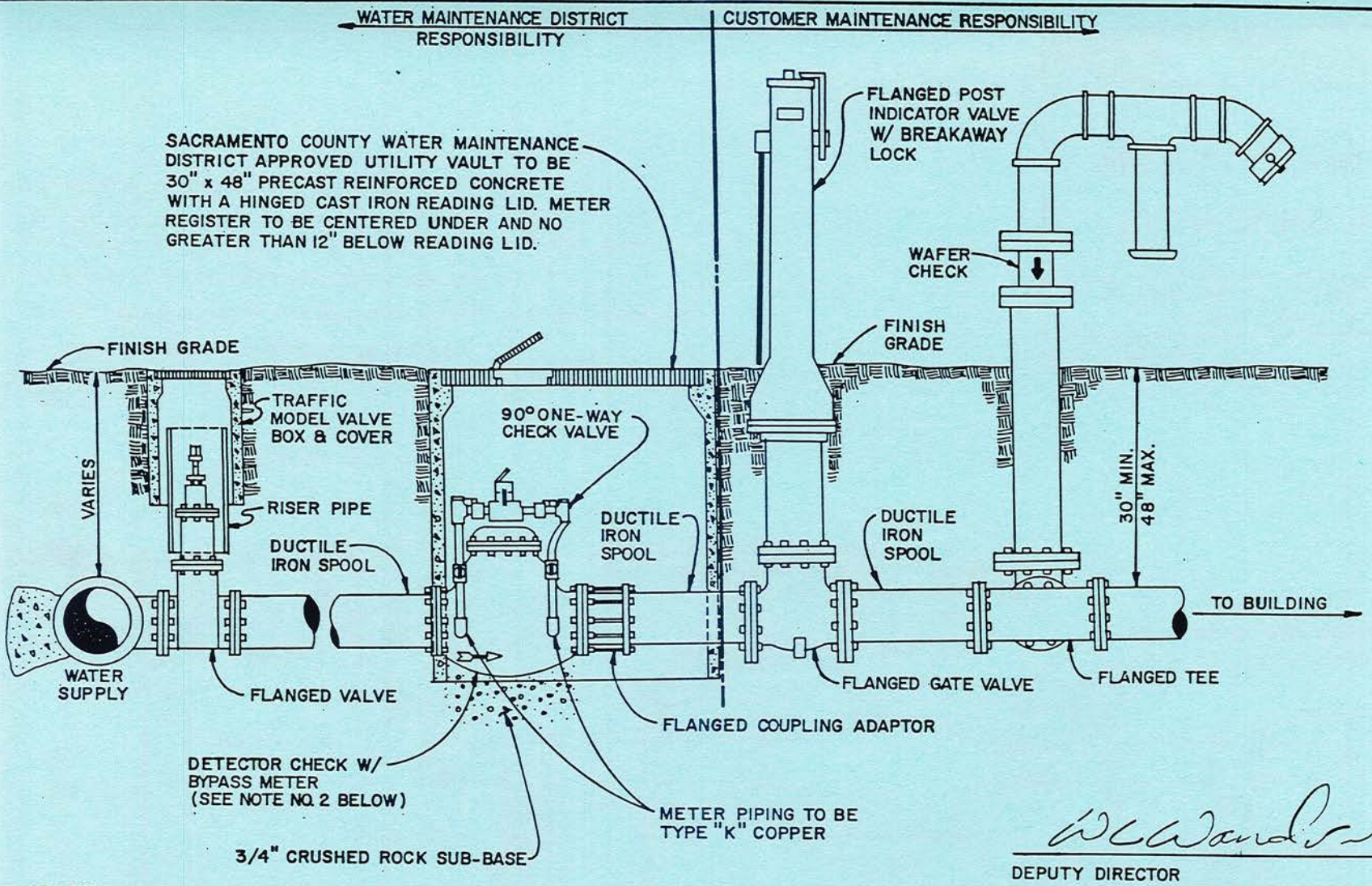
DEPUTY DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

COMPOUND METER INSTALLATION DETAIL

NO SCALE
DATE: 6-88
DRAWN BY: B. BURFORD

W-9



W. C. Wanderer

DEPUTY DIRECTOR

NOTES:

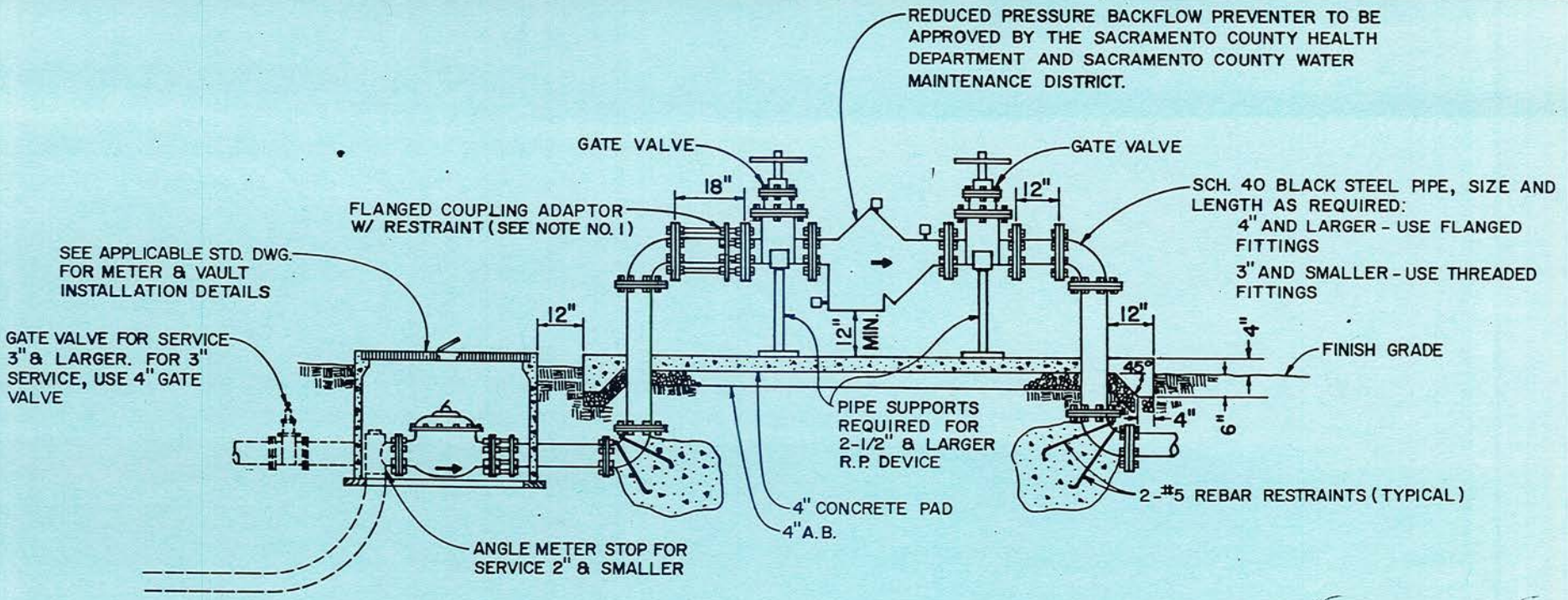
1. ALL MATERIALS SHALL BE U.L.-F.M. APPROVED.
2. DETECTOR CHECK WITH BYPASS METER TYPE AND MODEL MUST BE APPROVED BY THE FIRE DEPARTMENT AND THE SACRAMENTO COUNTY WATER MAINTENANCE DISTRICT. BYPASS 5/8" x 3/4" WATER METER TO CONFORM TO S.S. 86A.
3. TYPICAL LINE DRAWING. ACTUAL INSTALLATION MAY VARY WITH FIELD CONDITIONS AND FIRE DEPARTMENT REQUIREMENTS.
4. INSTALL TRACER WIRE PER S.S. 92-05.

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

FIRE PROTECTION DETAIL

NO SCALE
DATE: 12-87
DRAWN BY: B. BURFORD

W-10



NOTES:

1. 3" AND SMALLER SUBSTITUTE UNION JOINT FOR FLANGED COUPLING ADAPTOR.
2. TYPICAL LINE DRAWING. ACTUAL INSTALLATION MAY VARY WITH FIELD CONDITIONS.
3. INSTALL TRACER WIRE PER S.S. 92-05.
4. REDUCED PRESSURE BACKFLOW PREVENTER TO CONFORM TO S.S. 92A.

DEPUTY DIRECTOR

SACRAMENTO COUNTY
DEPARTMENT OF PUBLIC WORKS

REDUCED PRESSURE BACKFLOW PREVENTER INSTALLATION DETAIL

NO SCALE DATE: 4-88 DRAWN BY: B. BURFORD	W-11