Webster, MA

WEBSTER WATER DEPARTMENT

Water Construction Standards

November 2024

Approved by Water Sewer Commission-10.03.2024

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Standard Water Construction Details

Abbreviations and Terms

Whenever in these Standards the following abbreviations and terms are used, the intent and meaning shall be interpreted as follows:

Abbreviations:

AWWA	American Water Works Association
ASTM	American Society for Testing Materials
CTS	Copper tube size
DI	Ductile Iron
gpm	Gallons per minute
lb	Pound
O.D.	Outside diameter
MassDEP	Massachusetts Department of Environmental Protection
psi	Pounds per square inch
SBR	Styrene butadiene rubber
SDR	Standard dimensional ratio
USEPA	United States Environmental Protection Agency

Terms:

Backflow — The flow of water or other liquids, mixtures or substances into the distribution pipes of a potable water supply from any source other than the intended source.

Backflow Prevention Device(s) — Consist of any method to prevent backflow approved by MassDEP for use in Massachusetts.

Contractor — The person, firm, or corporation entering into a contract with the owner, developer, or the Town of Webster for the performance of work required under said contract and the Town of Webster's ordinances, rules, regulations, and standards.

Cross Connection — Any actual or potential connection between a distribution pipe of potable water from a public water system and any waste pipe, soil pipe, sewer, drain or other unapproved source.

Customer — Any Person who is the owner of a property with an active water service and/or account.

Double Check Valve Assembly — A backflow prevention device, which incorporates, and assembly of check valves, with shut-off valves at each end and appurtenances for testing.

Drain Layer — A person or company trained to build or repair water mains.

Main — Any water line owned and used by the Water Department to supply water to more than one person's property on more than one lot.

Owner — The owner of the property to be provided with new or modified water service.

Permit — The authorization by the Water Department to a licensed contractor to perform a specific task on the water system that has been approved by the Superintendent.

Service — All pipe, fittings, and appurtenances used for conveying water from a water main to the customer. The "Public" portion of the service shall be that section located either between the main and the curb stop or between the main and a location 10 feet beyond the Right of Way, whichever is less. The remainder shall be the "Private" portion of the service and the sole responsibility of the Owner.

Subgrade — The soil or rock material beneath a pavement structure. It is the portion of the roadbed on which pavement, surfacing, base, subbase, fill, or a layer of any other material is placed.

Tap — Physical connection to a water main which, together with appropriate license, effects water service to individual Customers.

Water Department
: Webster Water Department

Waterworks
: The system of reservoirs, wells, mains, pumping, and treatment by which a water supply is obtained and distributed to its users.

Section 1
General Requirements

This document describes the Town of Webster's water construction requirements, including those related to materials, installation, and testing. These "Water Standards" shall be enforced and interpreted, when necessary, by the Department. The Water Standards shall be construed as the minimum requirements of the Department. Although the Water Standards are intended to apply to most construction work, there may be aspects of construction activities that will require further interpretation by and guidance from the Department. The Water Standards may be amended or superseded by the Department at any time.

The Contractor/Owner/Developer shall design and construct any water system related construction and related items in accordance with the following:

1. Applicable Manufacturers' information and/or recommendations.
2. The construction and design requirements of the Massachusetts Department of Environmental Protection (MassDEP).
3. The construction and design requirements of the United States Environmental Protection Agency (EPA).
4. Construction and design practices that are accepted as "state of the art" in the Commonwealth of Massachusetts.
5. Drawings and Specifications authorized for the project if applicable.
6. The Town of Webster's Water Standards and Details, described in this document.

In the event of a conflict in the requirements listed above, the more restrictive requirements, as determined by the Department, shall govern in the design and construction of the water mains.

1.1 New Water Services and Right to Water

The Town of Webster charges a New Water Service Fee to allow any person or company to connect to the public water system. The fee is used to offset the future capital expenditures that will be required due to the additional water usage by a new connection. The fee does not include material, labor, or water. Any service pipe to be used for fire protection purposes (feeding hydrants, sprinkler systems, etc.) shall be a separate service from the main and subject to an entrance fee and annual fire protection fee. The entrance fee for all applicants shall be payable at the time of application. All entrance fees shall be non-refundable after approval of the application by the Water Department. See fee schedule in Town bylaw.

Approval of an application will guarantee the applicant the right to connect to the water system and that the present system is capable of supplying the proposed development. Any right to water granted by the Water Department will expire if the connection work is not completed within one (1) year of approval of the application. Right to water does not guarantee uninterrupted service, unlimited supply, water quality beyond that which is required by applicable regulatory authority. The Water Department shall not be held liable for any consequential or inconsequential damage resulting from service interruption or

water quality where said quality complies with the requirements of the applicable regulatory authority.

1.2 Water System Construction Requirements

Any person or company desiring to perform work or construction on the Webster Water System shall be a licensed drain-layer by the Town of Webster. Drain layer's licenses can be obtained from the Water Department.

Before any permit is issued for the installation of a water service, branch, or main the following must be presented to the Water Department:

1. A copy of the plot or subdivision plans approved by the Planning Board and sealed by a professional surveyor or engineer licensed in the Commonwealth of Massachusetts.
2. The Road Opening Permit issued by the Highway Department. All required bonds will be posted by the contractor on behalf of the Department in addition to those required by other Town Departments.

For work performed by developers and/or private contractors, and in the case of a water extension on or to a new development and on or to any private development, the owner of the property or the developer thereof shall provide new water mains and water service house connections in accordance with the following rules and regulations:

1. A design plan sealed by a professional engineer registered in the Commonwealth of Massachusetts, or a subdivision plan approved by the Planning and Zoning Board, shall be submitted to the Department, for review. All comments provided by the Department shall be addressed by the applicant to the satisfaction of the Department prior to issuance of a permit.
2. The Road Opening Permit issued by the Highway Department shall be submitted to the Department.
3. In the case of a new development which has the approval of the Planning Board, a plotted plan shall be submitted which has been recorded in the Worcester County registry of deeds. For other private projects that are approved by the appropriate Town agencies, a plan of the proposed water system shall also be submitted.

Any contractor involved in waterworks construction in the Town of Webster will strictly adhere to the provisions set forth herein. No equipment, tools or material will be rented or loaned from or provided by the Water Department. All material used must be of the same make and quality as set forth hereinafter.

All labor, equipment, and material costs to install a water system as specified herein, will be borne by the owner, developer, or contractor. Costs for taps into the public water system, and the restoration of any public way disturbed by this work, will also be borne by the owner, developer or contractor.

Before any water mains, water services, valves, hydrants, or related appurtenances are installed in a new subdivision or development, the contractor will bring the entire site where these water system components are to be located to subgrade. Such grades will be

verified by grade stakes set by a registered land survey or engineer employed by the owner or contractor so that the Town Engineer may expedite their checking of such grades.

Section 2 Standard Specifications

2.1 Corporation Stops

Corporation stops shall conform to AWWA C800 and shall be manufactured to ASTM B62 standards. Corporation stops shall be ball type, rated for a working pressure of 300 psi for sizes ¾ inch to 2 inches. Corporation stops shall be lead free per the Reduction of Lead in Drinking Water Act.

Inlet threads shall be AWWA tapered threads. Outlet ends shall be compression type suitable for connecting to CTS O.D. tubing. The corporations shall be easy turning, non-binding and designed to open clockwise (right).

Corporation stops shall be manufactured by the Ford Meter Box Company, Red Hed Manufacturing Co., A.Y. McDonald Manufacturing Co., Mueller Company, or approved equal.

All connections to the main greater than 1 inch in diameter and under 4 inches in diameter shall be made by the use of 2-strap corporation saddles manufactured by Smith-Blair, Mueller, or approved equal.

2.2 Curb Stops

Curb stops shall conform to AWWA C800 and shall be manufactured to ASTM B62 standards. The curb stops shall be ball type, without drains, furnished with compression connections at both ends. Curb stops shall be rated for a working pressure of 300 psi. Curb stops with drains may be allowed on seasonal installations, upon approval of the Water Department, or as part of air release valve assemblies. Curb stops shall open counterclockwise (left). Curb stops shall be lead free per the Reduction of Lead in Drinking Water Act.

Curb stops shall be manufactured by the Ford Meter Box Company or approved equal.

The curb stops and boxes shall be installed at or within 10 feet of the right of way line.

The curb box shall be 4-1/2 to 5-1/2 feet long, extension-type, with ¾-inch diameter stainless steel rod. Cover shall be provided with a counter sunk 1 inch brass plug tapped for 1 inch iron pipe. The curb box shall be manufactured by Ford Meter Box Company, A.Y. McDonald Manufacturing Co., or Mueller Company.

2.3 Water Main Fittings (bends, reducers, off-sets, tees and sleeves)

Buried fittings shall be constructed of ductile iron or gray iron and shall conform to ANSI/AWWA C110/A21.10 or ANSI/AWWA C153/A21.53. Fittings shall be a minimum of 8 inches in diameter and shall be the same diameter as the connecting piping. Fittings shall have mechanical joint ends.

Working pressure ratings shall be as follows:

1. Fittings less than or equal to 12 inches – 350 psi
2. Fittings greater than 12 inches and less than or equal to 24 inches - 350 psi
3. Fittings greater than 24 inches - 250 psi

Fittings shall be cement lined per AWWA C104 or fusion bonded epoxy coated with a 5 mil nominal thickness per AWWA C550 and AWWA C116. The cement lining shall be provided with a seal coat, which shall be in accordance with AWWA C104. Cement mortar lining shall be twice the standard thickness; tolerance shall be minus 0 inches, plus 1/8 inch.

Fittings shall be provided with an exterior bituminous coating in accordance with AWWA C110 or AWWA C153, or a fusion bonded epoxy coating with a 5 mil nominal thickness per AWWA C550 and AWWA C116. Sleeves shall not be cement lined, but shall be bituminous coated inside to a dry film thickness of 4 mils. All sleeves shall be long body type.

Anchoring tees shall be used at hydrant branches and shall have main run ends as required for the installation. The branch shall have a plain end with an integral gland and rotating mechanical joint gland to provide a restrained connection with the adjacent valve or fitting.

Fittings shall be manufactured by U.S. Pipe, American Cast Iron Company, or equal.

2.4 Couplings

Use restraining couplings for pipe less than or equal to 16 inches in diameter. Restraining couplings shall consist of a ductile iron body complying with ASTM A536 and shall have gaskets suitable for the pipe being joined. The bolts and nuts shall be stainless steel. The couplings shall be provided with "grippers" or gripping teeth that restrain the joint without leakage and prevent pullout. The couplings shall be rated for a minimum working pressure of 200 psi. Restraining couplings shall be Alpha Restrained Coupling, as manufactured by Romac, Hymax Grip Restrained Coupling, as manufactured by Hymax, or approved equal.

Couplings and transitional couplings for pipe greater than 16 inches in diameter shall consist of a steel sleeve with gaskets suitable for the pipe being joined. The bolts and nuts shall be corrosion resistant high strength, low alloy steel such as Cor-Ten steel or an approved equal. Couplings shall be Dresser Style 38, Smith Blair Style 311, Romac Style 400, or approved equal. Transition couplings for pipe greater than 16 inches in diameter shall be Dresser Style 62, Smith Blair Style 413, Romac Style TC400, or approved equal.

Couplings shall have an exterior epoxy coating.

2.5 Water Main Pipe

Buried water mains shall be constructed of Class 52, cement lined, ductile iron pipe with push-on joints, unless otherwise approved by the Water Department. Ductile iron pipe and fittings installed above ground and/or in buried vaults shall be Class 53 with flanged joints.

Water main shall be a minimum of 8 inches in diameter. Ductile iron pipe shall be designed in accordance with AWWA C150 and shall be manufactured in accordance with AWWA

C151. The cement lining shall be provided with a seal coat; both the cement lining and the seal coat shall be provided in accordance with AWWA C104. Cement mortar lining shall be twice the standard thickness; tolerance shall be minus 0 inches, plus 1/8 inch. The exterior of the pipe shall have an asphaltic coating in accordance with AWWA C151.

Ductile iron piping shall be manufactured by American Cast Iron Pipe Company, U.S. Pipe, or equal.

Restrained joint pipe, where required and approved by the Water Department, shall be Flex-Ring®/Lok-Ring® Joint by American Cast Iron Pipe Company, TR FLEX® by US Pipe and Foundry Co., or approved equal. Restrained gasketed joints for rubber push-on joint pipe shall be Fast-Grip® by American Cast Iron Pipe Company, Field Lok 350® by US Pipe and Foundry Co., or approved equal.

On water pipe and fittings, make provisions for the electrical continuity of the pipeline. Insert two bronze wedges per joint to provide electrical continuity. Place wedges as close to the 3 o'clock and 9 o'clock positions as possible.

A minimum of 4.5 feet and a maximum of 5 feet of cover is required for water main installation, unless otherwise approved by the Water Department. If excavation is in ledge, a minimum of 12 inches of spacing around the pipe will be required to allow for the placement of selected backfill material. Pipe bedding material shall be clean sand. No stones larger than 3 inches in diameter may be used within the first foot of backfill over the bedding material. Metallic warning tape shall be installed per Section 2.11 of these standards.

2.6 Concrete Thrust Blocks

Place precast concrete thrust blocks at all bends (regardless of the angle of deflection or direction), caps, offsets, hydrants, and tees, as well as in locations shown directed by the Webster Water Department. Protect pipeline materials and fittings from direct adherence of the concrete thrust block by wrapping in plastic, roofing felt, reinforced manila paper or similar material. The thrust block shall not bear directly on the joint and shall not interfere with future adjustments, tightening, or removal of the joint. Thrust blocks shall bear against undisturbed soil at the side or end of the trench and this undisturbed surface shall be carefully cleaned off so as to be vertical. The thrust blocks shall have a minimum horizontal thickness of 2 feet and shall have the minimum bearing area as determined by the Webster Water Department, measured perpendicular to the direction of thrust.

Provide thrust blocks and anchor blocks at the locations directed by the Water Department.

2.7 Mechanical Joint Restraints

Mechanical joint retainer glands shall be installed on all mechanical joints. Retainer glands shall be specifically designed to fit standard mechanical joint bells with corrosion resistant, high strength, low-alloy T-head bolts conforming to ANSI/AWWA A21.11/C111 and ANSI/AWWA A21.53/C153. Retainer glands shall be manufactured of ductile iron conforming to ASTM A536-80, grade 60-42-10.

Wedges shall be of hardened ductile iron and require the same torque in all sizes. These devices shall have a minimum 250 psi pressure rating with a minimum safety factor of 2:1 and shall be EBAA IRON, Inc., Megalug® series 1100, Tyler Union, TUFGrip, Romac Industries, Inc., ROMAGRIP, or approved equal.

2.8 Gaskets, Glands, Nuts and Bolts

Gaskets, glands, nuts, bolts and accessories shall conform to ANSI/AWWA C111/A21.11 or C153/A21.53, as appropriate. Gaskets shall be of plain tipped rubber, suitable for exposure to the liquid within the pipe. Lubricants must be suitable for the type of fluid to be carried by the main, and shall be NSF approved for water service. Glands shall be ductile or cast iron. Bolts shall be high strength, low alloy.

2.9 Water Service Piping

Water service piping 2 inches in diameter or smaller shall be polyethylene.

Polyethylene tubing shall be interior copper tube size (CTS) high density polyethylene PE3408 rated for 200 psi (SDR-9) working pressure in accordance with AWWA C901, ASTM D1248, and ASTM D2737.

Water service piping larger than 2 inches in diameter shall be Class 52, cement-lined ductile iron with push-on joints and shall meet the requirements included under the Water Main section of these standards.

Service lines shall be installed 90 degrees from the road, unless otherwise approved by the Water Department. Minimum cover for services shall be 5 feet. A sand backfill material of 8 inch minimum will be carefully placed around the service pipe to protect it from normal backfill and compaction.

2.10 Sand Borrow

Sand Borrow material shall be supplied from an off-site borrow area approved by the Engineer. Testing of the off-site Sand Borrow shall be at the Contractor's expense. Sand Borrow shall consist of clean, inert, hard, durable grains of quartz or other hard, durable, rock, free from loam or clay, surface coatings and deleterious materials. The allowable amount of material passing a No. 200 sieve as determined by ASTM-C117 shall not exceed 10% by weight.

Material shall consist of a clean, non-plastic, granular material conforming to the requirements of a SW, SP or SM under the Unified Soil Classification System (USCS) (ASTM D2487). The material shall have the characteristics that when placed and compacted, the soil particles will bind together so as to form a solid, stable surface capable of supporting rubber-tired vehicular traffic during wet weather periods as well as extended dry weather periods. The borrow material shall not contain fines to the extent that the surface layer becomes "greasy" when wet.

The material shall not contain stones larger than 3/8 inch in diameter. Material consisting of frozen clogs, ice and snow will be rejected. All sand borrow material to be used shall be subject to approval by Engineer.

2.11 Underground Warning Tape

Metallic warning tape for underground piping shall be polyethylene tape with metallic core for easy detection and location of piping with a metal detector. Tape shall be 6 inches wide. Tape shall be manufactured by Seton Name Plate Corp., New Haven, CT; Presco Detectable Underground Warning tape, Sherman, Texas; Blackburn Manufacturing, Nelight, NE; Mercotape, Hachensach, NJ; or equal.

It shall be highlight visible, blue, and have the phrase "CAUTION – WATER LINE BURIED BELOW" stamped in black letters and repeated at a maximum internval of 40 inches. All buried pipe and fittings shall be installed with metallic-lined underground warning tape located no more than 24 inches below final grade to allow detection by a metal detector.

2.12 Hydrants

The hydrant shall meet the requirements of AWWA C502, latest edition. The color of the hydrant above ground shall be yellow with silver caps and reflective silver bonnet. Hydrants shall open clockwise (right), shall have a 5-1/2 foot bury, shall have a 4-1/2-inch diameter valve opening, and shall have a 6-inch diameter ductile iron inlet. Hydrants shall be provided with 2 2-1/2-inch diameter National Standard Thread nozzles and 1 4-1/2-inch diameter National Standard Thread nozzle.

Fire hydrants shall be the Guardian Model-K81D as manufactured by Kennedy Valve Company.

Hydrant branches shall be 6-inch diameter ductile iron pipe and provided with a 6-inch diameter gate valve connected to an anchoring tee at the main.

The distance between hydrants along the water main shall not exceed 500-feet and locations shall be adjusted at the direction of the Water Department or the Fire Chief. No hydrant shall be placed within 15 feet of a driveway or access road, unless otherwise authorized by the Water Department.

One (1) cubic yard of washed ¾-inch stone shall be provided around the hydrant drain port and shall be at least 1 foot deep.

2.13 Valves

2.13.1 General

Buried isolation valves shall be either gate valves or butterfly valves. Butterfly valves shall be used on pipe diameters greater than 12 inches in diameter. Isolation valves shall be epoxy coated on the inside and outside surfaces. Valves shall be certified to NSF 61.

Isolation valves shall be installed in every three way or four way water main intersection and every 800 feet or less on water mains.

2.13.2 Gate Valves

Water main gate valves shall be resilient seat type suitable for underground service and complying with the requirements of AWWA C509. AWWA C509 gate valves shall be cast iron or ductile iron. Gate valves shall be designed to be bubble tight at a 250 psi working

pressure with no leakage past the seat from either side of the disc, and shall be hydrostatically tested to 500 psi.

Gate valves shall be set vertically, nut-operated, opening to the right (clockwise), non-rising stem and suitable for direct burial with "O" ring stem seals. Direct buried gate valves shall have mechanical joint ends complying with ANSI/AWWA C111/A21.1185.

Internal and external exposed ferrous surfaces of the valves shall be coated with a fusion-bonded, thermosetting powder epoxy coating conforming to AWWA C550. Coatings shall be non-toxic and shall impart no taste to water. Coating thickness shall be nominal 10 mils.

Gate valves shall be as manufactured by Mueller Co. or approved equal.

2.13.3 Butterfly Valves

Butterfly valves shall be rubber-seated, tight-closing type suitable for underground service complying with the requirements of AWWA C504.

Butterfly valves shall be designed to be bubble tight to a 250 psi working pressure with no leakage past the seat from either side of the disc, and shall be hydrostatically tested to 500 psi. Butterfly valves shall be bubble-tight at rated pressures with flow in either direction, and shall be satisfactory for applications involving throttling service and/or frequent operation and for applications involving valve operation after long periods of inactivity. Butterfly valves shall open right (clockwise).

Valves shall be equipped with a standard AWWA square nut (traveling type) operator, short operating rod, requiring a maximum of 150 foot-pounds at the maximum rated pressure. The stem shall be squared for the entire length of its insertion into a fully squared female portion of the operating nut.

Butterfly valve operators shall be fully grease-packed, suitable for underground service and be of the manual, totally enclosed, worm gear or traveling nut type. Adjustable stops shall be built into the operator to prevent over-travel in either direction. Operators shall be enclosed in a protective housing and designed to transmit twice their rated torque without permanent damage or distortion. The operator shall have a 450 foot-pound torque rating.

The valve shaft shall be 1 piece (attached to the valve disc), constructed of corrosion-resistant stainless steel in accordance with ASTM A564. Diameter of the valve shafts and the connections to the valve disc shall be suitable for the service connections specified.

The shaft bearings shall be self-lubricating corrosion-resistant sleeve type. Thrust bearings shall keep the disc centered regardless of valve position.

Shaft seals shall be standard, self-adjusting (replaceable without removing the valve shaft) split V-type packing, standard O-Ring seals or pull-down packing gland, complying with the requirement of AWWA C504.

Butterfly valves shall be cast iron or ductile iron, with fully rubber-lined body. Cast iron shall meet the specifications of ASTM A126, Class B. Castings shall be clean and sound

without defects that will impair their service. No plugging or welding of such defects will be allowed. Ductile iron shall meet the standards of ASTM A536.

Butterfly valves shall have elastomeric body seat constructed of Buna-N rubber bonded to the valve body (in accordance with ASTM D429) with an integral stainless steel clamp ring, and stainless steel self-locked screws. No metal-to-metal seating surfaces will be permitted.

Discs shall be concentric design, of cast iron or ductile iron conforming to the requirements of AWWA C504. The disk seating edge shall be stainless steel and shall mate with the rubber seat.

The discs must be able to fully open when connected to Class 52 ductile iron pipe with double cement mortar lining.

Valve discs shall rotate 90 degrees from the full open position to the tight shut position.

Internal and external exposed ferrous surfaces of the valves shall be coated with a fusion-bonded, thermosetting powder epoxy coating suitable for potable water service and conforming to AWWA C550. Coating shall be non-toxic and shall impart no taste to water. Coating thickness shall be nominal 8 mils.

Butterfly valves shall be Henry Pratt (Model HP-250), M&H (Series 4500), Mueller (Lineseal XP), equivalent by DeZurik, or approved equal.

2.13.4 Valve Boxes

Valve boxes shall be round, 2-piece, sliding type, cast iron. The upper section of each box shall have a flange on top having sufficient bearing area to prevent settling. The bottom of the lower section shall be belled to enclose the operating nut of the valve. The barrel of the bottom section shall be 5-1/2-inch O.D. minimum. Covers for valve boxes shall be 6-inch diameter and shall have the word "WATER" cast on the top.

Boxes shall be of lengths consistent with pipe depths. Boxes shall be adjustable, with a lap of at least 6 inches when in the most extended position. Cover shall have slots for easy removal. Valve boxes shall be coated with coal-tar pitch enamel or other approved coating. Valve boxes shall be suitable for the size valve on which they are used. The length of the lower section shall be adequate for trench adjustment with no top or mid-section adapters.

Valve boxes shall be manufactured by Clow Corporation, Tyler/Union Corporation, United States Foundries, or approved equal.

2.13.5 Stainless Steel Repair Clamps

The sleeve shall be of full circle design, either 1 piece or 2 piece. Repair clamps shall be single section up to 12-inch diameter and 3 sections for 16-inch through 24-inch diameter. The shell shall be constructed of Grade 18-8 Type 304 stainless steel. Lugs and side bars shall be constructed of Grade 18-8, Type 304 stainless steel with stainless steel fasteners welded to the lugs and side bars.

All fasteners, excluding joint accessories, shall be made of Grade 304 stainless steel. Bolts shall be in accordance with ASTM A193 grade B8, latest revision. Nuts shall be in

accordance with ASTM A194 grade 8, latest revision. Bolts and nuts shall be Unified National Coarse (UNC) rolled thread and heavy-duty hex nuts. Bolts installed into castings shall be provided with 1 Grade 304 stainless steel flat washer and nuts and bolts shall be provided with 2 Grade 304 stainless steel flat washers so that the epoxy coating is not damaged. At a minimum, nuts shall be coated with fluorocarbon, epoxy, zinc, or other anti-corrosion coating to help prevent galling.

Repair clamps shall be provided with gaskets constructed of virgin SBR rubber in accordance with ASTM D2000 AA 415.

Single section repair clamps shall be manufactured by Cascade-Style CR1, Dresser–Style 364 (up to 12-inch diameter), Ford–Style FS1, Romac–Model SS1, or approved equal. Three (3) section clamps shall be manufactured by Cascade-Style CR3, Ford–Style FS3, Romac–Model SS3, or approved equal.

2.14 Tapping Sleeves and Valves

2.14.1 Stainless Steel Tapping Sleeves

Stainless steel tapping sleeves shall be constructed of Grade 18-8, Type 304 stainless steel with removable stainless steel fasteners. Tapping sleeves shall be provided with a ¾" NPT test port with a lead-free brass lug with standard square head. Proper use of this feature assures positive seal before tapping. Bolt Lugs shall be 3/16" minimum thickness. Tapping sleeves shall be provided with gaskets made of gridded styrene butadiene rubber (SBR) or Nitrile (Buna-N) compounded for water service and shall meet ASTM D2000-80M 4AA607. The sleeve gaskets shall provide 360 degree full circumferential support over the full length of the sleeve. The sleeve gasket shall have heavy gauge stainless steel armors, a minimum of 2-1/4-inch wide, bonded in place to span the gap between the tapping sleeve sections. The outlet gasket shall be made of Nitrile (Buna-N). 6. The flange shall be made of Grade 18-8, Type 304 Stainless Steel. The flange shall conform to AWWA C207 Class D ANSI 150 lb. The flange shall be recessed to accept standard AWWA tapping valves. The bolt holes shall straddle the pipe center line. Iron flanges shall not be accepted.

Tapping sleeves shall be rated for a 150 psi working pressure and a 225 psi minimum test pressure. All welds used in the construction of the tapping sleeve shall conform to all American Welding Society (AWS) codes. All welds shall be fully passivated in order to restore the stainless steel to its original corrosive resistant characteristics. Tapping sleeves shall be provided with a Grade 18-8, Type 304 Stainless Steel outlet. The outlet shall be double welded, at 2 places, the flange and the sleeve, to provide maximum strength.

Acceptable manufacturers include Dresser Industries, Inc.-Style 630, Ford Meter Box Company-Style FTSS, Romac Industries, Inc.-Style SSTIII, Smith Blair–Model 622, or approved equal.

2.14.2 Ductile Iron Tapping Sleeves

Ductile iron tapping sleeves shall be constructed of high strength ductile iron conforming to ASTM A-536 grade 65-45-12. The bolt holes shall straddle the pipe center line. Tapping sleeves shall be mechanical joint conforming to ANSI A21.11/AWWA C-111, unless otherwise specified. Tapping sleeves shall be provided with a ¾" NPT test port with a lead free brass lug with standard square head. Proper use of this feature assures positive seal before tapping. Tapping sleeves shall be provided with gland and body components made

of grade 60-42-10 ductile iron conforming to ASTM A536-84. Tapping sleeve outlet gasket shall be made of Nitrile (Buna-N). The tapping sleeve outlet flange dimensions shall comply with ANSI B16.1 class 125 and with MSS SP-60. The flange shall be recessed to accept standard AWWA tapping valves.

Tapping sleeves shall be rated for a 150 psi working pressure and a 225 psi minimum test pressure. Exterior coating shall be fusion-bonded epoxy in accordance with ANSI A21.16/AWWA C116 and shall be applied to the interior and exterior of the fitting. Fittings shall be marked with the weight. Fittings shall have cast upon them the pressure rating, the manufacturer's identification, nominal diameter of the openings, and the number of degrees or fractions of the circle on all bends.

Acceptable manufacturers include Clow–Model F-5205, Mueller–Models H-615 & H-616, U.S. Pipe–Models H-615 & H-616, or approved equal.

All taps to the existing public water system over 2 inch in diameter shall have a tapping sleeve and gate valve.

2.14.3 Tapping Valves

Tapping valves shall conform to the Gate Valve requirements described in these Standards, except that the valve shall be specifically manufactured for use in a tapping operation with 1 end flanged to attach to a tapping sleeve and the other end mechanical joint. Tapping valves shall be provided with an oversized opening to permit the use of full size cutters and the tapping valve seat opening shall be larger than the nominal size to permit full diameter cuts to be made.

2.15 Water Meter Installation

Water meters shall be purchased from and installed by the Water Department. The associated water meter piping shall be installed by the Customer.

Each water meter shall have a ball valve located before and after it, and each valve will be within 1 foot of the meter. Where water pressures are in excess of 80 psi, a pressure-reducing valve shall be installed upstream of the water meter.

2.16 Fire Protection Systems

Per 310 Code of Massachusetts Regulations (CMR) Section 22, a Massachusetts licensed fire sprinkler contractor is responsible for all work conducted on a fire protection system, including the installation, maintenance and repair of backflow prevention devices. In addition to the requirements set forth in 310 CMR 22.22, the installation and testing of a backflow protection device on a fire protection system may be subject to the requirements of the following:

- 780 CMR: Massachusetts State Building Code - Fire Protection Systems, Design, Installation, Testing and Maintenance Requirements
- 527 CMR: Massachusetts Fire Prevention Regulations, Installation Permits
- 250 CMR: Board of Registration of Professional Engineers and Land Surveyors, Practice of Engineering and Preparation of Plans and Specifications

- 528 CMR: Bureau of Pipe fitters, Refrigeration, and Sprinkler Fitters, Qualification and Licensing of Installers
- M.G.L. c. 148, § 27A, Shutting off Existing Fire Protection systems and Permitting; f. 248 CMR: State Plumbing and Fuel Gas Code, Permits and Installation

2.17 Disinfection and Testing of Water Mains

For water mains, the pressure test shall not be conducted until the new main has been flushed clean, disinfected in accordance with AWWA C651 and the chlorinated water properly disposed of. After acceptable completion of the water system disinfection, pressure testing of the new water main may commence.

2.17.1 Disinfection

All new water mains shall be chlorinated using the Continuous Feed Method specified in AWWA C651. The Tablet Method is not acceptable.

The Contractor shall determine the location of the chlorination and sampling points in the field. The Contractor shall install taps for chlorinating, sampling and expulsion of air and shall uncover, backfill, and plug the taps as required.

Prior to disinfecting the water main, the main shall be completely filled to remove all air pockets and then flushed to remove particulates. The flushing velocity in the main shall not be less than 3.0 ft/s unless the Water Department determines that conditions do not permit the required flow to be discharged to waste.

TABLE 1
Required Flow to Flush Mains (40 psi residual pressure in water main)*

Pipe Diameter (in)	Flow Required to Produce 3.0 ft/s (Approximate) Velocity in Main	Number of 2 ½ inch Hydrant Outlets
6	260 gpm	1
8	470 gpm	1
10	730 gpm	1
12	1,060 gpm	2
16	1,880 gpm	2
20	2,937 gpm	2

**AWWA C651, AWWA Standard for Disinfecting Water Mains*

At a point not more than 10 feet downstream from the beginning of the new main, water entering the new main shall receive a dose of chlorine fed at a constant rate such that the water will not have less than 25 mg/L (PPM) free chlorine throughout the entire section of pipe to be chlorinated.

TABLE 2
Chlorine Required to Produce 25-mg/L Concentration in 100 Feet of Pipe – By Diameter*

Pipe Diameter (in)	100 % Chlorine (Pounds)	1% Chlorine Solution (Gals.)
6	0.030	0.36
8	0.054	0.65
10	0.085	1.02
12	0.120	1.44
16	0.217	2.60
20	0.330	3.26

**AWWA C651, AWWA Standard for Disinfecting Water Mains*

The chlorinated water is to remain in the new main for at least 24-hours. After a contact time of 24-hours there should be a free chlorine concentration of not less than 10 mg/L (PPM). During this period, proper precautions are to be taken to prevent this chlorinated water from flowing back into the existing system.

All valves and hydrants within the treated section shall be operated to ensure disinfection of the appurtenances.

2.17.2 Final Flushing

Following the chlorination period, all treated water shall be flushed from the lines at their extremities and replaced with water from the distribution system. Flushing the main is to be accomplished at as high a velocity as possible consistent with the ability of the Contractor to collect the discharge water for proper disposal. All treated water flushed from the lines shall be disposed of by discharging to the nearest sanitary sewer or by other approved means provided in AWWA C651 and approved by the Water Department. Flushing shall be done in strict conformance with all applicable local, state, and federal regulations. No discharge of chlorinated water to any storm sewer or natural watercourse will be allowed.

2.17.3 Bacteriological Analyses

After the 24-hour disinfection period and all chlorine solution has been thoroughly flushed, the bacteriological sampling and analysis of the replacement water may then be performed. Bacteriological sampling shall be made by the Contractor's competent person(s) in full accordance with AWWA C651- *Section 5, Bacteriological Tests* and under the supervision of the Water Department. Analysis shall be performed by an independent commercial laboratory certified by MassDEP and USEPA for analyzing public drinking water supplies. All results shall be provided to the Water Department for review. Two (2) consecutive sets of acceptable samples, taken at least 16-hours apart are required prior to placing the main into service. Samples shall be collected for every 1,200 ft of the new water main, plus 1 set from the end of the line and at least 1 from each branch greater than 1 pipe length. Failure of any 1 of the bacteriological test samples shall require rechlorination and retesting by the Contractor. The line shall not be placed in service until the bacteriological requirements of AWWA C651 are met.

2.17.4 Pressure/Leakage Testing

Interim pressure testing of the main shall be completed prior to tapping for services. Pressure testing shall occur again up to the closed curb stops after installing services and prior to final acceptance. Both pressure tests are required to pass in order for the new water main to be accepted by the Water Department. Testing shall be completed by a third party.

Run pressure test and leakage test simultaneously in accordance with ANSI/AWWA C600. Test pressure shall be 200 psi for the first 5 minutes of the test followed by 150 psi for the next 2-hours. No leakage or pressure drop shall be allowed during the test period. Test pressure shall not exceed pipe or thrust-restraint design pressures.

2.18 Water Main Alignment and Crossing of Existing Sewer Mains

Water mains shall be laid at least 10 feet horizontally from any existing or proposed gravity sanitary or storm sewer, septic tank, or subsoil treatment system. The distance shall be measured edge to edge. In cases where it is not practical to maintain a 10-foot separation, it is permissible to install a water main closer to a sewer. However, the water main must be laid in a separate trench or on an undisturbed earth shelf located on one side of the sewer at such an elevation that the bottom of the water main is at least 18 inches above the top of the sewer.

Water mains crossing sewers shall be laid to provide a minimum vertical distance of 18 inches between the outside of the water main and the outside of the sewer. It is preferred that the water main cross above the sewer. At crossing, one full length of water pipe shall be located so both joints will be as far from the sewer as possible, and the sewer materials shall be water works grade 150 psi pressure rated pipe meeting latest AWWA standards and shall be pressure tested to ensure water tightness.

If the water mains crossing sewers are not able to be laid at a minimum vertical distance of 18 inches, the sewer must be encased 10 feet on both sides of the crossing with 6 inches of 3,000 PSI concrete. If a sewer main or sewer service crosses above the water main, total encasement of both the water main and the sewer main or sewer service is required on both sides of the crossing, regardless of separation.

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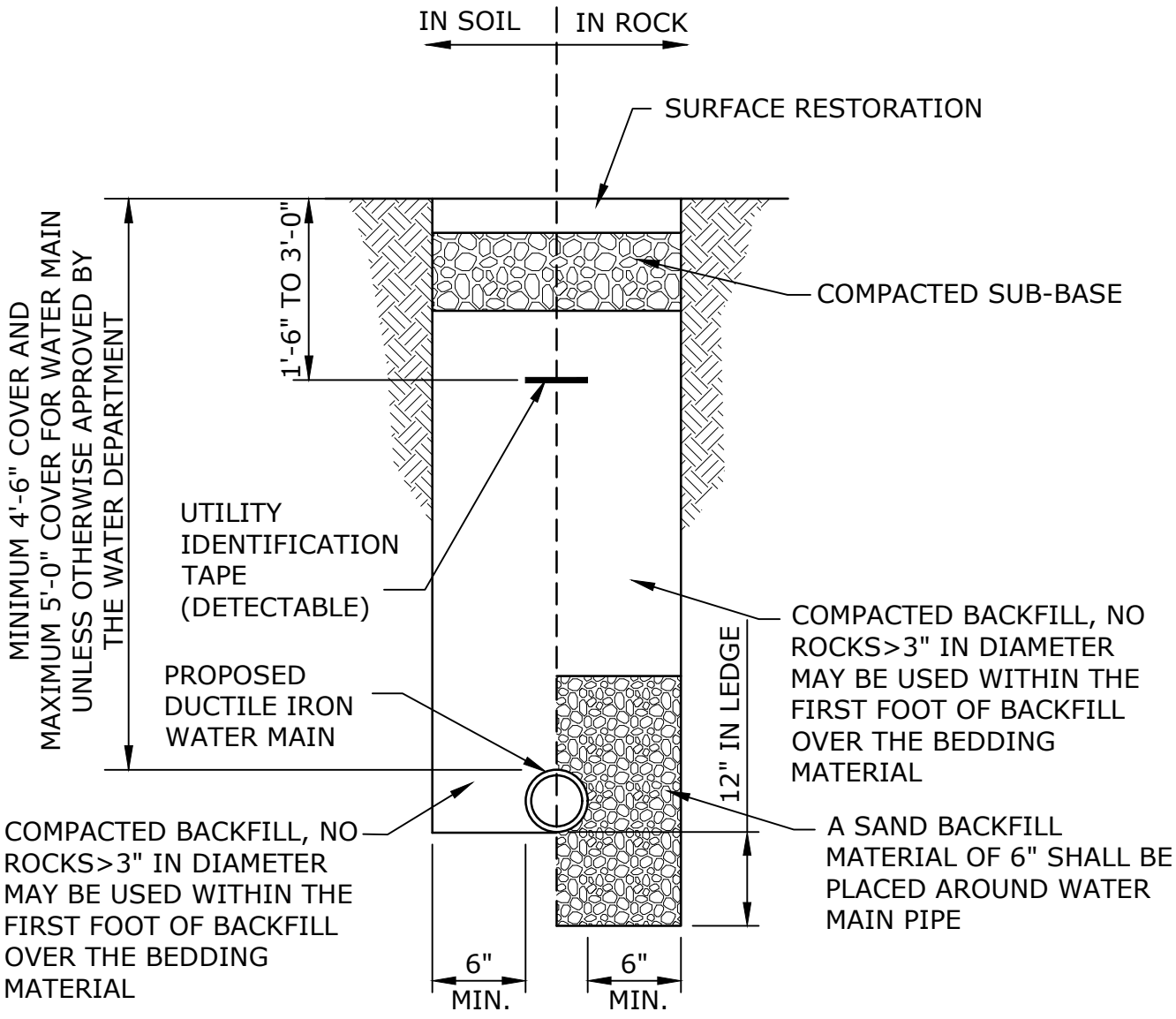
Standard Water Construction Details

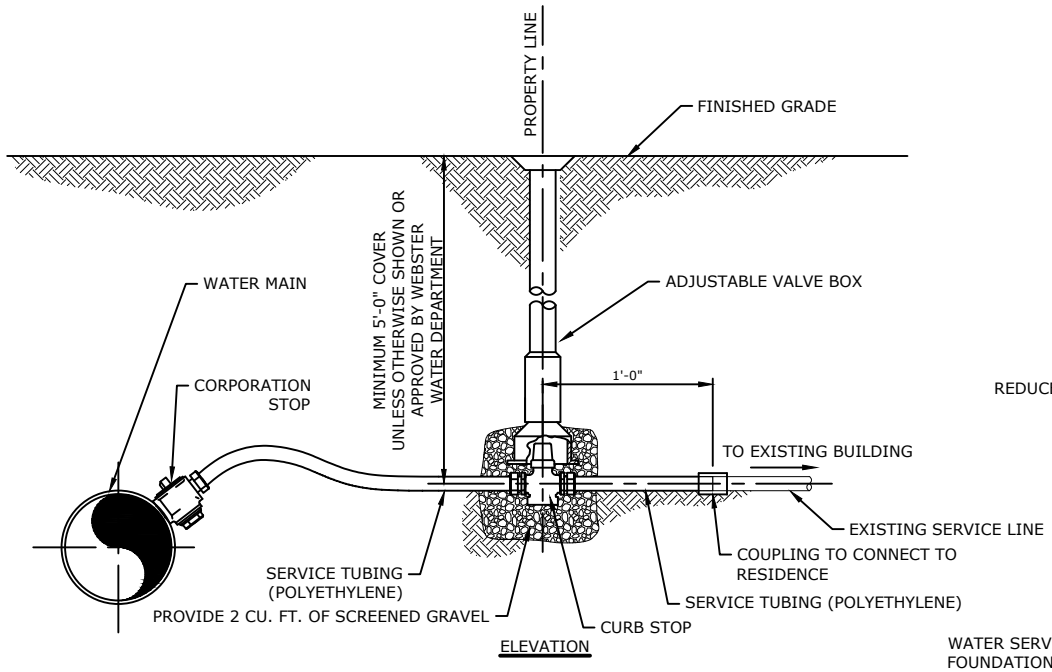
November 2024



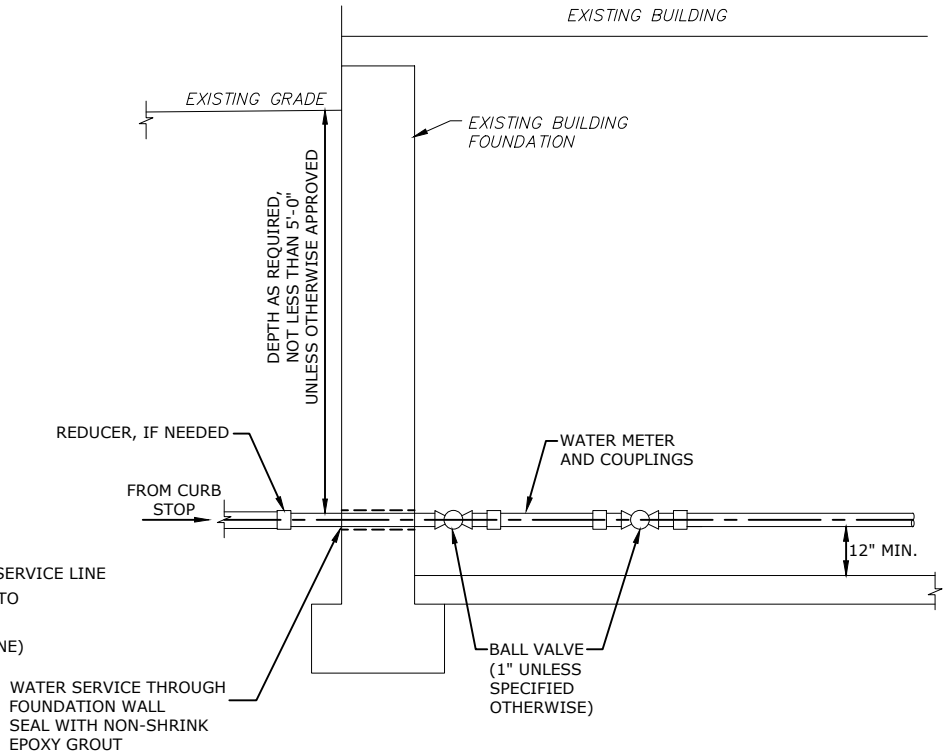
TYPICAL WATER MAIN TRENCH

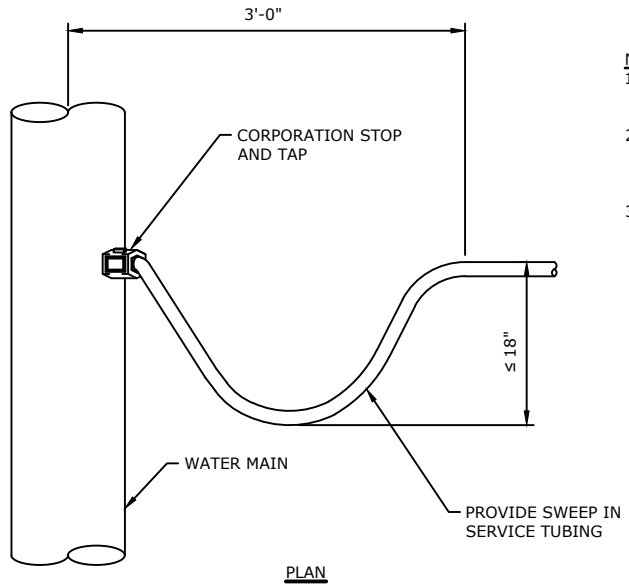
NO SCALE

1. TYPICAL WATER MAIN TRENCH
WEBSTER WATER DEPARTMENT



ELEVATION





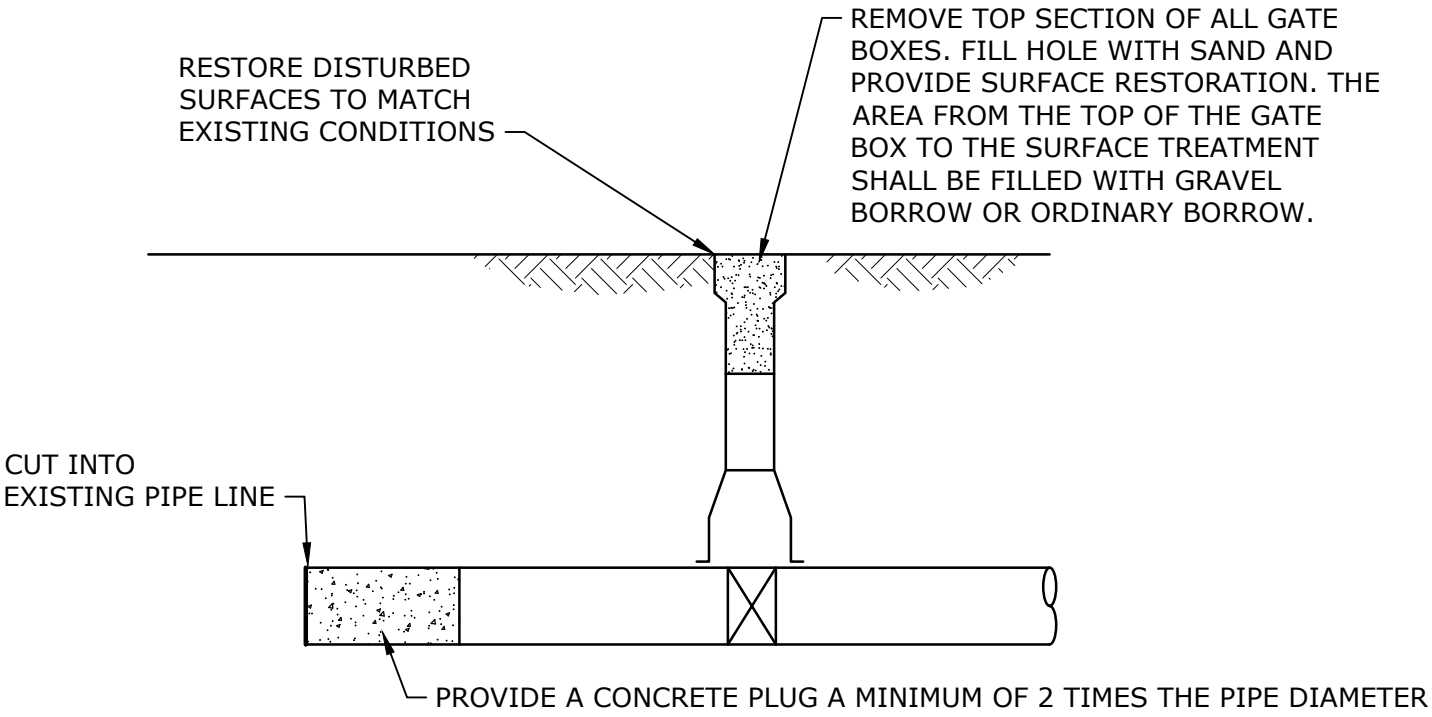
PLAN

NOTES:

1. LOCATION OF WATER SERVICE CONNECTION SHALL BE FIELD VERIFIED.
2. LOCATIONS OF NEW WATER SERVICES AND CURB STOPS SHALL BE FIELD LOCATED PER THE WEBSTER WATER DEPARTMENT'S DIRECTION.
3. WHEN WATER SERVICES ARE BEING TRANSFERRED FROM AN EXISTING WATER MAIN TO A NEW WATER MAIN, THE EXISTING WATER SERVICE SHALL BE ABANDONED AT THE EXISTING WATER MAIN PER THE WEBSTER WATER DEPARTMENT'S DIRECTION.
4. SERVICE SADDLES SHALL BE REQUIRED FOR SERVICES LARGER THAN 1" DIAMETER AND SMALLER THAN 4" DIAMETER.
5. POSITION CORPORATION STOP VALVE OPERATOR OPPOSITE FROM DIRECTION OF COPPER SERVICE PIPE AT MAIN.
6. INSTALL CURB STOP SO THAT IT IS OFFSET A MINIMUM OF 2' FROM ANY OBSTRUCTION PREVENTING THE USE OF CURB STOP WRENCH (E.G., FENCE, RETAINING WALL, ETC.)
7. CURB STOPS AND BOXES SHALL BE LOCATED AT OR WITHIN 10' OF THE RIGHT-OF-WAY LINE.

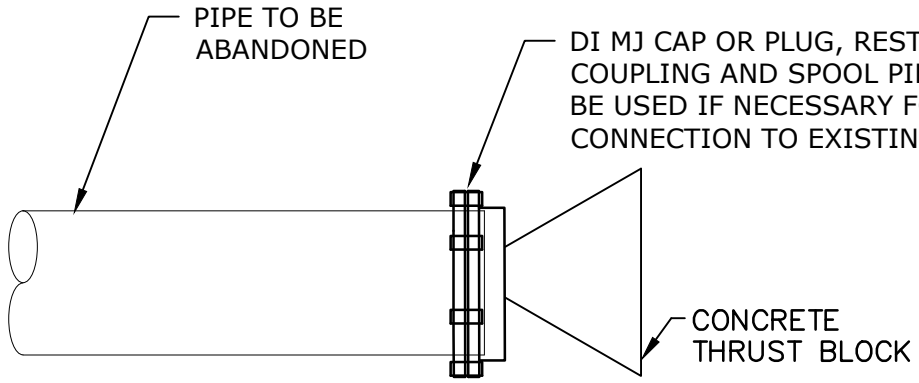
2. TYPICAL WATER SERVICE CONNECTION

WEBSTER WATER DEPARTMENT



NOTE:

FOR PIPES NOT SUBJECT TO PRESSURE

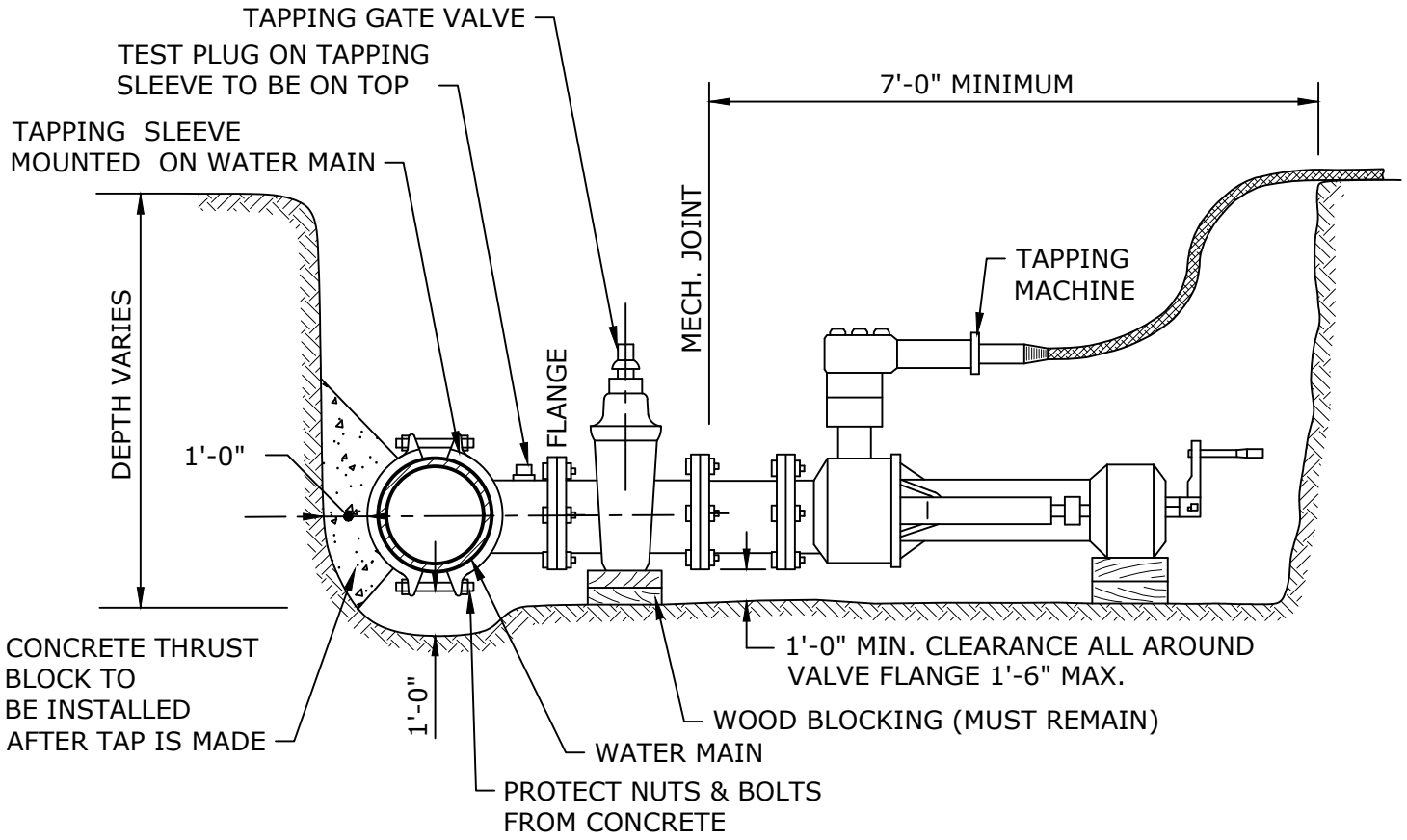


NOTE:

FOR PIPES SUBJECT TO PRESSURE

3. TYPICAL WATER MAIN ABANDONMENT DETAIL

WEBSTER WATER DEPARTMENT



NOTES:

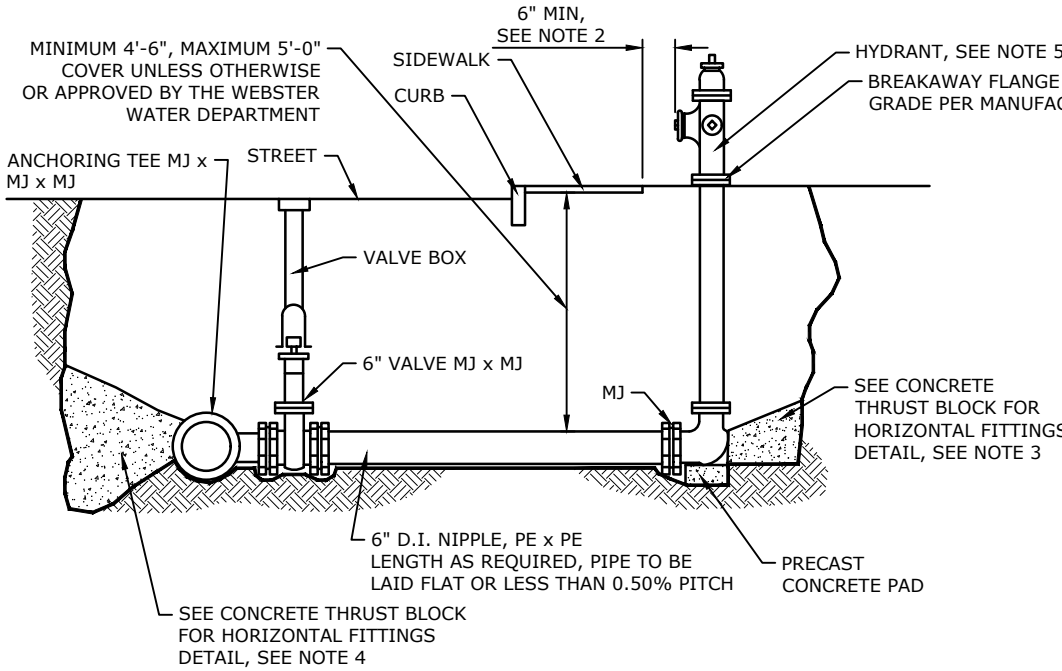
1. TAPPING SLEEVE & TAPPING GATE VALVE SHALL BE INSTALLED ON WATER MAIN BY THE CONTRACTOR. THE WEBSTER WATER DEPARTMENT WILL TEST INSTALLATION PRIOR TO MAKING TAP. NO TAP WILL BE MADE IF THERE IS NO TEST PLUG.

2. TAPPING GATE VALVE SHALL HAVE OPENING DIRECTION AS DIRECTED BY THE WEBSTER WATER DEPARTMENT. IF VALVE OPENING DIRECTION IS NOT CORRECT, NO TAP WILL BE MADE.

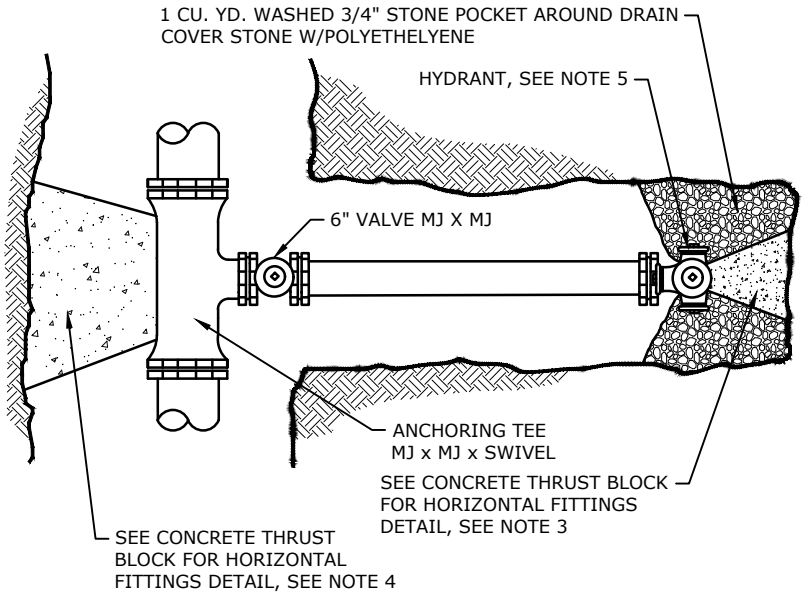
3. TRENCH SHALL BE DEWATERED AND IN COMPLIANCE WITH OSHA REQUIREMENTS FOR TRENCH EXCAVATION.

4. TRENCH REQUIREMENTS FOR 4" TO 12" WATER MAIN TAPS

WEBSTER WATER DEPARTMENT



ELEVATION



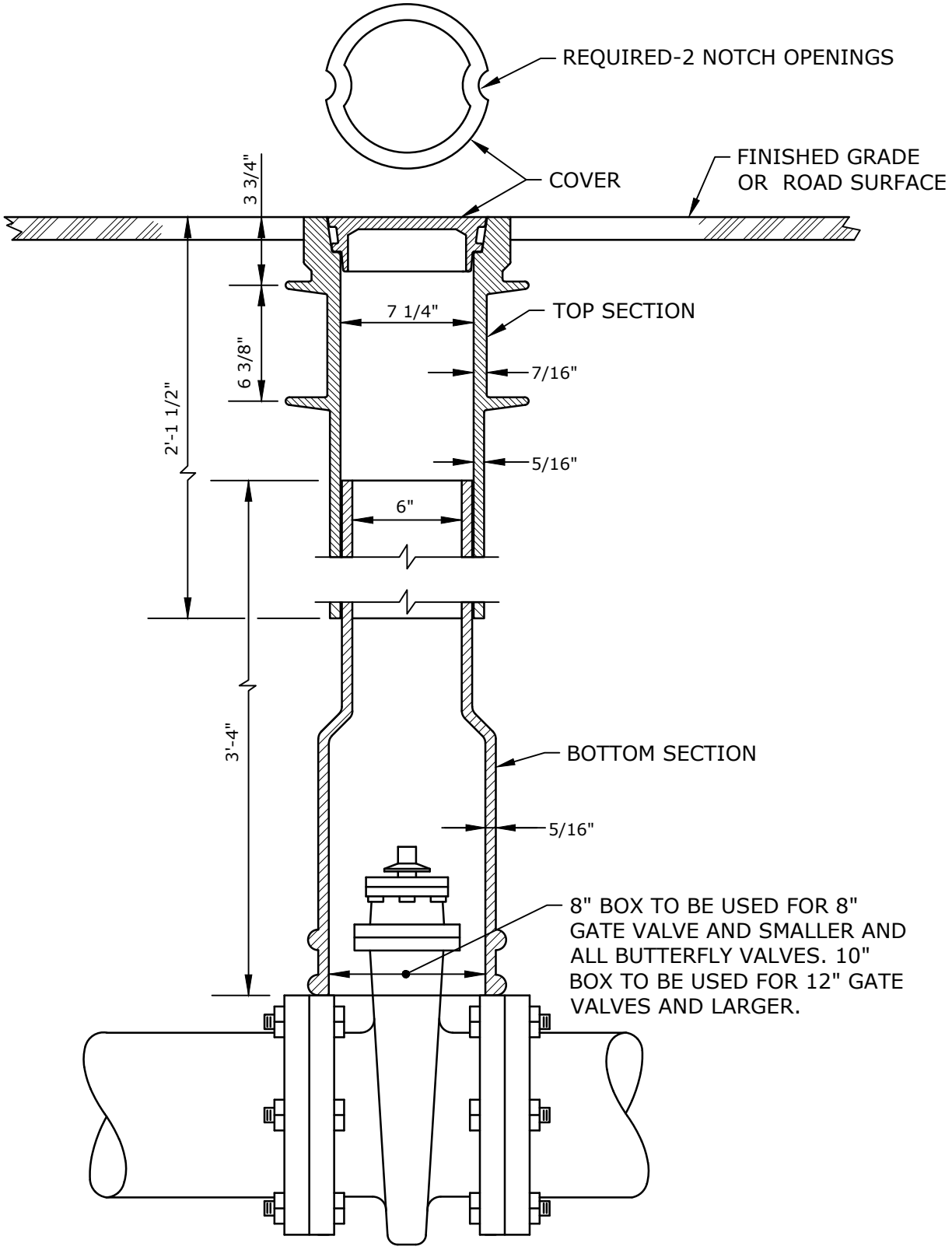
PLAN

NOTES:

1. ALL MJ JOINTS SHALL HAVE RETAINER GLANDS.
2. HYDRANT OFFSET DISTANCES TO EXISTING SURFACE FEATURES SHALL BE FIELD COORDINATED WITH THE OWNER AND AS DIRECTED BY THE WEBSTER WATER DEPARTMENT.
3. CARE SHALL BE TAKEN TO SHIELD HYDRANT BASE DRAIN HOLES DURING PLACEMENT OF THE CONCRETE THRUST BLOCK. DRAIN HOLES SHALL BE VERIFIED AS OPEN AND FREE OF OBSTRUCTIONS PRIOR TO BACKFILLING.
4. CARE SHALL BE TAKEN TO SHIELD ALL MECHANICAL JOINT GLANDS AND BOLTS DURING PLACEMENT OF CONCRETE THRUST BLOCK. ALL BOLTS AND GLANDS SHALL BE FREE AND UNOBSTRUCTED BEFORE BACKFILLING.
5. HYDRANT SHALL BE SET PLUMB. VERTICAL HYDRANT EXTENSIONS SHALL BE USED AS NECESSARY TO PROPERLY LOCATE THE BREAKAWAY FLANGE PER MANUFACTURER'S RECOMMENDATIONS.
6. POLYETHYLENE SHEETING SHALL BE PLACED OVER THE ANCHORING TEE AND HYDRANT BASE TO PREVENT DIRECT CONTACT OF CONCRETE WITH THE FITTING AND HYDRANT BASE.

5. HYDRANT DETAIL

WEBSTER WATER DEPARTMENT

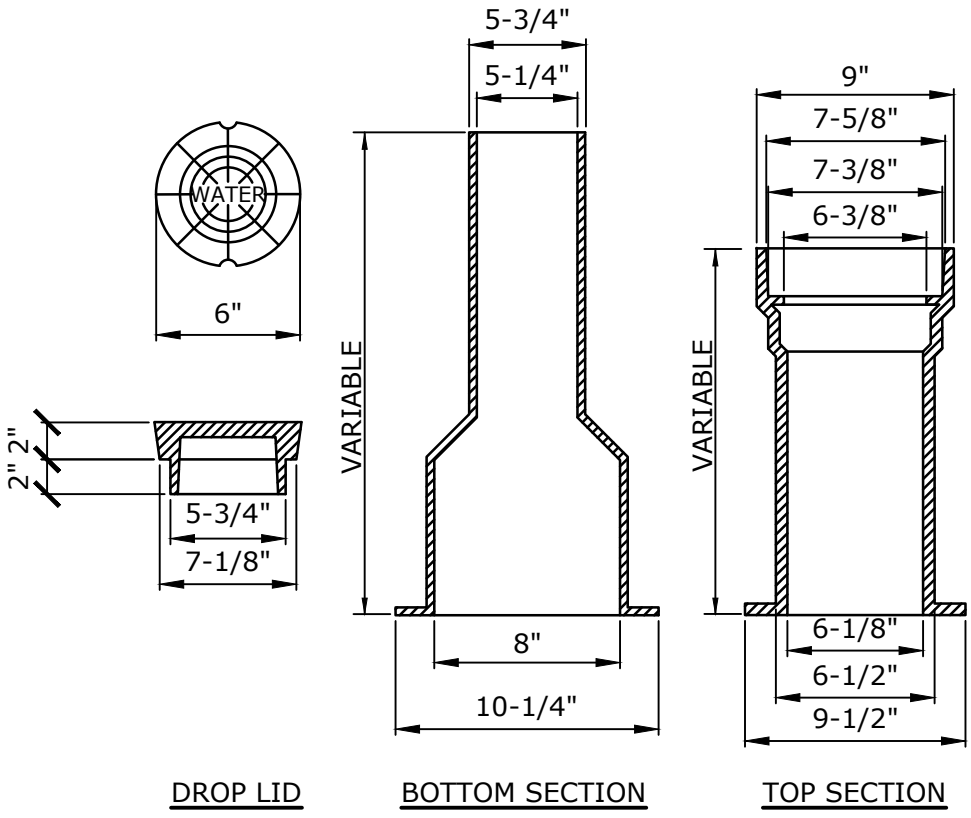


BURIED GATE VALVE DETAIL

NO SCALE

6. BURIED GATE VALVE DETAIL

WEBSTER WATER DEPARTMENT



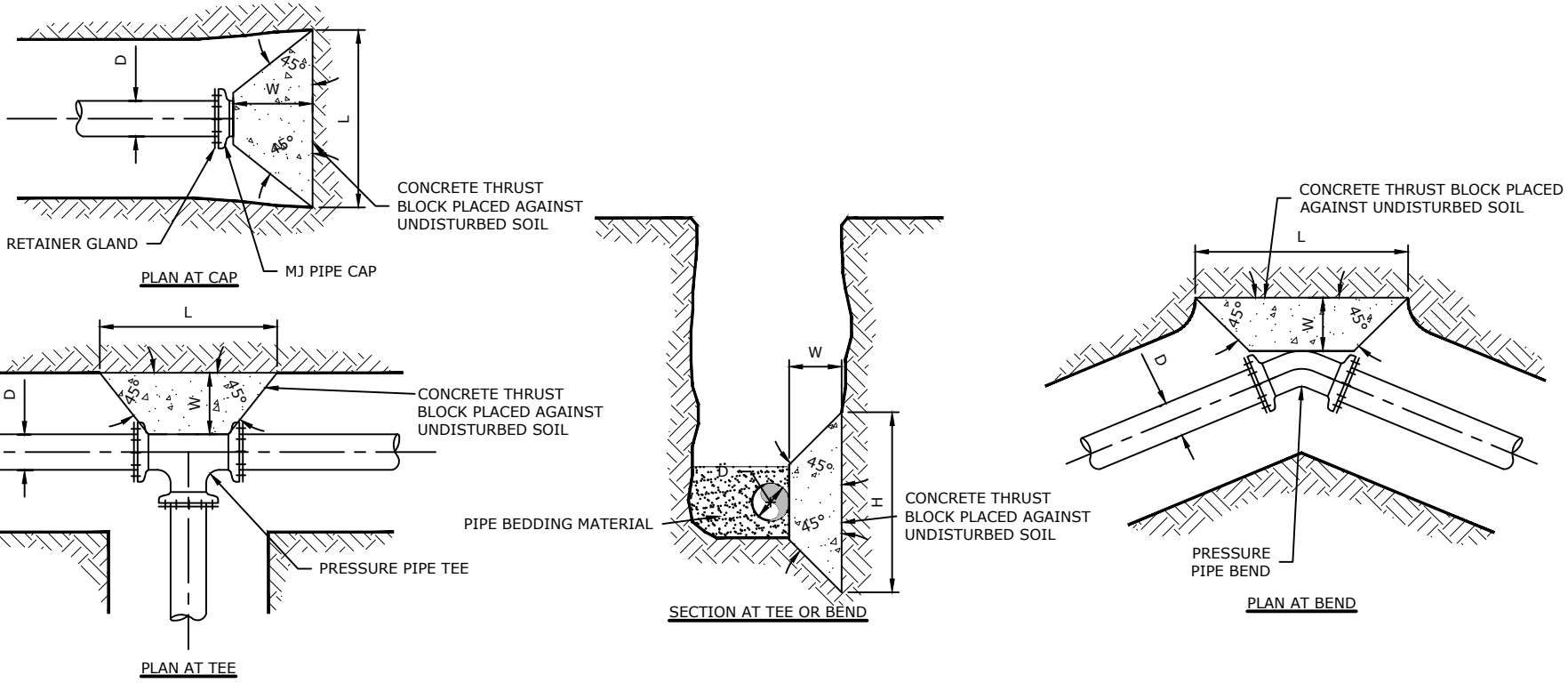
VALVE BOX DETAIL

NO SCALE

NOTES:

1. 8" BOX TO BE USED FOR 8" GATE VALVE AND SMALLER AND ALL BUTTERFLY VALVES. 10" BOX TO BE USED FOR 12" GATE VALVES AND LARGER.

7. VALVE BOX DETAIL
WEBSTER WATER DEPARTMENT



NOTES:

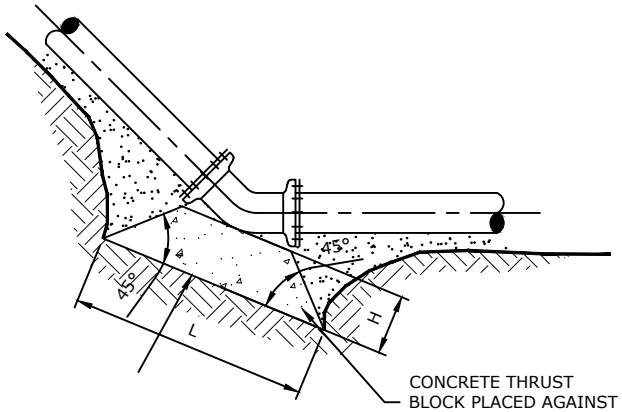
1. THRUST BLOCK DIMENSIONS WILL BE CALCULATED BASED ON A PSI AND SOIL CONDITION DETERMINED BY THE WEBSTER WATER DEPARTMENT.
2. CONCRETE THRUST BLOCKS SHALL BE PLACED AGAINST UNDISTURBED SOIL.
3. DIMENSIONS L, H, & W MAY BE ADJUSTED TO MEET FIELD CONDITIONS, PROVIDED THE BEARING AREA REMAINS UNCHANGED, UPON APPROVAL OF THE WEBSTER WATER DEPARTMENT.
4. THE HEIGHT OF THE BLOCK (H) SHALL BE LESS THAN OR EQUAL TO HALF THE TRENCH DEPTH BUT NOT LESS THAN THE PIPE DIAMETER.

PRECAST CONCRETE THRUST BLOCK
FOR HORIZONTAL FITTINGS

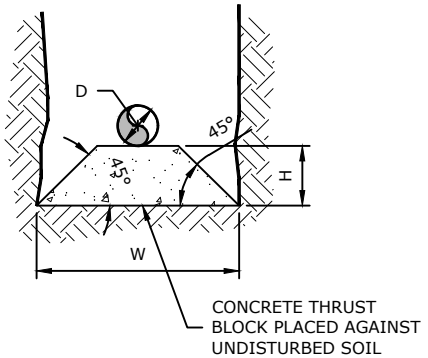
NO SCALE

8. PRECAST CONCRETE THRUST BLOCKS FOR HORIZONTAL FITTINGS

WEBSTER WATER DEPARTMENT



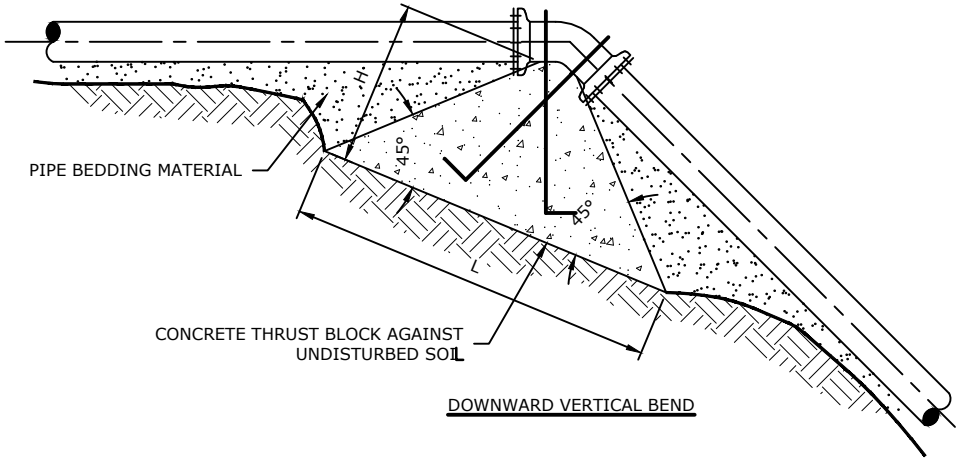
UPWARD VERTICAL BEND



SECTION

NOTES:

1. THRUST BLOCK DIMENSIONS WILL BE CALCULATED BASED ON A PSI AND SOIL CONDITION DETERMINED BY THE WEBSTER WATER DEPARTMENT.
2. CONCRETE THRUST BLOCKS SHALL BE POURED AGAINST UNDISTURBED SOIL.
3. DIMENSIONS L, H, & W MAY BE ADJUSTED TO MEET FIELD CONDITIONS, PROVIDED THE BEARING AREA REMAINS UNCHANGED, UPON APPROVAL BY THE WEBSTER WATER DEPARTMENT.
4. DOWNWARD VERTICAL BENDS SHALL BE RESTRAINED BY CAST-IN-PLACE CONCRETE THRUST BLOCKS OR OTHER RESTRAINING METHOD AS APPROVED BY THE WEBSTER WATER DEPARTMENT.



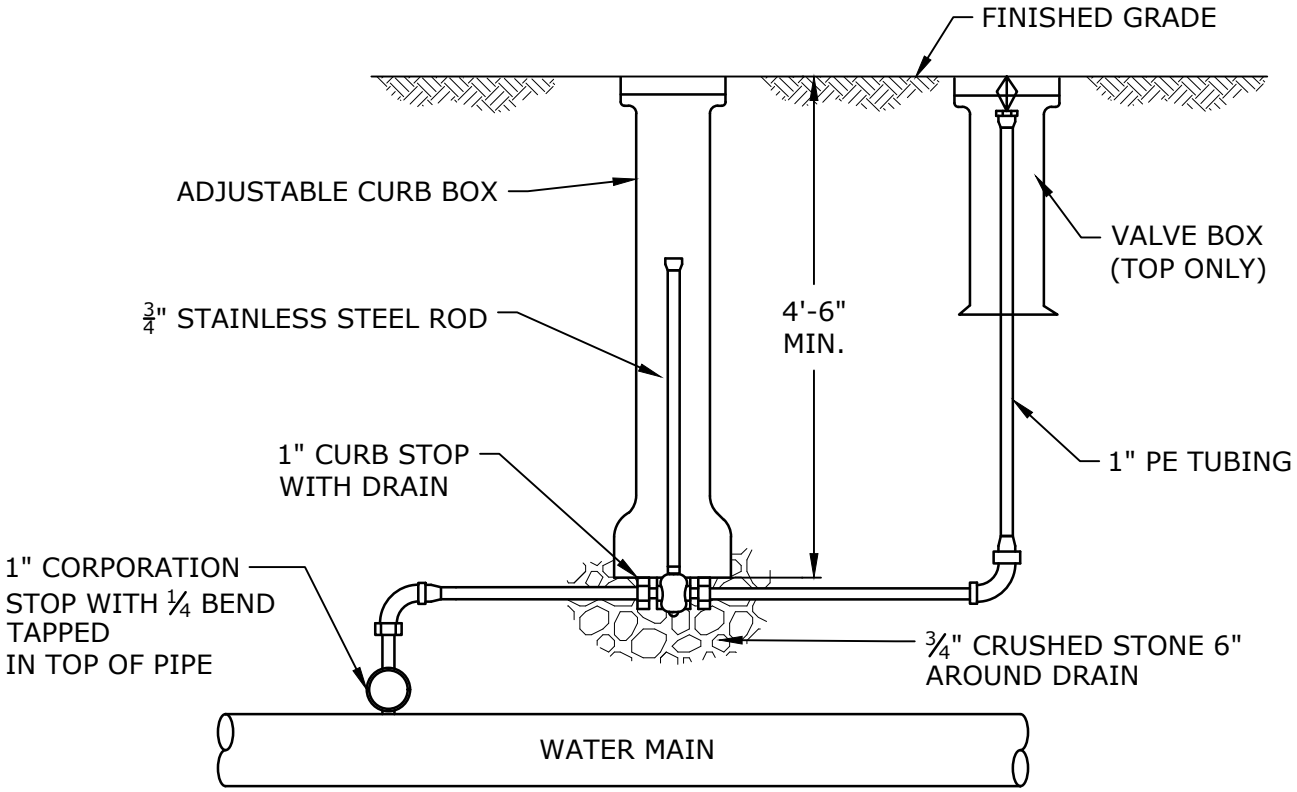
DOWNWARD VERTICAL BEND

PRECAST CONCRETE THRUST BLOCK
FOR VERTICAL BENDS

NO SCALE

9. PRECAST CONCRETE THRUST BLOCKS FOR VERTICAL BENDS

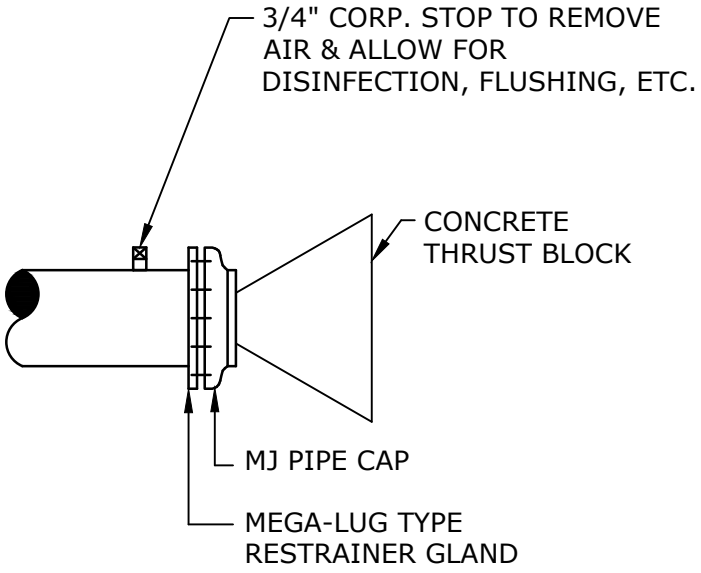
WEBSTER WATER DEPARTMENT



PERMANENT AIR VENT DETAIL

NO SCALE

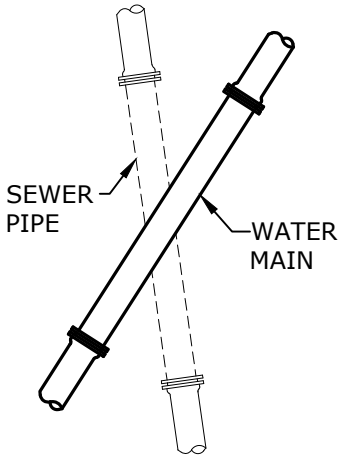
10. PERMANENT AIR VENT DETAIL
WEBSTER WATER DEPARTMENT



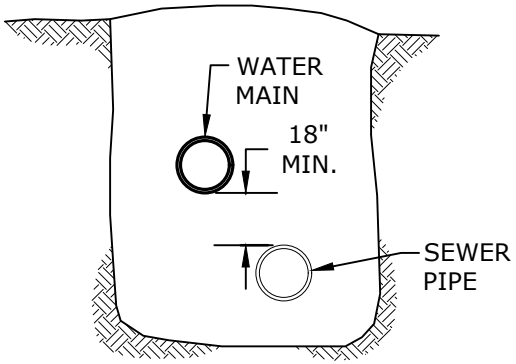
WATER MAIN CAPPING DETAIL

NO SCALE

11. WATER MAIN CAPPING DETAIL
WEBSTER WATER DEPARTMENT



PLAN



SECTION

NOTES:

1. IN SITUATIONS WHERE WATER AND SEWER LINES CROSS, WATER LINES SHALL BE LAID ABOVE SEWER MAINS WITH AT LEAST 18" OF VERTICAL CLEARANCE BETWEEN THE OUTSIDE OF THE SEWER AND OUTSIDE OF THE WATER MAIN. IF IT IS NOT POSSIBLE TO PROVIDE THIS VERTICAL CLEARANCE; 1) ONE FULL LENGTH OF WATER PIPE SHALL BE CENTERED ABOVE OR BELOW THE SEWER LINE SO THE SEWER JOINTS ARE AS FAR FROM THE WATER LINE AS POSSIBLE; 2) IN SITUATIONS WHEN A WATER MAIN CROSSES UNDER A SEWER, ADEQUATE STRUCTURAL SUPPORT SHALL BE PROVIDED FOR THE SEWER TO PREVENT DAMAGE TO THE WATER MAIN.

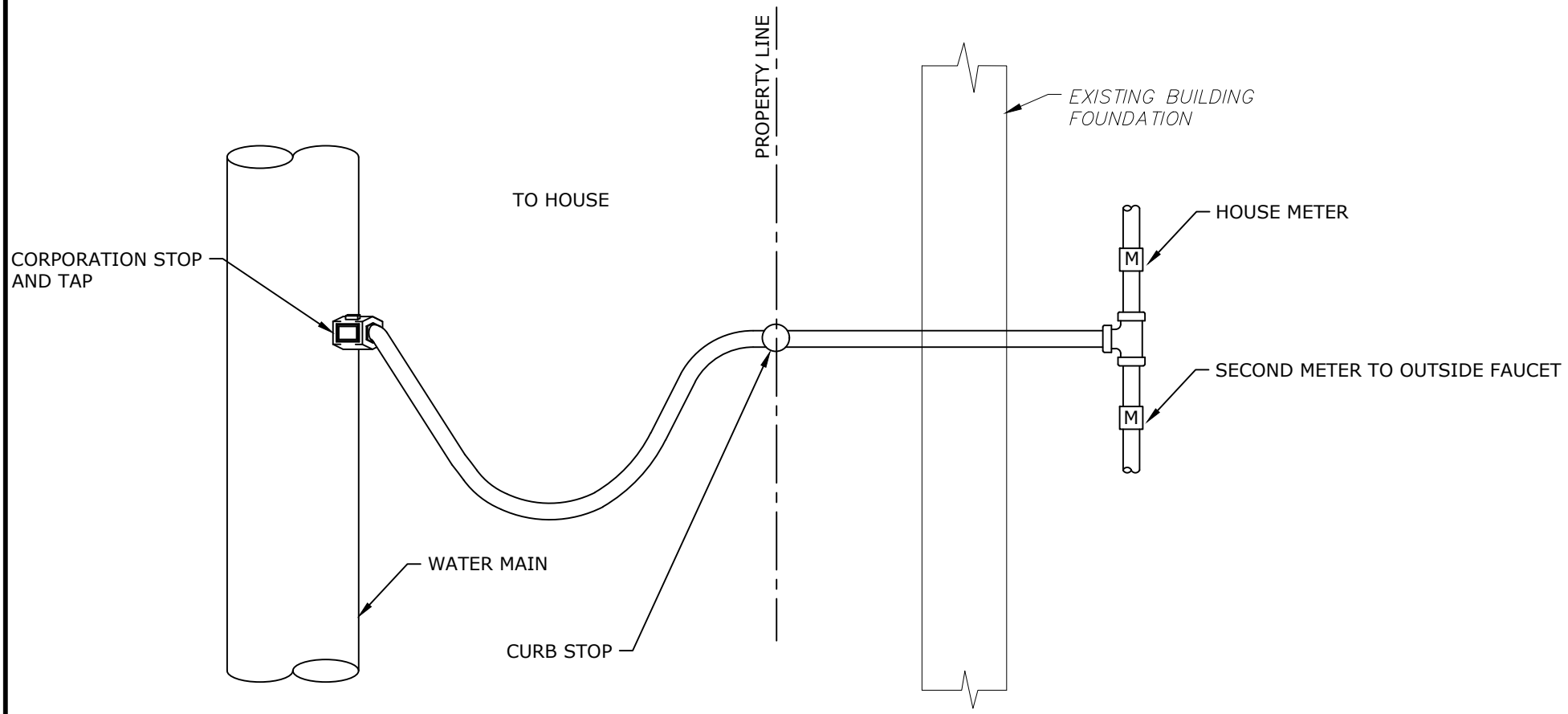
2. WHEN THE CROSSING AS SHOWN IS LESS THAN 18" VERTICAL CLEARANCE THE SEWER MAIN OR SERVICE MUST BE ENCASED 10' ON BOTH SIDES OF CROSSING WITH 6" OF 3000 PSI CONCRETE. IF THE SEWER MAIN OR SERVICE CROSSES ABOVE THE WATER MAIN OR SERVICE TOTAL ENCASEMENT, BOTH SIDES OF THE CROSSING IS REQUIRED, REGARDLESS OF SEPARATION.

WATER MAIN CROSSING EXISTING SEWER PIPE

NO SCALE

12. WATER MAIN AND EXISTING SEWER PIPE CROSSING

WEBSTER WATER DEPARTMENT



TYPICAL SECOND METER INSTALLATION

NO SCALE

13. TYPICAL SECOND METER INSTALLATION

WEBSTER WATER DEPARTMENT