

RESOLUTION NO. 1931

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF
 SOLEDAD ADOPTING DESIGN STANDARDS AND
 STANDARDS SPECIFICATIONS FOR
 PUBLIC IMPROVEMENTS

BE IT HEREBY RESOLVED by the City Council of the City of Soledad that the following document entitled, "CITY OF SALINAS, CALIFORNIA, DEPARTMENT OF PUBLIC WORKS "DESIGN STANDARDS AND STANDARDS SPECIFICATIONS", dated July, 1985 is approved and adopted by reference in the form of the document hereunto attached, marked "Exhibit A", and by reference made a part hereof, and modified as provided in "Exhibit B" Standards modifications.

PASSED AND ADOPTED by the City Council of the City of Soledad at a regular meeting duly held on the 8th day of August, 1989, by the following vote:

AYES, and in favor thereof, Councilmembers: Campos,
 Holguin, Ledesma, Mayor Pro Tem Untalon, Mayor Ortiz
 NOES, Councilmembers: None
 ABSENT, Councilmembers: None


 MAYOR OF THE CITY OF SOLEDAD

ATTEST:


 CITY CLERK OF THE CITY OF SOLEDAD

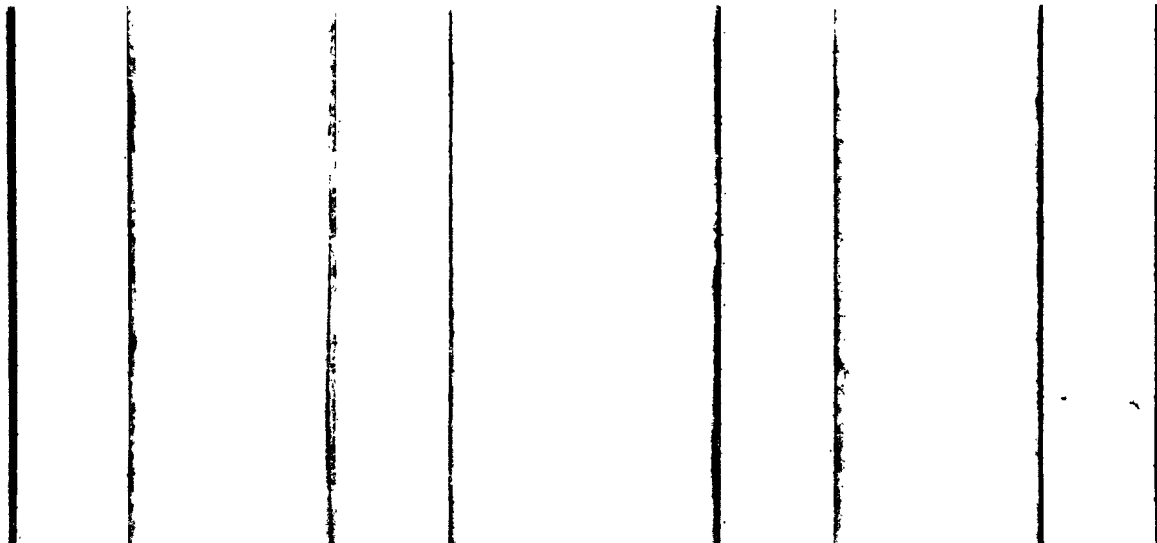
CITY OF SALINAS, CALIFORNIA
DEPARTMENT
OF
PUBLIC WORKS

DESIGN STANDARDS
AND
STANDARD SPECIFICATIONS

1985

A copy of the above referenced document is in file and available upon request from the City Clerk.

EXHIBIT "A"

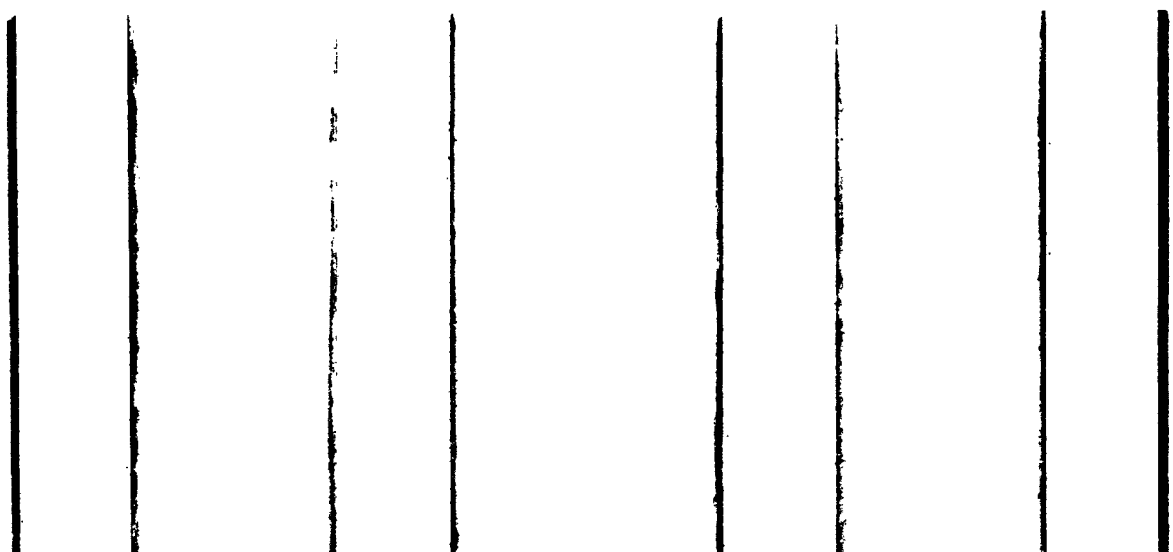


CITY OF SALINAS DESIGN STANDARDS
AND
STANDARDS SPECIFICATIONS

MODIFICATIONS FOR
THE CITY OF SOLEDAD

Adopted by the City Council
August 8th, 1989
Via Resolution No. 1931

"B"



344

SECTION 76
DOMESTIC WATER FACILITIES

76-01 Description - All work to be done under this section shall conform to the applicable requirements of the City of Salinas, Department of Public Works, Design Standards and Standard Specifications, latest edition, herein referred to as the Standard Specifications. The Caltrans Standard Specifications and Standard Plans, latest edition, are included by reference. This work consists of furnishing and installing pressure water pipe, control valves, thrust blocks, fire hydrant assemblies, fittings, service lines and appurtenances, all as shown on the plans or as directed by the Engineer, and as specified in these specifications and the Supplemental Conditions.

76-02 Materials - All City water system mains shall be ductile iron pipe. Private onsite water pipe may be ductile iron, steel, or polyvinyl chloride (PVC) pipe.

All materials shall meet or exceed the latest revisions of American National Standards Institute/American Water Works Association (ANSI/AWWA) Standards. All pipes and fittings (except valves) shall have a minimum working pressure of one hundred fifty (150) pounds per square inch (psi) and conform to the following requirements:

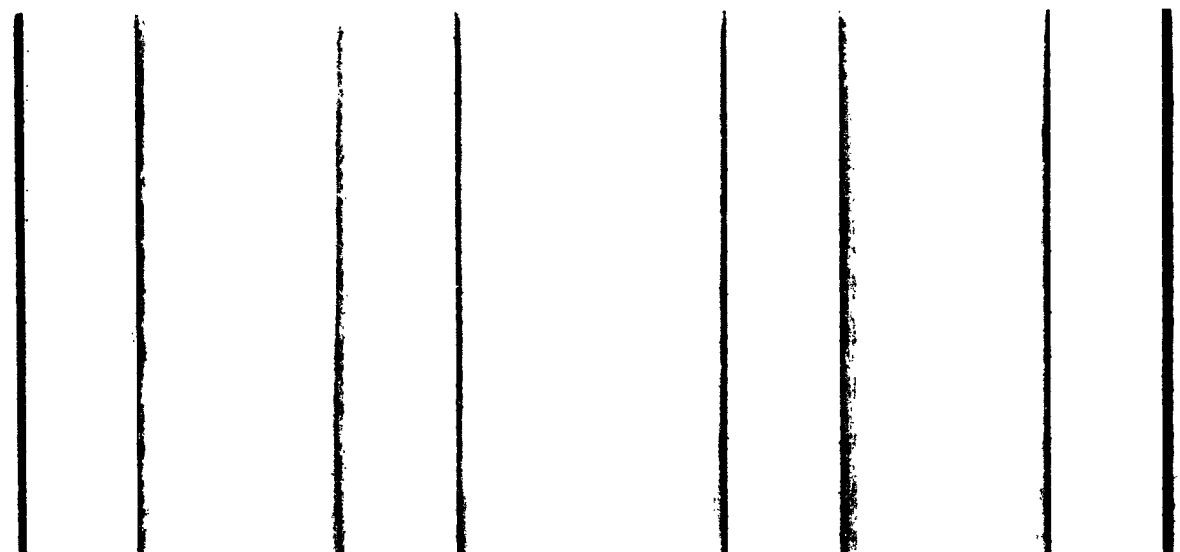
76-02A Asbestos-Cement Pressure Pipe - Asbestos-cement pressure pipe shall not be used.

76-02B Ductile Iron Pipe - Ductile iron pipe for water and other liquids shall be furnished in the sizes, classes, grades or nominal thicknesses, and joint types designated on the plans or in the Supplemental Conditions.

Ductile iron pipe shall comply with ANSI/AWWA C151/A21.51 for a minimum working pressure of 150 psi unless otherwise specified. Ductile iron pipe shall conform to and be tested in accordance with ASTM E8 and E23. Casting grade for pipe shall be 60-42-10. Laying length shall be the manufacturer's standard length, normally 18 feet. Shorter lengths may be used when required for closures and proper location of special sections.

The interior surface of all ductile iron pipe shall be cement-mortar lined and seal coated in conformance with ANSI/AWWA C104/A21.4 and the exterior surface shall have an asphaltic coating, approximately 1 mil thick.

Fittings shall be push-on, mechanical, or flanged-type ductile iron or gray iron and shall conform to ANSI/AWWA C110/A21.10 and ANSI/AWWA C111/A21.11 designed for a working pressure of 250 psi. Ductile iron castings shall conform to and be tested in



accordance with ASTM A536, except the casting grade shall be 70-50-05. Coating and lining requirements shall be the same as specified for pipe.

Joints shall be push-on, mechanical, or flanged type and shall conform to ANSI/AWWA C111/A21.11 and ANSI/AWWA C110/B16.1 and A21.10 with rubber gaskets unless otherwise specified. Ductile iron pipe is to be used on all water crossings or where required by State Health Code sanitary sewer water line clearance regulations. Pipe shall utilize either flange, mechanical or push on rubber gasketed joints. Pipe shall be minimum standard thickness Class 50 with standard cement lining (USA Std. A21.4).

76-02C Polyvinyl Chloride (PVC) Pipe - Polyvinyl chloride pipe shall be furnished in the classes, sizes, and grades designated on the plans and Supplemental Conditions.

PVC pipe shall meet the requirements of ANSI/AWWA C900. Pipe sizes shall be four (4) inch through twelve (12) inch only - AWWA Class 150 minimum. All Class 150 pipe shall meet the requirements of DR 18 and Class 200 pipe shall meet the requirements of DR 14 with cast iron O.D. Pipe shall be furnished in minimum standard lengths of 20 feet.

All pipe shall be suitable for use as a pressure conduit. Provisions shall be made for expansion and contraction at each joint with a "O" ring elastomeric gasket seal meeting the requirements of ASTM F477. Solvent welded joints will not be permitted. The bell section shall be designed to be at least as strong as the pipe wall.

Fittings for PVC pipe shall be cast iron only.

76-02D Steel Pipe - Steel pipe shall be furnished in the sizes, thickness, lengths, type of end preparation, type of protective coating, and type of protective lining of each quantity of pipe designated on the plans or in the Supplemental Conditions.

Steel pipe shall meet the requirements of ANSI/AWWA C200. Pipe sizes shall be six (6) inches and larger.

End Preparation - Ends of sections of pipe shall be prepared for the type of joint set forth in the project specifications and plans. End may be designated as for "flexible couplings," for "lap-welded joints," for "rubber gasket joints," for "flanged joints," or by other designation set forth in the project specifications and plans.

Flexible Couplings - For flexible coupled field joints, ends of pipe shall be plain. Welded beads on the outside of the pipe shall be trimmed down so that the weld metal does not project above the surface of the adjacent metal for a distance back from the ends of the pipe of six (6) inches, or as otherwise specified in the project specifications.

Lap-Welded Joints - For lap-welded field joints, at least one end of each section shall be belled to provide a tight-fitting socket which will allow a lap of approximately one (1) inch with the adjacent plain end of the next section of pipe.

Rubber-Gasketed Bell and Spigot Joints - For rubber-gasketed bell and spigot joints, the spigot ends shall have a groove to accommodate a round rubber gasket of the proper diameter and cross-section. The bell end shall be so shaped that, upon the insertion of a spigot into the bell, the gasket becomes deformed and completely fills the groove and, as the joint is closed, the gasket becomes completely enclosed by steel. The gasket shall be furnished with the pipe and shall provide the sole means of making the joint water-tight.

Flanged Joints - For flanged joints, a steel slip-on weld flange of the specified size shall be welded to the end of the bare pipe before any coatings are applied.

Protective Coatings - All welded steel pipe and fittings shall have the inside and outside surfaces protected by coatings. Coatings may be designated as "Cement Mortar Lined and Wrapped," as "Cement Mortar Lined and Concrete Coated," as "Fusion Bonded Epoxy Coated," or by other designations as set forth in the project specifications and plans.

Cement Mortar Lined and Wrapped Pipe - Pipe and fittings shall be prepared as follows: after the pipe has been subjected to the hydrostatic tests, and after the pipe ends have received their final preparation, the pipe shall be thoroughly cleaned of all dirt, grease, oil, loose scale, or other foreign matter in preparation for inside and outside coatings.

Exterior Coating - Exterior protection shall consist of a coat of Type B (fast-drying, synthetic) primer, a hot coat of coal tar enamel, a single layer of specified outerwrap [coal-tar-saturated asbestos felt; pipeline glass-fiber felt; polyethylene-kraft paper (2 component single wrap); or polyethylene-elastomer laminate (2 component single wrap)], finished with either one coat of water-resistant whitewash, water-emulsion latex paint, or a single wrap of kraft paper. Materials and application shall conform to ANSI/AWWA C203.

Interior Lining - Interior protection shall consist of a cement mortar lining with materials, application, and thickness, in accordance with ANSI/AWWA C205.

Cement Mortar Lined and Concrete Coated Pipe - Pipe and fittings shall be prepared as follows: after the pipe has been subjected to the hydrostatic tests, and after the pipe ends have received their final preparation, the pipe shall be thoroughly cleaned of all dirt, grease, oil, loose scale, or other foreign matter in preparation for inside and outside coatings.

Exterior Coating - Exterior protection shall consist of a spiral wire reinforced concrete coating with materials, application, and thickness in accordance with ANSI/AWWA C205.

Interior Lining - Interior protection shall consist of a cement mortar lining with materials, application and thickness, in accordance with ANSI/AWWA C205.

Fusion Bonded Epoxy Coated Pipe - Interior and exterior of pipe coated using this method shall be limited to sixteen (16) inches or larger. Protective coatings shall meet the requirements of ANSI/AWWA C213.

76-03 Cast Iron Fittings - Cast iron fittings shall be used on all ductile iron and polyvinyl chloride pipelines and shall conform to ANSI/AWWA C110/A21.10 in material, body thickness, and radii of curvature. The fittings shall be coated with a cement mortar lining, in accordance with ANSI/AWWA C104/A21.4.

Cast iron fittings shall be Class D fittings conforming to ASTM Designation 126 and shall be one hundred twenty-five (125) psi standard. All valves and fittings shall all be flanged.

Steel Fittings - Fittings shall be fabricated from steel plate or sheets, and shall be of equal strength to the adjoining pipe. Unless otherwise indicated in the project specifications or plans, dimensions for fittings shall conform to ANSI/AWWA C208. In all cases, manufacturer's drawings shall be submitted for approval before fabrication.

Mechanical joint and flanged fittings shall conform with all applicable requirements of ANSI/AWWA C110/A21.10.

Rubber gasket joint fittings shall conform to all applicable requirements of ANSI/AWWA C111/A21.11, and shall be designed to receive the particular type of pipe inserted.

76-04 Valves - This specification includes four (4) inch through twelve (12) inch diameter gate valves and twelve (12) inch or larger diameter butterfly valves and operators intended for buried service in a domestic water system.

Valves four (4) inch through twelve (12) inch NPS shall be iron body, with bronze stem nuts, glands and bushings, resilient-seated gate valve with resilient seat bonded or mechanically

attached to the gate, non-rising stem (NRS), open to the left (counter-clockwise), working water pressure of 200 psi, conforming to the requirements of ANSI/AWWA C509. The valve shall have a two (2) inch square operating nut. Unless otherwise specified or shown on the plans, valves shall be furnished with ends flanged or mechanical joint, using an elastomeric-gasket seal, and shall conform in dimensions and style to the pipe and/or fitting requirements.

When specifically referred to in the Supplemental Conditions or plans, double disc valves will be allowed. Valves shall be iron body, bronze mounted, double disc, parallel seat, non-rising stem (NRS), open to the left (counter-clockwise), 200 psi pressure rating, conforming to the requirements of ANSI/AWWA C500. The valves shall have a two (2) inch square operating nut. Unless otherwise specified or shown on the plans, valves shall be furnished with ends flanged or mechanical joint, using an elastomeric-gasket seal, and shall conform in dimensions and style to the pipe and/or fitting requirements.

Valves twelve (12) inches and larger shall be iron body, rubber seated, tight-closure butterfly valves conforming to the requirements of ANSI/AWWA C504. Operating stem with manual operators shall open to the left (counter-clockwise), working pressure of 150 psi, and be provided with a two (2) inch square operating nut unless otherwise specified or shown on the plans. Valves shall be furnished with ends conforming in dimensions and style to the pipe and/or fitting requirements.

Valves for use with flanged pipe shall be cast with Class 125 flanges, dimensions and drilling shall conform to ASA B16.1. Flange bolt holes shall be spot faced if flange fillets interfere with bolt heads and nuts.

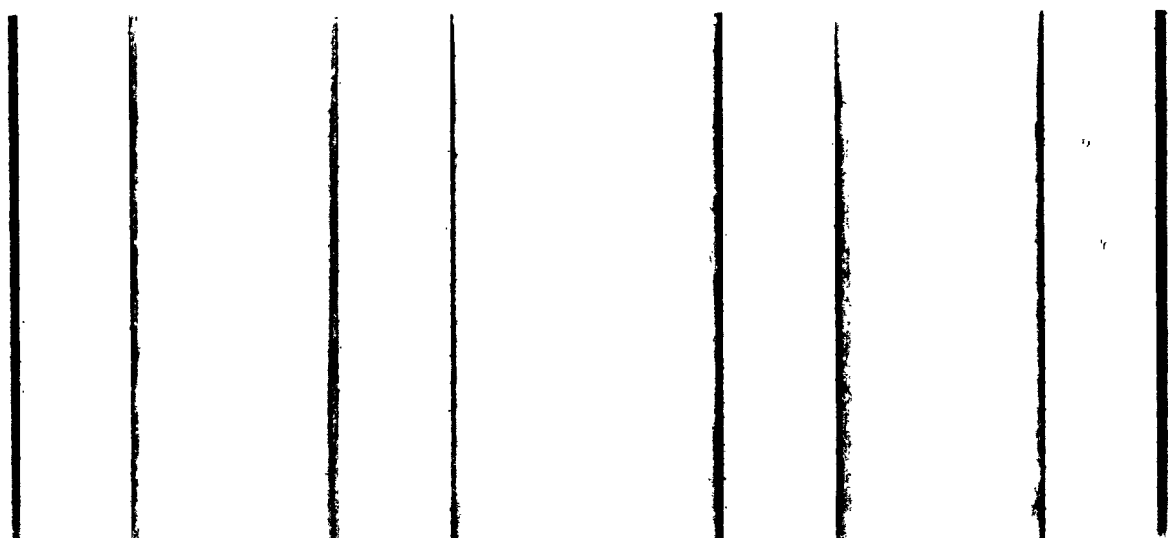
Inlet flange and tapping gate valve flanges shall be Class 125 flange. Ductile iron flanged tapping sleeves and tapping gate valves shall be approved by the Public Works Director prior to the beginning any work.

All stem seals, gate valves and butterfly valves, shall be O-rings only.

Wrench nuts shall be made of top grade cast iron, fitting the top of the valve stem and secured by nut or key.

Valves requiring operating wrenches exceeding six (6) feet in length shall have extension and guides installed in valve boxes.

76-05 Valve Boxes - Valve boxes for traffic service shall be of a precast concrete, and shall have a cast iron face and a cast iron traffic lid. Valve boxes out of traffic areas shall be of precast concrete, with a concrete lid with a cast iron meter reading lid. Covers shall be marked "WATER" and shall have a loose fit in the box. Valve box risers shall be of precast concrete or PVC and shall fit inside of valve box without slipping.



Installation - Valves shall be set plumb, supported on a concrete base or a 2"x8"x12" redwood block, and properly fitted to the adjacent sections of main. A valve box shall be installed over each valve. The type of box and lid is dependent upon location, as specified herein. Valve boxes shall be set flush with the finished grade, pavement, or concrete, and be supported by two 3/4 inch galvanized steel pipes extended into undisturbed earth. Where valves are placed in unimproved easement areas the valve boxes shall be set 6-inches above grade.

Payment - The unit price bid for valves shall include excavation, furnishing and setting valves and valve boxes as detailed on the plans, backfilling, restoration of paved surfaces, and furnishing all other labor, equipment and material necessary for placing the valve in accordance with the plans and specifications. The unit price bid shall be the average price for all valves of a given size.

76-06 Gaskets - Gaskets for flanged joints shall be either ring or full face, one-eighth (1/8) inch rubber gaskets, conforming to the dimensions in ANSI/AWWA C115/A21.15, Appendix A.

76-07 Thrust Blocks - Thrust blocks shall conform to Standard Drawing No. 29-A. Concrete for thrust blocks shall be Class B with one and one-half (1-1/2) inch max. size aggregate in accordance with Section 90 of the Standard Specifications.

76-08 Fire Hydrants Assemblies - Fire hydrants shall be dry or wet barrel meeting the requirements of ANSI/AWWA C502 and ANSI/AWWA C503. Dry barrel hydrants shall have a replaceable flanged "breakable" section to be installed three inches above the ground line. Wet barrel hydrants shall be furnished with a break-off check valve. Main valve size for dry barrel hydrants shall be at least four (4) inches, open left (counter-clockwise).

The footpiece shall have an inlet size for connecting to pipe of not less than six (6) inches and shall be suitable for push-on, mechanical-joint, or flanged end pipe.

The bury length shall be three (3) feet from the flanged "breakable" section to the centerline of the connecting pipe, unless otherwise shown on the plans, or required by the topography and approved by the Engineer.

Delivery classification shall be two-hose and one-pumper nozzle, having "National Standard Fire Hose Coupling Screw Threads" in conformity with NFPA 194 and ANSI B26. Hose nozzles shall be for 2-1/2 inch hose and pumper nozzle shall be for 4-1/2 inch hose. The operating nuts and nozzle caps shall be National Standard pentagon dimensions, open left (counter-clockwise).

Dry barrel fire hydrants are to be furnished with bronze to bronze seat rings.

Hydrants are to be furnished without a drain opening in the base; if manufactured with such opening, it shall be plugged.

Even though not indicated on the plans, every fire hydrant installation shall have a six (6) inch gate valve installed on the lateral from the main.

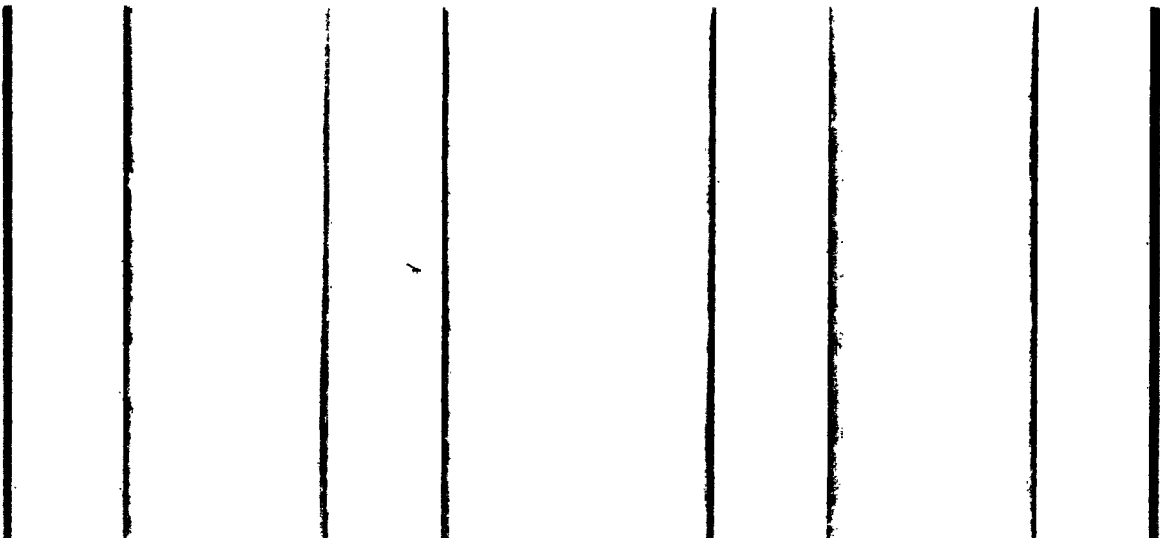
Installation - For installation details, see Standard Drawing Nos. 11 & 12. In no case shall a fire hydrant be installed within three (3) feet of a building or any other obstruction that would limit access. Fire hydrants shall stand plumb with the pumper outlet facing the street and at least eighteen (18) inches above the sidewalk or finished ground surface, whichever is higher.

Payment - The unit price bid for fire hydrant assemblies shall include excavation, furnishing and placing the tee in the main, the 6 inch lateral to the hydrant, the gate valve, the fittings, and the hydrant, all as detailed on the plans, blocking, backfill, restoration of street surfaces, and all other labor, equipment and material necessary for installing the fire hydrant assembly in accordance with the plans and specifications. The unit price bid shall be the average price for all fire hydrant assemblies indicated or required.

76-09 Service Lines - All City water system service lines shall be copper water tubing, type K, to the meter. Private onsite service lines may be copper, polyethylene (PE), or PVC (Sch. 80) tubing/pipe meeting ANSI/AWWA standards.

Service lines up to and including meter connection shall be as detailed in Standard Drawing Nos. 27-A, B & C, as applicable for the service intended and with the ANSI/AWWA C800, except as hereinafter modified or as modified by the plans and special conditions.

Materials - All water service lines shall be 3/4 inch in diameter unless otherwise specified. Water service pipe material up to and including 2 inches shall be copper water tubing, "Type K", soft tempered, meeting ASTM B88 and ANSI/AWWA C800 or polyethylene pressure pipe meeting standards of AWWA C901. Polyethylene pipe shall be high density, ultra-high molecular weight and meet all applicable requirements, including testing, of Type III, Grade P33 or P34, Class C, designated as PE 3306 or 3406 in ASTM D2239 and D1248. The plastic pipe shall have a minimum pressure rating of 160 psi, shall be homogeneous throughout and free of cracks, holes, foreign inclusions or other defects, shall be uniform in color, opacity, density and other physical properties.. Plastic pipe shall be supplied with markings, at intervals of not more than five feet, indicating nominal pipe size, designation, pressure class of 160 psi, and manufacturer's name or trademark. Polyethylene pipe shall be manufactured to copper pipe size (CPS) for connection using



compression connections. Installation shall be in accordance with the manufacturer's recommendation. Services two (2) inches and larger shall be considered as a special condition and will require the prior approval of the Public Works Director and City Engineer. When the size of the tap exceeds the manufacturer's recommended limit for the size of the main, a special fitting shall be furnished [Six (6) inch PVC pipe may be tapped for 3/4" maximum service. Eight (8) inch PVC pipe may be tapped for one (1) inch maximum service. Saddles or service clamps shall be used on all PVC taps and shall be designed specifically for PVC pipe. Saddles or service clamps shall be stainless steel straps, or double bronze straps].

All services shall be equipped with a corporation stop at the main. On services up to and including 1-1/2 inch diameter, a curb stop shall be installed at the property line or easement line; on 2 inch or larger services a gate valve shall be installed. Size of the corporation stop and curb stop or gate valve shall be the same as the service line. A valve box at the property line or easement line is required for all services. Valve boxes in unimproved areas shall be set 6 inches above grade. Service saddle requirements are indicated on Standard Drawing No. 28. Only neoprene or rubber gaskets shall be used between the saddle and the pipe. Threads for underground service line fittings shall conform to ANSI/AWWA C800.

Location - Where curb and gutter exists, or is to be constructed concurrently with the improvements, the location of each service shall be permanently indicated by inscribing the letter "W" in the curb directly above the line when the service is perpendicular to the street centerline. Otherwise, the "W" mark for a skewed or angling service shall be placed at a right angle to the end of the service. When water services are installed in a street with existing curb, the curb mark shall be placed at the time the service is installed to assure proper location. In new subdivisions when the services are installed before the curb is constructed, it shall be the Contractor's responsibility to establish the exact location of each service and to furnish this information to the curb and gutter subcontractor, if any, in order that he may place the "W" in the curb after it is placed. The Contractor shall also furnish this information to the inspector. The Contractor may arrange with the Consulting Engineer for the subdivision, to resurvey and reestablish the end of each service before the curb and gutter is placed in lieu of the above requirements to insure that the "W" mark is properly placed.

Payment - The unit price for water services shall include all labor and materials necessary to excavate the trench, connect to the main, furnish and install the service saddle, corporation valve, pipe fittings, and curb stop or gate valve, bed, place and joint the pipe and fittings, backfill the trench, restore street

surface, mark the curb, furnish and install a valve box, and all other work necessary to produce a complete installation in accordance with plans and specifications. The unit price bid shall be the average price for all water services of a given size.

76-10 Water Meters - Cold-water meter main casing shall be of copper alloy and furnished with hermetically sealed register with sweep test hand, reading in cubic feet and shall conform to ANSI/AWWA C702.

Cold-water meter main case connections for 1-1/2 inch and 2 inch sizes shall be provided on both ends with an oval type flange; 3 inch size and larger shall be provided on both ends with a round type flange; both oval and round flange dimensioned as shown in Table 3, ANSI/AWWA C701.

Meter Box - Meter box shall be of precast reinforced concrete designed for the appropriate size of meter and curb stop. Meter box lid outside of traffic area shall have a reinforced concrete lid with a cast iron self-closing reading lid and meter box for traffic service shall have a steel checker plate traffic cover with round self-closing reading lid. Covers shall have a loose fit in the box and shall be marked "WATER".

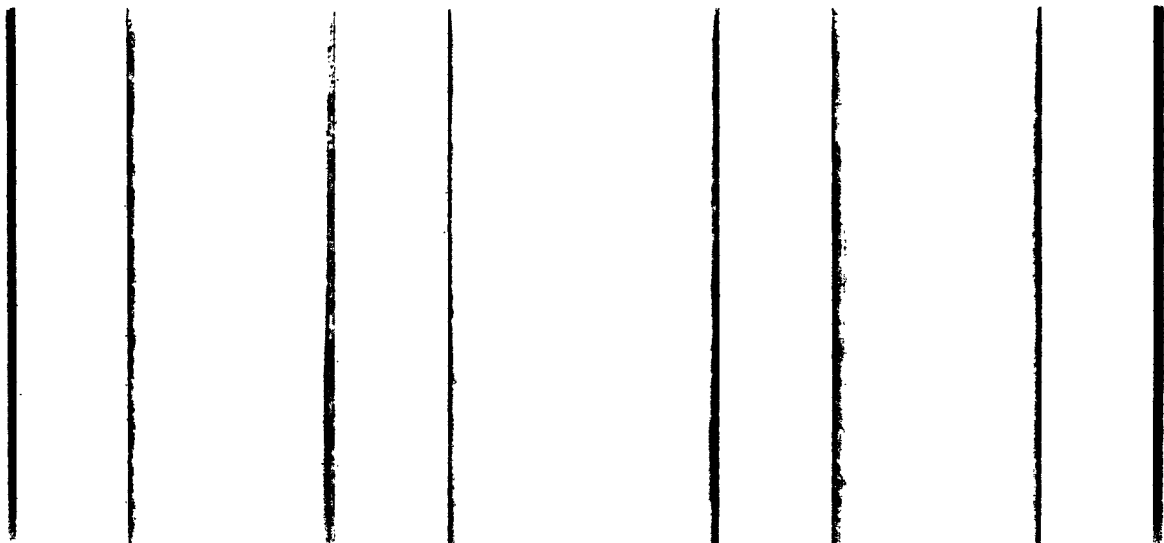
Installation - Cold-water meters shall be installed and set in a horizontal position with the manufacturer's recommendations. A meter box shall be installed over each meter in such a manner that the meter may be easily read through the reading lid of the cover. The meter box shall be installed in such a manner to prevent undue stress from normal or traffic load on the meter, curb stop, fittings and piping.

Meter box, with the appropriate lid, shall be set flush with the finish grade, pavement or concrete.

Payment - The unit price bid for cold-water meter shall include excavation, furnishing and setting meter, meter box, furnishing appropriate connectors to piping and making all connections, backfilling, restoration of surface, and furnishing all other labor, equipment and material necessary for the installation of the meter in accordance with the manufacturer's recommendation and in a good workmanlike manner. The unit price bid shall be the average price for all meters of a given size.

76-11 Installation of Water Mains

Description - The contractor shall, unless specified otherwise, furnish all material, equipment, tools, and labor necessary to do the work required, and unload, haul and distribute all pipe, castings, fittings, valves, hydrants and accessories. The contractor shall also remove pavement as stipulated; excavate trenches and pits to the required dimensions; excavate bell holes; construct and maintain all bridges for traffic control;



sheet, brace, and support the adjoining ground or structures where necessary; handle all drainage or ground water; provide barricades, guards, and warning lights; lay and test the pipe, castings, fittings, valves, hydrants, and accessories; back-fill and consolidate the trenches and pits; restore the roadway surface unless otherwise stipulated; remove surplus excavated material; clean the site of the work; and maintain the street or other surface over the trenches as specified. All connections to existing lines shall be flanged by fittings with isolation plates.

Alternates - Pipe used in the construction of water distribution systems may be either ductile iron, steel, or polyvinyl chloride, unless a particular type is specified on the plans and in the Supplemental Conditions, and as specified in Section 76-02 and 76-09. All pipes shall be the regular product of a firm which has successfully manufactured comparable pipe for at least 3 years.

All pipe, valves, fittings, connections, and appurtenances thereto shall conform to the provisions of these specifications or as specifically set forth in the Supplemental Conditions. The Department of Public Works will maintain a listing of approved hydrants, meters and water service material and fittings which establish a standard of material quality for the City water system and keep the City's parts inventory to a minimum. Material used shall be limited to those on this listing. Alternate material items may be added to this list upon review an/or test by the Department of Public Works.

Testing of Material - All testing requirements of the ASTM and ANSI/AWWA specifications shall be conducted by the pipe manufacturer or his representative within the State of California and the resulting tests shall be certified by an established, reputable firm operating in the testing materials field. Such certificates must accompany the delivery of the materials to the job site.

Excavation - Trench excavation shall conform to the requirements of the Standard Drawing No. 13. The bottom of the trench shall be carefully graded as indicated in Section 71-1.03 of the Standard Specifications.

Jacking - The Contractor shall submit plans for jacking, and obtain the approval of the City Engineer prior to performing any jacking operations.

Installation - All pipes, valves, fittings, and appurtenances shall be installed in accordance with the manufacturer's recommendations and according to accepted water works practice. Each section of pipe and each fitting shall be thoroughly cleaned out before it is installed. All pipe, fittings, valves, etc., shall be carefully lowered into the trench by suitable tools or equipment in such a manner as to prevent any damage, particularly to the pipe lining and coating. When required by the Engineer, approved slings shall be used to lower the pipe. Under no

circumstances shall pipe or accessories be dropped into the trench.

The Engineer shall be the judge of whether a pipe is seriously damaged and any pipe so classified shall be permanently removed from the site of the work.

The pipe shall be laid true and uniform to line and grade, with no visible change in alignment at any joint unless curved alignment is called for on the plans, in which the maximum deflection at any joint shall not exceed the manufacturer's recommendation for the type of pipe and joint being used.

Select back-fill shall be placed and thoroughly compacted across the bottom of the trench to provide full support of all the pipe. Bells and/or couplings shall have soil removed to provide a uniform bearing.

The pipe shall have a minimum cover of 36-inches and maximum cover of 60-inches from the lip of curb and gutter within roadways or from finish grade out of roadway areas, unless specifically set forth in the Supplemental Conditions or shown on the contract plans.

Thrust blocks of Class "B" concrete shall be cast-in-place at all horizontal or vertical bends of 11-1/4 degrees angle or more, behind each plug, cap, tee, or cross which is valved or plugged in such manner that it can act as a tee or elbow, and at the back of each fire hydrant. The thrust block shall extend from the fitting to undisturbed soil, shall be kept clear of the joints, and shall be of such bearing area as to assure adequate resistance to the force to be encountered. Size of blocking shall be in accordance with Standard Drawing No. 29-A. In lieu of the above required thrust blocks, movement may be prevented by use of pipe collars and rods when permitted by the Engineer.

Whenever pipe laying is discontinued for an hour or more, the open ends of all mains and fittings shall be closed with water-tight plugs or bulkheads. The plug or bulkhead shall not be removed unless, or until, the trench is dry and the Contractor is ready to proceed with the work. Pipe shall not be laid when the condition of the trench or the weather is unsuitable or when there is possibility of foreign material entering the pipe.

The inside of all pipes and couplings shall be free from dirt, grease, or other deleterious materials. The open ends of all pipe previously laid shall be adequately plugged water tight whenever pipe laying operations are suspended at the end of each work day, or for any other reason.

All pipe jointing, including the maximum deflection at joints in curved alignments, shall be in accord with accepted best practice and as detailed in the manufacturer's installation manual. Both joint surfaces shall be clean before joints are made. Materials

used in jointing the pipe shall only be that furnished with the pipe or recommended by the manufacturer. Excess solvent that appears at the outer shoulder of the fittings shall be wiped off.

Where necessary to properly locate valves and fittings the pipe shall be neatly and squarely cut length, using methods recommended by the manufacturer.

When field cuts are made in polyvinyl chloride pipe, a pipe cutter or carpenter's miter box must be used. The cut ends shall be cut square and all burrs removed from the pipe interior. The beveling of the pipe ends shall be as specified by the manufacturer. Guide marks for jointing the pipe, after cutting, must be made on the pipe in accordance with the manufacturer's specification.

On water systems, excepting water systems being installed as part of new subdivision improvements, no more than 3000 lineal feet of water main shall be installed before starting installation of the water services, with this approximate sequence maintained throughout the construction project.

Testing, flushing, placement of first lift of paving and cleanup shall follow pipe laying and service line construction as a continual operation, or as designated by the Engineer, with the provision that these phases of the work shall be completed no later than 15 working days after starting construction in any portion of the project.

Connection To Existing Mains - Under no circumstances shall anyone other than a representative of the Department of Public Works open or close any valve in a City operated water system. When a water service or lateral is to be connected to an existing line, City forces shall make the tap into the existing main, unless otherwise set forth in the Supplemental Conditions. Application should be made to Department of Public Works and the required fees paid at least 5 working days in advance of the time the tap is desired. All excavation and backfill, and the installation of the remainder of the water lateral or 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 Department of Public Works.)

In general, shutdowns shall be made only at times when there will be the least interference with consumer service. Connections shall be made only after complete and satisfactory preparation for such work has been made, in order that the shutdown may be of as short duration as possible. Notification to Fire Districts and to all consumers whose water service will be interrupted shall be made by the Department of Public Works unless otherwise set forth in the Supplemental Conditions.

Locating Wire - All runs of non-metallic water pipe, including services, shall have a No. 10 gauge solid, bare, soft drawn copper wire laid along the pipe to facilitate locating the pipe at a later date. The wire shall be stubbed up inside each valve box, and be placed as shown on Standard Drawing No. 29-B. Wire extending into the valve boxes shall have 4/64 inch polyvinyl chloride insulation.

Regulations Relating to Sanitary Hazards - All construction shall conform to applicable regulations relative to safeguarding the public health, particularly the regulations relating to cross connections as established by the California Administrative Code, Title 17, Division 5, Sections 7583-7605.

In designing the distribution system, it is intended that 10 feet be the minimum horizontal distance between parallel water and sanitary sewer lines and services, and that the water main be at least 12 inches higher, per Title 22, California Administrative Code, Section 64630. No field changes shall be made that conflict with this requirement without the prior approval of the Engineer. When crossing a sanitary sewer force main, the water main shall be a minimum of 1 foot above the sewer force main and shall be constructed of pipe materials with a minimum rated working pressure of 200 psi or equivalent pressure rating. All portions of any new sewer force main within 10 feet horizontally of a water main shall be enclosed in a continuous sleeve, as specified or directed by the Engineer.

76-12 Backfilling - Backfilling shall not be completed until the pipe has been properly installed to the satisfaction of the Engineer.

Backfill materials shall be placed on both sides of the pipe simultaneously to prevent any undue strain on the pipe.

Embedment material shall be imported backfill material placed in the trench in six (6) inch layers to a depth of twelve (12) inches above the pipe and shall be hand tamped, or compacted to 85 percent relative compaction.

Intermediate backfill shall be imported backfill material placed and compacted as shown by mechanical means on Standard Drawing No. 13. This Standard shall be used as a minimum in all new construction unless otherwise noted in the Supplemental Conditions.

Imported backfill material shall be of clean, imported sand, free of vegetation, silt, and clay and shall have a minimum sand equivalent (S.E.) value of 30 as determined by the State of California, Caltrans, Standard Test Procedures.

Backfilling and bedding for PVC pipe shall be performed in accordance with Standard Drawing No. 13 and the manufacturers recommendations.

The Contractor shall do all excavating, loading, hauling, placing and compacting of the material in place.

All pipe damaged during construction operations shall be replaced by the contractor as his expense to the satisfaction of the Engineer.

Trench Resurfacing - Trenches in existing streets, except streets which are to be closed or abandoned, shall be resurfaced with the type of thickness of bases, surfacing or pavement shown on the plans and/or Standard Drawing No. 13.

The contractor shall proceed immediately to resurface any part of any excavation upon notice from the Engineer without waiting for completion of the full length of line.

76-13 Installation of Water Services - Materials for water services shall be as specified in Section 76-09. Generally, a service shall consist of a corporation stop in a saddle at the main, service line of approved material, and a curb stop or gate valve at the property or easement line, as required by the above referenced section. Non-metallic services shall have a locating wire as specified in Section 76-11.

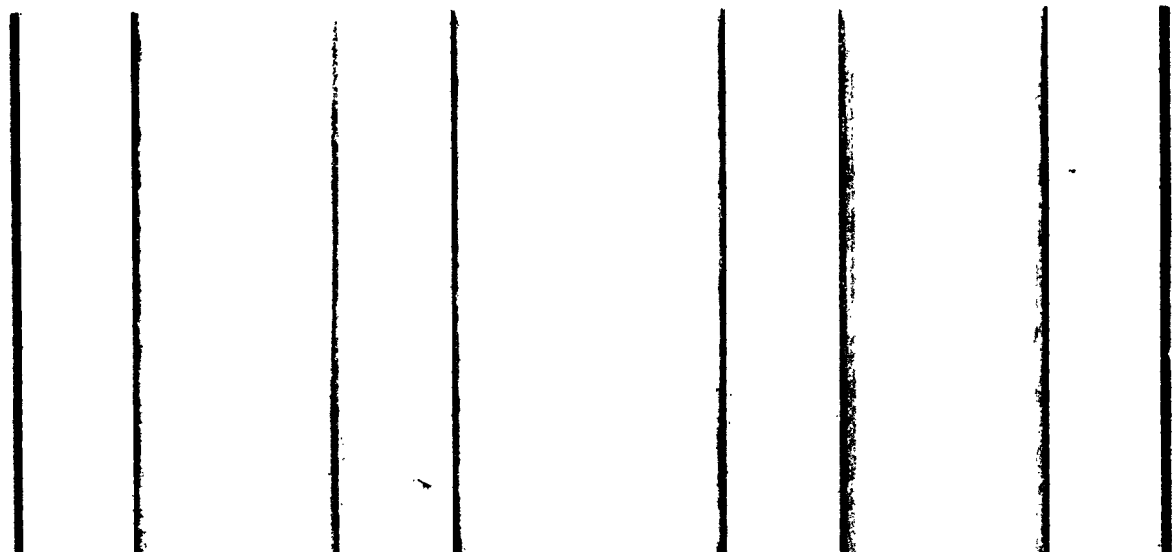
The water main shall be tapped at the service locations shown on the plans and construction completed by the Contractor in accordance with Standard Drawing Nos. 27-A, B & C. A minimum distance of 18 inches between taps must be maintained. The service line may be either laid in an open cut or placed through a hole produced by jacking or drilling. Water services to adjacent lots may be laid in a common trench, provided that a minimum center to center spacing of 18 inches is maintained, with no service at the right-of-way line less than 9 inches from the common property line.

Where water service lines are installed by the open cut method, the service line trench shall be backfilled in the same manner as the water main trench except, however, service line trenches crossing an existing street shall be completely backfilled with sand, to an elevation of 6 inches minimum over the top of the service pipe.

Applicable codes prohibiting the laying of water pipe in the same trench as the service sewer shall be rigidly enforced.

76-14 Disinfecting Water Mains

General - The interior of all pipe, fittings, and other accessories shall be kept as free as possible from dirt, foreign material and bacteria at all times. During pipe laying operations, when bacterial contamination of interior pipe surfaces is obvious or suspected by the Engineer he may order said surfaces to be swabbed with an approved bactericidal solution.



Disinfection and Flushing - After all other work has been completed, and prior to placing in service, all water lines shall be completely disinfected in accordance with ANSI/AWWA C651.

The main shall be flushed as thoroughly as possible with the water pressure and outlets available, prior to chlorination. However, if calcium hypochlorite tablets are attached to the pipe at the time of installation for purposed of sterilization, it will not be possible to flush the main prior to disinfection. It will therefore be necessary that extreme care be exercised in keeping the pipe clean during installation. The number of calcium hypochlorite tablets used shall be in accordance with the following table, which is based on 5 gram tablets. Proportionately more tablets will be required if they are of a smaller size.

TABLE I
NUMBER OF TABLETS REQUIRED FOR
MAIN STERILIZATION

Length of Section	Diameter of Pipe					
	4"	6"	8"	10"	12"	16"
13' or Less	1	1	1	2	3	4
18'	1	1	2	3	4	6
20'	1	1	2	3	4	7
30'	1	2	3	4	6	10
40'	1	2	4	5	7	13

Prior to acceptance of the system by the Engineer, all mains shall be thoroughly flushed.

Isolation of New Mains - All new water lines shall be completely isolated from any existing main until they have been tested and disinfected to the satisfaction of the Engineer. New mains may be filled from existing mains only by temporary tap thereto and through a system of one (1) shut-off valve and two (2) check valves so arranged as to provide positive backflow prevention. When new main is properly disinfected and the isolation dam is removed from connection flange or other type connection is made, extreme care shall be exercised to prevent the entry of contamination. Connection fittings shall be thoroughly swabbed with an approved bactericide immediately prior to their installation.

76-15 Testing

Flush the mains thoroughly at the end of the contact period. The DPD test shall show no more chlorine in the water leaving the main than in the water entering the main.

The Engineer will collect a sample for bacteriological examination in a sterile bottle provided by the laboratory. On the label, give date, address, and the job number. Where possible the sample should be taken from a service located near the end of the chlorination section, otherwise, it may be taken through the same blowoff used for flushing the heavily chlorinated water out of the main so that the blowoff is sterilized.

If the bacteriological tests are unsatisfactory, the main shall be re-sterilized using Method No. 2 (Sec. 5.2, AWWA C651) or Method 3 (Sec. 5.3, AWWA C651), and the sterilization repeated, if necessary, until satisfactory results are obtained.

Acceptance Test - After completion of the installation, the Contractor shall test all piping to the pressure hereinafter specified. The Contractor shall furnish all material, equipment, and labor for such testing. The system may be tested as a unit or in sections as directed by the Engineer, but each unit tested shall successfully meet the requirements herein specified. The water services shall be considered as part of the main for test purposes.

In no case shall there be placement of permanent pavement prior to successful completion of the test. Joints and fittings must be backfilled to the horizontal diameter of the pipe and the pipe between joints backfilled to a depth necessary to hold the line securely during the test, but in no case less than 18 inches. Thrust blocks shall have been in place for at least 36 hours if high-early-strength cement was used or at least 7 days if standard cement was utilized. The contractor shall take the necessary precautions to insure that the pipe fittings, couplings, valves, and other appurtenances are not displaced during the test.

Each section of the pipe to be tested shall be slowly filled with water, and all air shall be expelled from the pipe. The release of the air can be accomplished by opening hydrants and service line cocks at the high points of the system and the blowoffs at all dead ends. The valve controlling the admission of water into the section of pipe to be tested should be opened wide before shutting the hydrants or blowoffs. After the system has been filled with water and all air expelled, all the valves controlling the section to be tested shall be closed and the line remain in this condition for a period of not less than 24 hours.

The pipe shall then be refilled, if necessary, and subjected to a pressure of not less than 150 pounds per square inch, or the service pressure plus 50 pounds, whichever is greater, for a period of 1 hour.

The allowable leakage in the test section shall not exceed 2 gallons per hour per mile per inch diameter of pipe tested.

All leaks that are found shall be immediately corrected and the system again subjected to the same test for a period of one hour. It shall be the contractor's responsibility to locate and repair the points of line failure; fill, re-compact the trench and re-test the section of line in the event the line fails the leakage test. Even if the leakage is less than the allowable, all observed leaks shall be repaired.

The Contractor shall take all necessary precautions to prevent any joints from drawing while the pipe lines and their appurtenances are being tested and shall, at his own expense, repair any damage to the pipes and their appurtenances, or to any other structures, resulting from or caused by these tests.

76-16 Measurement - The work to be performed under these specifications will be listed in the contract items by size, class type, or whatever information is necessary for identification.

The length of pipe to be paid for will be the slope length designated by the Engineer.

Pipe bends, wyes, tees, and other branches will be measured by the linear foot for the sizes of pipes involved.

76-17 Payment - The unit price bid per lineal foot of water main of the respective sizes and types set forth in the Proposal shall include the furnishing of all materials for construction of the water pipeline and the appurtenances and all labor, materials, and equipment necessary to excavate the trench, remove all obstructions, remove and replace all utilities where necessary, bed, place and joint the pipe, place thrust blocks, backfill the trench, restore the street surface, disinfect, flush and test the pipe lines, make connections to existing facilities, furnish preconstruction photographs where specified in the Supplemental Conditions, and do all other work necessary to produce a complete and finished job in accordance with the plans and specifications. The unit price bid shall be the average price for all mains and appurtenances of a given size.

* * * * *

CITY OF SOLEDAD
LIST OF APPROVED WATER SYSTEM APPURTENANCES

Water Meters:

5/8" to 2" - Neptune T-10
2" or larger - approval by the Public Works Director

Fire Hydrants:

Clow-Rich 550W with one (1) 2-1/2" outlet
and one (1) 4-1/2" outlet

Gate Valves:

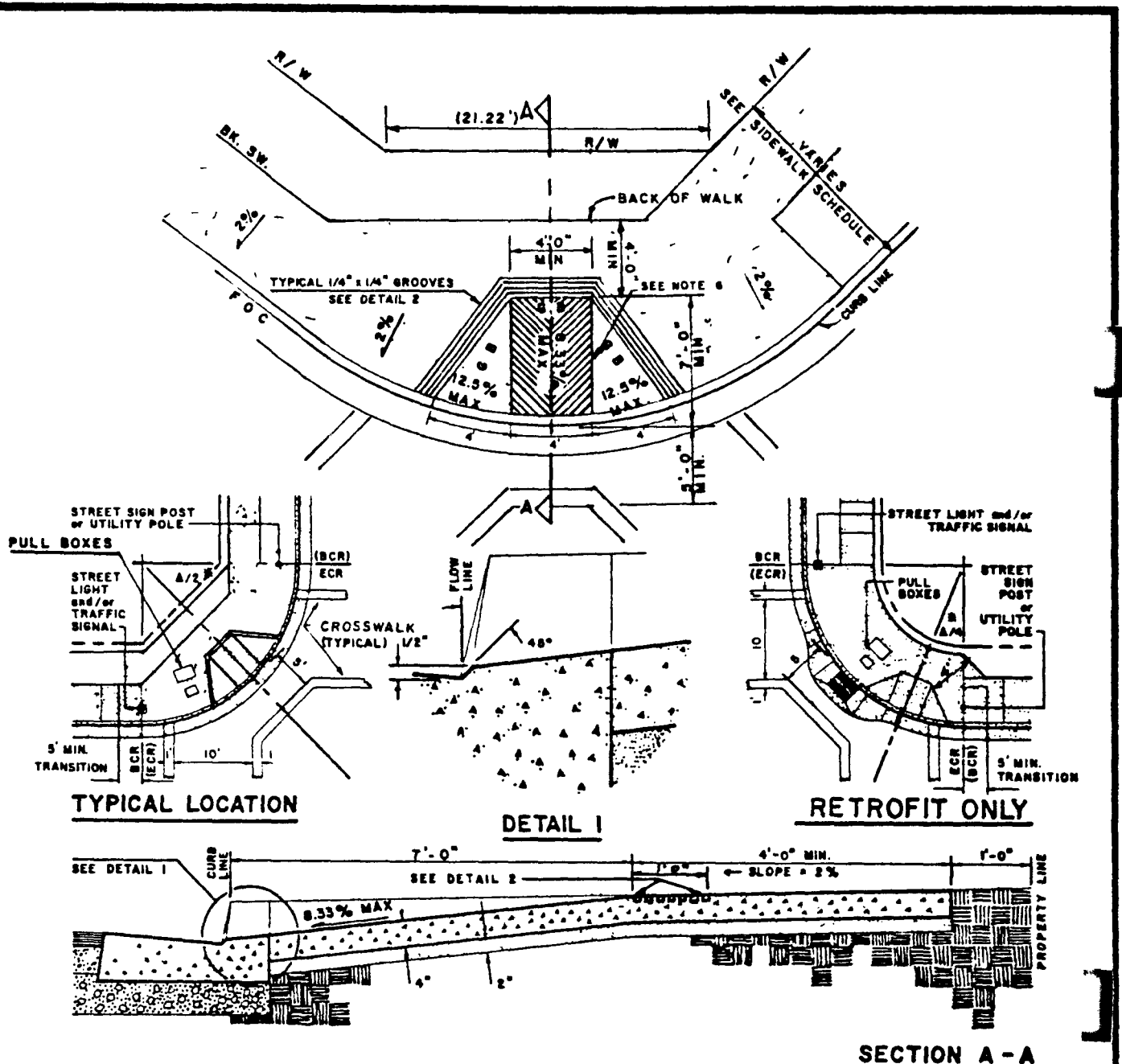
Mueller Company

Backflow Prevention Assemblies:

Approval for specific conditions by the Public Works Director
and the City Engineer. The assemblies must be on the "List
of Approved Backflow Prevention Assemblies", latest date, by
the Foundation For Cross-Connection Control and Hydraulic
Research. This list is maintained by the City Engineer.

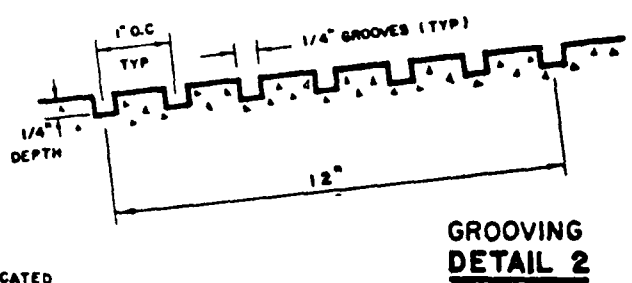
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NOTES:

1. ACCESS RAMP SHALL BE MONOLITHIC, CLASS B P.C.C. 4" THICK WITH 2" SAND CUSHION, AND WITH A COARSE BROOM FINISH.
2. WIDTH OF SIDEWALK AND RADIUS OF CURB RETURN SHALL BE PER CONSTRUCTION DRAWINGS.
3. CURB AND GUTTER SHALL BE PER STANDARD PLAN NO. 1.
4. SIDEWALK SHALL BE PER STANDARD PLAN NO. 2.
5. ALTERNATIVE LOCATIONS/CONFIGURATIONS ARE SUBJECT TO PRIOR APPROVAL BY THE CITY ENGINEER.
6. PROVIDE GROOVES (2" O.C.) ON SLOPING PORTION OF RAMP WHEN LOCATED WITHIN CURB RETURN W/ALIGNMENTS PARALLEL TO CROSSWALK STRIPING.



ACCESS RAMP

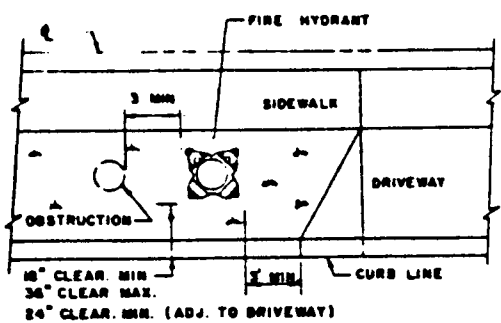
DEPARTMENT OF PUBLIC WORKS
CITY OF SOLEDAD, CALIFORNIA

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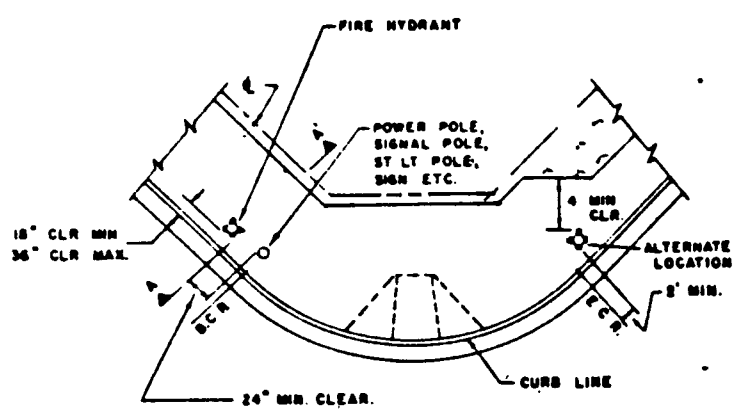
DATE

STANDARD DETAIL

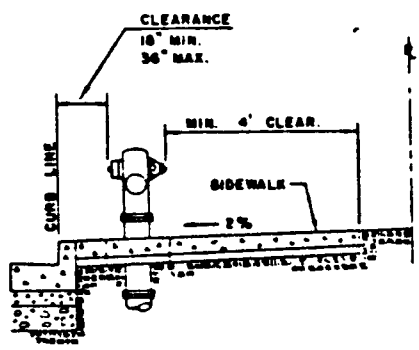
CITY ENGINEER RCE 17,186
(EXPIRES 6-30-91)



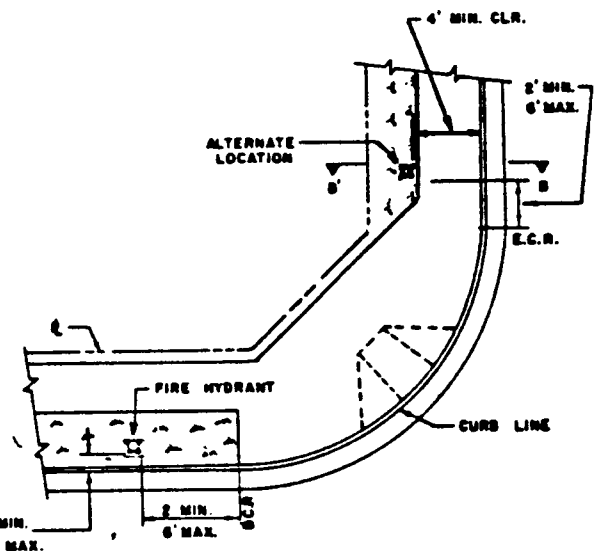
CASE A IN PARKWAY STRIP



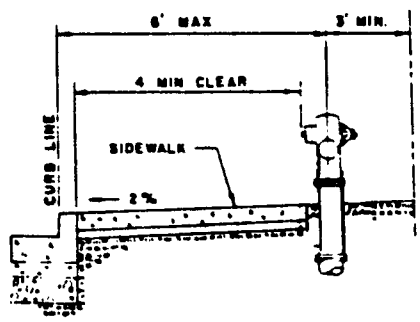
CASE B. IN SIDEWALK AT CURB RETURN



SECTION A-A'



CASE C IN PARKWAY/PLANTER AT CURB RETURN



SECTION B-B'

NOTES

1. SIDEWALKS ADJACENT TO FIRE HYDRANT LOCATIONS SHALL BE A MINIMUM 4' WIDE (CLEARANCE) FOR PEDESTRIAN TRAFFIC.
2. DETAILS SHOW PREFERRED HYDRANT LOCATIONS NO DIMENSIONS OR DETAIL HEREON SHALL PRECLUDE THE FINAL LOCATION OF FIRE HYDRANT IN THE FIELD BY THE FIRE DEPARTMENT.
3. SEE STANDARD PLAN 12 FOR FIRE HYDRANT CONSTRUCTION.

FIRE HYDRANT LOCATION

DEPARTMENT OF PUBLIC WORKS
CITY OF SOLEDAD, CALIFORNIA

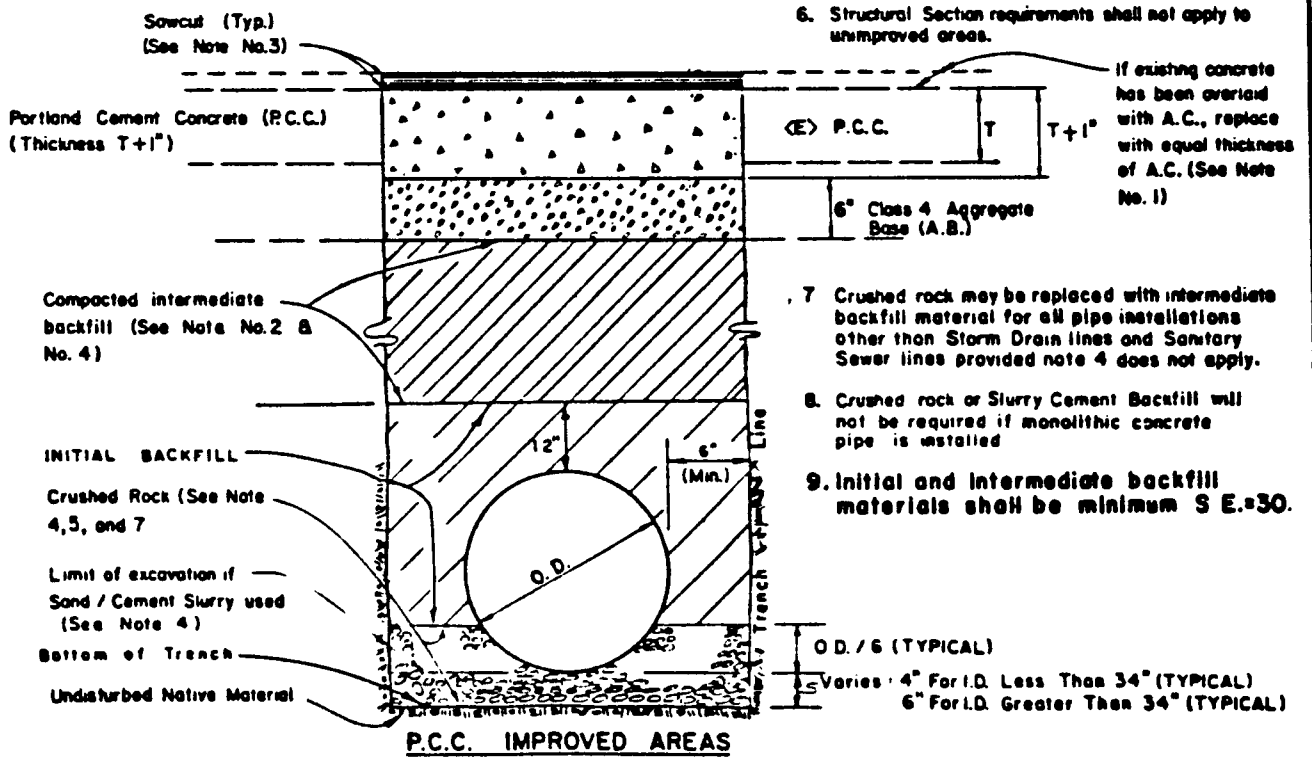
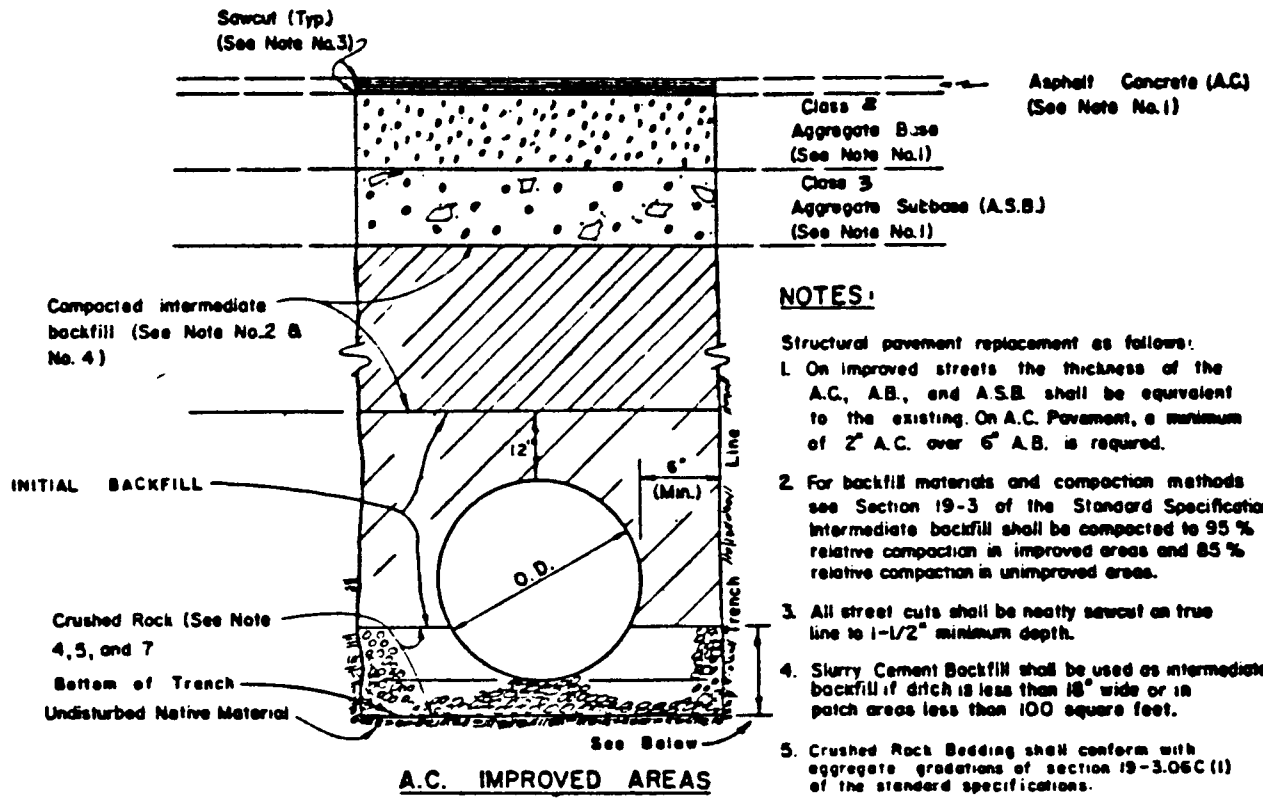
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STANDARD DETAIL

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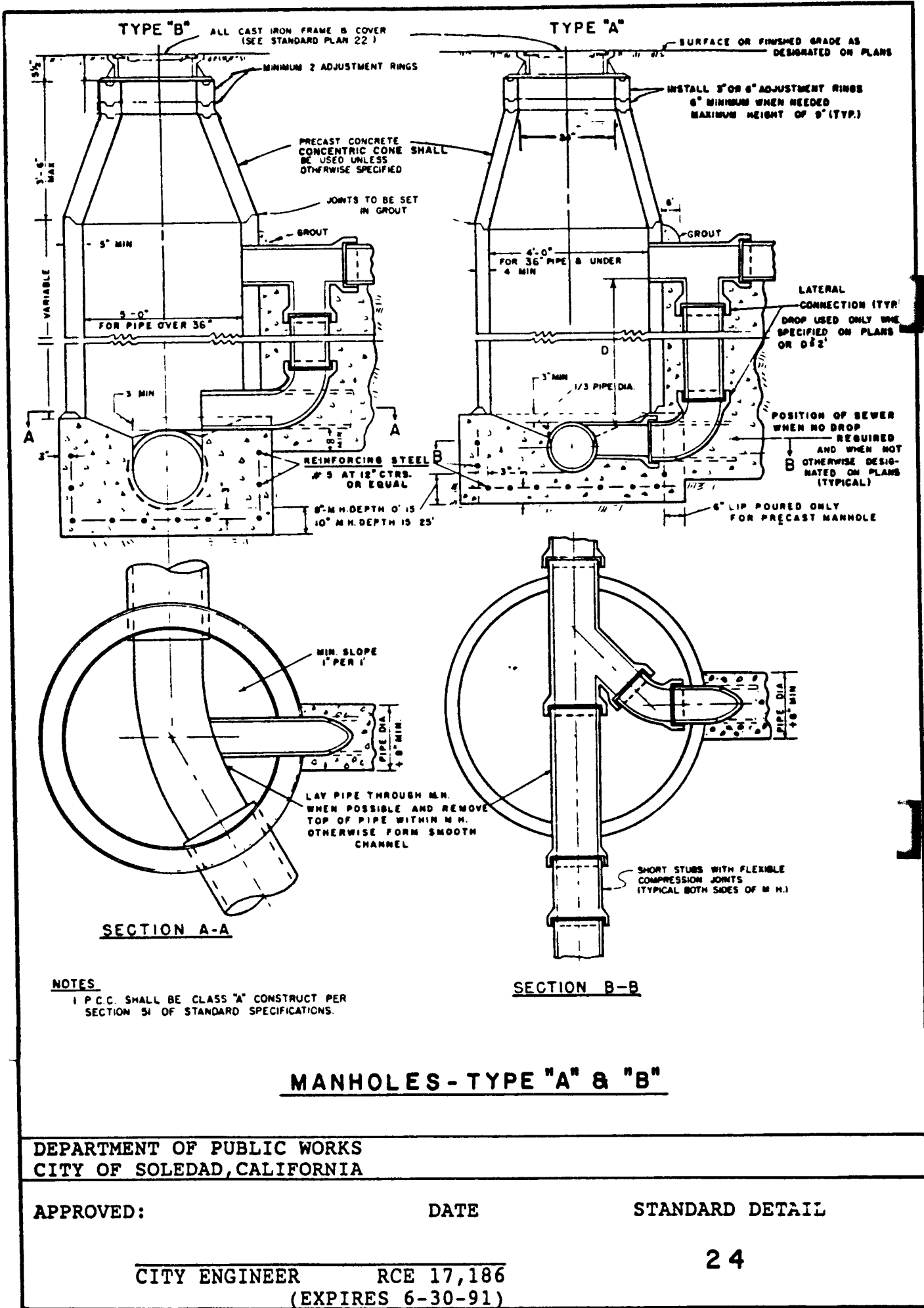


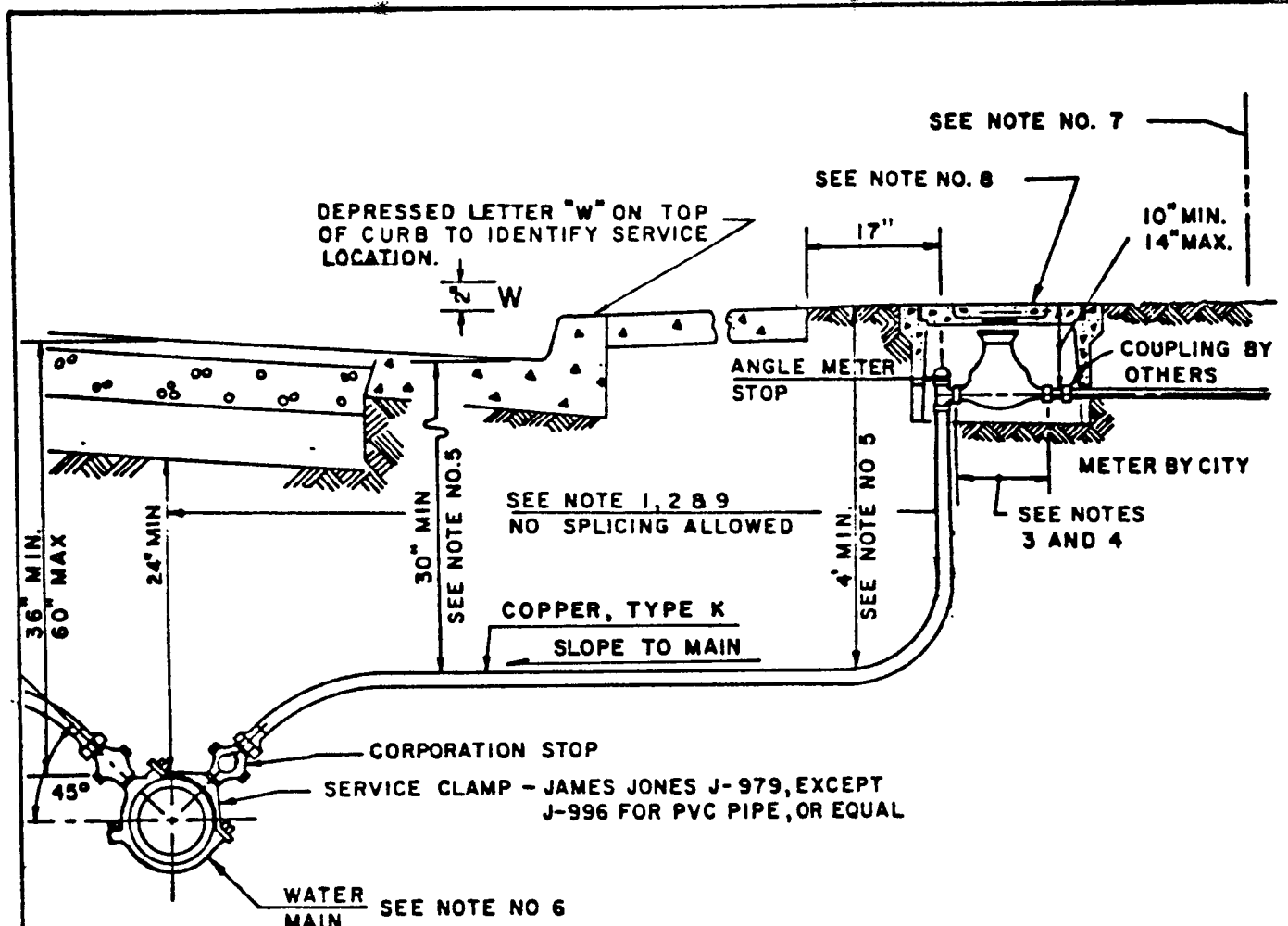
TRENCH BACKFILL AND SURFACE RESTORATION

DEPARTMENT OF PUBLIC WORKS
CITY OF SOLEDAD, CALIFORNIA

APPROVED: _____ DATE _____ STANDARD DETAIL

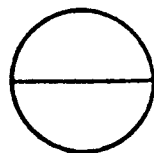
CITY ENGINEER RCE 17,186
(EXPIRES 6-30-91)





NOTES:

1. 3/4" OR 1" DIA. LINE TO EACH LOT.
2. SEE DETAIL NO. 28 FOR FITTINGS.
3. METERS SHALL BE FURNISHED AND INSTALLED BY CITY.
4. ALLOW 12" MIN. CLEARANCE FOR 1" METER AND 14" MAX. BURY.
5. MAXIMUM 5' DEPTH WHERE GOVERNED BY ADJACENT UNDERGROUND ELECTRIC, GAS, TELEPHONE, OR OTHER UTILITY.
6. THE LOCATION OF THE TAP SHALL BE A MINIMUM OF 18" FROM ANOTHER TAP, BELL, SPIGOT, OR OTHER FITTING.
7. METER BOX MAY BE PLACED ADJACENT TO PROPERTY OR EASEMENT LINE WITH PRIOR APPROVAL OF THE DIRECTOR OF PUBLIC WORKS.
8. USE BROOKS NO. 36 BOX AND 36H LID, OR CHRISTY BX9 BOX AND BX9G LID, OR EQUAL.
9. COPPER, TYPE K, SERVICE PIPE TO BE CONTINUOUS (NO JOINTS) BETWEEN MAIN AND METER.
10. SERVICE LINES FROM ALL METERS TO PROPERTY LINE SHALL HAVE A MINIMUM OF 10" COVER FROM TOP SIDEWALK OR GROUND LINE.



3/4" & 1" WATER SERVICE INSTALLATION

N.T.S

DEPARTMENT OF PUBLIC WORKS
CITY OF SOLEDAD, CALIFORNIA

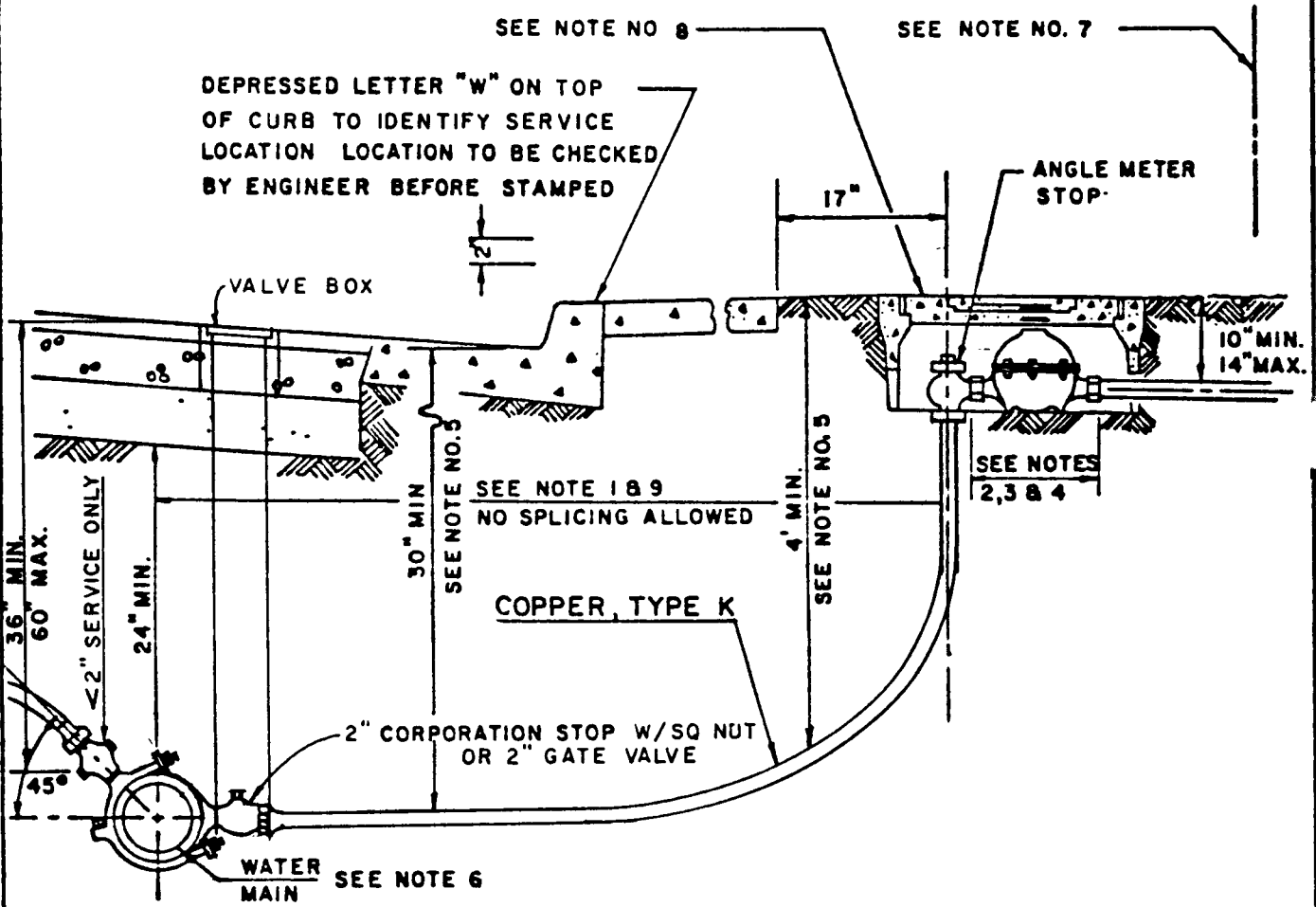
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DATE

STANDARD DETAIL

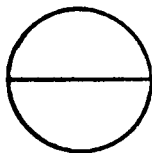
CITY ENGINEER RCE 17,186
(EXPIRES 6-30-91)

27-A



NOTES:

1. SEE DETAIL NO. 28 FOR FITTINGS.
2. METERS SHALL BE FURNISHED AND INSTALLED BY CITY.
3. ALLOW 13" MIN. CLEARANCE FOR 1-1/2" METER & 14" MAX. BURY
4. ALLOW 17" MIN. CLEARANCE FOR 2" METER AND 14" MAX. BURY.
5. MAXIMUM 5' DEPTH WHERE GOVERNED BY ADJACENT UNDERGROUND ELECTRIC, GAS, TELEPHONE, OR OTHER UTILITY.
6. THE LOCATION OF THE TAP SHALL BE A MINIMUM OF 18" FROM ANOTHER TAP, BELL, SPIGOT, OR OTHER FITTING.
7. METER BOX MAY BE PLACED ADJACENT TO PROPERTY OR EASEMENT LINE WITH PRIOR APPROVAL OF THE DIRECTOR OF PUBLIC WORKS.
8. USE BROOKS NO. 65 BOX AND 65H LID, OR CHRISTY B36 BOX AND B36G LID, OR EQUAL.
9. COPPER, TYPE K, SERVICE PIPE TO BE CONTINUOUS (NO JOINTS) BETWEEN MAIN AND METER.
10. SERVICE LINES FROM ALL METERS TO PROPERTY LINE SHALL HAVE A MINIMUM OF 10" COVER FROM TOP SIDEWALK OR GROUND LINE.



2" WATER SERVICE INSTALLATION

N.T.S

DEPARTMENT OF PUBLIC WORKS
CITY OF SOLEDAD, CALIFORNIA

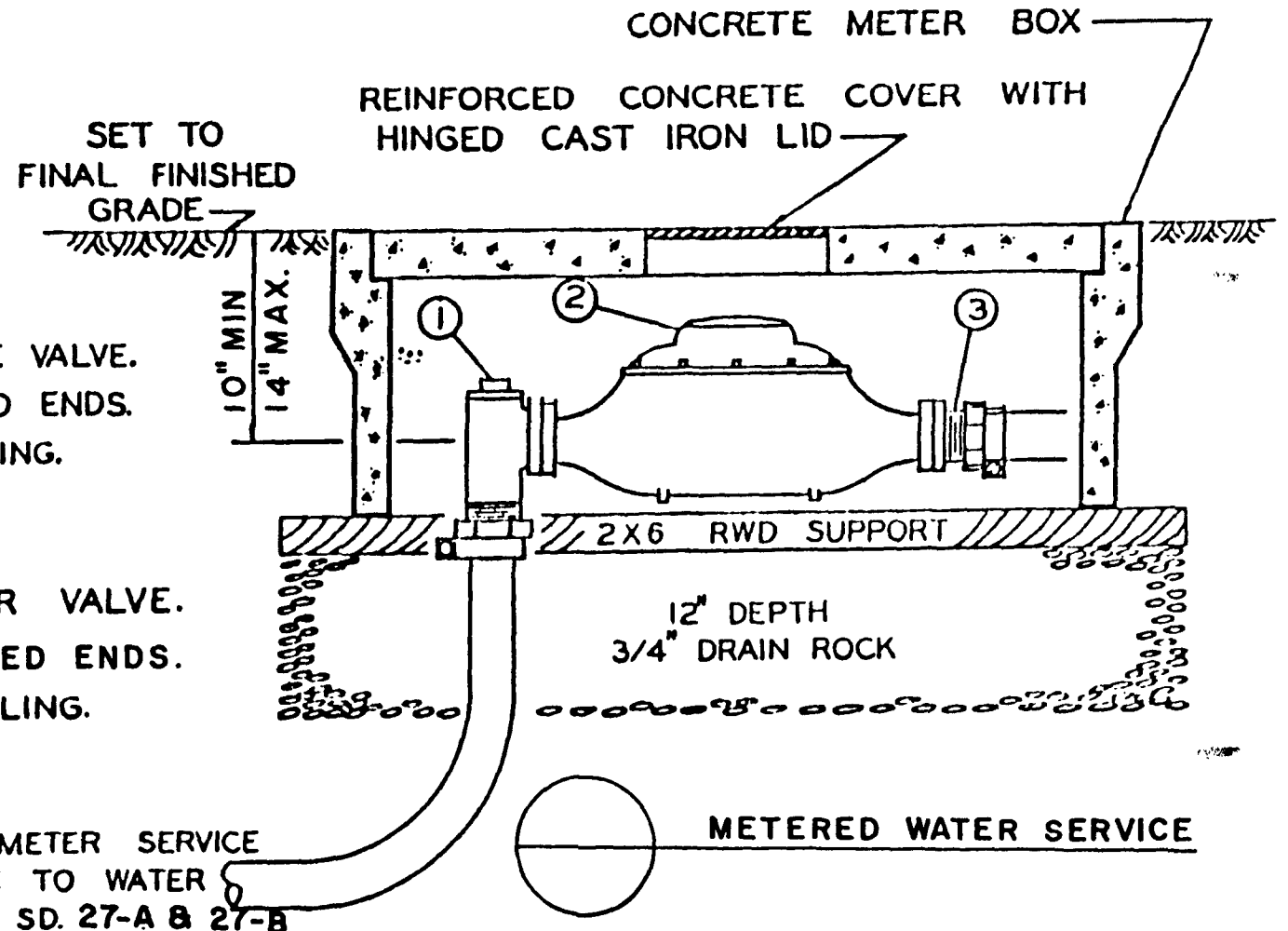
APPROVED:

DATE

STANDARD DETAIL

CITY ENGINEER RCE 17,186
(EXPIRES 6-30-91)

27-8



METER - 1" OR LESS

- ① THREADED METER ANGLE VALVE.
- ② WATER METER, THREADED ENDS.
- ③ THREADED METER COUPLING.

METER - 1 1/2" OR LARGER

- ① FLANGED ANGLE METER VALVE.
- ② WATER METER, FLANGED ENDS.
- ③ FLANGED METER COUPLING.

FOR WATER METER SERVICE
 CONNECTION TO WATER
 MAIN, SEE SD. 27-A & 27-B

DEPARTMENT OF PUBLIC WORKS CITY OF SOLEDAD, CALIFORNIA		
APPROVED:	DATE	STANDARD DETAIL
CITY ENGINEER	RCE 17,186 (EXPIRES 6-30-91)	27-C

NOTE: SEE DETAILS NOS. 27-A, 27-B, AND 27-C FOR DETAILS.

UNDERGROUND SERVICE LINES

SERVICE LINES SHALL BE COPPER SERVICE TUBING, TYPE K, PER ANSI/AWWA C800 STANDARD. CONNECTION SHALL BE AS FOLLOWS:

1. SERVICE SADDLES

SERVICE SADDLES FOR ALL SIZE MAINS SHALL BE AS MANUFACTURED BY JAMES JONES J-979 OR FORD 202B, OR EQUAL (I.P. THREAD).

2. CORPORATION STOPS

A. 3/4" AND 1" DIAMETER CORPORATION STOPS SHALL BE AS MANUFACTURED BY JAMES JONES J-3403 OR FORD F1100, OR EQUAL.

B. 1-1/2" DIAMETER CORPORATIONS STOPS SHALL BE AS MANUFACTURED BY JAMES JONES J-1935 OR FORD FB1100, OR EQUAL.

C. 2" CORPORATION STOPS SHALL BE AS MANUFACTURED BY JAMES JONES J-1935 OR FORD FB1100, OR EQUAL, WITH A SQUARE OPERATING NUT OR ALTERNATE 2" GATE VALVES WITH SQUARE NUT MAY BE USED WITH APPROVAL BY THE PUBLIC WORKS DIRECTOR.

3. ANGLE METER STOPS

A. 3/4" AND 1" ANGLE METER STOPS SHALL BE AS MANUFACTURED BY JAMES JONES J-4201 OR FORD KV-43, OR EQUAL.

B. 1-1/2" AND 2" ANGLE METER STOPS SHALL BE AS MANUFACTURED BY JAMES JONES J-4205 OR FORD FV-23, OR EQUAL.

4. WATER METER BOXES

A. 3/4" AND 1" METER BOXES SHALL BE: CHRISTY BX9 BOX WITH BX9G LID, OR BROOKS 36 BOX WITH 36H LID, OR EQUAL.

B. 1-1/2" AND 2" METER BOXES SHALL BE: CHRISTY B36 BOX WITH B36G LID, OR BROOKS 65 BOX WITH 65H LID, OR EQUAL.

C. DOUBLE SERVICES SHALL BE SET IN SEPARATE METER BOXES PER A & B ABOVE.

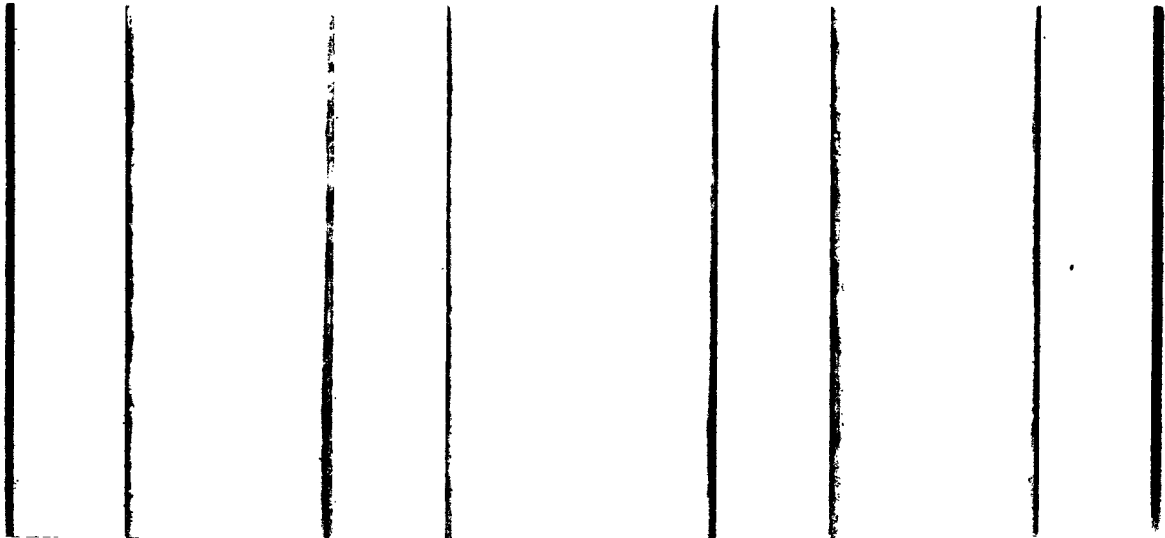
DEPARTMENT OF PUBLIC WORKS
CITY OF SOLEDAD, CALIFORNIA

APPROVED:

DATE

STANDARD DETAIL

CITY ENGINEER RCE 17,186
(EXPIRES 6-30-91)



REQUIRED BEARING AREA — TOTAL SQUARE FEET

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								
SIZE OF PIPE	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 PSI IN SOIL WITH 2,000 PS.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.

THRUST BLOCK BEARING AREA
 STANDARD DETAIL 29-A
 DEPARTMENT OF PUBLIC WORKS
 CITY OF SOLEDAD, CALIFORNIA

APPROVED: _____ DATE _____

CITY ENGINEER RCE 17,186
 (EXPIRES 6-30-91)

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SECTION 71
SANITARY SEWERS

71-01 Description - All work to be done under this section shall conform to Section 71 of the City of Salinas Standard Specifications, except as herein modified.

71-1.02 Materials - Pipe, fittings, miscellaneous materials and the most common joint materials are described in this Section 71-1.02.

Portland cement used in the production of concrete products set forth in this Section 71-1.02 shall be Type II Modified cement conforming to the provisions in Section 90, "Portland Cement Concrete."

71-1.02A Reinforced Concrete Sewer Pipe - Reinforced concrete pipe shall not be used.

71-1.02D Acrylonitrile-Butadiene-Styrene (ABS) Sewer Pipe - Pipe sizes four (4) and six (6) inch diameter shall conform to ASTM D2751 with minimum wall thickness determined by SDR 35.

Pipe sizes eight (8) through fifteen (15) inch diameter shall conform to ASTM D2680 with Type OR or Type SC joints.

71-1.02E Asbestos Cement Sewer Pipe - Asbestos Cement pipe shall not be used.

71-1.02F Bituminous Lined Corrugated Metal Pipe - Bituminous lined corrugated metal pipe shall not be used.

71-1.02G Cast Iron Pipe and Fittings - Cast iron pipe shall not be used.

71-1.02K Rubber Gasketed Joints - Rubber gasketed joints shall conform to the provisions in Section 65-1.06B, "Rubber Gasketed Joints".

71-1.02L Polyvinyl Chloride PVC Sewer Pipe - All solid wall pipe and fittings in 4" through 15" in diameters shall conform to either ASTM D3034, SDR 35 minimum wall thickness or ASTM F789.

71-1.03 Excavation and Back-fill - Excavation and back-fill shall conform to the provisions shown on City Standard Plan No. 13.

Trenches shall not be left open farther than 100 feet in advance of pipe laying operations or 100 feet to the rear thereof, unless otherwise permitted by the Engineer.

71-1.05B Pipe Joints

A. Vitrified Clay Pipe - Either polyvinyl chloride or polyurethane compression joints may be used. Materials shall conform to ASTM Designation C-425.

Joints shall contain two sealing components, one bonded to the outside of the spigot and the other bonded to the inside of the socket. Sealing components shall be a plasticized polyvinyl chloride compound or polyurethane elastomer bonded to pipes and fittings at the pipe factory, and shall be cured to a uniform hardness and compressibility. The sealing components shall be shaped, sized, bonded, and cured in such a manner as to form a tight, dense, and homogeneous compression coupling when the joint is assembled. Any imperfection in the sealing components will be cause for rejection.

Upon installation, the meeting surfaces shall be wiped clean of dirt and foreign matter, then an approved lubricant shall be applied to the joint surfaces. The spigot shall be positioned inside the socket and the joint shoved home. For large diameter pipe, a lever attachment or bar cushioned with a wooden block shall be used to shove the joint into place.

In no case shall a bar be used on an unprotected joint surface. Mating surfaces shall be in tight contact with each other upon completion of the joint installation.

Polyvinyl chloride joints may be used on curves, provided that the radius of curvature is not less than shown in the following table, unless beveled pipe or shorter lengths are provided:

Pipe size Inches	Maximum Pipe Length Feet	Minimum Radius of Curvature	Maximum Deflection
6	5	100	2½00'
8	5	100	2½00'
8	6	115	2½00'
10	5	185	1½33'
10	6	220	1½33'
12	5	215	1½20'
12	6	260	1½20'
15	5	275	1½03'
15	6	330	1½03'

Polyurethane joints may be permitted for use on curves, provided that the radius of curvature is not less than shown in the following table, unless beveled pipe or shorter lengths are provided:

Pipe size Inches	Maximum Pipe Length Feet	Minimum Radius of Curvature	Maximum Deflection
6	5	100	2½00'
8	5	100	2½00'
8	6	115	2½00'
10	5	170	1½41'
10	6	205	1½41'
12	5	150	1½54'
12	6	180	1½54'
15	5	190	1½32'
15	6	225	1½32'
18	5	225	1½16'
18	6	275	1½16'
21	5	265	1½06'
21	6	315	1½06'
24	5	240	1½12'
24	6	290	1½12'
27	5	270	1½04'
27	6	325	1½04'
30	5	300	0½58'
30	6	360	0½58'
33	5	275	1½03'
33	6	330	1½03'
36	5	295	0½59'
36	6	355	0½59'
39	5	325	0½54'
39	6	385	0½54'
42	5	345	0½50'
42	6	415	0½50'

B. ABS Sewer Pipe

1. Pipe lengths and fittings shall be joined by utilizing elastomeric gaskets as referenced in ASTM D2680 and D2751 and meeting the requirements of ASTM D3212 "Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals," or solvent weld joints.

Solvent weld joint or usage shall conform to ASTM F402 "Safe Handling of Solvent Cements and Primers Used for Joining Thermoplastic Pipe and Fittings," and the following requirements:

- a. All ABS pipe joints, fittings and surfaces to be joined by solvent welding shall be connected with adhesive cement conforming to ASTM D2680 for ABS composite sewer pipe or to ASTM D2751 for 4-inch and 6-inch ABS solid wall pipe. (Solid wall ABS limited to 4-inch and 6-inch pipe with 35 SDR maximum).

b. Prior to joining ABS pipe joints, fittings and surfaces, dirt, mud or any other foreign material shall be thoroughly removed and cleaned from the joints, fittings and surfaces to be joined.

c. A coat of adhesive cement shall be liberally and thoroughly applied to the joints, fittings and surfaces to be joined. After application of the adhesive cement, the pipe joints, fittings, and surfaces to be joined shall be immediately fitted and joined without interruption.

For bell and spigot connections, the spigot end of each pipe shall be fitted to the full depth of the bell socket.

d. When the temperature is below 40 degrees F., a primer shall be applied to the pipe surface to be cemented and joined.

2. Reducing Wyes:

a. Reducing wyes for service laterals shall be either saddle type wyes or in-line bell and spigot type wye fittings. All reducing wyes shall be premolded and factory fabricated.

b. Saddle Fittings:

1. In addition to the solvent welding of the saddle to the main pipeline, the saddle type wye shall be attached to the main pipeline with a stainless steel clamp.

2. Tapping hole for saddle fittings shall be cut with a cutting instrument. The hole shall be of the same size and shape of the lateral pipe and shall provide a smooth and continuous interior pipe surface.

3. Exposed Pipe Cross-Sections: Exposed cross-sections of the ABS composite sewer pipe shall be coated with adhesive cement prior to connection of pipe joints, fittings and surfaces.

4. Manhole Connections: At manhole connections, a manhole water stop shall be attached to the ABS pipe with a stainless steel clamp. The water stop shall be centered to the manhole wall with gasket fingers pointed to the outside of the wall.

C. PVC Sewer Pipe -

1. All joints shall be integral wall bell and spigot configuration, factory formed. All rubber rings shall conform to ASTM F477.
2. Reducing wyes for service laterals shall be in line bell and spigot type, factory molded.
3. Assembly of all joints shall conform to ASTM P3212.
4. Saddle fittings for lateral connection will be permitted; solvent welded.
5. Manhole connections shall be by rubber ring water stop installed on pipe and cast in center of manhole wall or four (4) inches from outside face of manhole base. Pipe section on water-stop at manhole shall have bell flush with outside of manhole or no more than ten (10) inch outside manhole.

71-1.04 Existing Manholes - Unless otherwise specified on the plans, all existing manholes, lampholes and terminal cleanout frames and covers that are removed become the property of the City.

71-1.07 Sewer Structures - Manhole frames shall be secured to the manhole cover or riser barrels with full mortar bed or full circle concrete collar that will effectively secure the frame to the manhole structure and provide a uniform bearing for the frame.

71-1.07.1 Coating Manholes

General - The interior of all sanitary sewer manholes downstream from pump stations, drop manholes, manhole pumping stations, and any other structure where the City Engineer determines that hydrogen sulfide gas may be a problem shall receive a polyurethane coating.

Material - The coating shall be a high build, two-component, 100% solids, non-solvented, hybrid polyurethane material. The flash point of the individual components and the fluid mixture shall be a minimum of 415 degrees F (COC). Application shall be 125 mils in thickness.

The cured coating shall have a Shore D hardness of 57 at 77 degrees F and shall be capable of passing the flexibility test as prescribed by ASTM D-1737 using an 8mm diameter mandrel. The coating shall have a minimum tensile strength of 2,500 PSI and a recoverable elongation of 30% minimum. It shall have good impact resistance and shall be able to bridge up to 1/8 inch settling crack, which may take place in the concrete structure, without damage to the coating. The coating shall be capable of repair at any time during its life.

The coating shall be resistant to attack from the following: Oxidizing agents such as bleaches, sulfuric, acetic, hydrochloric, phosphoric, nitric, chromic, oleic, and stearic acids; sodium and calcium hydroxides, ammonium, sodium, calcium, magnesium, and ferric chlorides; ferric sulfate, petroleum oils and greases, vegetable and animal oils, fats, greases, soaps and detergents. The coating shall be impermeable to sewage gases and liquids and shall be non-conductive to bacterial or fungus growth.

Surface Preparation - New concrete shall be aged 30 days. All foreign matter shall be removed from the surface of old concrete using solvents (no alcohol shall be used) if necessary to remove grease. For old concrete, all surfaces to be coated will be sandblasted or waterblasted to remove all residue, loose grout or loose brick. Surfaces of new concrete shall be washed with ten percent muriatic acid solution and flushed with water to remove lime. Surfaces which have retained a glossy smooth surface shall be abrasive waterblasted, sandblasted or power wire brushed to produce a satisfactory anchor for the coating. The surface must be dry when applying the coating. Cracks shall be sealed by spraying directly into the crack and then overcoating while still tacky.

Any steel surfaces in the area to be coated will be prepared and primed as required.

After blast cleaning the surface as described above, the surfaces of the concrete shall be dried by air blowing for four hours.

Application - The polyurethane coating shall be applied by high pressure airless spray with the two components mixing just before the spray gun. During application the applicators, including any persons in the immediate area, shall wear protective clothing including face masks, and anyone in the manhole during spraying shall be supplied respiration air.

71-1.08A Deflection Test for ABS and PVC Sewer Pipe - The contractor shall furnish all equipment needed to complete this test. The cost for the deflection test shall be included in the unit price bid for the sanitary sewer pipe. Deflection test shall be conducted after the placement and densification of backfill.

For PVC Pipe - see table.

For ABS Pipe - All mainline pipe shall be cleaned and then mandrelled to measure for obstructions (deflection, joint offsets, lateral intrusions, etc.). A rigid mandrel with a circular cross-section having a diameter at least 96 percent of the specified average inside diameter shall be pulled through the pipe. The method of measuring the deflection shall be approved by the City Engineer. Any pipe through which the mandrel will not pass shall be said to have failed and will be repaired by the contractor at his expense.

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At his option the Engineer may require a sample of ten percent (10%) of the laterals randomly selected by the inspectors shall also be tested for deflection. If difficulty is encountered in passing the mandrel test, the inspector may direct that a larger sample of laterals be tested up to including one-hundred percent (100%) of all laterals.

Contractor shall furnish properly sized mandrels for size and type of pipe installed. Certification of proper mandrel size shall be required and mandrel identified in a manner to identify with certification.

The following tables list minimum pipe I.D. deflections; i.e. O.D. of mandrel:

Table of Allowable Deflections for PVC

<u>Pipe Size & Type</u>	<u>Base I.D.</u>	<u>Min. Allowable I.D.</u>
4" PVC	3.966	3.66
6" PVC	5.742	5.36
8" PVC	7.665	7.18
10" PVC	9.563	8.98
12" PVC	11.361	10.69
15" PVC	13.898	13.08

At the contractor's expense, all locations with deflection greater than allowable shall be excavated, repaired or replaced, back-filled and re-tested.

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