

DIVISION ONESTANDARDS FOR SANITARY SEWERS

CHAPTER 1.1. GENERAL

Sec. 1.1.1 Purpose and Scope

This division establishes the minimum acceptable standards of design, materials and methods to be used in providing sanitary sewer systems for subdivisions in the City of Bakersfield. Where the sewer system being designed is to be installed within a district which has adopted standards for sewers, the more restrictive of that district's standards and the standards contained herein shall apply. Minor deviations from these standards may be permitted where warranted in the opinion of the City Engineer with the concurrence of the district.

Sec. 1.1.2 The design data and calculations and the construction plans for proposed subdivision sewers are to be submitted by the subdivider's engineer to the City Engineer for review and approval prior to construction. This is in addition to the approval of any applicable district.

Sec. 1.1.3 The requirement for review by, and approval of, the City Engineer for sewer plans may be waived when all of the following conditions exist:

1. Facilities consist of private facilities neither dedicated nor maintained by the City in non-dedicated right-of-way.
2. The district or company has received written approval of the City Engineer for waiver of the requirement of his review and approval of the plans.

CHAPTER 1.2 DESIGN STANDARDS

Sec. 1.2.1 Sanitary Sewers

1.2.1.1 The following guidelines shall be used to compute contributing sewage:

- a) The average family unit shall be two and six-tenths (2.6) persons per single-family residential unit and two (2.0) persons per multi-family residential unit.
- b) The average daily discharge of domestic sewage shall be one hundred (100) gallons per day per person. The design discharge of domestic sewage shall be based upon the following formula:

DESIGN DISCHARGE = PEAK FACTOR X AVERAGE DISCHARGE, where peak factor is defined as follows:

	<u>Formula</u>	<u>Ave. Discharge Units</u>
(1) Peak Factor = 2.54	x (Ave. Discharge) -0.1	(MGD)
(2) Peak Factor = 2.65	x (Ave. Discharge) -0.1	(CFS)

- c) In the absence of any specific information to the contrary, the peak design discharge for commercial and industrial sewage shall be:

<u>Land Use</u>	<u>Peak Discharge Rate</u>	<u>Peak Factor</u>
Commercial	0.010 CFS/GA (6,460 GPD/GA)	1.8
Industrial	0.015 CFS/GA (9,695 GPD/GA)	2.0

GA- Gross Acre

An alternate per capita method may be used for determining commercial flows, provided sufficient data is available, as follows:

Compute people = 5 person per 1,000 sq.ft. NFA, where
NFA (Net Floor Area) = 0.85 X GFA (Gross Floor Area)

AVE. FLOW = Rate per Capita x No. of
For given land use People

Flow rates may be obtained from references listed in the Bibliography or other acceptable source.

- d) Depth of flow in main and trunk sewers:
Trunk and main sewers may be designed to flow full.

NOTE: Under no conditions is a gravity sewer ever to be designed to flow under a head.

1.2.1.2 Sewer Velocity and Quantities

Minimum design velocity for any sanitary sewer shall be two (2) feet per second, for pipes flowing full or half full, or with the approval of the City Engineer one and six-tenths (1.6) feet per second. Acceptable criteria for allowing 1.6 feet per second would be as follows. Pipes designed for 1.6 feet per second velocity at peak flow (flowing full) shall flow at least 40% full for computed average flows.

Unless special provisions for erosion protection, approved by the City Engineer have been provided, design velocities for sanitary sewers shall be computed using Mannings formula with a constant "n" value as indicate in Section 2.4.2 for pipes half full or full. Mannings "n" value for pipes with special erosion protection shall be increased to account for the effects of the treatment.

1.2.1.3 Minimum Slopes (n = 0.013 V= 2.0 Ft/Sec)

Minimum slopes shall conform to the following table:

<u>Pipe Size</u>	<u>Minimum Slope</u>	<u>Capacity (CFS)</u>	<u>(MGD)</u>
4"(Laterals)	.0100	-	-
6"	.0100*	0.56	0.36
6"	.0050	0.40	0.26
8"	.0035	0.71	0.46
10"	.0025	1.10	0.71
12"	.0020	1.59	1.03
15"	.0015	2.50	1.62
18"	.0011	3.48	2.25
21"	.0009	4.75	3.07
24" or greater	.0008		

* Last 100 feet where required

1.2.1.4 Maximum Discharge and Velocity

The maximum design discharge shall not exceed the flow at critical slope and velocity. Sanitary sewers should not be designed for flow conditions at critical slope and velocity. Under no circumstances shall velocity exceed ten (10) feet per second without approved erosion control.

Sec. 1.2.2 Manholes

1.2.2.1 Manholes shall be placed at the intersections of all main sewer lines. A main sewer line shall be defined as any sewer, other than a building lateral, serving one or more building laterals or other sewer mains.

1.2.2.2 Manholes shall be placed at all changes of alignment, either vertical or horizontal.

- 1.2.2.3 The maximum distance between manholes shall be four hundred (400) feet, except that to six hundred (600) feet for mains 15 inches in diameter, or larger.
- 1.2.2.4 A one tenth (0.1) foot energy drop shall be allowed for flow through manholes with a deflection of 45° or more.
- 1.2.2.5 Invert elevations of varying size pipes leading into and out of manholes shall be set by matching elevations of the eight-tenths (0.80) depth. Invert elevations of equal size pipes leading into and out of manholes shall be equal or shall conform to Sections 1.2.2.4 or 1.2.3.

Sec. 1.2.3 Drop Manholes

Whenever the vertical distance between the inverts of sewer line connections of a manhole exceeds thirty (30) inches, a standard Drop Manhole shall be constructed. Vertical distances less than 30 inches between inverts will not be allowed other than as specified in Section 1.2.2

Sec. 1.2.4 Rodding and Flushing Cleanout

Rodding and flushing cleanouts may be constructed at the end of all sewer mains. The maximum distance from the last manhole shall be 175 feet.

Sec. 1.2.5 Sewer Main Location, Alignment, Cover and Size

1.2.5.1 Location

All sanitary sewers and appurtenant structures shall be located in streets or alleys a minimum of five (5) feet from the roadway center line. In no case shall a sanitary sewer line be located closer than five (5) feet from an existing or proposed gutter lip. Sanitary sewers shall be centered on travel lanes to the greatest extent possible.

The entire sanitary system shall be located as mentioned above and shall be designed to clear all other existing or proposed utilities by a minimum of six (6) inches. Clearances with water lines shall conform to Section 1.4.4.

Location of sewer lines in easements shall be subject to the approval of the City Engineer. Sewer lines will not be permitted in easements between side or back yards of R-1 or R-2 lots. Where sewer lines are located within easements, the easements shall be:

- a. Granted with final map, or

- b. Be granted to the entity accepting and maintaining the sewers, or
- c. Be dedicated to and accepted by City of Bakersfield.
- d. The minimum width of any easement for sanitary sewer purpose shall be ten (10) feet. In special cases of terrain, depth of sewer line, etc. the required easement width shall be increased based on 1:1 cut slope plus 3 feet for pipe zone.
- e. All easements shall include right of ingress and egress over adjoining property for maintenance, replacement and operation. No permanent structures shall be constructed in such easements, except fences, or utilities which are subject to any overlapping easement.

1.2.5.2 Alignment

Whenever possible, sewer lines shall be laid out in a straight line between structures. Curved sewer lines will be allowed under the following conditions:

- a. All curve data shall be shown on the plans.
- b. Minimum radius of curvature and joint deflections shall be as recommended by the pipe manufacturer and approved by the City Engineer. Alignment shall be concentric to street or easement centerline.
- c. All deflections shall be at the pipe joints or by specially mitered pipe sections. Actual bending of the pipe itself will not be allowed.
- d. A manhole shall be constructed at the B.C. or E.C. of all curves.
- e. In the event sewer pipe is constructed on alignments non-concentric to curved easement or street centerlines any non-metallic sewer line shall have a No. 10 bare soft copper detector wire placed over the pipe line prior to backfilling. The detector wire shall be brought up to the manhole frames at each end of the pipeline.
- f. Identification tape, designed for use on sewers, shall be placed on top of the sewer main along its entire length. Identification tape shall also be placed on the top of sewer laterals extending from one foot above the sewer main to the right of way line.

1.2.5.3 Cover

Depth of building sewer shall provide a minimum of two and one-half ($2\frac{1}{2}$) feet of cover at gutter flowline. Where circumstances require cover of less than two and one-half ($2\frac{1}{2}$) feet special design and approval by the City Engineer is required. Any lateral with less than $2\frac{1}{2}$ feet of cover shall be noted on the plans.

1.2.5.4 Minimum line size for any sewer main shall be eight (8) inches inside diameter. For sewer mains which cannot be extended, (e.g. cul-de-sacs) sewer shall not be less than six (6) inches in diameter.

Sec. 1.2.6 Building Sewers

1.2.6.1 Size

Minimum size of any sanitary building sewer within City right of way to serve individual residences, commercial structures, etc. shall be four (4) inches. Actual size of building sewers larger than four (4) inches shall be determined by fixture unit requirements as per the current edition of the Uniform Plumbing Code.

Quantity

1.2.6.2 A separate building sewer lateral shall be provided to each lot, parcel or building. Subdivision of land into large parcels subject to potential future re-subdivision or multiple building sites may require additional laterals or increased lateral size.

Sec. 1.2.7 Special Equipment and Structures

All special equipment such as package lift stations, their appurtenances, and their effluent disposal methods shall be designed, located, and constructed so as to preclude contamination, pollution, nuisance, and structural and mechanical instability. Special structures, such as pump stations, pressure lines and sags, etc. shall be subject to the approval of the City Engineer and the local District.

Sec. 1.2.8 Sewer Pumping Stations

Sewer lift stations shall be designed to lift the design peak flow as determined using the criteria in article 1.2.1.1 of this manual. The lift station shall be equipped with two pumps, each capable of discharging the peak flow. Multiple pump stations may be considered where dual pump stations are infeasible, subject to the approval of the City Engineer. Said facilities shall be capable of passing the peak flow with any one pump out of service.

The wet well capacity shall not exceed 10 minute detention of average flow.

Design feature requirements of lift stations are outlined in article 1.4.5 of this manual.

CHAPTER 1.3 FINAL ACCEPTANCE

Sec. 1.3.1 Cleaning

Prior to the acceptance of any sewer line by the City, the contractor shall clean all lines with a Wayne-type sewer cleaning ball under hydrostatic pressure. Any stoppage, dirt or foreign matter shall be removed from the lines. All cleaning and testing of sewer lines shall take place after all construction work is completed, up to but not including the final paving. The system will be inspected after final paving is completed and any damage to the system during final paving and cleanup will be corrected before approval.

Sec. 1.3.2 Testing1.3.2.1 Mandrel Test of ABS and PVC Pipe.

Following the placement and densification of backfill and prior to the placing of permanent pavement, all main line pipe shall be cleaned and then mandrelled to measure for obstructions (deflections, joint offsets and lateral pipe intrusions). A rigid mandrel, with a circular cross section certified as having a diameter conforming to the table below, shall be pulled through the pipe by hand. The minimum length of the circular portion of the mandrel shall be equal to the nominal diameter of the pipe. The mandrel shall have an odd number of ribs, numbering no less than nine (9), spaced evenly around the mandrel.

If pipe does not meet mandrel test vibratory means of correcting is allowed provided pipe has not been crushed and vibratory method will not disrupt adjacent property.

MANDREL TABLE

<u>Nominal Diameter</u>	<u>Mandrel Diameter</u>
6"	5.47
8"	7.27
10"	9.07

1.3.2.2 Pressure Test

Prior to final approval all sewer lines shall be tested for leakage by standard hydrostatic or low pressure air test.

Testing of the sewer line shall be conducted from manhole to manhole in accordance with the Uniform Plumbing Code Air Test Method (UPC Sec. 318-b(4) 1985 Edition or later equivalent)

CHAPTER 1.4 MATERIALS AND INSTALLATION

Sec. 1.4.1 General

All material that is to become a permanent part of any sanitary sewer or appurtenant structure, shall conform to the requirements for the particular material as set forth in these specifications. The contractor shall supply any and all certificates of compliance, certified tests results or shall perform tests as required to assure the City Engineer that the material being incorporated into the work has met the requirements as specified. Requests to use materials not listed in these standards shall require special consideration and approval of the City Engineer.

Sec. 1.4.2 Pipe and Conduits

All pipe or conduits shall be of the size, material and strength as shown on the plans. All pipe and fittings shall be marked or stamped with the trade brand name of the manufacturer, and strength or class of pipe. All pipe shall be designed to withstand all internal or external loads applied. Supporting strength of conduits as installed to safely carry imposed gravity loads and superimposed loads (including a suitable factor of safety) shall be determined by use of Marston formula as per Chapter IX (Structural Requirements) ASCE Manual of Engineering Practice No. 37. All pipe or conduits shall be of the same materials between structures.

1.4.2.1 Vitrified Clay Pipe (VCP)

- a. Materials: The pipe and fittings shall be extra strength vitrified clay conforming to current ASTM designation C-700, and shall be installed in conformance with the provisions of sections 71 of the standard specifications of the State of California, Department of Transportation, current edition and the current ASTM designation C-12.
- b. Joints:
 - (1) The pipe and fittings shall have a socket end and a spigot end with compression joints conforming with the current ASTM designation C-425.
 - (2) The pipe and fittings for 6", 8", 10", and 12" sanitary sewer mains may be plain-end with compression couplings conforming with the current ASTM designation C-425, excepting that a stainless steel shear ring as manufactured by Mission Clay Products Corporation for their "Mainline" bandseal compression coupling, or approved equal, shall be required.
 - (3) The pipe and fittings for private sanitary house sewer or building laterals may be plain-end with compression coupling conforming with the current ASTM designation C-425, (stainless steel shear rings are not required).

1.4.2.2 Poly Vinyl Chloride Pipe (PVC)

- a. Materials: Pipe and fittings shall meet the requirements of ASTM specification D3034 for SDR35. Pipe and fittings shall be homogeneous throughout and free from cracks, holes, foreign inclusions or other injurious defects. Fittings shall be injection molded and shall be installed in line on new pipelines; cut-in fittings are not permitted.
- b. Joints: Use only elastomeric gasket joints. The assembly of joints shall be in accordance with the manufacturer's recommendation. Where PVC pipe connects to VCP, use couplings approved by the City of Bakersfield.
- c. Installation: Pipe and fitting should be installed in accordance with ASTM D2321. Only Class I, II, III, embedment materials will be considered suitable.

1.4.2.3 Acrylonitrile-Butadiene-Styrene Pipe (ABS)

- a. Materials: Pipe and fittings shall meet the requirement of ASTM specifications D2680 and D2751. Pipe and fittings shall be homogeneous throughout and free from cracks, holes, foreign inclusions or other injurious defects. Fittings shall be injection molded and shall be installed in line on new pipelines; cut-in fittings are not permitted.
- b. Joints: Use only solvent welded joints. The assembly of Joints shall be in accordance with the manufacturer's recommendations. Where ABS pipe connects to VCP, use couplings approved by the City of Bakersfield.
- c. Installation: Pipe and fittings should be installed in accordance with ASTM D2321. Only Class I, II, III embedment materials will be considered suitable.

1.4.2.4 System Testing

Installed pipe shall be tested in accordance with Chapter 1.3, with the recommendations of the manufacturer and acceptable to the City of Bakersfield. 24 hour notice shall be required for test and inspection.

1.4.2.5 Laterals and Stubs

- a. All laterals shall extend to a minimum of four feet beyond the property line and shall be 4" in diameter except as noted on plans. Surface markers for sewer laterals shall be installed at property line.
- b. Wye fittings shall be in-line type and shall be used for all lateral connections and shall be rotated a minimum of 23 degrees above the horizontal plane running through the centerline of the main.
- c. All sewer stubs shall be closed with a standard plastic plug solvent welded.

1.4.2.6 Backfill, Compaction and Pavement Patches

Backfill and compaction shall be in accordance with City of Bakersfield Standard Drawing S-39. All existing pavement and surfacing removed, damaged or undercut shall be replaced in accordance with City of Bakersfield Standard Drawing S-6.

1.4.2.7 Existing Facilities

All existing improvements, (Curb, gutter, sidewalk, cross gutter, fencing, etc.), that are removed, damaged or undercut shall be repaired or replaced as directed by the City Engineer.

Sec. 1.4.3 Manholes and Cleanouts (Lampholes)

All manholes shall be constructed in accordance with the City of Bakersfield Standard Drawings S-7 and S-8 and Section 70-1.02H and 71-1.07 of the Standard Specifications of the State of California, Department of Transportation, current edition.

All cleanouts shall be constructed in accordance with City of Bakersfield Standard Drawing S-20.

Sec. 1.4.4 Standard for Separation of Water and Sewer Lines

1.4.4.1 Water lines shall be laid in separate trenches as far as possible from nearby sewer lines. A minimum horizontal separation of ten (10) feet is recommended.

1.4.4.2 Water lines shall be laid at a higher elevation than nearby sewer lines.

1.4.4.3 When pipelines cross, the bottom of the water line shall be at least twelve (12) inches above the top of the sewer pipe.

1.4.4.4 Where steel casings or tunnels are used for the passage of water and sewer lines under railroad tracks, highways or other structures, the same shall be specially designed to eliminate any hazard of contamination to the water system.

Sec. 1.4.5 Sewer Lift Stations

Sewer lift stations shall conform to the specifications in Appendix A and shall have, as a minimum, the following features:

1.4.5.1 Pumps shall be installed in a single wet well and shall be a submersible of approved manufacture.

1.4.5.2 Pumps shall be removable from ground level through use of a guide rail attached to the wet well and cable system.

1.4.5.3 Sewer lift stations shall be located outside street right of way in right of way dedicated for a lift station in conformance to Article 2.6.4

- 1.4.5.4 Site shall be enclosed by fence and interior surface shall be graveled with 0.30' of 3/4" gravel. Site shall have approved access.
- 1.4.5.5 Wet well shall be equipped with access frame and cover which will allow lifting out of pump and motor assembly.
- 1.4.5.6 Wet well shall be mechanically vented to prevent odors from reaching adjacent properties.
- 1.4.5.7 Minimum pump horsepower shall be 5hp.
- 1.4.5.8 Surfaces shall be treated as indicate in Appendix A
- 1.4.5.9 A fresh water supply shall be provided for wash down.
- 1.4.5.10 Bottom of wet well shall be sloped toward pumps to direct sludge. Pumps shall be supported on smooth and level bottom area.
- 1.4.5.11 All pipes shall be neoprene sealed at walls of wet well.
- 1.4.5.12 A wash down assembly to facilitate break-up of scum layer shall be connected to each discharge as near the top as possible. It shall consist of a 1" NPT Bronze strap service saddle with stainless steel nuts and bolts, a 1" NPT cast iron threaded nipple 8" long, and a 1" cast iron threaded 90° El.
- 1.4.5.13 Discharge shall feed into a valve box equipped with check and gate valves for each discharge line. The box shall have a 3/4" gravel bedding with a 2-inch bleed off pipe connected to the wet well. (See Detail SW-12)
- 1.4.5.14 The pump number shall be painted on each discharge pipe in a manner clearly visible from above in contrasting colors.
- 1.4.5.15 The motor control center shall be pedestal mounted on a concrete base in a weatherproof, rainproof and lockable enclosure.

1.4.5.16 The motor control center shall have the following features:

1. Liquid level controller, pneumatic, compressor driven (with backup compressor), purge and clear feature. It shall have level sensors for (1) on lead and highwater elevation (Minimum of 0.5' below lowest inlet invert), (2) on lead, (3) off lead or off lead and lag.
2. Standby power receptacle allowing for bare wire hook-up
3. Automatic alternater
4. Run time meter for each pump
5. Hand-off-auto switch for each pump
6. Run lights, green for each pump
7. High water alarm light, red
8. Alarm silence and reset switches
9. Phone Dialer

1.4.5.17 Minimum motor horsepower shall be 5 hp.

Sec. 1.5 Sewer Construction Plans

Sewer construction plans shall contain all notes, details and specifications necessary to complete the proposed work. Said information shall include, but not be limited to the following checklist:

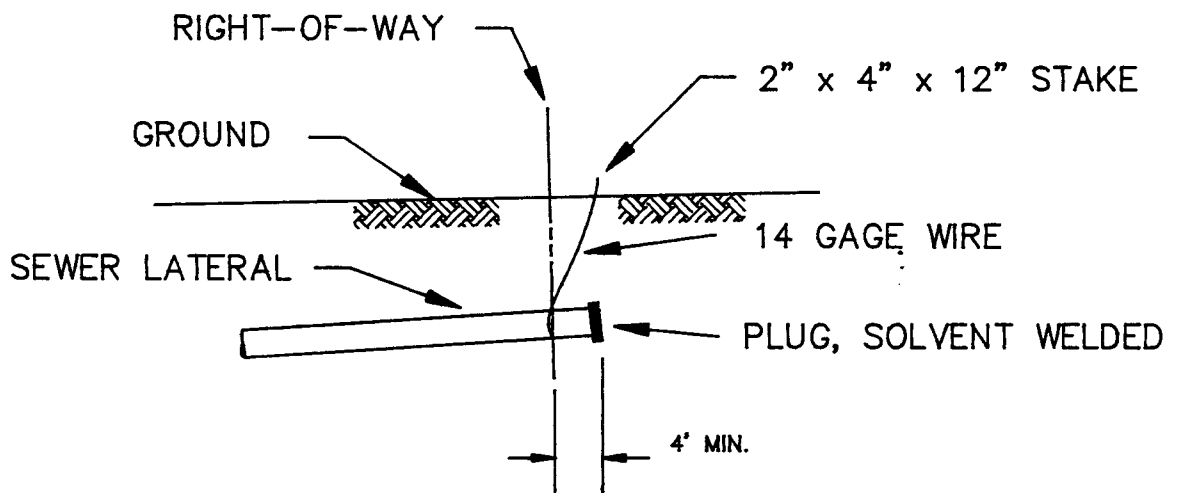
CHECKLIST FOR ONE-STOP PROCESSING
SEWER CONSTRUCTION PLANS

THE FOLLOWING IS A CHECKLIST OF ITEMS NECESSARY TO BE SHOWN ON THE IMPROVEMENT PLANS OR SUBMITTED SEPARATELY.

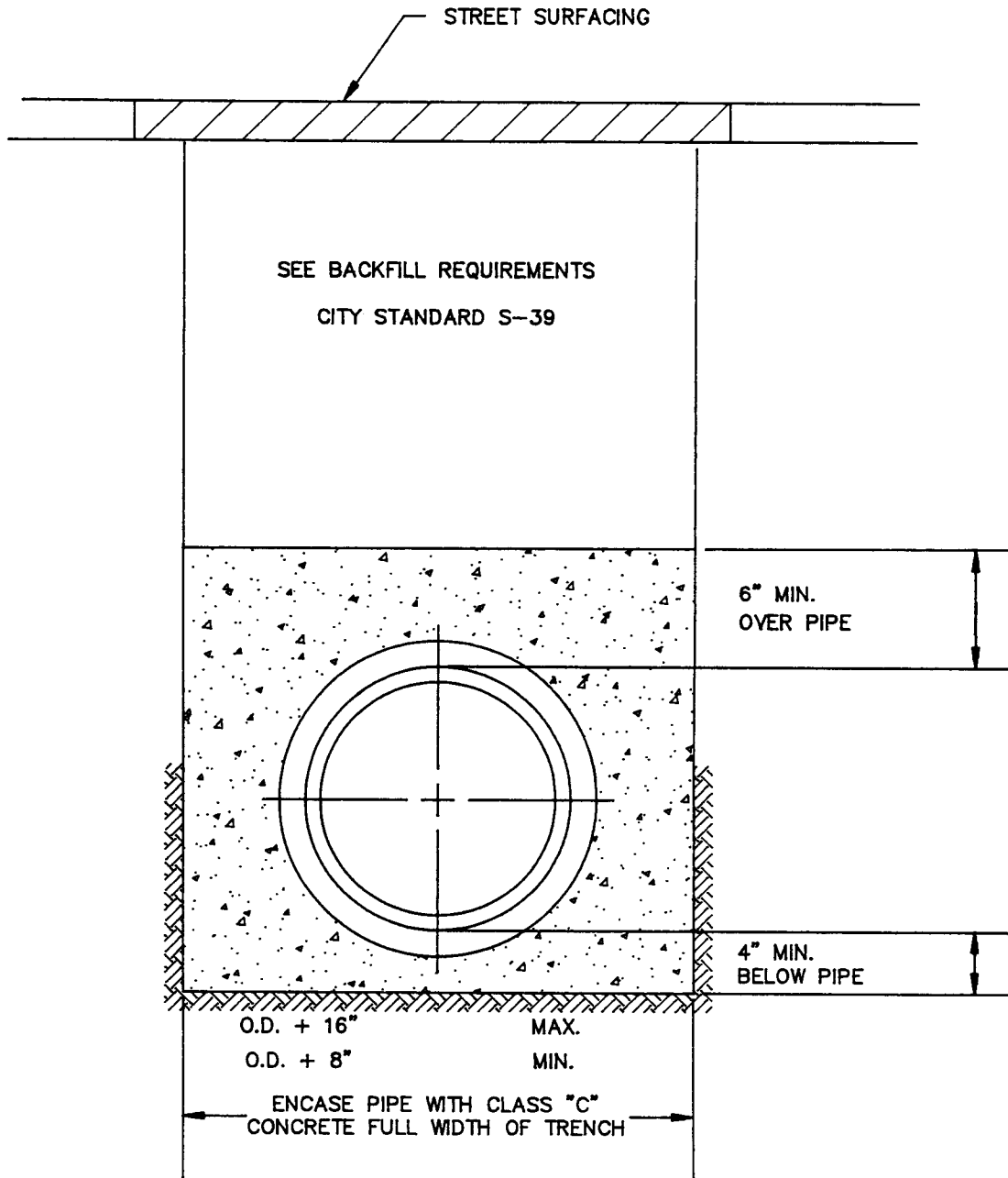
- 1.5.1 Project Title
- 1.5.2 Vicinity Map
- 1.5.3 Key Map drawn to a scale of 1" = 200'
- 1.5.4 Engineer's signature with seal and license expiration date
- 1.5.5 Number of sheets
- 1.5.6 Pipe specifications of all pipe which may be utilized
- 1.5.7 Notes peculiar to this project
- 1.5.8 Standard drawings sheet or reference to applicable standards

- 1.5.9 Bench Mark - USGS datum - not verified by the City-equations won't be acceptable
- 1.5.10 Maximum sheet size = 24" x 36"
- 1.5.11 Legend
- 1.5.12 Plan & profile
- 1.5.13 Horizontal & vertical scales on each sheet (1" = 50' and 1" = 10' maximum). Same for all sheets.
- 1.5.14 North arrow
- 1.5.15 Sewer line location relative to centerline or property line
- 1.5.16 Pipe size and slope - ensure 30" minimum cover
- 1.5.17 Relation to existing pipes, utilities, etc. - show by cross sections with verified depths
- 1.5.18 Required sewer and water line separations
- 1.5.19 Lateral size
- 1.5.20 Lateral location - extend at least 4' beyond right of way line ensure 2.25' minimum cover at the property line, 2.5' at gutter flowline.
- 1.5.21 Lateral markers
- 1.5.22 Stationing - from south to north and west to east (coincident with street stationing)
- 1.5.23 Manhole locations - not to exceed maximum distance between
- 1.5.24 Lamphole locations - not to exceed maximum distance between
- 1.5.25 Conforms to master plan
- 1.5.26 Connection to existing lines or structures
- 1.5.27 construction phasing limits shown
- 1.5.28 24 hour inspection notice - Prior to the start of any phase of construction, the City Construction Inspection Section shall be given at least 24 hours notice. The Section may be notified at (805) 326-3049.
- 1.5.29 Compaction test note -Compaction tests shall be the responsibility of the developer/subdivider/contractor. The number and location of required tests shall be determined by the City Engineer.

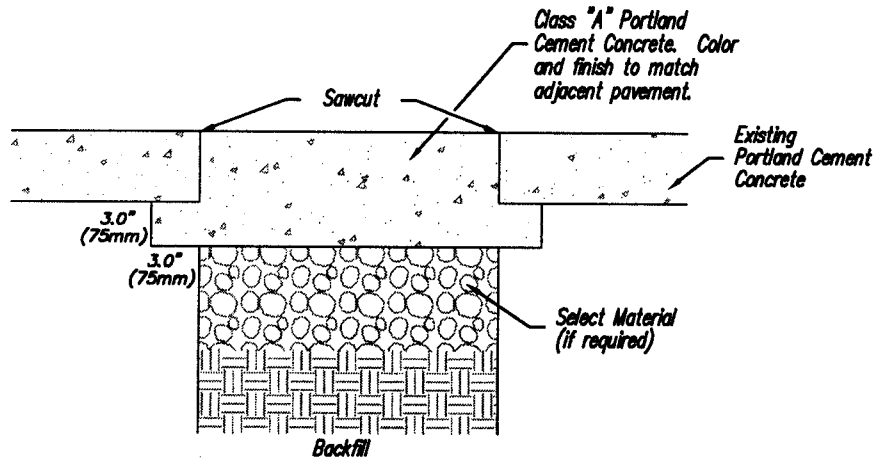
- 1.5.30 Materials list
- 1.5.31 Engineer's estimate, based on unit prices as approved by the City Engineer, for plan check and inspection fee determination
- 1.5.32 Submit plan check and inspection fees
- 1.5.33 Engineer's Certificate;
I hereby certify that these plans and specifications comply with City of Bakersfield ordinances, standards, and design criteria, and that they include all improvement requirements of the Advisory Agency or other review board.
I am responsible for all calculations and drawings on these plans and any errors, omissions, or violations of those ordinances, standards, and design criteria shall be corrected during construction.



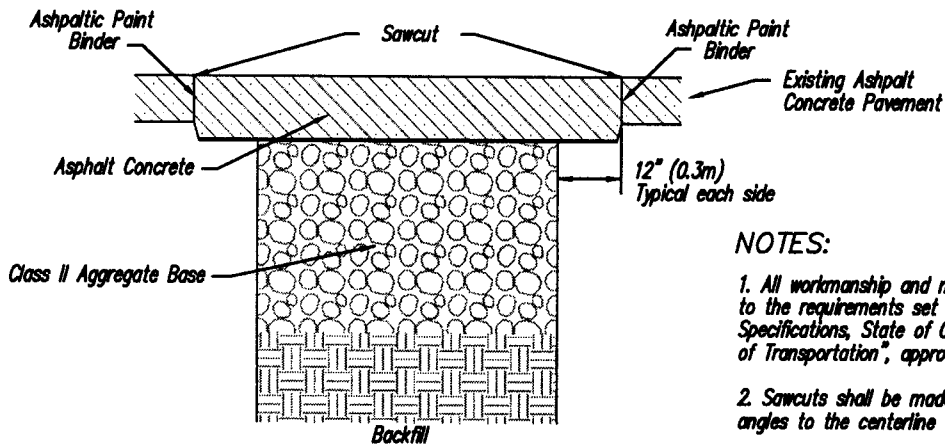
	SUBDIVISION DESIGN MANUAL		DATE 8/13/86
	SEWER LATERAL MARKER		DRAWN BJD
			CHECKED
			SCALE NTS
APPROVED <i>E. W. [Signature]</i> CITY ENGINEER	CITY OF BAKERSFIELD CALIFORNIA		SHEET NO. SW-1
	ENGINEERING	DEPARTMENT	



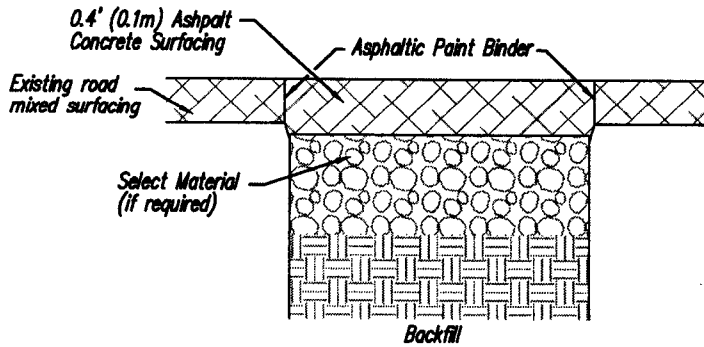
	SUBDIVISION DESIGN MANUAL	DATE 8/13/86
	TYPICAL TRENCH SECTION FOR CONCRETE ENCASED PIPE	DRAWN B.J.D.
		CHECKED
		SCALE NTS
APPROVED <i>E. W. Stahel</i> CITY ENGINEER	CITY OF BAKERSFIELD CALIFORNIA ENGINEERING	SHEET NO. SW-2
	DEPARTMENT	



PATCH IN CONCRETE SURFACE



PATCH IN ASPHALT CONCRETE SURFACE



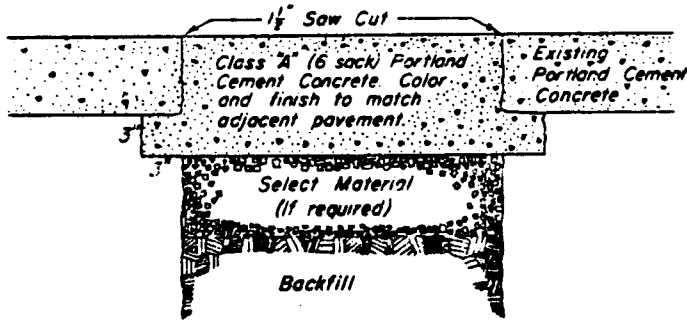
PATCH IN ROAD MIXED SURFACE

NOTES:

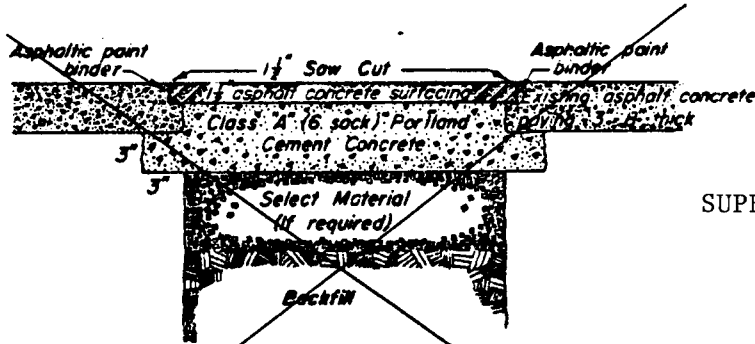
1. All workmanship and materials shall conform to the requirements set forth in the "Standard Specifications, State of California, Department of Transportation", approved current edition.
2. Sawcuts shall be made parallel or at right angles to the centerline of the street.
3. Depth of select material, if required, shall be determined in the field by the engineer.
4. Patches less than 2.0' (0.6m) from existing patches, edges of payment, or gutter shall be extended to include the intermediate isolated strip of existing pavement.
5. Minimum patch width shall be 2.0' (0.6m) at its smallest dimension, unless otherwise allowed by the city engineer.
6. Reference standards ST-13 and ST-14 for compaction requirements.
7. For patch in asphalt concrete unless otherwise allowed by the city engineer:
 - A. local streets minimum 0.4' (0.1m) asphalt concrete over 0.5' (0.15m) Class II aggregate base
 - B. Arterial and collector streets minimum 0.7' (0.2m) asphalt concrete over 1.0' (0.3m) Class II aggregate base.

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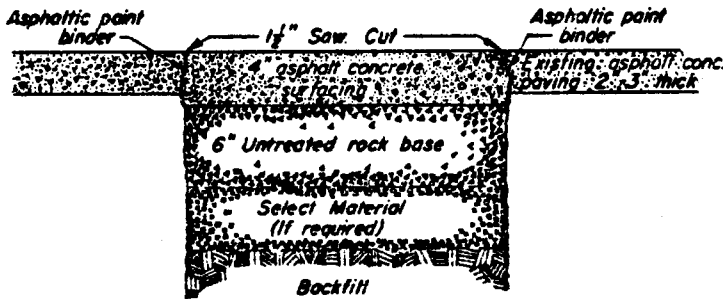
	STANDARD	DATE	6/2/99
	PAVEMENT PATCHES	DRAWN	JCU
	CITY OF BAKERSFIELD CALIFORNIA	CHECKED	M. SHAW
		SCALE	N.T.S.
		SHEET NO.	SW-3
APPROVED	CITY ENGINEER	PUBLIC WORKS	DEPARTMENT



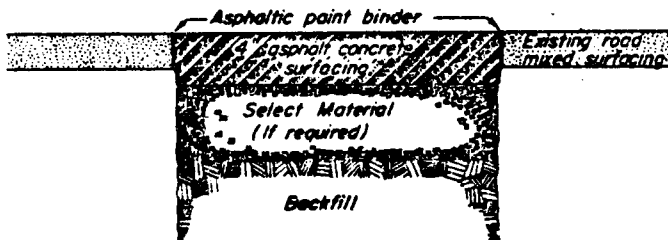
PATCH IN CONCRETE SURFACE



PATCH IN ASPHALT CONCRETE SURFACE MORE THAN 3" IN THICKNESS



PATCH IN ASPHALT CONCRETE SURFACE LESS THAN 3" IN THICKNESS



PATCH IN ROAD MIXED SURFACE

SUPERCEDED - SEE NEW SW-3

GENERAL NOTES:

All workmanship and materials shall conform to the requirements set forth in the "Standard Specifications, State of California, Department of Public Works, Division of Highways, TRANSPORTATION, CURRENT EDITION".

Saw cuts of an opening in asphalt concrete 3 or more inches in thickness may be made when the concrete patch has cured and is ready to receive the asphalt concrete surfacing.

Saw cuts shall be made parallel or at right angles to the center-line of the street.

Depth of select material, if required, shall be determined in the field by the Engineer.

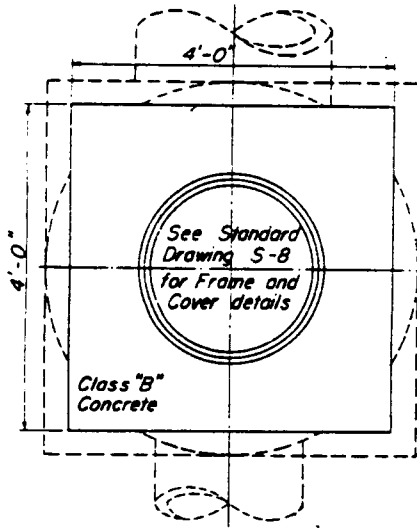
In asphalt concrete road surfaces, asphalt concrete surfacing shall be mixed with paving grade asphalt.

Patches less than 2 feet from existing patches, edges of pavement, or gutter shall be extended to include the intermediate isolating strip of existing pavement.

Minimum patch width shall be 2 feet at its smallest dimension.

REVISED

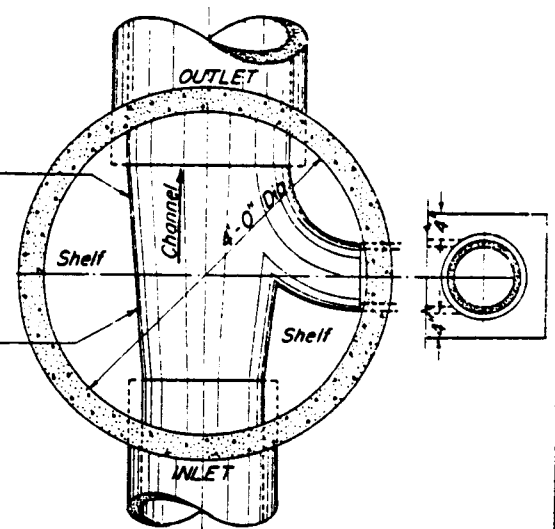
APPROVED BY THE CITY COUNCIL <i>F. J. G.</i> 1965	STANDARD	DATE 6-30-64
<i>[Signature]</i> CITY CLERK		DRAWN T.J.M.
APPROVED <i>H.E. Barger</i> CITY ENGINEER	PAVEMENT PATCHES	CHECKED J.D.H.
		SCALES None
	CITY OF BAKERSFIELD CALIFORNIA	S-6
	ENGINEERING DEPARTMENT	



PLAN

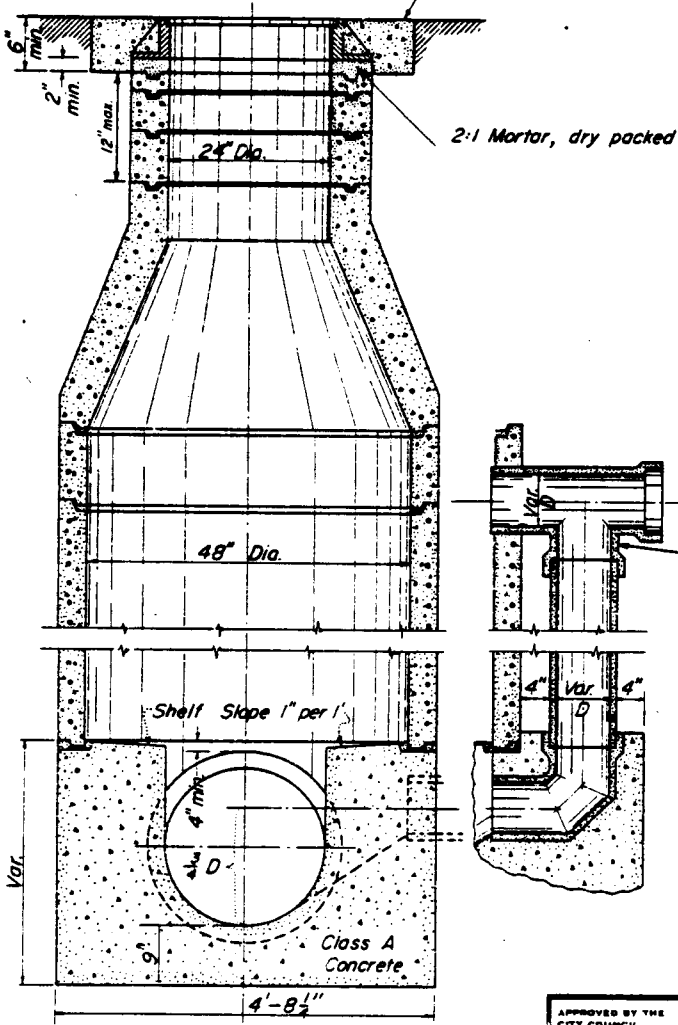
Where incoming and outgoing sewers in manhole vary in size, extend lower halves of sewers 8" beyond inside of wall and shape transition channel between ends of lower halves of pipes.

Where incoming and outgoing sewers in manhole are of the same diameter, the top half of pipe only shall be removed between walls and the broken edges shall be plastered smooth with cement mortar.



SECTION

NOTE: P.C.C. slab not to be poured until paving is in place.



SECTION

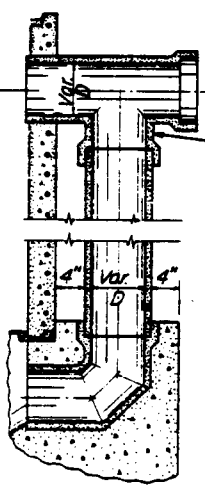
GENERAL NOTES:

All work shall conform to the applicable sections of the specifications entitled "Standard Specifications, State of California, Department of Transportation", current edition.

Joints shall be filled with mortar and neatly raked or wiped on inside of pipe.

Whenever the vertical distance between the inverts of sewer line connections exceeds thirty (30) inches, a drop connection shall be constructed as shown.

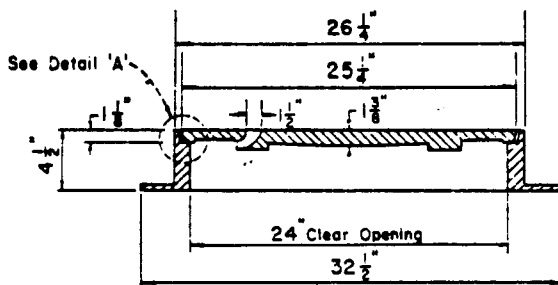
Precast reinforced manhole sections shall be constructed in accordance with the provisions of ASTM C-478, current edition.



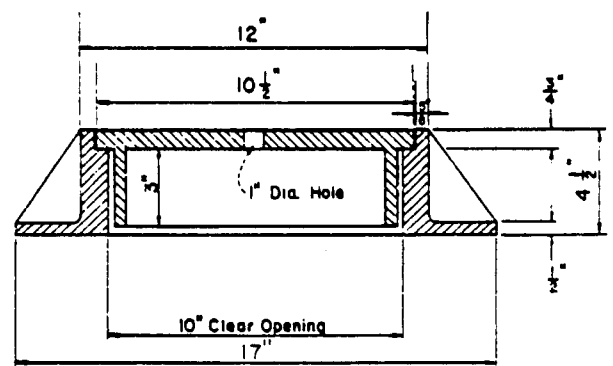
Use Drop Manhole "Tee" where pipe diameter is 6" or 8"

JUL 89

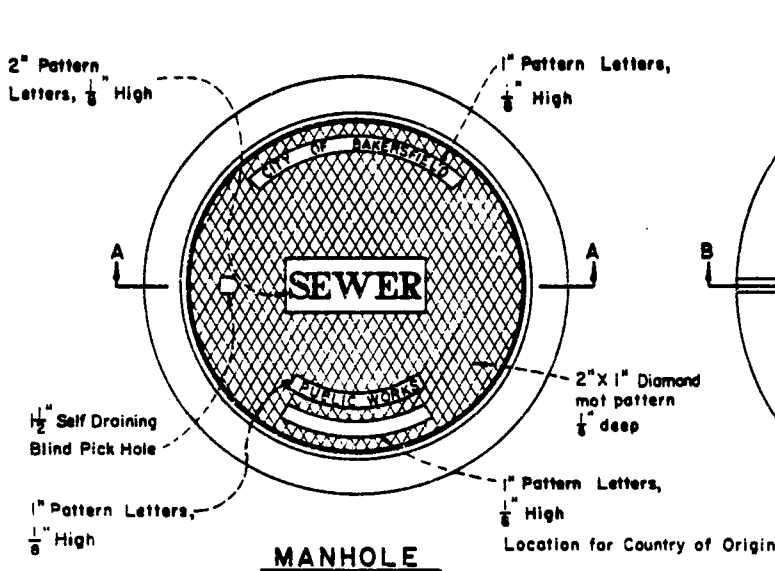
APPROVED BY THE CITY COUNCIL <i>Feb 8</i>	STANDARD MANHOLE TYPE "A" SHOWING DROP CONNECTION	DATE 9-1-64
		DRAWN TJM
APPROVED <i>H.E. Burgess</i> CITY ENGINEER	CITY OF BAKERSFIELD CALIFORNIA ENGINEERING DEPARTMENT	CHECKED J. SCALE None S-7



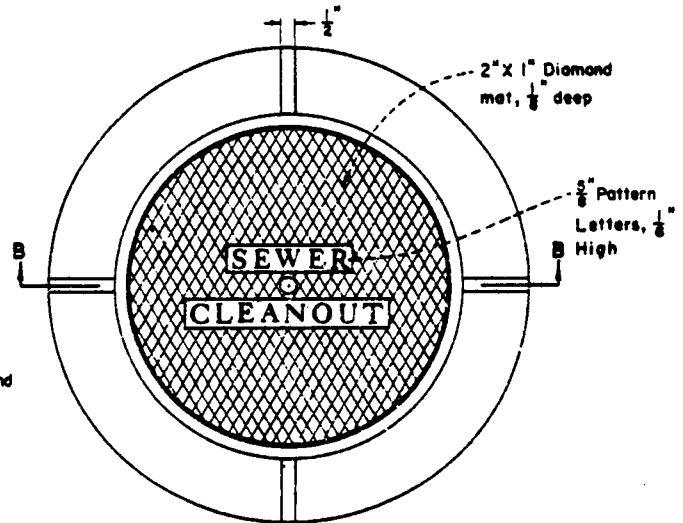
SECTION A-A



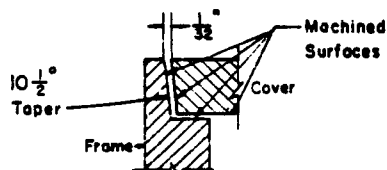
SECTION B-B



MANHOLE



CLEANOUT



DETAIL A

The name of manufacturing company shall be on the under side of the cover.
 Manhole frame shall weigh not less than 120 pounds or more than 250 pounds. The cover shall weigh not less than 120 pounds or more than 200 pounds.

Manhole covers shall have a self draining blind pick hole of some type unless otherwise approved by the City Engineer.

The 2" Pattern Letters on the manhole covers shall have one of the following designations: DRAIN or SEWER.

ADDED STANDARDS APPLICABLE TO IMPORTED COVERS

1. Imported covers and frames shall conform to Section 207 of the Trade and Tariff Act of 1984.
2. The name of the country if other than The United States of America, must be designated upside down and located on the outside edge of the lid.
3. If a manhole lid is imported, the name of the company who receives the product must be designated on the underside of the cover.

GENERAL NOTES:

All Frames and Covers shall be tough, gray cast iron, free from warps, cracks, holes, swells and cold-shot, and shall have a workmanlike finish.

Castings shall conform to the provisions of the specifications for Gray - Iron Castings, Serial Designation ASTM: A 48 (latest revision), Class No. 30B.

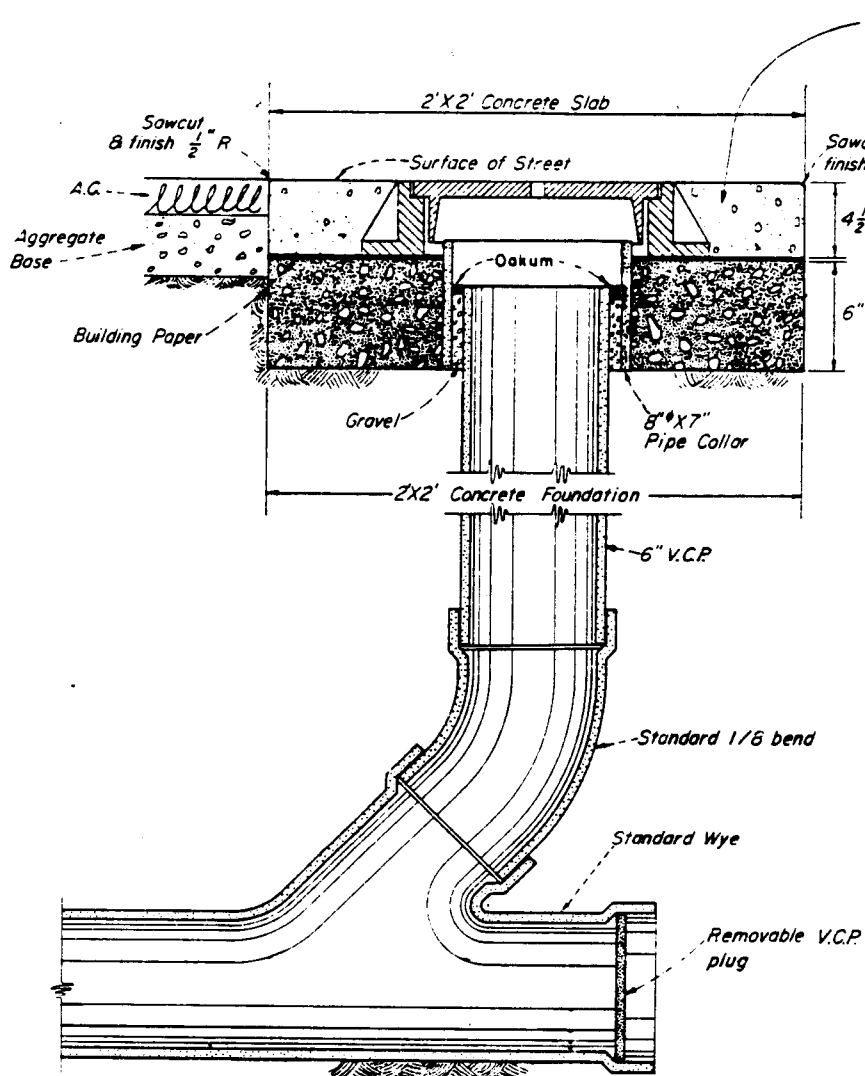
All Frames and Covers shall be tested for accuracy of fit and shall be marked in sets prior to delivery.

The seats of frames and bearing faces of the covers shall be machined for a smooth non-rocking fit between the two castings.

Castings shall be thoroughly cleaned and dipped twice in a quick-drying, jet-black asphaltic compound to provide a protective coating.

REVISED JAN. 18, 1988

APPROVED BY THE CITY ENGINEER JANUARY 5, 1981 <i>Philip Kelman</i> CITY ENGINEER	STANDARD FRAMES AND COVERS FOR MANHOLES & CLEANOUTS	DATE Dec. 17, 1980 DRAWN G.L.P. & J.A.S. CHECKED <i>Art Home</i> DESIGNED None
APPROVED <i>J. Dale Hawley</i> CITY ENGINEER		CITY OF BAKERSFIELD CALIFORNIA ENGINEERING DEPARTMENT



P.C.C. Slab not to be poured until paving is in place

GENERAL NOTES

All work shall conform to the applicable sections of the specifications entitled "Standard Specifications, State of California, Business and Transportation Agency, Department of Transportation, Latest Edition, and these General Notes.

Vitrified clay pipe shall be extra strength conforming to the specifications of A.S.T.M, Designation: C700-78

All concrete shall be Class "A" 6 sack (P.C.C.)

Cleanout frame and cover shall conform to the City of Bakersfield Standard S-8.

Concrete shall have no additives unless prior written approval is obtained from the City Engineer.

Concrete shall be cured with a white pigmented curing compound per Sec 90-7018 of the Standard Specifications.

Top of slab shall be troweled smooth and given a light broom finish.

Permit for this construction shall be obtained from the City of Bakersfield, Department of Public Works.

90% Relative compaction is required for all backfill within 24" of the riser pipe.

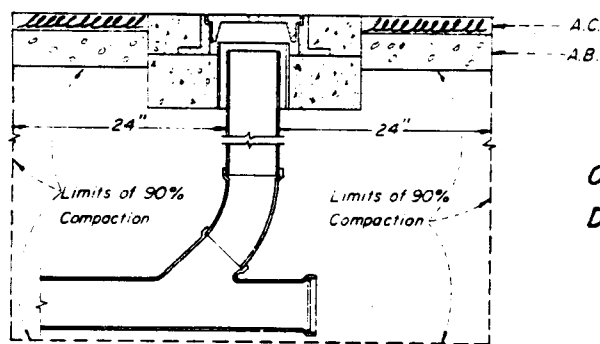
Building paper shall be placed between the 6" concrete foundation and 4 1/2" concrete slab

Fill cavity between pipe and collar with gravel to within 1/2" of top of pipe. Caulk remaining 1/2" with impregnated oakum to top of pipe to create a water tight seal.

Collar shall be A.G.P., A.B.S pipe or V.C.P.

Finished pad to be 1/4" max. below finished paving surface.

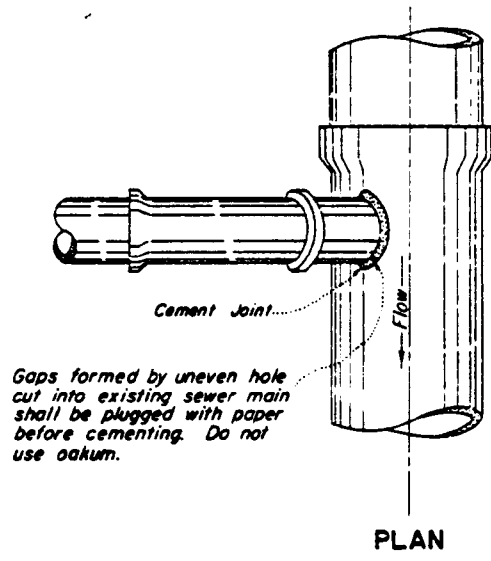
The removable plug shall be V.C.P. unless prior written approval is obtained from the City Engineer.



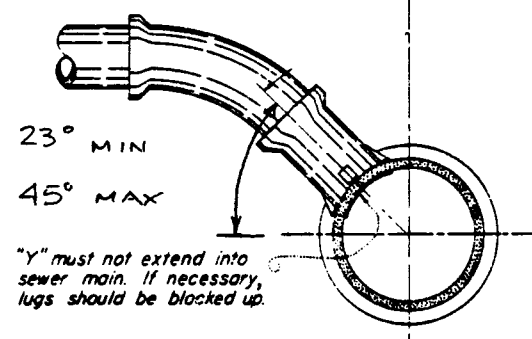
COMPACTION DETAIL

REVISED JUL 89

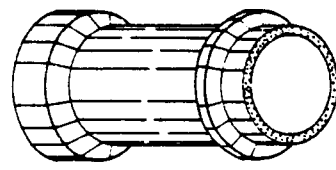
APPROVED BY THE CITY COUNCIL JANUARY 15, 81 <i>Marquitta B. Davis</i> CITY CLERK	STANDARD 6" CLEAN - OUT	DATE Dec. 30, 1980 DRAWN J.A. STINSON CHECKED <i>[Signature]</i> SCALE None
APPROVED <i>J. Dale Hawley</i> CITY ENGINEER	CITY OF BAKERSFIELD CALIFORNIA ENGINEERING DEPARTMENT	S-20



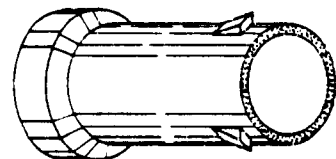
PLAN



ELEVATION



COLLAR



LUG

WYE SADDLES

Standard Vitrified Clay Saddles are available in 4", 6" and 8" sizes.

NOTE: Y Saddle Connection to 10" or larger size City Sewer shall be installed by coring the line. This work shall only be done by an approved agent of the City of Bakersfield.

For pipes 8" to 18" in diameter, a licensed contractor who has the proper equipment and permits is considered an approved agent and may core into the City's lines. For pipes larger than 18" the corings must be made by City forces. Where corings are made by contractors, the City inspector must observe the installation of saddles to cores.

If the contractor does not have the proper equipment, he may request the coring be made by City crews. Where cores are made by the City, the owner must pay in advance to the City the cost to core the sewer main.

For 6" sewer lines, the contractor may core or remove a section and place a wye or tee.

GENERAL NOTES:

Vitrified Clay Pipe Saddles shall be extra strength clay pipe and shall conform to the requirements of West Coast Standards of the Clay Pipe Institute.

Saddles shall be first quality vitrified clay, sound and well burned throughout their entire thickness, and impervious to moisture. Saddles shall have either lugs or collar.

The bell shall be true, circular and concentric with the bore of the pipe and shall be scored on the inside over its entire depth.

Opening in existing sewer shall be made only large enough to admit shell of saddle fitting. Lugs or collar not resting on pipe shall be blocked up and cement joint shall be neatly formed.

Mortar shall consist of one part portland cement, two parts of clean sharp sand and enough water to thoroughly dampen the mixture.

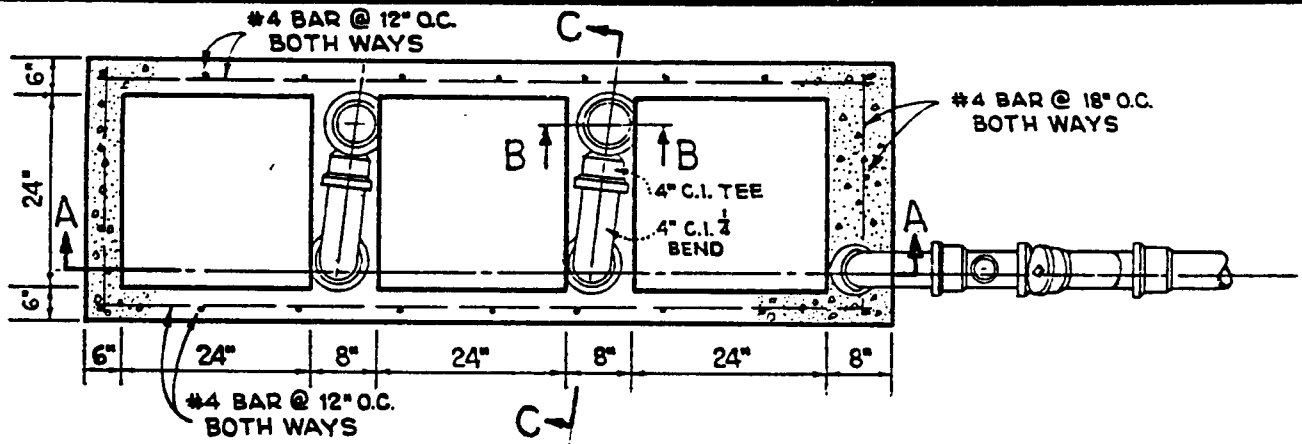
The joint shall be roughly plastered in place and allowed to set for thirty minutes. Second coat shall be applied and finished with a neat trowel finish.

All installations shall be inspected by the Engineering Department of the City of Bakersfield prior to backfill.

For PVC and ABS pipe, fittings shall be injection molded and shall be installed in line on new pipelines; cut-in fittings are not permitted.

REVISED JUL '89

APPROVED BY THE CITY COUNCIL <i>F. J. R.</i> 1965	STANDARD HOUSE CONNECTION SHOWING VITRIFIED CLAY SADDLE	DATE Jan 5, 1963
APPROVED <i>H. E. Borgen</i> CITY ENGINEER		DRAWN Hillis
	CITY OF BAKERSFIELD CALIFORNIA ENGINEERING DEPARTMENT	CHECKED J. D. H.
		SCALAR None
		S-22

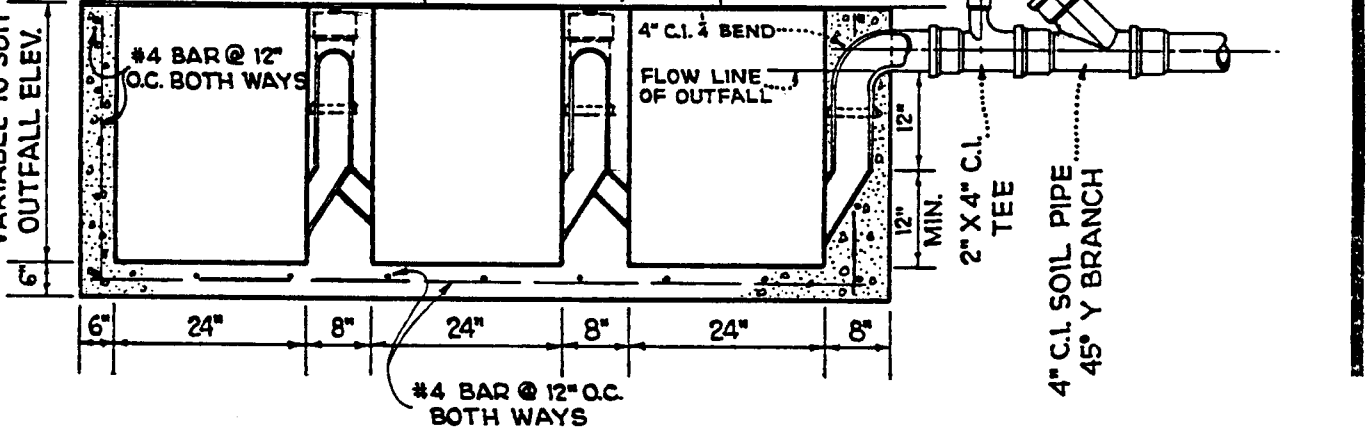


SECTIONAL PLAN

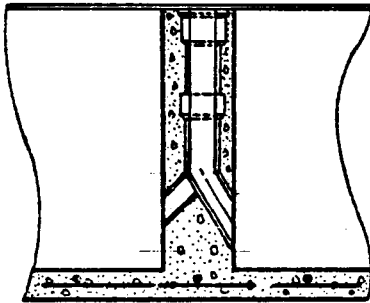
32" X 38" BOILER PLATE COVER 1/4" THICK (1/2" PERFORATIONS- 3" C-C)

36" X 32" BOILER PLATE COVER 1/4" THICK (NOT PERFORATED)

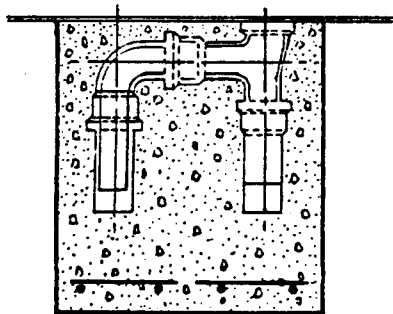
VARIABLE TO SUIT
OUTFALL ELEV.



ELEVATION SECTION A-A



SECTION B-B



SECTION C-C

ALL WORK SHALL CONFORM TO THE APPLICABLE SECTIONS OF THE SPECIFICATIONS ENTITLED "STANDARD SPECIFICATIONS, STATE OF CALIFORNIA, DEPARTMENT OF PUBLIC WORKS, DIVISION OF HIGHWAYS- TRANSPORTATION", LATEST EDITION.

WALLS SHALL BE INCREASED IN THICKNESS 2 INCHES IF POURED AGAINST EARTH BANK IN LIEU OF OUTSIDE FACE FORMS.

ALL CONCRETE TO BE CLASS "A" UNLESS OTHERWISE SPECIFIED.

ALL REINFORCING STEEL SHALL BE #4 BARS. MINIMUM CLEARANCE FROM FACE OF CONCRETE TO REINFORCING STEEL SHALL BE 2"

SAND TRAP DRAIN LINE TO BE CONNECTED TO BUILDING SEWER, EXTERIOR OF ANY BUILDING.

THE NUMBER OF COMPARTMENTS WILL VARY DEPENDING ON THE USAGE.

DIMENSIONS SHOWN ARE MINIMUM. SIZES ARE DETERMINED BY TYPE OF USE.

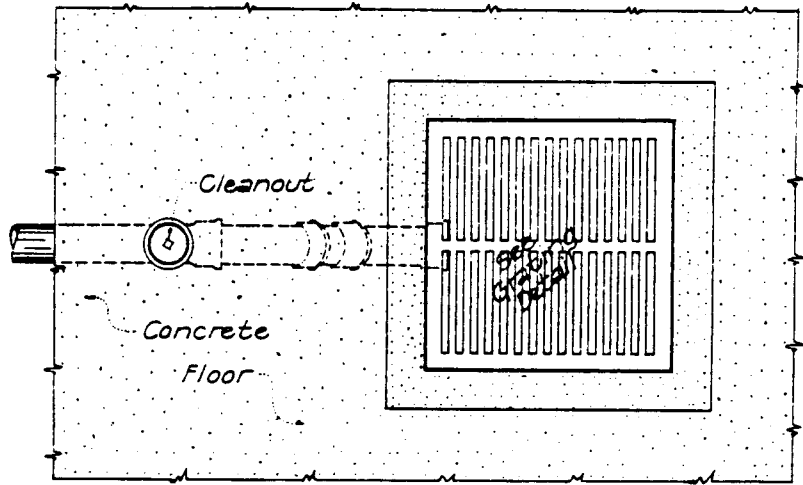
REVISED JUL 89

APPROVED BY THE CITY COUNCIL <i>July 12, 1971</i> <i>William Ling</i> CITY CLERK	STANDARD FOR THE CONSTRUCTION OF AN INDUSTRIAL SAND TRAP	DATE <i>June 1, 1971</i> DRAWN <i>Hillis</i> CHECKED <i>J.D.H.</i> SCALES <i>None</i>
APPROVED <i>William Ling</i> CITY ENGINEER	CITY OF BAKERSFIELD CALIFORNIA ENGINEERING DEPARTMENT	S-38

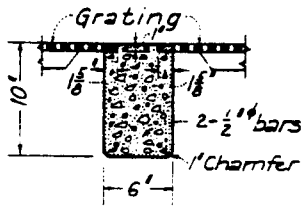
NOTES:

Concrete in trap pit to be of Class "A" (6 sacks per cu. yd.) unless otherwise specified.

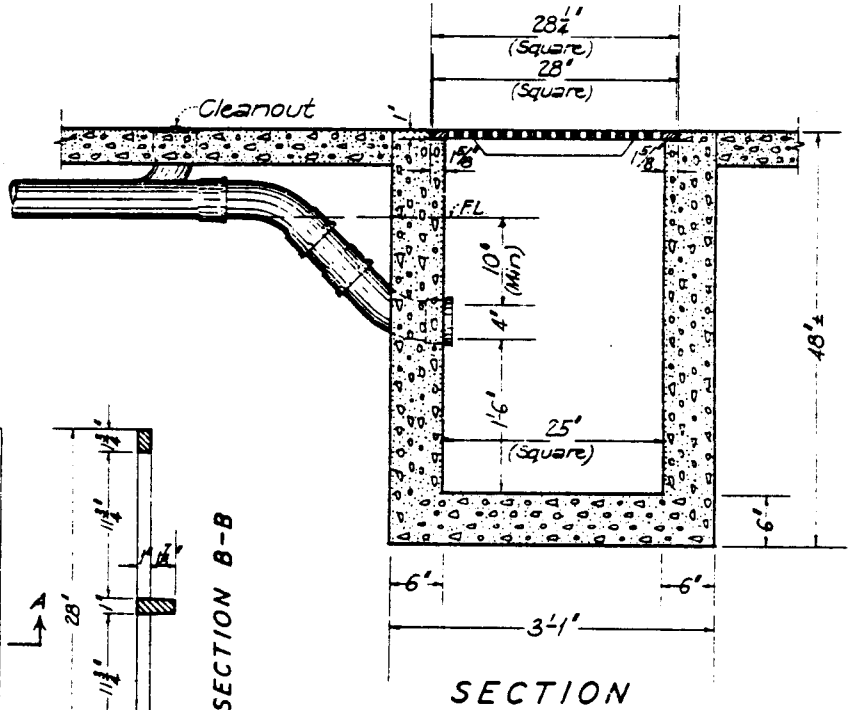
Grating to be of gray iron and shall conform to the requirements of the Specifications for Gray Iron Castings of the American Society for Testing Materials, serial designation A 48-36, Class 40, with subsequent amendments.



PLAN

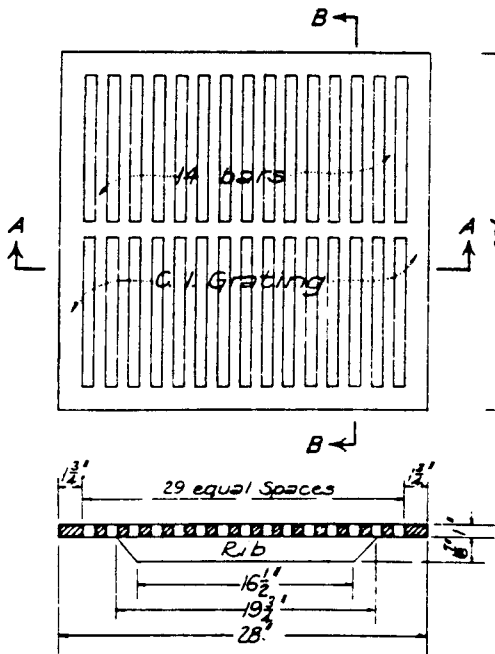


SUPPORT BEAM FOR DOUBLE GRATE INSTALLATION



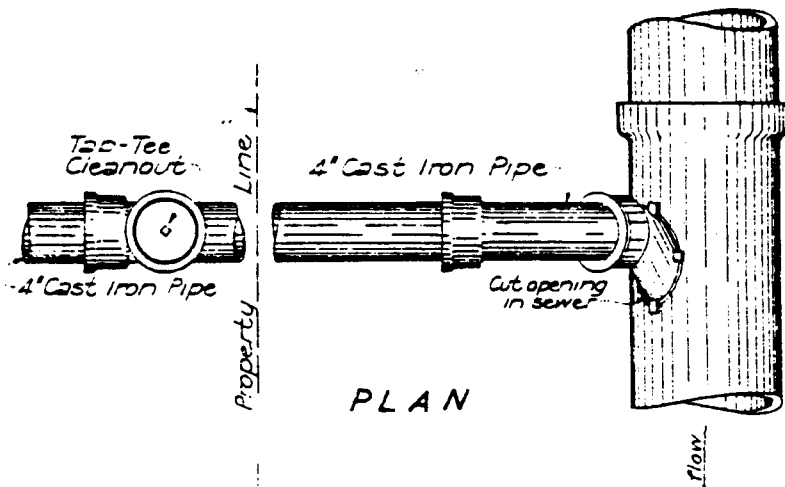
SECTION B-B

SECTION

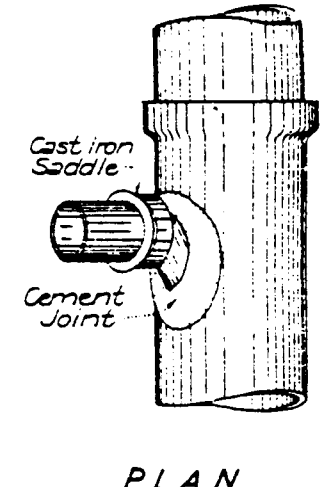


SECTION A-A GRATING DETAILS

APPROVED BY THE CITY COUNCIL <i>June 30, 41</i> <i>W. Van Dine</i> CITY CLERK	STANDARD SAND TRAP	DATE May 19, 1941
		DRAWN CHECKED SCALE None
APPROVED <i>J. H. Felder</i> CITY ENGINEER	CITY OF BAKERSFIELD CALIFORNIA ENGINEERING DEPARTMENT	NO 11.4 B1

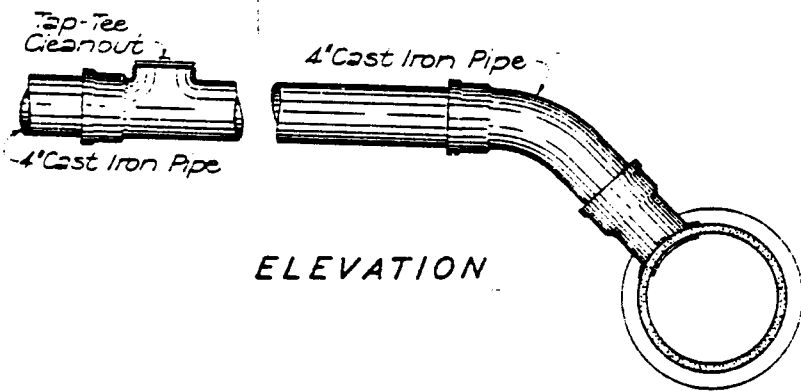


PLAN



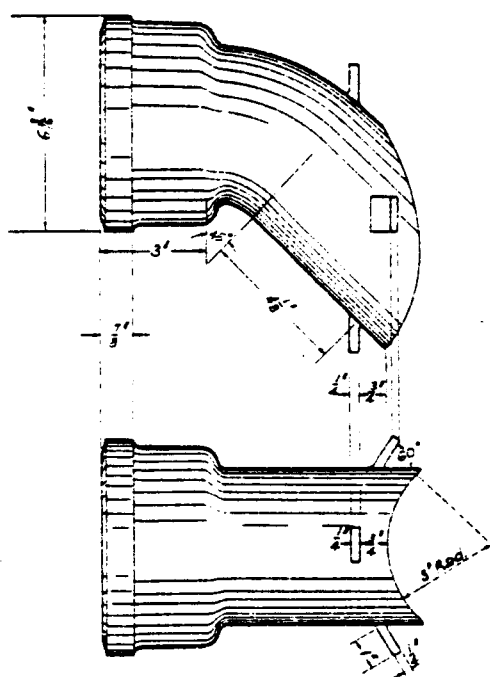
PLAN

Private Property (Min. Grade $\frac{1}{2}$ inch per foot) | Alley or Street (Max. Grade 6 inches per foot)



ELEVATION

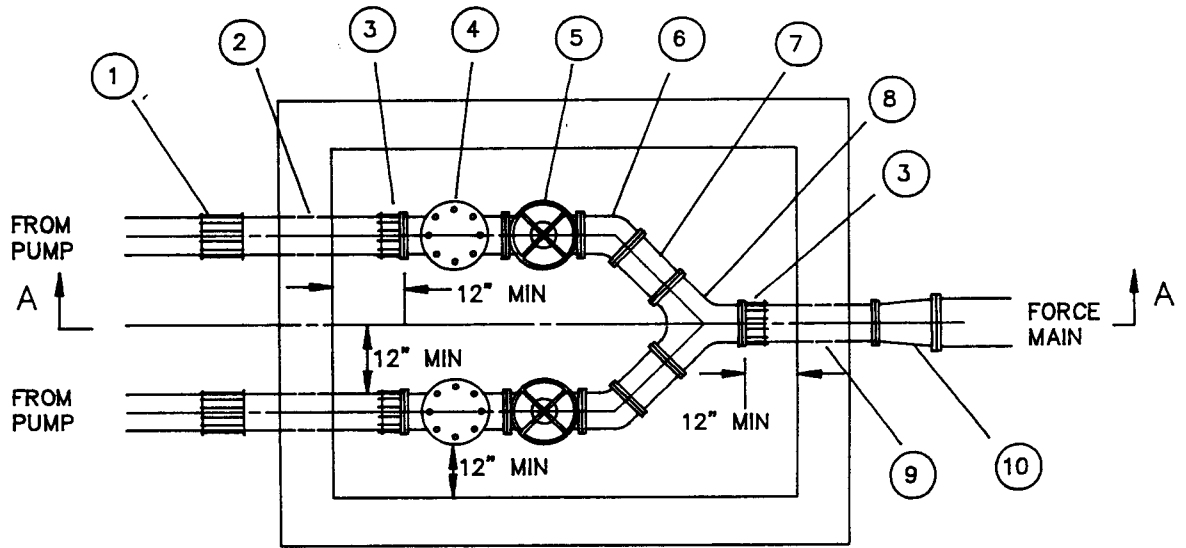
NOTE (House Connection)
 An opening shall be cut in the existing sewer only large enough to admit shell of saddle fitting. Wigs not resting on pipe to be blocked up and a cement joint ($\frac{1}{2}$ of sand to 1 of cement) shall be neatly formed.



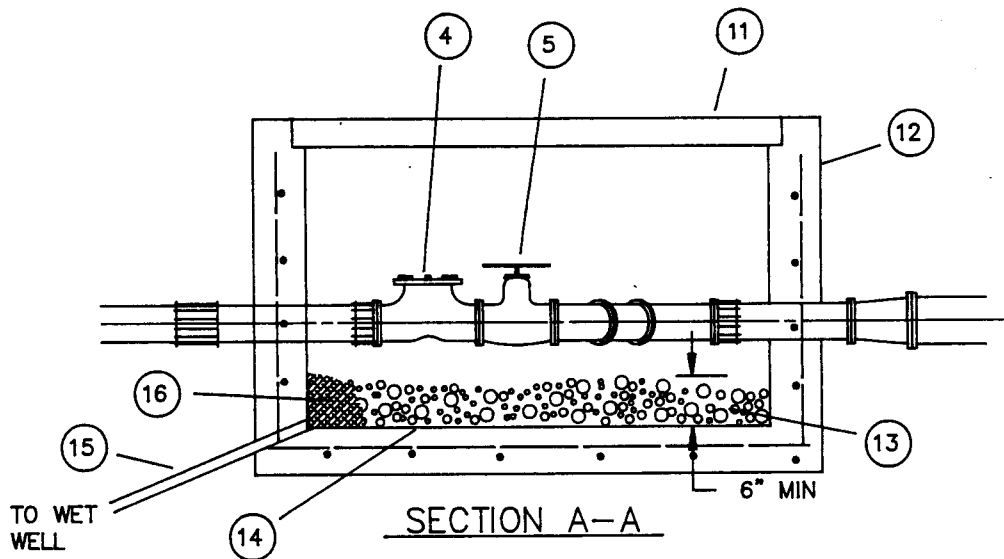
CAST IRON SADDLE

NOTE: (Saddle fitting)
 Detailed dimensions and full size drawing of cast iron saddle on file in the office of the City Engineer.

APPROVED BY THE CITY COUNCIL <i>June 30, 41</i>	STANDARD HOUSE CONNECTION SHOWING CAST IRON SADDLE	DATE May 19, 1941
<i>J. H. Holzfelder</i> CITY CLERK		CHECKED None
APPROVED <i>J. H. Holzfelder</i> CITY ENGINEER	CITY OF BAKERSFIELD CALIFORNIA ENGINEERING DEPARTMENT	NO 11.4B2



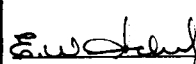
PLAN VIEW



SECTION A-A

KEY TO CIRCLED REFERENCES

- | | |
|---------------------------------------|---|
| 1 FLEXIBLE COUPLING ADAPTOR (2) | 11 ACCESS COVER WITH FRAME & HINGES (1) |
| 2 PIPE - PLAIN ENDS (2) | 12 REINFORCED CONCRETE VALVE BOX, PRE-CAST OR CAST-IN-PLACE (1) |
| 3 FLANGED COUPLING ADAPTOR (2) | 13 3/4" GRAVEL BEDDING |
| 4 SWING CHECK VALVE, FLANGED ENDS (2) | 14 2 COATS #50 BITUMASTIC PLACED PRIOR TO BACKFILL (15 MIL) OR EQUAL |
| 5 GATE VALVE, FLANGED ENDS (2) | 15 2" SCHEDULE 80 PVC DRAIN PIPE |
| 6 45° ELBOW, FLANGED ENDS (2) | 16 PERVIOUS BACKFILL MATERIAL IN A BURLAP SACK, SECURELY TIED. GALVANIZED 1/4" MESH PLACED OVER 2" PVC OPENING. |
| 7 PIPE - FLANGED ENDS (2) | |
| 8 FLANGED WYE (1) | |
| 9 PIPE, FLANGED END & PLAIN END (1) | |
| 10 CONCENTRIC REDUCER (1) | |

SUBDIVISION DESIGN MANUAL TYPICAL SEWER LIFT STATION VALVE BOX		DATE 7/31/89
		DRAWN BJD
APPROVED  CITY ENGINEER		CHECKED
		SCALE NTS
CITY OF BAKERSFIELD CALIFORNIA		SHEET NO.
ENGINEERING DEPARTMENT		SW-12