



1551 Highway 88 West * Brick, New Jersey 08724-2399

732-458-7000 * FAX 732-458-8203

WATER & SEWER SPECIFICATIONS

Adopted October 2020

RESOLUTION NO. 69-20

October 29, 2020

THE BRICK TOWNSHIP MUNICIPAL UTILITIES AUTHORITY

**A Resolution Authorizing the Adoption of Revised Specifications
for the Construction of Water and Sewer Systems**

WHEREAS, The Brick Township Municipal Utilities Authority (the "Authority") on May 14, 1969, adopted Rules and Regulations governing the applications to the Brick Township Municipal Utilities Authority for construction of sanitary sewer systems and water systems in the Township of Brick; and

WHEREAS, The Authority's Specifications for the Construction of Water and Sewer Systems were updated and adopted on March 22, 1993 under Resolution No. 19-93; and

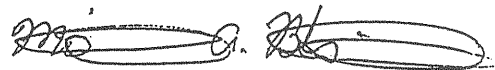
WHEREAS, The Authority's Specifications for the Construction of Water and Sewer Systems were last updated and adopted on February 22, 2010 under Resolution No. 23-10; and

WHEREAS, the refinement of construction techniques and the development of new materials caused the aforementioned Specifications to require revision;

NOW, THEREFORE, BE IT RESOLVED that the attached document dated October, 2020, and entitled Brick Utilities' Water and Sewer Specifications is hereby adopted and any other resolutions and specifications heretofore adopted by the Authority which are inconsistent with this resolution are hereby rescinded.

CERTIFICATION

I hereby certify that the foregoing Resolution was duly adopted at the Regular Meeting of The Brick Township Municipal Utilities Authority of the Township of Brick, County of Ocean, State of New Jersey, and held on October 29, 2020, a quorum being present and voting in the majority.

A handwritten signature in black ink, appearing to read "Michael Blandina", written over a horizontal line.

Michael Blandina, Secretary

WATER SPECIFICATIONS

TABLE OF CONTENTS

Specifications for the Construction of Water Systems

| <u>Section Number</u> | <u>Title</u> | <u>Page Number</u> |
|-----------------------|--------------------------------------|--------------------|
| 1.0 | General | 1 |
| 2.0 | Excavations | 1 |
| 2.1 | Trench Excavation | 1 |
| 2.2 | Bracing and Shoring | 1 |
| 3.0 | Maintenance of Traffic | 1 |
| 4.0 | Backfilling | 2 |
| 5.0 | Pavement Restoration | 2 |
| 6.0 | Dewatering | 2 |
| 7.0 | Erosion Control | 3 |
| 8.0 | Piping | 3 |
| 8.1 | Handling | 3 |
| 8.2 | Cleaning | 3 |
| 8.3 | Bedding and Pipe Installation | 3 |
| 9.0 | Piping and Accessories | 4 |
| 9.1 | Types of Pipe & Fitting Material | 4 |
| 9.1.1 | Polyvinyl Pipe & Fabricated Fittings | 4 |
| 9.1.2 | Ductile Iron Pipe & Fittings | 5 |
| 9.2 | Tapping Sleeves | 6 |
| 9.3 | Fire Hydrants | 6 |
| 9.4 | Post Type Hydrants | 6 |
| 9.5 | Valves | 7 |
| 9.5.1 | General | 7 |
| 9.5.2 | Gate Valves | 7 |
| 9.5.3 | Butterfly Valves | 7 |
| 9.5.4 | Valve Boxes | 8 |
| 10.0 | Water Services | 8 |
| 10.1 | General | 8 |
| 10.2 | Domestic Water Service | 8 |
| 10.2.1 | Copper Pipe | 8 |
| 10.2.2 | Polyethylene Pipe | 8 |
| 10.2.3 | Bronze Service Saddle | 8 |
| 10.2.4 | Corporation Valve | 9 |
| 10.2.5 | Curb Valve | 9 |
| 10.2.6 | Curb Box | 9 |
| 10.2.7 | Pipe Stiffeners | 9 |

| <u>Section Number</u> | <u>Title</u> | <u>Page Number</u> |
|---------------------------|------------------------------|------------------------|
| 10.3 | Water Meters | 9 |
| 10.3.1 | Commercial Buildings | 9 |
| 10.3.2 | Residential Buildings | 9 |
| 10.4 | Fire Services | 10 |
| 11.0 | Disinfection and Testing | 10 |
| 11.1 | Pressure and Leakage Testing | 10 |
| 11.2 | Disinfection | 11 |
| 11.3 | Flushing | 11 |
| 11.4 | Bacteriological Testing | 11 |

LIST OF DETAILS

| | |
|----------------|--|
| Detail W-1 | Class “C” Bedding |
| Detail W-2 PVC | Fire Hydrant Assembly (PVC C900) |
| Detail W-2 DIP | Fire Hydrant Assembly (DIP) |
| Detail W-2A | Post Type Hydrant Assembly |
| Detail W-3 | Water Service Connection (Non-Residential) |
| Detail W-3A | Curb Box |
| Detail W-3R | Water Service Connection (Residential) |
| Detail W-3M | Meter Pit |
| Detail W-4 | Water Meter Bar Type Yoke Assembly |
| Detail W-4C | Water Meter Horn Yoke Assembly |
| Detail W-4D | Basic Water Meter Installation |
| Detail W-5 | Typical Concrete Cradle Detail |
| Detail W-6 | Concrete Thrust Blocks |
| Detail W-8 | Water Meter Pit/Vault (1 ½” or 2” Diameter Water Line) |
| Detail W-8A | Vault Door |
| Detail W-8B | Water Meter Pit/Vault (Commercial) |
| Detail W-9 | Wet Tap Connection |
| Detail W-9A | Tapping Sleeve – Line Stop |
| Detail W-10 | Meter Installation (Commercial) |

| | |
|--------------|---------------------------|
| Detail W-13 | Water Main Sweep |
| Detail W-17 | Blow-Off Assembly |
| Detail W-21 | Air Release Valve Manhole |
| Detail W-21A | Air Release Valve Details |

--END OF TABLE OF CONTENTS--

SPECIFICATIONS FOR THE CONSTRUCTION OF WATER SYSTEMS

1.0 GENERAL

The applicant shall design and construct a water distribution system including, but not limited to, water mains, valves, hydrants, post hydrants, and all accessories capable of supplying the necessary domestic flow plus fire protection flow to the proposed project.

Brick Utilities may perform a distribution system analysis to check the adequacy of the distribution system. The approval will be based on the successful results of said analysis.

2.0 EXCAVATIONS

Excavation shall not be carried below the required level. All excavations shall be kept free of water until the installation of the pipe has been completed and backfilling of the excavation is completed. Excess excavation below the required level shall be backfilled with $\frac{3}{4}$ " crushed stone as directed by Brick Utilities.

Unstable soil shall be removed and replaced with $\frac{3}{4}$ " crushed stone, crushed slag, or suitable fill, which shall be thoroughly tamped. Brick Utilities will determine what constitutes unstable soil and will specify the amount to be removed and replaced.

All applicable OSHA Rules and Regulations shall be followed.

2.1 Trench Excavation

Width of the trench at the top of the pipe shall be six inches (6") minimum, eight inches (8") maximum, on each side of the pipe coupling. The bottom of the trench shall be rounded so that an arc of the circumference equal to 0.5 of the outside diameter of the pipe rests on undisturbed soil. Coupling holes shall be excavated accurately to size by hand. If a trench box is used, the bottom edges of the box shall at no time be below the proposed invert elevation of the pipe.

2.2 Bracing and Shoring

The Contractor shall do all bracing, sheeting, and shoring necessary to perform and protect all excavation as required for safety of the workers, public, existing utilities, structures, pavements, and public and private property. When the sheet piling is driven below the bottom of the pipe or the structure, the Authority Engineer may direct the contractor to leave the sheeting in place. All applicable OSHA Rules and Regulations shall be followed.

3.0 MAINTENANCE OF TRAFFIC

All work shall be performed in a manner that will ensure the least obstruction to traffic. The Contractor shall at all times conduct their operation with not only the motorists' safety in mind, but also of the pedestrians and their own employees.

The requirements of the Agency having jurisdiction over the road in which the Contractor is working shall govern. Emergency vehicles shall be provided access at all times.

The Contractor is responsible for submitting traffic control plans and acquiring all road opening, traffic detour, and road closing permits.

4.0 BACKFILLING

Backfilling shall be done with approved materials free from large clods or stones. Backfill materials in trenches shall be placed evenly and carefully around and over pipe in 6" maximum layers. Each layer shall be thoroughly and carefully tamped until one foot of cover exists over pipe.

The remainder of backfill materials shall be placed in twelve inch (12") lifts maximum, moistened if necessary, and compacted in all areas (repaved and/or easements). No compacting shall be done when the material is too wet.

All forms, trash, and debris shall be removed and cleared away from excavation. Approved backfill material may be from excavation or borrow. It shall be free from rocks, lumber, debris and frozen material. Backfill materials shall be placed symmetrically on all sides in twelve inch (12") maximum layers to the top of the pipe. Each layer shall be moistened and compacted with mechanical or hand tampers. In roadway or areas to be paved, each layer shall be compacted to density equal to that of adjacent original materials, so that pavement can be placed immediately.

The trenches shall be backfilled at the end of each workday, except when the conditions require them to be left open overnight. When the trenches are left open overnight, temporary fencing and/or plates shall be installed at those openings.

Even though testing may indicate that the required density has been attained, the Contractor will be responsible for correcting any settlement or damage to the utilities.

5.0 PAVEMENT RESTORATION

Existing pavement shall be restored in accordance with the rules and regulations of the agency having jurisdiction over the roadway. Said agency will determine if the roadway has been restored adequately.

6.0 DEWATERING

Dewatering shall be accomplished by methods which ensure that the groundwater will be drawn down to an elevation two (2') feet below the bottom of the bedding. Upon removal of well points, deep wells or other dewatering equipment, the contractor shall backfill, compact, and pave all roads where required. Well point and deep well holes shall be compacted for the full depth to a density equal to in-situ soils.

Dewatering for the structures and pipelines shall commence when groundwater is first encountered and shall be continued as long as the excavation is open.

7.0 EROSION CONTROL

Erosion control measures taken at the site shall be in full conformance with and meet all requirements of the “Standards for Soil Erosion and Sediment Control Act of 1975 - New Jersey State Soil Conservation Committee.”

A compliance certificate from the Ocean County Soil Conservation District (Brick) and the Freehold Soil Conservation District (Howell) shall be submitted to Brick Utilities.

8.0 PIPING

8.1 Handling

Pipe, fittings and accessories shall be handled with care and shall not be dropped or bumped against pipe or appurtenances already on the ground or against any other object on the ground. The Contractor’s methods for installation and handling of pipe, fittings and accessories shall conform to the pipe manufacturer’s recommendation and AWWA C-605 Standard for PVC and C-600 Standard for DIP, latest edition.

8.2 Cleaning

The interior of all pipes, fittings and accessories shall be thoroughly cleaned of all foreign matter before being installed and shall be kept clean until the work has been accepted. All joint contact surfaces shall be kept clean until the jointing is completed.

Every precaution shall be taken to prevent foreign material from entering the pipe during installation.

Groundwater shall not be allowed to rise around the pipe until the trench is backfilled and the grading is completed. Dewatering operation must be continuous for as long as the trench is open.

Whenever pipe laying is stopped, the open end of the pipe shall be closed with a water tight plug or cap.

8.3 Bedding and Pipe Installation

Bedding material shall be broken stone, free from silt, clay or organic material, and shall conform to the requirements of the New Jersey State Department of Transportation Standards for No. 57 coarse aggregate.

Pipe shall be bedded true to line and grade, and no blocking shall be used to bring the pipe to grade. Class “C” bedding shall be used for all pipes unless otherwise specified or directed by Brick Utilities as warranted by field conditions (See Detail W-1). Class “C” bedding shall be defined as that method of bedding water mains in approved granular material with a shaped bottom in undisturbed earth so as to fit the lower part of the pipe, for a width of at least 50% of the pipe diameter; and in which the remainder of the pipe is surrounded to a height of at least 0.5 feet above its top with approved granular materials, shovel placed and tamped to completely fill all spaces under and adjacent to the pipe; all under the direction and inspection of Brick Utilities.

Where the water main is to be laid without special foundation, the earth forming the bed shall be free of large stones. The pipe shall then be evenly bedded in the earth, great care being taken to remove only enough of the earth to leave a uniform bed for the entire length of the pipe, except the bell, under which a recess shall be excavated to a sufficient depth to relieve it of any load and to allow ample space for making the joint. In case the bed shaped in the bottom of the trench is too low, $\frac{3}{4}$ " stone must be properly placed into the bottom and thoroughly compacted and a new bed shaped for the pipe. It is unacceptable to raise the grade of the pipe by ramming earth beneath it. When the pipe has been bedded satisfactorily and the joint made, the recess around the bell shall be refilled with soil and enough soil shall be refilled and tamped on each side of the pipe to hold it securely in place, care being taken not to disturb the position of the pipe during this process.

Concrete cradles, where required, shall be constructed as directed. The concrete for the full width of the foundation shall be deposited continuously to the height of the outside bottom of the pipe. Before this concrete is set, the pipe shall be evenly bedded therein, so as to have a uniform support for its entire length, and the remainder of the concrete shall be immediately deposited in such a manner as to avoid changing the position of the pipe. Concrete shall be a minimum of 3,000 psi.

Concrete cradle shall be allowed to cure sufficiently to prevent consolidation of backfill, and wet concrete cradle shall be allowed to cure 24 hours before vehicle loads can be applied to that area of the trench. Steel plates may be used to cover the trench to protect the cradle from vehicle loads if the 24-hour undisturbed cure period cannot be provided (See Detail W-5).

Where the water main is to be laid below groundwater level, it shall be laid on $\frac{3}{4}$ " crushed stone bedding, and the stone shall be deposited for the full width of the trench. The pipe shall then be bedded on this material and the remainder of the stone deposited and carefully tamped so as to avoid disturbing the pipe but giving a uniform support to its entire length.

In the event that the water main has to be looped under another utility line and/or obstruction in order to provide the minimum four foot (4') of earth cover above the water main, a water main sweep shall be constructed (See Detail W-13).

Chlorine tablets shall be placed in the pipe during installation in accordance with the applicable AWWA section on disinfection.

9.0 PIPING AND ACCESSORIES

9.1 Types of Pipe & Fitting Material

Due to highly corrosive soils, all newly installed pipe shall be polyvinyl chloride piping (PVC) meeting AWWA Standard C900 and C905 and all newly installed fittings are to be polyvinyl chloride fabricated fittings (refer to section 9.1.1). Ductile iron pipe is to be used under highly traveled roadways (County and State roadways) and at waterway crossings (refer to section 9.1.2).

9.1.1 Polyvinyl Chloride Pipe & Fabricated Fittings

The minimum allowable pipe diameter shall be six inches (6"). Where directed by Brick Utilities, water pipes shall be encased in concrete at the crossings (See Detail W-5). Polyvinyl chloride

pipe material water mains and services shall be constructed with a minimum of four foot (4') earth cover to the top of the pipe. Polyvinyl chloride pipe and fittings shall be manufactured in accordance with ANSI 61, UL 1285 and AWWA C900 + C905 shall be the thickness DR18 except where otherwise specified.

A metal tracing wire (#10 HMW/PE insulated) shall be wrapped around the polyvinyl chloride pipe continuously from the water valve box to the subsequent water valve box in line or to the hydrant. The tracing wire shall be extended up to the top of each water valve box. In addition, a metal marking tape designating buried water pipe shall be installed two feet (2') above the polyvinyl chloride pipe for its entire extension.

Brick Utilities requires that the polyvinyl chloride pipe product which shall be used is the JM Eagle LOC900™ PVC pipe material, Diamond Lok-21 restrained joint C900 PVC Pipe or approved equal.

All of the Polyvinyl Chloride Fabricated fittings shall be HARCO Class 150 Gasketed PVC Fittings in conformance to AWWA C900 Standards including DR18 Requirements, or approved equal. All fitting should be restrained using EBAA Iron Series 2500 restraints, or approved equal, and Thrust Blocks. All fitting hardware to be Grade 316SS.

9.1.2 Ductile Iron Pipe & Fittings

The minimum allowable pipe diameter shall be six inches (6"). Ductile iron pipe material shall be installed in heavily traveled roadways (County & State), waterway crossings, and in areas where the water mains are to be installed at extreme depths. Where directed by Brick Utilities, water pipes shall be encased in concrete at crossings (See Detail W-5). Ductile iron pipe water mains and services shall be constructed with a minimum of four foot (4') of earth cover to the top of the pipe.

Ductile iron fittings shall be mechanical joints type conforming to ANSI/AWWA C153/A21.53 UL Listed.

All ductile iron mechanical joints fittings shall conform to ANSI A21.10. All fittings 12" and smaller shall conform to a minimum pressure rating of 250 psi, and at least 150 psi for other fittings (14" or larger).

All of the hardware used as part of the mega lug retainer glands shall be stainless steel – Grade SS316.

For restraining all mechanical joint fittings, the combination of the following restraints shall be installed:

- Mega lug retainer glands and concrete thrust blocks
- Mega lug retainer glands and stainless steel – Grade SS316 thrust rods

For the construction of the concrete thrust blocks refer to Detail W-6. The pipe shall be furnished with the necessary rubber gaskets.

All of the ductile iron fittings shall be MJ C153 Ductile Iron compact fittings in conformance to ANSI/AWWA C153/A21.53 or approved equal.

9.2 TAPPING SLEEVES

Tapping sleeve shall be bolted type of stainless steel construction with molded rubber gasket to provide a permanently tight flexible, leak proof joint. No caulked or poured joints will be permitted. Tapping sleeve shall be equipped with a test plug. Contractor shall furnish gate valve, which is part of this installation, conforming in every respect with Section 9.5.2 of these specifications. Stainless Steel tapping sleeve shall be manufactured by Ford as style "FAST", ROMAC Industries "SST Series", Smith Blair Model No. 663 or approved equal (See Detail W-9). All of the hardware used as part of the stainless steel tapping sleeve shall be stainless steel – Grade SS316.

If the type of tapping sleeve selected by the Contractor to be utilized is not the bolted type of stainless steel construction, it will require the approval of the Authority Engineer.

The tapping sleeve utilized for any line stop application will be manufactured specifically for this type of application. The type of line stop tapping sleeve selected by the Contractor will require the approval of the Authority Engineer. All of the hardware used as part of tapping sleeve for a line stop application shall be stainless steel – Grade SS316. Refer to Detail W-9A, for information regarding the installation of the tapping sleeve for the line stop type of application.

The hot tap/insertion valve system utilized for any line stop application where the water system is to remain in service as part of a new water main extension shall be the "EZ Valve Permanent Valve Insertion System" as manufactured by Advanced Valve Technologies, LLC or approved equal. The bonnet flange and all of the hardware used as part of the hot tap/insertion valve system shall be stainless steel – Grade SS316 hardware.

9.3 FIRE HYDRANTS

Fire hydrant locations and quantity shall be approved by the District Board of Fire Commissioners having jurisdiction over the project and Brick Utilities. At minimum, hydrants shall be spaced so that the traveled distance between hydrants does not exceed 500 linear feet.

Fire hydrants shall comply with the latest edition of AWWA Standard C-502. Fire hydrants shall have a minimum 4 ½" main valve opening, and shall be equipped with two 2 ½" hose nozzles and one 4 ½" steamer nozzle. All nozzles shall be National Standard thread. The operating and nozzle cap nuts shall be 1 ½" pentagon. Hydrants shall be furnished with a 6" gate valve. All of the hardware used for the assembly of the hydrant shall be stainless steel-Grade SS316. Hydrants shall be Mueller Co. Model A-421 or equal (See Detail W-2). For hydrants installed on larger size water mains (12" diameter or larger), hydrants shall be Mueller Co. Model A-423 5 ¼" or equal (See Detail W-2).

Fire hydrants shall be painted "Safety Yellow", factory applied.

9.4 POST TYPE HYDRANTS

Post type hydrants shall be installed in areas where larger water mains are shown connecting to existing undersized water mains and where the remaining sections for the undersized water mains are

not planned to be changed to the larger size water mains. In areas where the existing undersized water mains are to remain, post type hydrants shall be installed at the end of all dead end undersized water mains where no fire hydrants are located.

Post type hydrants shall comply with AWWA Standard C-502, latest edition. Post type hydrants shall be a minimum 2 1/8" main valve opening. Post type hydrants shall be equipped with one 2 1/2" nozzle with National Standard threads. The operating and nozzle cap nuts shall be 1 1/2" pentagon. Post type hydrant shall be furnished with a 3" gate valve. All of the hardware used for the assembly of the post type hydrant shall be stainless steel – Grade SS316. Post type hydrants shall be Mueller Co. Model A-411 or equal (See Detail W-2A).

Post type hydrants shall be painted "Safety Yellow", factory applied.

Installation of a proposed two inch (2") diameter blow-off assembly as part of the construction of a new water main will have to be approved by Brick Utilities. If allowed, the installation of the two inch (2") diameter blow-off assembly will be constructed in accordance with the Detail W-17.

9.5 VALVES

9.5.1 General

System valves shall be installed with a minimum of two (2) valves at each intersection. For every run of pipe without an intersection, a valve shall be placed every 800 LF. Valves larger than twelve inch (12") diameter shall be butterfly type valves. Automatic air release valves shall be installed at high point in the mains. All valves shall be equipped with a valve box allowing access to the valve nut.

9.5.2 Gate Valves

Gate valves shall be a single iron disc type with resilient rubber seat. The body shall be ductile iron or cast iron. The exterior and interior surfaces shall be epoxy coated. Gate valves shall be clockwise closing. All of the hardware used for the assembly of the gate valves shall be stainless steel – Grade SS316. Gate valves shall comply with AWWA C-509 Standard, latest edition. Gate valves shall be Mueller Co. 2360 Series or equal.

9.5.3 Butterfly Valves

Body of Butterfly valves shall be ductile iron or cast iron. Disc shall be a ductile iron material with a resilient Nitrile rubber seat. Disc shall be self-adjusting. Butterfly valves shall be clockwise closing. All of the hardware used for the assembly of the butterfly valves shall be stainless steel – Grade SS316. Butterfly valves shall comply with AWWA C-504 Standard, latest edition. Butterfly valves shall be Mueller Co. Model B-5228 or equal.

9.5.4 Automatic Air Release Valves

Automatic air release valves shall be float-actuated with heavy cast iron body, stainless steel float, and bronze or stainless steel working parts. All of the hardware used for the assembly of the automatic air release valves shall be stainless steel – Grade SS316. Air release valves shall comply with AWWA C-512 Standard, latest edition. Air release valves shall be fitted with blow-off valves, isolation

valve, quick disconnect couplings and a minimum of six foot (6') of hose for backflushing. Piping required to pipe air release valve discharge to nearest drain shall be installed. Air release valves shall be APCO Heavy Duty Air Release Valve No. 400 Series by Valve & Primer Corporation or equal (See Detail W-21 & Detail W-21A).

9.5.4 Valve Boxes

All gate and butterfly valves shall be equipped with an adjustable valve box. Valve box shall be cast iron. Valve box shall be Bingham & Taylor Model 4908 or equal.

10.0 WATER SERVICES

10.1 General

For each residential units, water services laterals shall be installed to each individual lot at the time of main installation. For individual buildings containing individual multi-residential units (apartment type units and/or townhouse type units), water service laterals shall be installed to each individual residential units which are occupying individual buildings at the time of building construction. For commercial units, water service laterals shall be installed to each individual units which are occupying individual commercial buildings at the time of building construction. Water service lateral shall be installed from the main and terminate behind the curb with a curb valve. Contractor shall saw-cut the letter "W" on the top of the curb in front of the curb box. Water service laterals shall be one inch (1") diameter (minimum) iron pipe size 200 psi polyethylene or one inch (1") diameter (minimum) type K copper. As part of the work for installing the water service lateral, a #10 HMW/PE insulated wire shall be wrapped around the service lateral and will be connected continuously from the corporation valve to the curb box. The as-built plan prepared for the newly installed water main will also have to note the installation of the tracer wire around the water service lateral. Stainless steel pipe stiffeners shall be used at all corporation and curb valve connections (See Detail W-3).

10.2 Domestic Water Services

10.2.1 Copper Pipe

Copper pipe shall be one inch (1") inside diameter (minimum), type K in conformance with ASTM B88.

10.2.2 Polyethylene Pipe

Polyethylene pipe shall be one inch (1") (minimum) iron pipe size and rated at a minimum 200 psi. Polyethylene pipe shall be manufactured in accordance with ASTM D-2239 SDR-7.

10.2.3 Bronze Service Saddle

Bronze Service Saddle shall be sized based on the size of the outside diameter of the installed PVC C900 pipe water main. The outlet pipe size of the bronze service saddle shall be one inch (1") diameter (minimum). Bronze Service Saddle shall be Mueller Model S-13000 Series OD Controlled Bronze Service Saddle or equal. All of the hardware used as part of the service saddle shall be Silicone Bronze or stainless steel – Grade SS316.

10.2.4 Corporation Valve

Corporation valve shall be manufactured in accordance with AWWA C800 Standard, latest edition. Corporation valve shall be quarter-turn check type. Corporation valve shall be Ford Type F1101, Mueller Co. H-15029, or equal.

10.2.5 Curb Valve

Curb valve shall be manufactured in accordance with AWWA C800 Standard, latest edition. Curb valve shall be quarter turn check type. Curb valve shall be Mueller Co. Model H-15159, Ford Model B-66-444, or equal.

10.2.6 Curb Box

Curb box shall be constructed of cast iron and shall be furnished with cast iron lid and stainless steel shut off rod and stainless steel cotter pin. All hardware used for the shut off rod and cotter pin for the curb box shall be stainless steel – Grade SS316. Curb box shall be Mueller Co. Model H-10314 or equal (See Detail W-3A and Detail WF-3).

10.2.7 Pipe Stiffeners

Pipe stiffeners shall be stainless steel. Pipe stiffeners shall be Mueller Co. Model 52, or equal.

10.3 Water Meters

10.3.1 Commercial Buildings

Water meters under 1 ½" diameter will be installed by Brick Utilities. The Applicant shall install a meter yoke for all meters under 1 ½" diameter. The meter yoke shall be mounted in the horizontal position with a minimum of 8" clearance from side wall and floor. Crawlspace mounting of meter shall be within 10 feet of an accessible opening. A gate valve or plug cock shall be installed on the inlet side of the meter. A shut-off valve shall also be installed on the discharge side of the meter. The Applicant shall supply and install a two-conductor cable from the meter to the remote readout location. In all cases, Brick Utilities will supply the meter, remote readout and threaded flanges (See Detail W-4D).

Installation of one and one half inch (1 1/2") or larger sized water meters will be the responsibility of the Contractor. The Contractor will be supplied the larger sized water meters by Brick Utilities. It is noted that installation of the piping for the larger sized water meters will be completed in accordance with all appropriate plumbing code standards (See Detail W-10).

10.3.2 Residential Buildings

The applicant shall install a Ford coil water meter pit Model PFCBHCCR-488-18-XX-FP-NL (or approved equal), with Ford composite lid model PPSC-18-L-P-REC-T H-20 composite Plastic with Recessed hole for Touch Read (Sensus), (or approved equal) to house the 1" water meter. Installation of any Ford coil water meter pit will require the final approval of Brick Utilities. The Ford coil meter pit shall be installed immediately after the curb box valve. A Ford model CCID-xx style (or approved equal) foam insulating disc shall be provided and installed within the meter pit. For water meters larger

than 1 1/2" or 2" diameter that are to be installed in the water meter pits, the applicant will provide detailed design and construction details for the water meter pit for review and approval by Brick Utilities. Meter will be provide by Brick Utilities.

Per *2018 National Standard Plumbing Code*, Sec. 10.15.7, the applicant is responsible for installing a thermal expansion tank where a closed system is created with a water pressure regulator, a backflow preventer, or a check valve.

10.4 Fire Services

All fire service water lines shall have separate main connections with separate water valve shut-offs. The size shall be of an adequate size to provide sufficient water to the applicant's fire suppression system. The fire service size shall be determined by the applicant's engineer. All fire services shall be D.I.P. Class 52 or PVC C900 conforming to Section 9.1 of this specification. Every fire service shall include a detector check valve. The inspections of the fire service lines are under the jurisdiction of the Township of Brick Bureau of Fire Safety.

11.0 DISINFECTION AND TESTING

Prior to placing water mains and appurtenances into service, said mains and appurtenances shall be pressure and leakage tested and disinfected in accordance with the provisions of this Section.

The contractor shall provide all labor, materials, equipment, gauges, air, water, and all else necessary to test and disinfect all piping systems and appurtenances installed.

Prior to scheduling the acceptance test, all underground utilities and the road base for each project will have to have been installed and the record drawings for the project's water systems will have to be approved by Brick Utilities.

11.1 Pressure and Leakage Testing

A hydrostatic test pressure of 140 psi shall be maintained in the pipe line for a minimum period of two (2) hours. At the end of the test period, if the test pressure has remained constant, the pipe line shall have passed the test. If the pressure has dropped, it shall be brought back to the test pressure by pumping a known volume of water (by pumping from a graduated container or by metering) back into the pipe line. The volume of water thus used, representing leakage from the pipe line, shall be recorded. If the leakage is less than the allowable leakage specified below, the pipe line shall have passed the test. If the leakage exceeds the allowable specified, the contractor shall locate the leaks; permanently repair the sections of piping where the leaks are occurring, to the satisfaction of Brick Utilities, and retest the pipe line as specified above. This process shall be repeated until the pipe line has successfully passed the pressure test.

All air shall be expelled from a pipe line before it is tested. All caps, plugs, and fittings shall be adequately braced and anchored to withstand the test pressures. The test pressure specified by Brick Utilities shall be obtained and measured at the lowest elevation in the pipe line under test.

Flanged, welded, threaded, and solvent welded pipe lines shall show no leakage at the test pressure. The leakage for mechanical joint and push-on joint pipe lines shall not exceed the allowable leakage per 1000 LF of pipe as shown in the following Table:

Allowable Leakage Per 1000 L.F. at 140 psi

| | | | | | | | |
|----------------|------|------|------|------|------|------|------|
| Pipe Diameter: | 4" | 6" | 8" | 10" | 12" | 16" | 20" |
| Gallons/Hour: | 0.35 | 0.53 | 0.71 | 0.89 | 1.06 | 1.42 | 1.77 |

*Per AWWA C600, latest edition

11.2 Disinfection

Pipes and hydrant barrels shall be disinfected by introducing chlorine of such a strength as to produce in the filled line a solution of not less than 50 parts per million of free chlorine. During construction, chlorine tablets shall be placed in each length of pipe in quantities sufficient to produce the proper chlorine solution once water is introduced to the main. The solution shall remain in the lines for a period of no less than 12 hours. During this 12-hour period, all valves in the system shall be operated to disinfect all parts of said valves.

11.3 Flushing

After the newly installed water main has successfully passed the hydrostatic tests, it must be disinfected and flushed. A representative of Brick Utilities will be present during any flushing of the water mains. Disposal of heavy chlorinated water shall comply with AWWA C651-99, Section 4.5.2 and Appendix C.

11.4 Bacteriological Testing

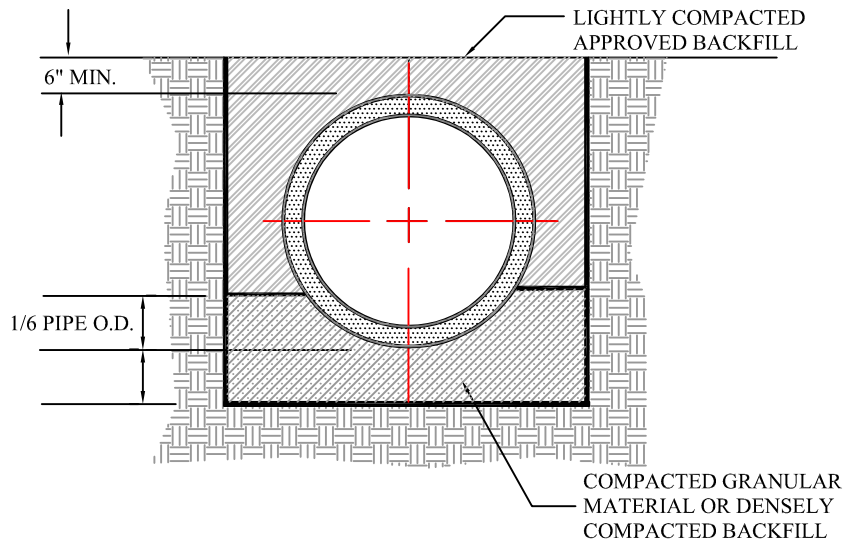
Once the new water main has been thoroughly flushed, the bacteriological sampling will be completed in accordance with the applicable AWWA (refer to AWWA 651-99, latest edition). The first set of water samples of the newly installed water system will be taken and a bacteriological analysis will be performed. A second set of water samples will be taken on the following day and a subsequent bacteriological analysis will be performed by Brick Utilities. The Contractor will be responsible for assisting Brick Utilities with the collecting of both sets of water samples.

The result for the first set of water samples will be known after a 24 hour time period. The result for the second set of water samples will be known after a 48 hour time period. Both of the set of water samples for the newly installed water main will have to be found to be free of bacteria. In the event that it is determined that the bacteriological testing on either set of water samples are not free of bacteria, a second series of bacteriological testing will have to be completed and the results for the additional second series of water sampling will be known within the time periods as indicated above. It will be required that two sets of water samples for the newly installed water main will have to be found bacterial free or additional bacteriological testing and analysis will have to be performed until the results of two consecutive sets of water samples are found to be bacteria free.

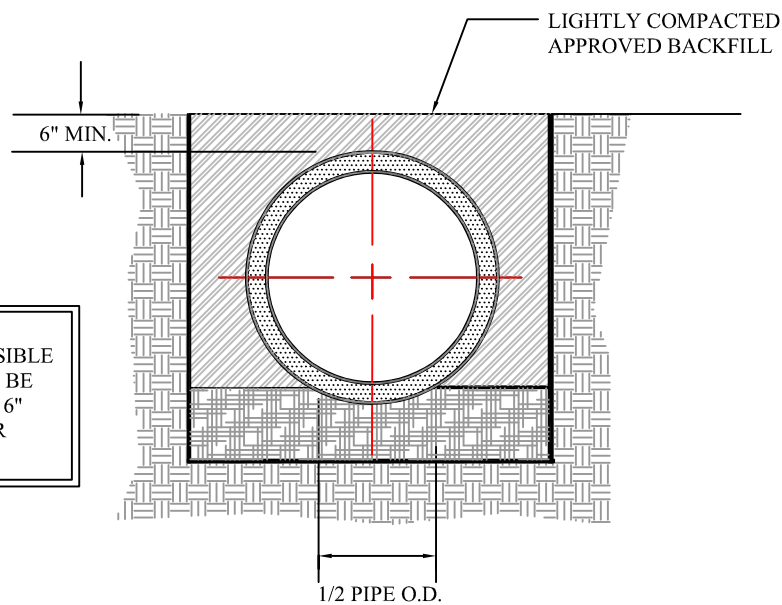
Should the bacteriological test fail, the Contractor, at their expense, shall be responsible for rechlorinating and flushing the water main as many additional times as may be necessary to make the new water main free of bacteria.

Once the bacteriological testing on the new water main has been found to be bacteria free, the water main will be determined as accepted as part of the water system of Brick Utilities.

**--END OF SPECIFICATIONS
FOR THE CONSTRUCTION OF WATER SYSTEM--**



Granular Foundation



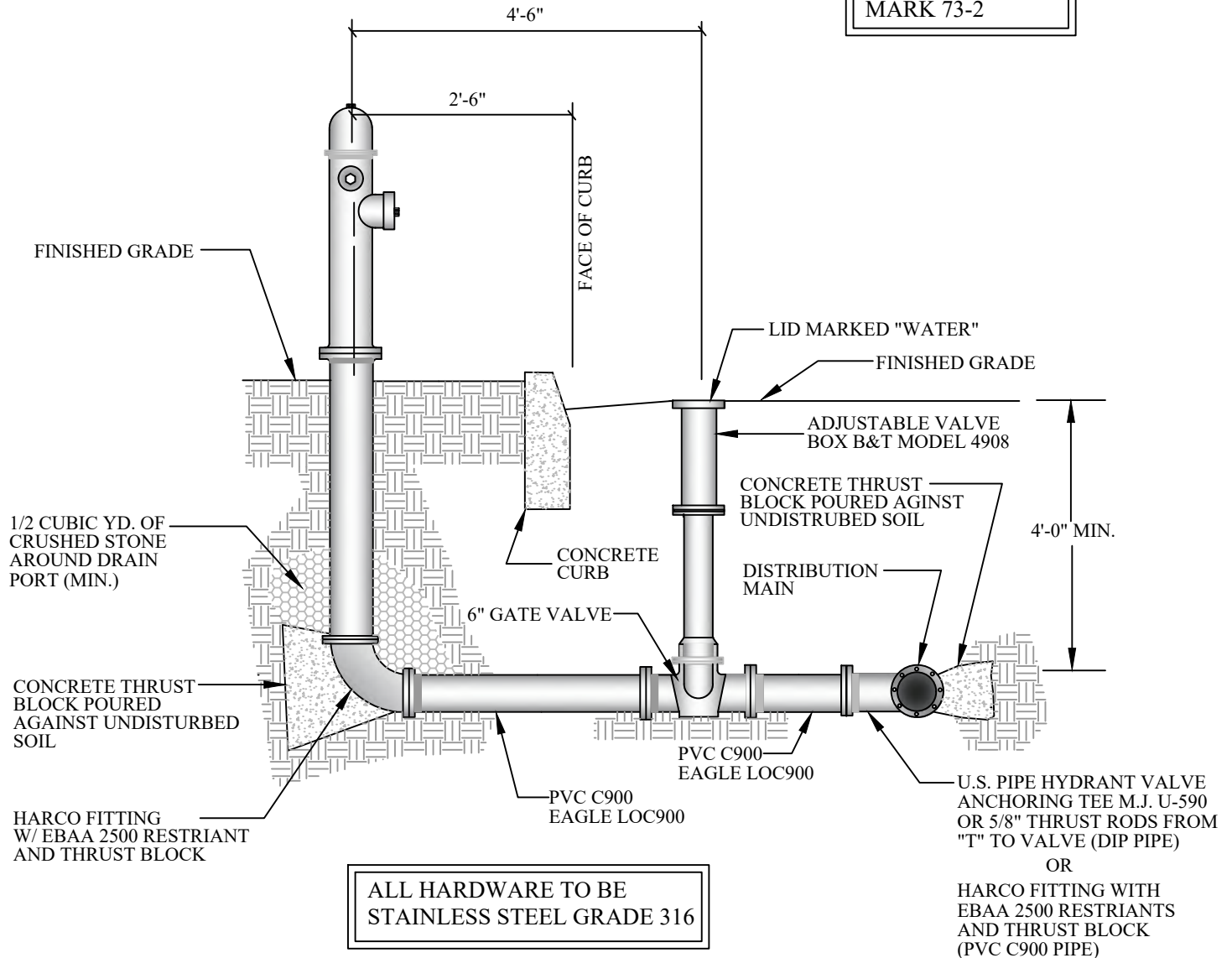
NOTE:
FOR ROCK OR OTHER INCOMPRESSIBLE
MATERIALS, THE TRENCH SHOULD BE
OVEREXCAVATED A MINIMUM OF 6"
AND REFILLED WITH A GRANULAR
MATERIAL.

Shaped Subgrade

CLASS "C" BEDDING

Revised: Dec. 2009

FIRE HYDRANT
MUELLER A-421
OR AMERICAN
DARLING MODEL
MARK 73-2

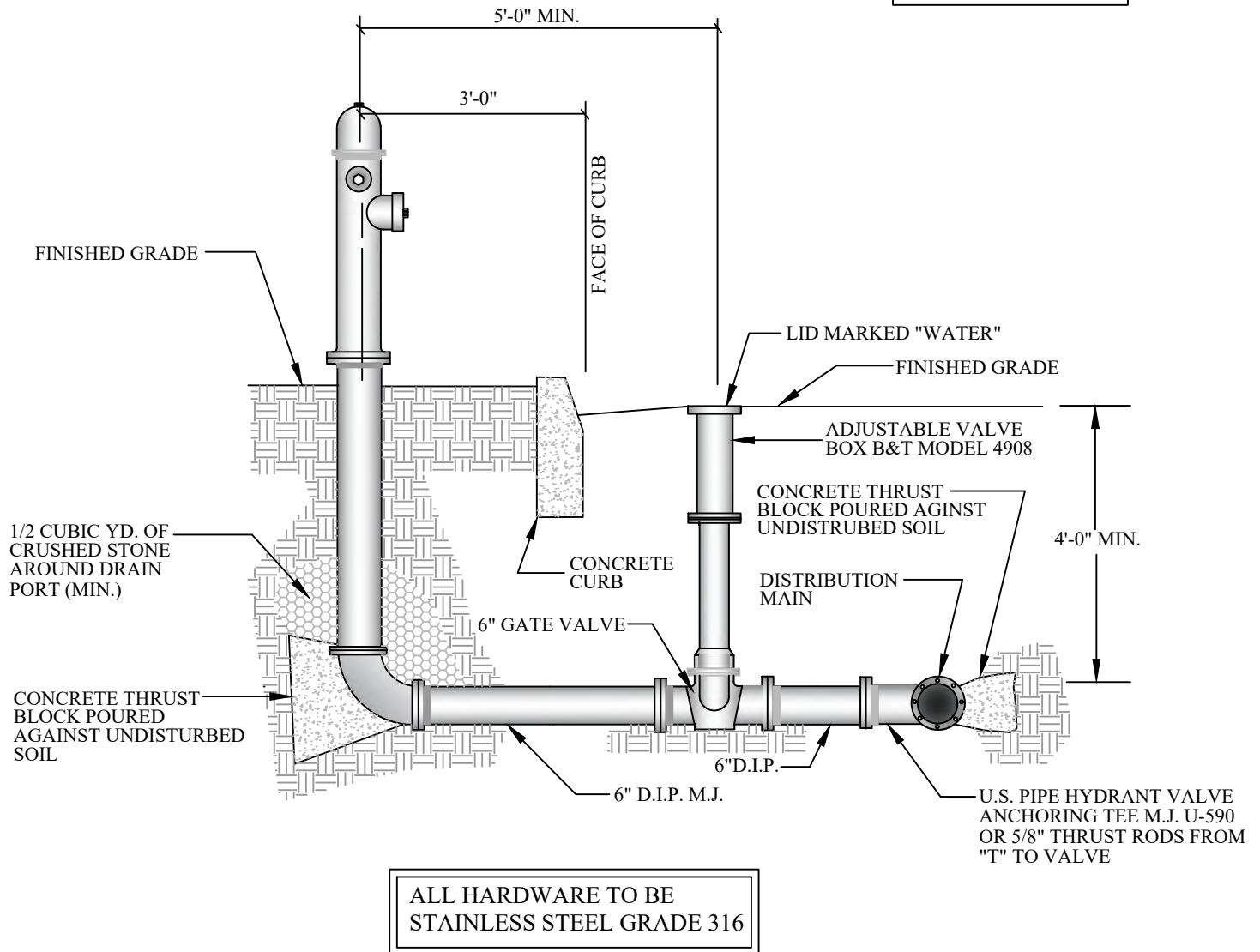


Fire Hydrant Assembly

INCLUDING BUT NOT LIMITED TO
HYDRANTS, VALVES, AND RESTRAINTS

Revised: June 2020
Revised: Aug. 2012
Revised: Dec. 2009

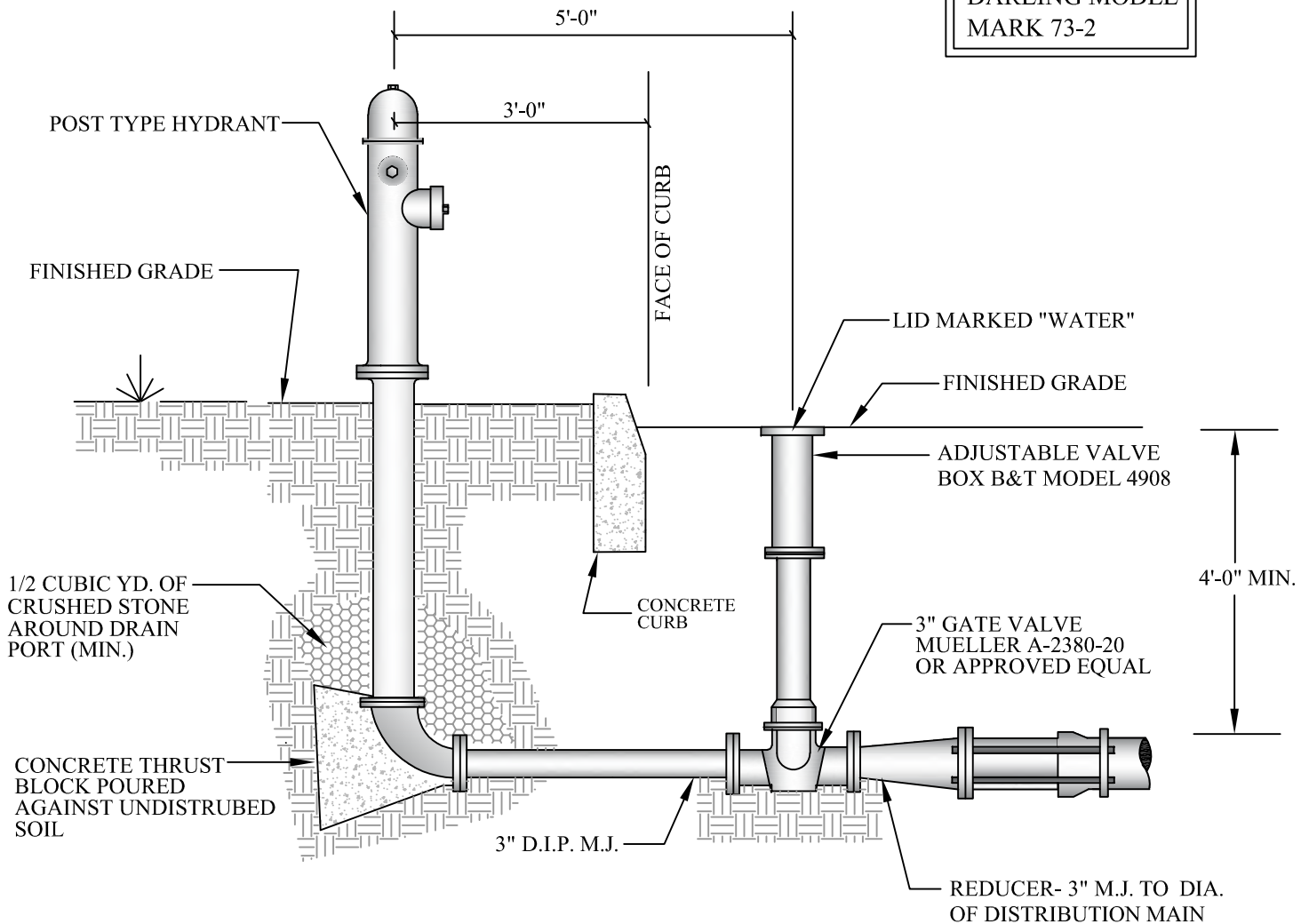
FIRE HYDRANT
MUELLER A-421
OR AMERICAN
DARLING MODEL
MARK 73-2



Fire Hydrant Assembly

Revised: Dec. 2009

FIRE HYDRANT
MULLER A-421
OR AMERICAN
DARLING MODEL
MARK 73-2

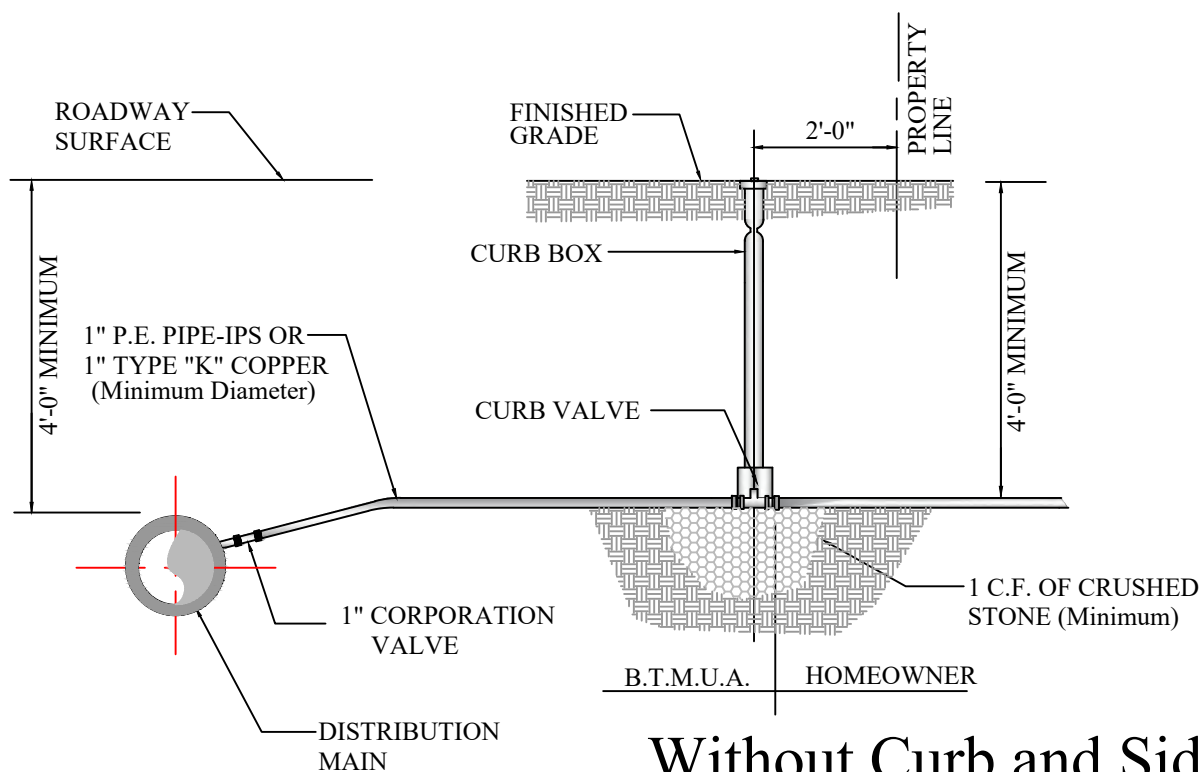
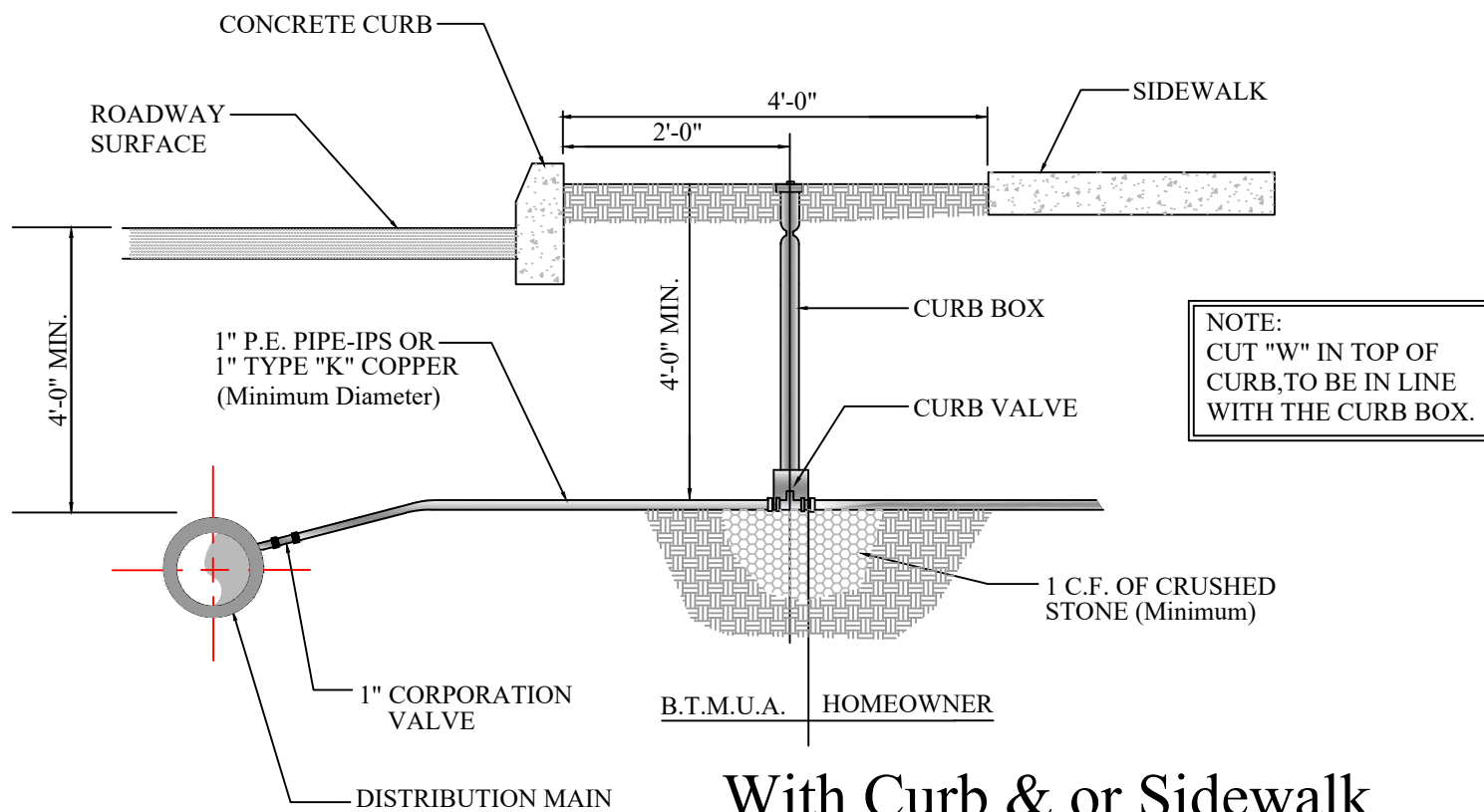


5/8" THRUST RODS TO BELL
CLAMP FOR MAINS TERMINATING
WITH A POST TYPE HYDRANT

ALL HARDWARE TO BE
STAINLESS STEEL GRADE 316

Post Type Hydrant Assembly

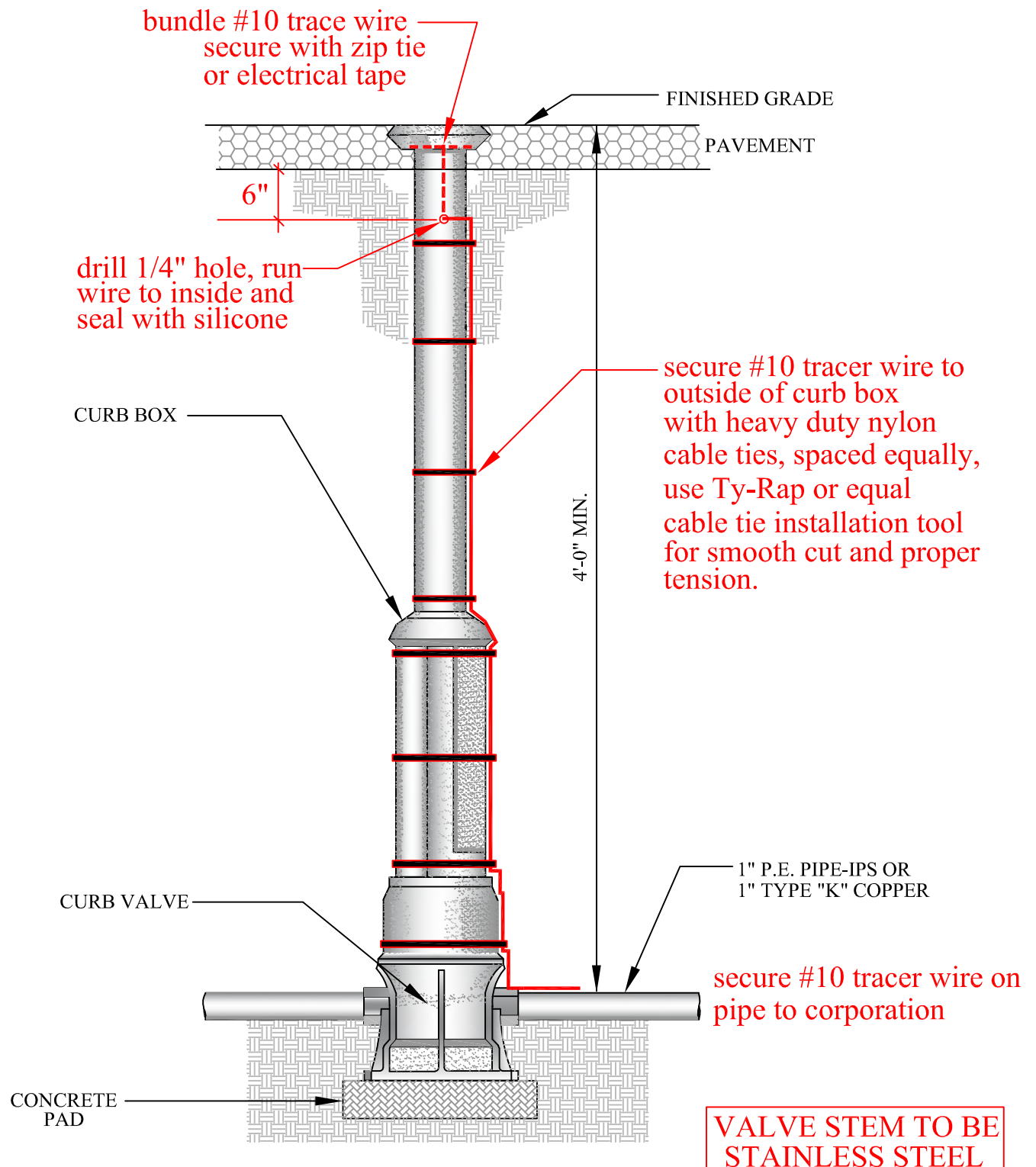
Revised: Aug. 2012
Revised: Dec. 2009



Water Service Connection

Non-Residential

Revised: Dec. 2009

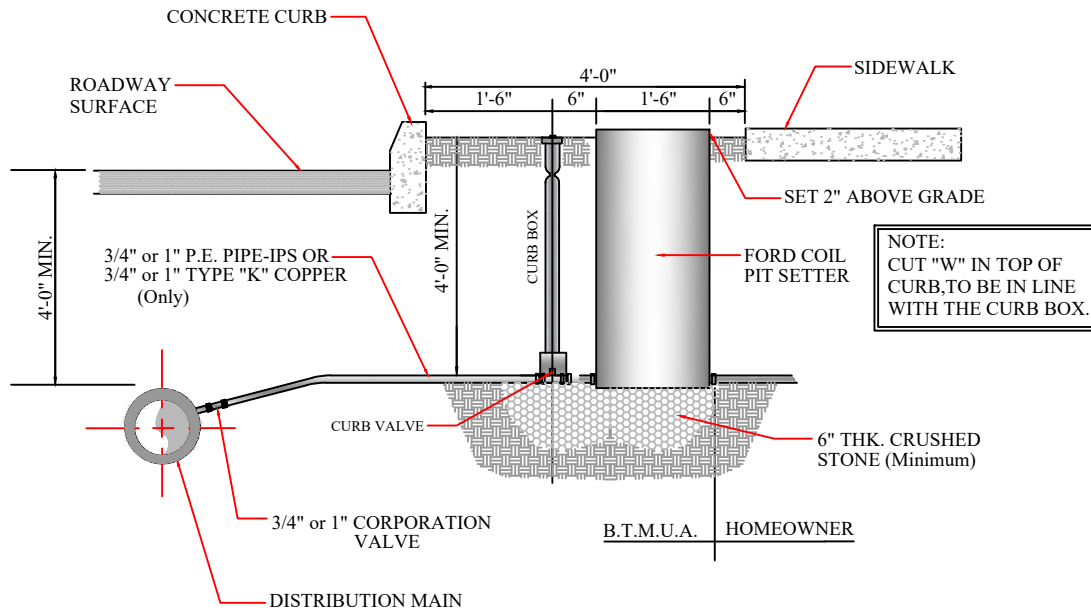


CURB BOX

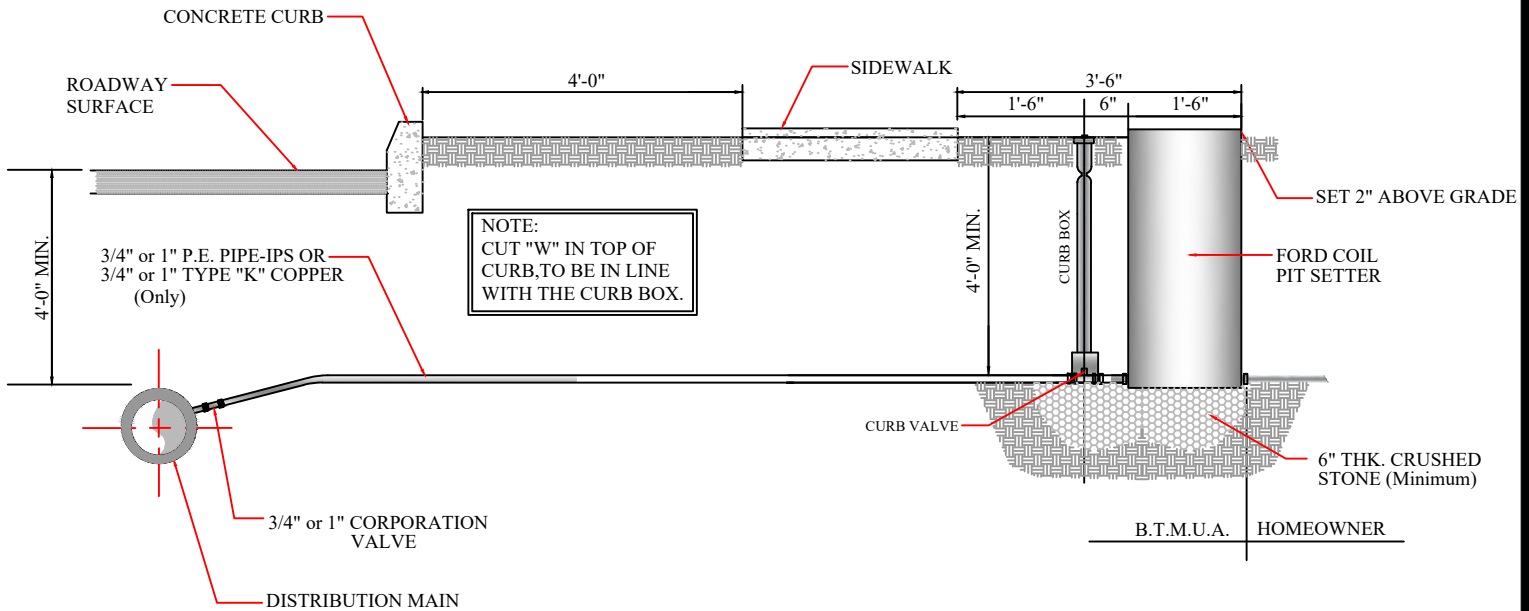
Revised: July 2016
Revised: Sept. 2012
Revised: Dec. 2009

DETAIL W-3A

| DRAWN BY | CHECKED BY | DATE | SCALE | REVISIONS |
|----------|------------|------------|-------|-------------|
| D.A.G. | S.T.S. | APRIL 2003 | NONE | AS REQUIRED |



Between Curb & Sidewalk



Behind Sidewalk (Must Remain In Public R.O.W. or Easement)

USE THIS APPLICATION IF OTHER UTILITIES EXIST BETWEEN CURB AND SIDEWALK
OR SPACING BETWEEN CURB AND SIDEWALK IS NOT LARGE ENOUGH

Water Service Connection

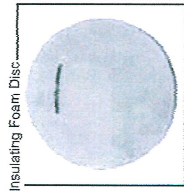
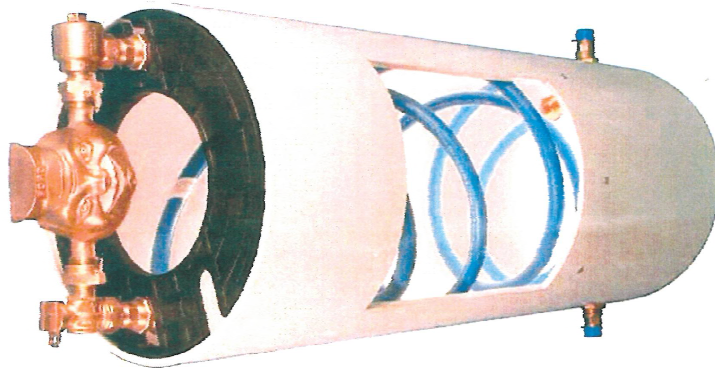
Residential

Revised: June 2020

FORD COIL PIT SETTER

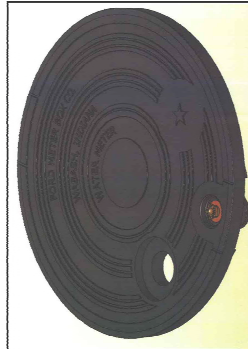
Ford Coil Pit Setters and components are 100% made in the USA

The Ford Meter Box Coil Pit Setter design positions the meter below the frost line and allows the meter to be raised to the top of the pit setter for easy meter access.



Insulating Foam Disc

H-20 Composite Plastic w/ recessed for touch read (Sensus)



BRICK UTILITIES COIL PIT SPECIFICATIONS

Here is what the codes stand for:

PFCBHCCR-488-18-48-FP-NL 1" Coil Pit 18 inch diameter tile with Full Port Inlet Angle Ball Valve and Outlet ASSE Approved chloramine resistant Dual Cartridge Check Valve. Coils CTS Poly AWWA Approved attached by using compression couplings, no lead, Meter Pit 48" Depth.

- 2" Risers 2" Elevation Riser
- 4" Risers 4" Elevation Riser
- 6" Risers 6" Elevation Riser

PPSC-18-L-P-REC-T H-20 Composite Plastic w/ recessed for touch read (Sensus)

CCID-18-4 4" Insulation Disk for 18" tile

C16-44QNL 1" FIP X PEP Compression Coupling

Housing:

SDR51 PVC Pipe Tile, per ASTM D2241

18" Diameter PVC Tile (.360" Thick)

1" Single Meter Setting

Coil:

Coiled high-density polyethylene (HDPE) tubing, per ASTM D2737, SDR9 CTS sized (Polybutylene pipe is not acceptable)

Complies with AWWA C901 (AWWA has withdrawn standard AWWA C902 and is not approved for tubing)

Working Pressure 200 PSIG

Connections:

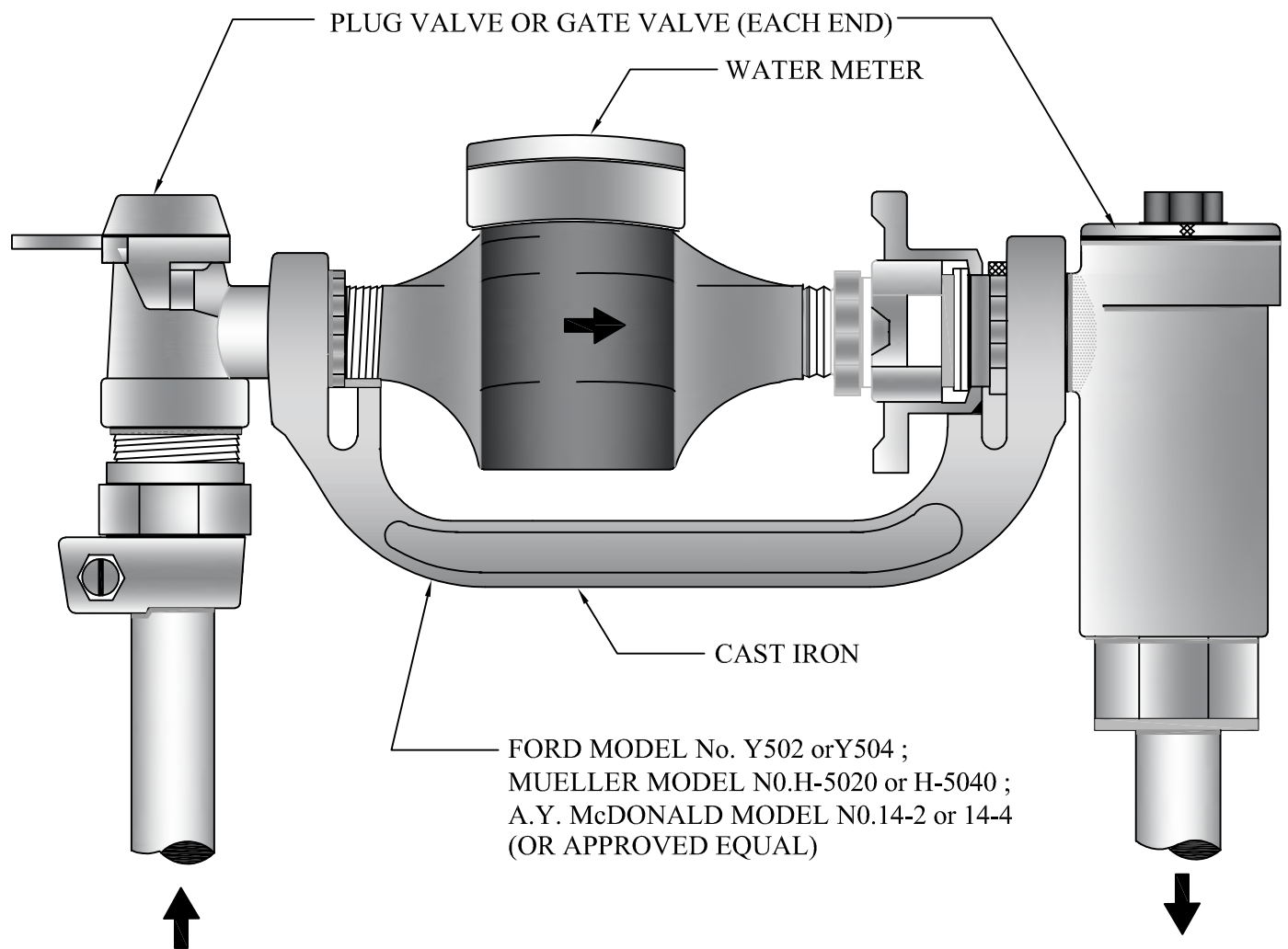
Brass components that come in contact with potable water conform to AWWA Standards C800

Angled 60 degree elbows provide minimal stress on tubing and maintain proper coil orientation.

METER PIT

DETAIL W-3M

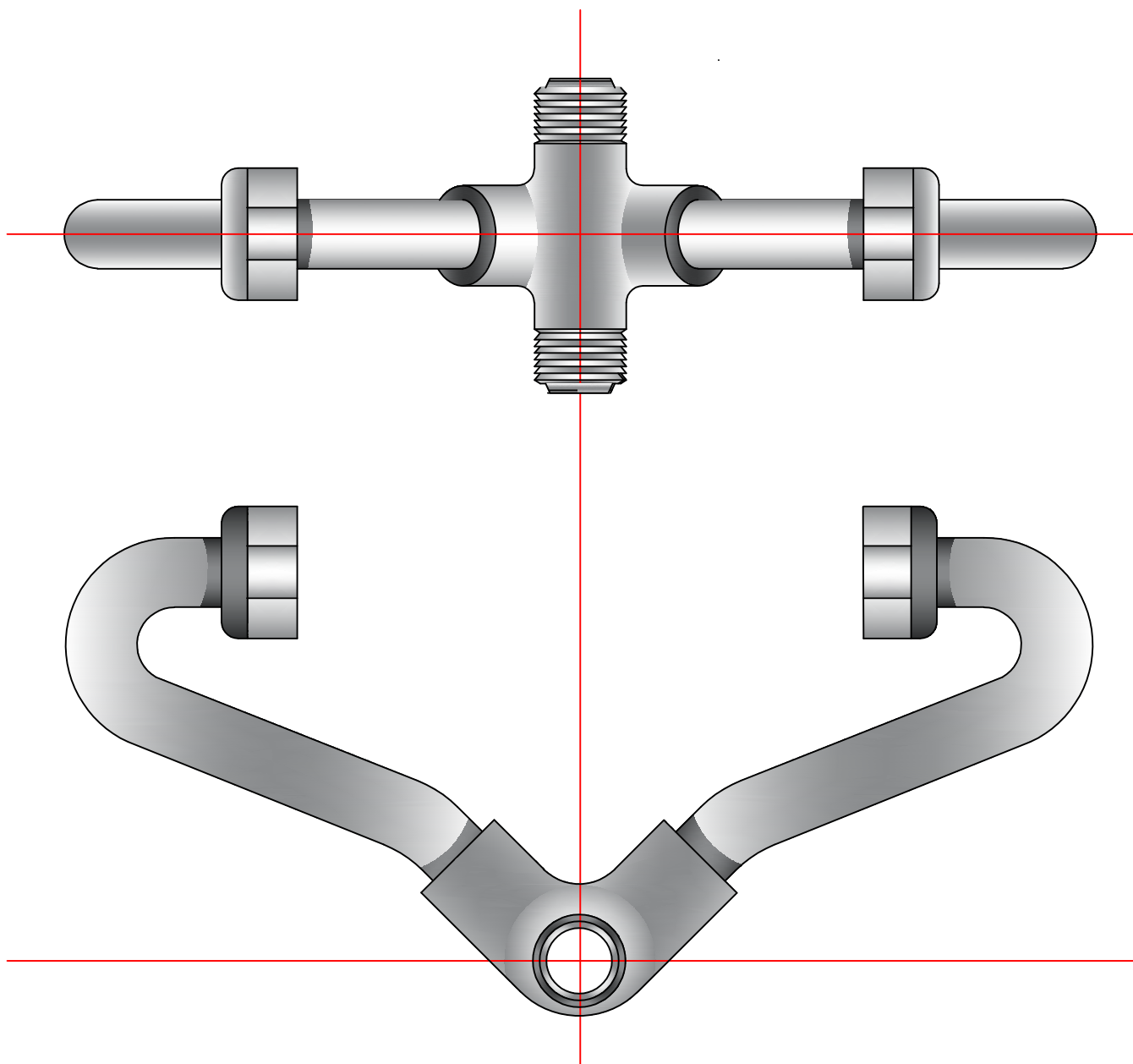
| DRAWN BY | CHECKED BY | DATE | SCALE | REVISIONS |
|----------|------------|-----------|-------|-------------|
| T.W.S. | S.T.S. | JUNE 2020 | NONE | AS REQUIRED |



Water Meter Bar Type Yoke Assembly

(5/8" x 3/4" or 1" dia. Sized Water Meters)

Revised: Dec. 2009

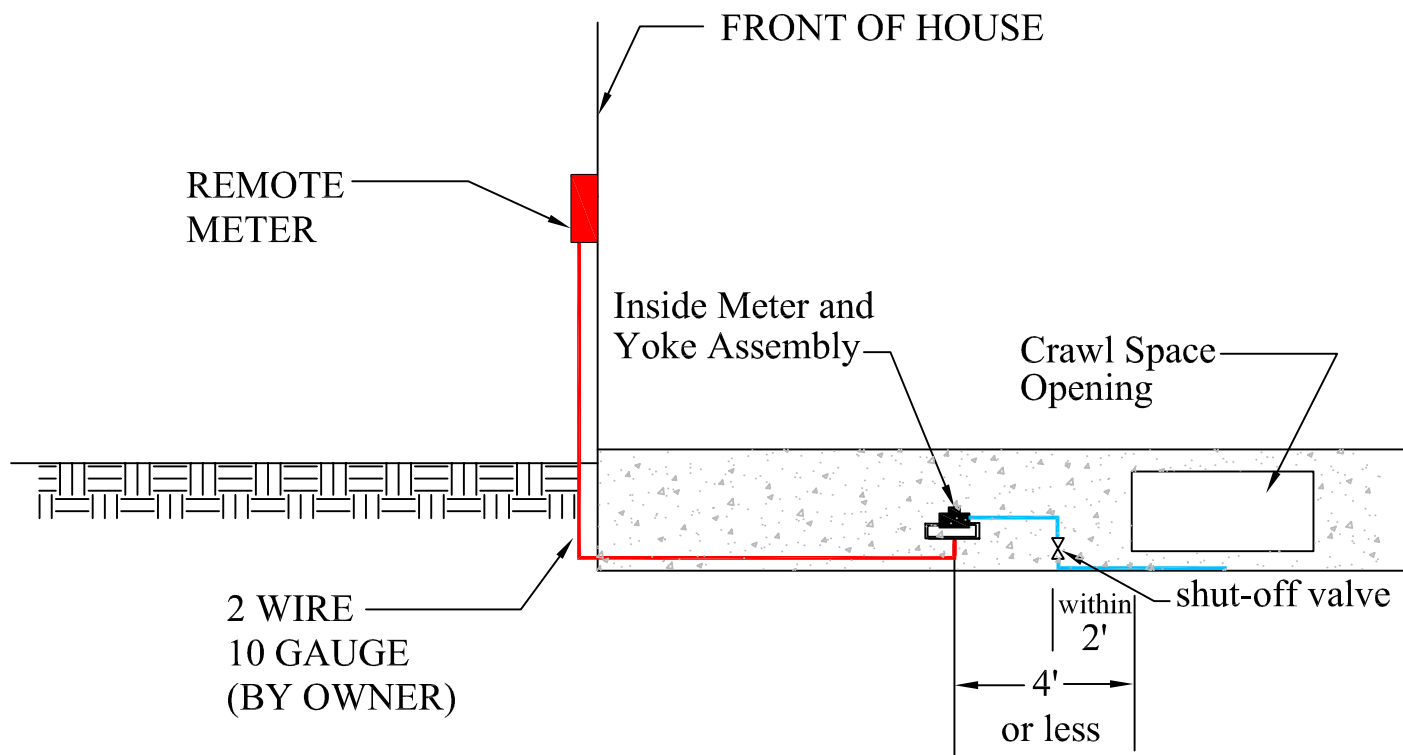


Water Meter Horn Yoke Assembly

(5/8" x 3/4" or 1" dia. Sized Water Meters)

McDonald 44 Series Copper Meter Setter (shown)
OR APPROVED EQUAL - SEE SPECIFICATIONS

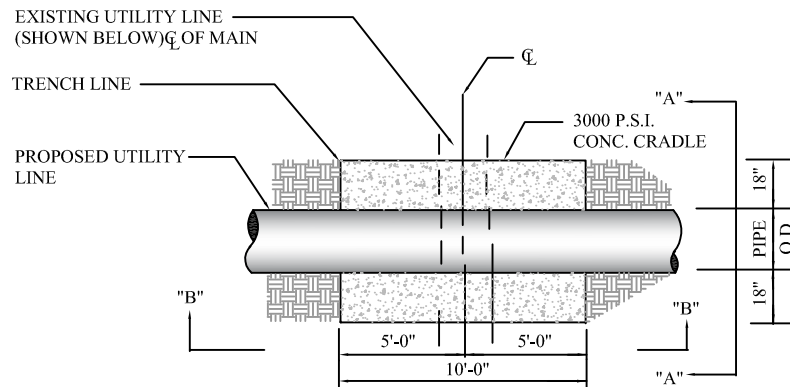
Revised: Dec. 2009



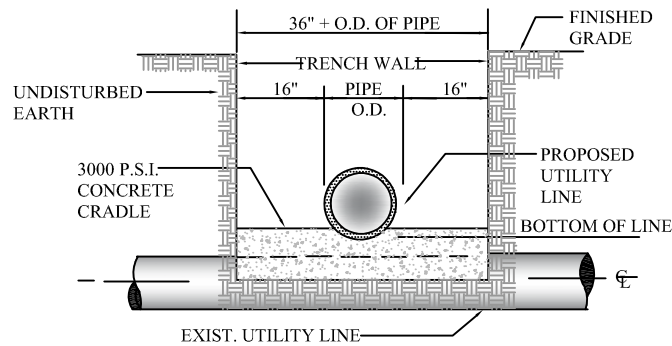
Basic Water Meter Installation

(5/8" x 3/4" or 1" dia. Sized Water Meters)

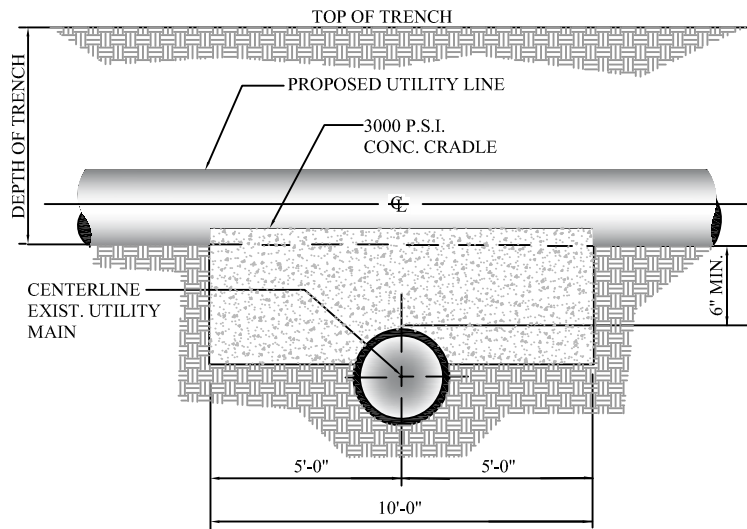
Revised: Mar. 2010
Revised: Dec. 2009



Plan View



Section "A-A"

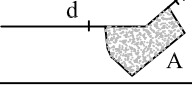
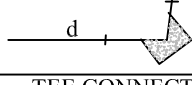
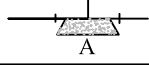
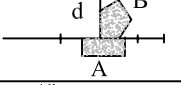
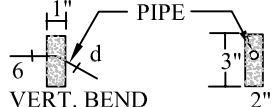


Section "B-B"

Typical Concrete Cradle

Revised: Dec. 2009

CONTACT AREA - SQUARE FEET

| DIAMETER [d] OF PIPE | 6 " | 8" | 10" | 12" | 16" | 20" |
|--|--------------|------|------|----------------|------|------|
| HOR.ANGLE = FROM 10° TO 45°  | 3.0 | 5.0 | 8.0 | 11.5 | 18.0 | 28.0 |
| HOR.ANGLE = FROM 46° TO 90°  | 6.0 | 9.5 | 13.0 | 19.0 | 33.0 | 51.0 |
| TEE CONNECTION  | 4.0 | 6.5 | 9.5 | 13.5 | 23.0 | 36.0 |
| LATERAL CROSS CONNECTION  | 4.0 | 6.5 | 9.5 | 13.5 | 23.0 | 36.0 |
| | 7.5 | 12.3 | 18.0 | 22.5 | 44.0 | 68.0 |
|  | ← AS SHOWN → | | | SEE NOTE BELOW | | |

NOTES:

1. ALL HORIZONTAL BENDS SHALL HAVE CONCRETE THRUST BLOCKS WITH MINIMUM BEARING AREAS AGAINST UNDISTURBED SOIL AS SHOWN ON THIS DRAWING.
2. BEARING AREAS ARE BASED UPON UNDISTURBED SOIL WITH A MIN. BEARING CAPACITY OF 0.5 TONS PER SQUARE FOOT. FOR A LESSER SOIL BEARING CAPACITY THESE AREAS SHALL BE INCREASED ACCORDINGLY.
3. THRUST BLOCKS SHALL BE POURED DIRECTLY AGAINST TRENCH WALLS.
4. DETAILS FOR SUPPORTS OR BRACING FOR VERTICAL BENDS FOR 12" DIAMETER OR LARGER, SHALL BE APPROVED BY THE AUTHORITY ENGINEER PRIOR TO CONSTRUCTION.
5. NO JOINT SHALL BE COVERED WITH CONCRETE.
6. CONCRETE SHALL BE 2000 P.S.I.

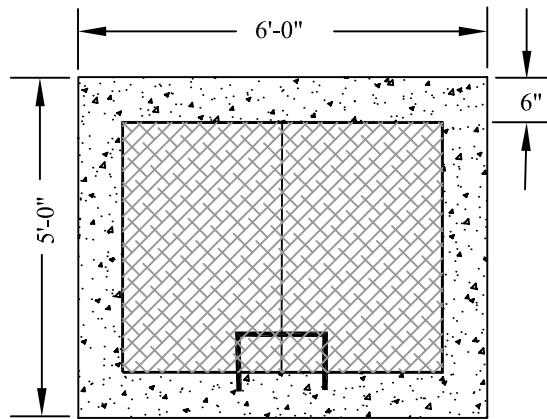
Concrete Thrust Blocks

Revised: Dec. 2009

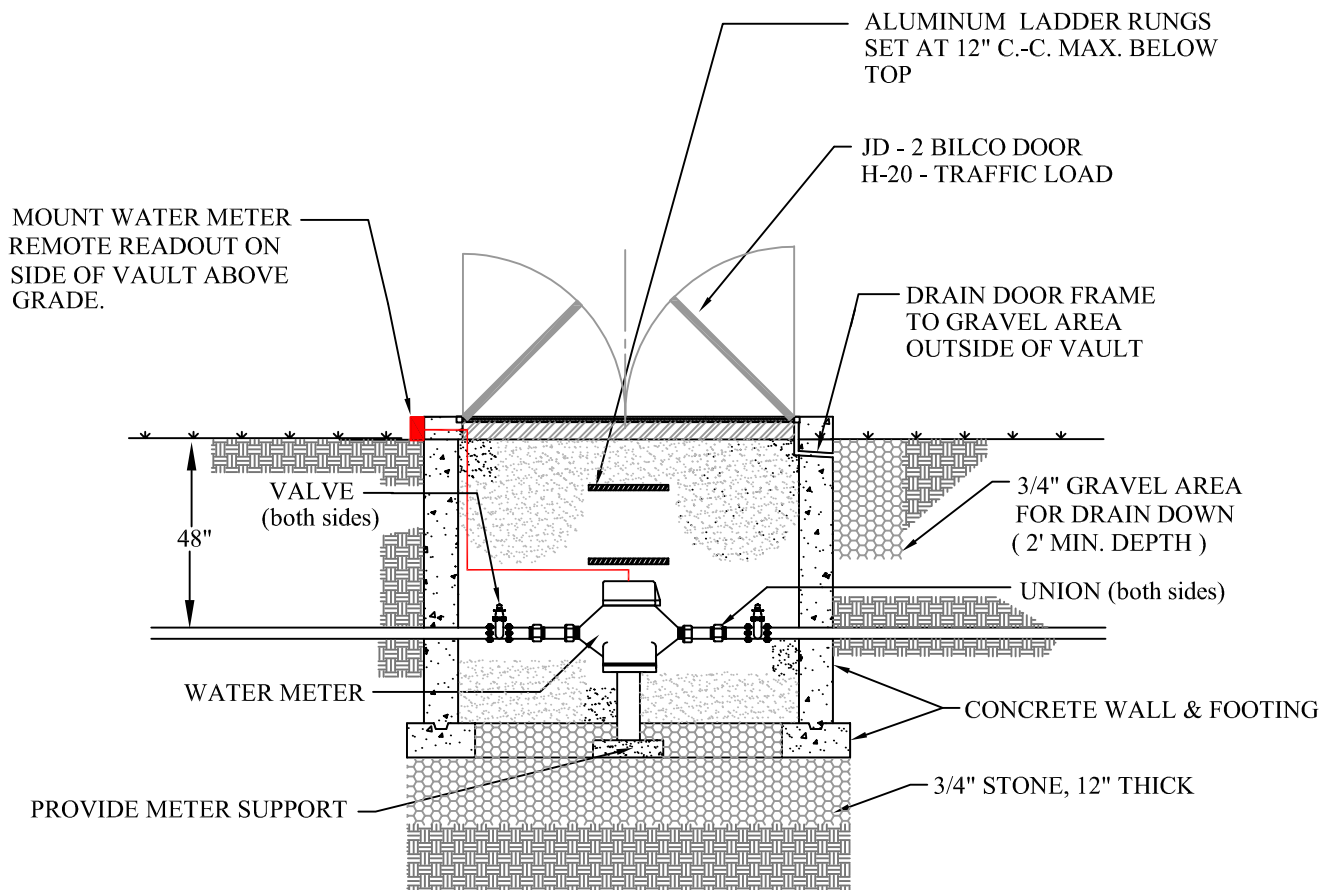


DETAIL W-6

| DRAWN BY | CHECKED BY | DATE | SCALE | REVISIONS |
|----------|------------|------------|-------|-----------|
| D.A.G. | S.T.S. | APRIL 2000 | NONE | AS NOTED |



NOTE :
TOP OF VAULT
TO BE SET A
MIN. OF 6" ABOVE
FINISHED GRADE.



WATER METER PIT / VAULT

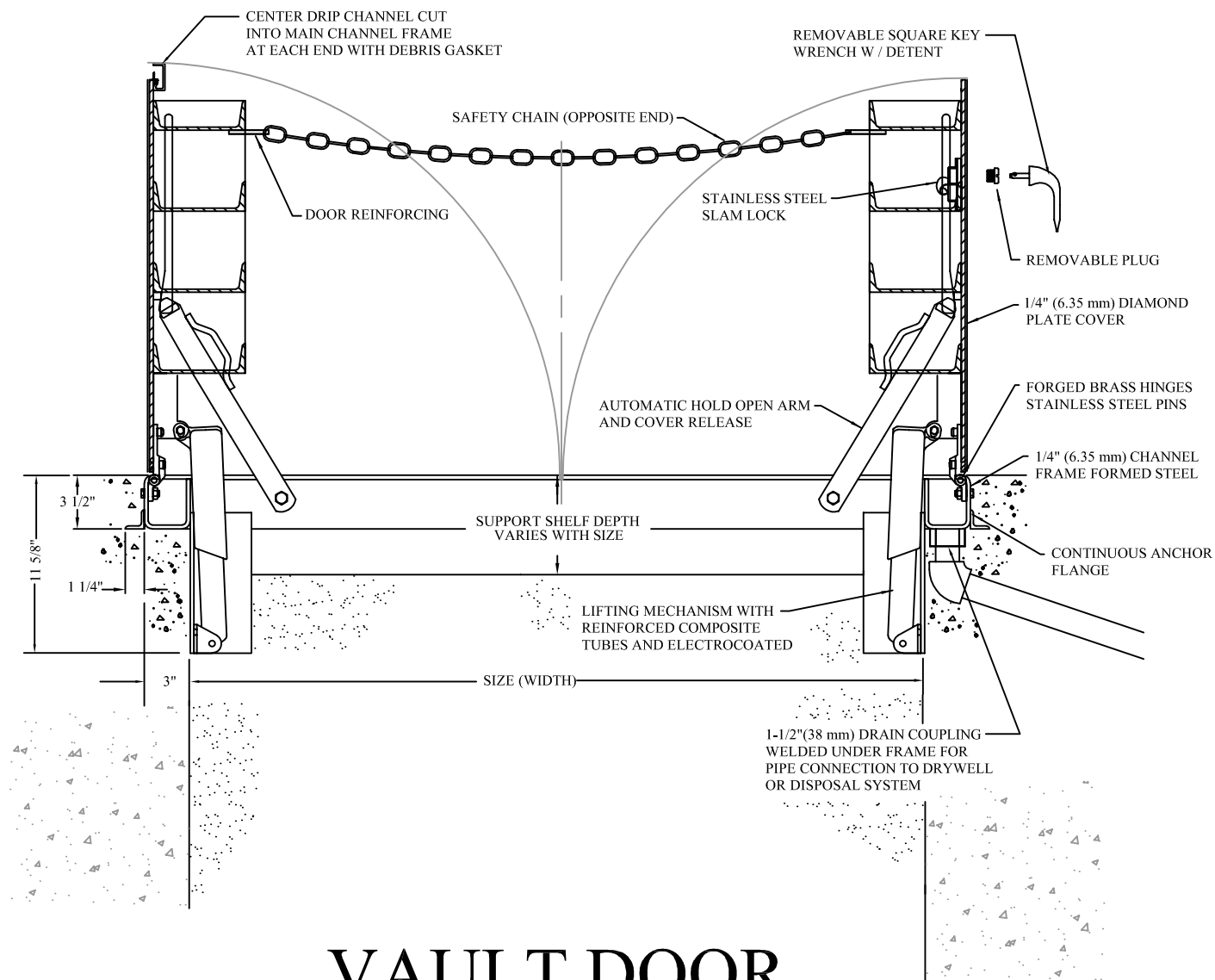
(FOR 1-1/2" & 2" WATER LINE)

BOTTOM OF METER
TO BE SET 1'-0" MIN.
ABOVE TOP OF STONE

Revised: Aug. 2020
Revised: Dec. 2009

BILCO Type JD-H20 Steel Floor, Vault, and Sidewalk Door

DESIGNED TO WITHSTAND H-20 WHEEL LOADING
SUITABLE FOR USE IN OFF-STREET LOCATIONS
WHERE NOT SUBJECTED TO HIGH DENSITY TRAFFIC.

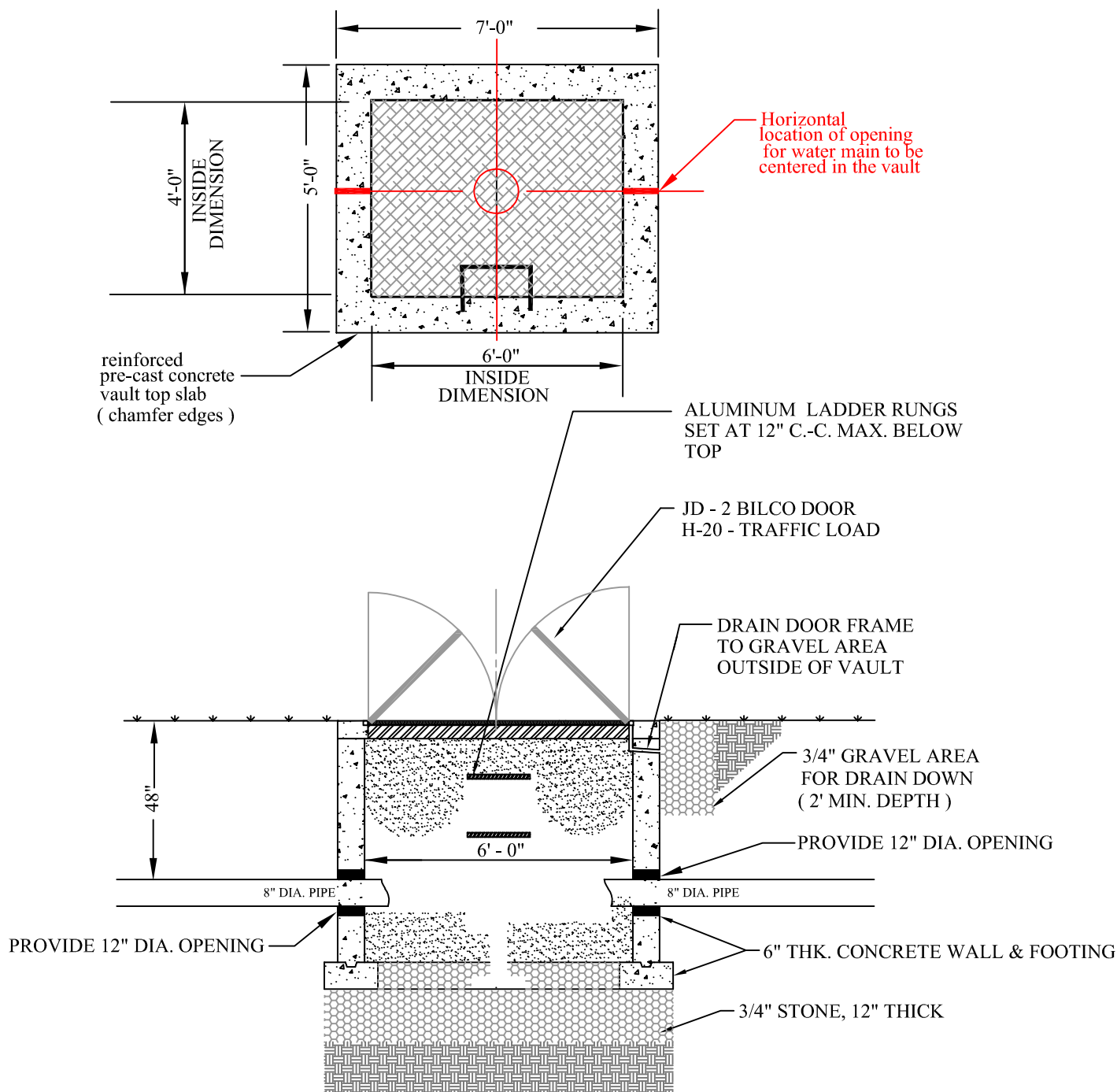


VAULT DOOR

Revised: Dec. 2009

DETAIL W-8A

| DRAWN BY | CHECKED BY | DATE | SCALE | REVISIONS |
|----------|------------|-----------|-------|-----------|
| D.A.G. | S.T.S. | FEB. 2003 | NONE | AS NOTED |

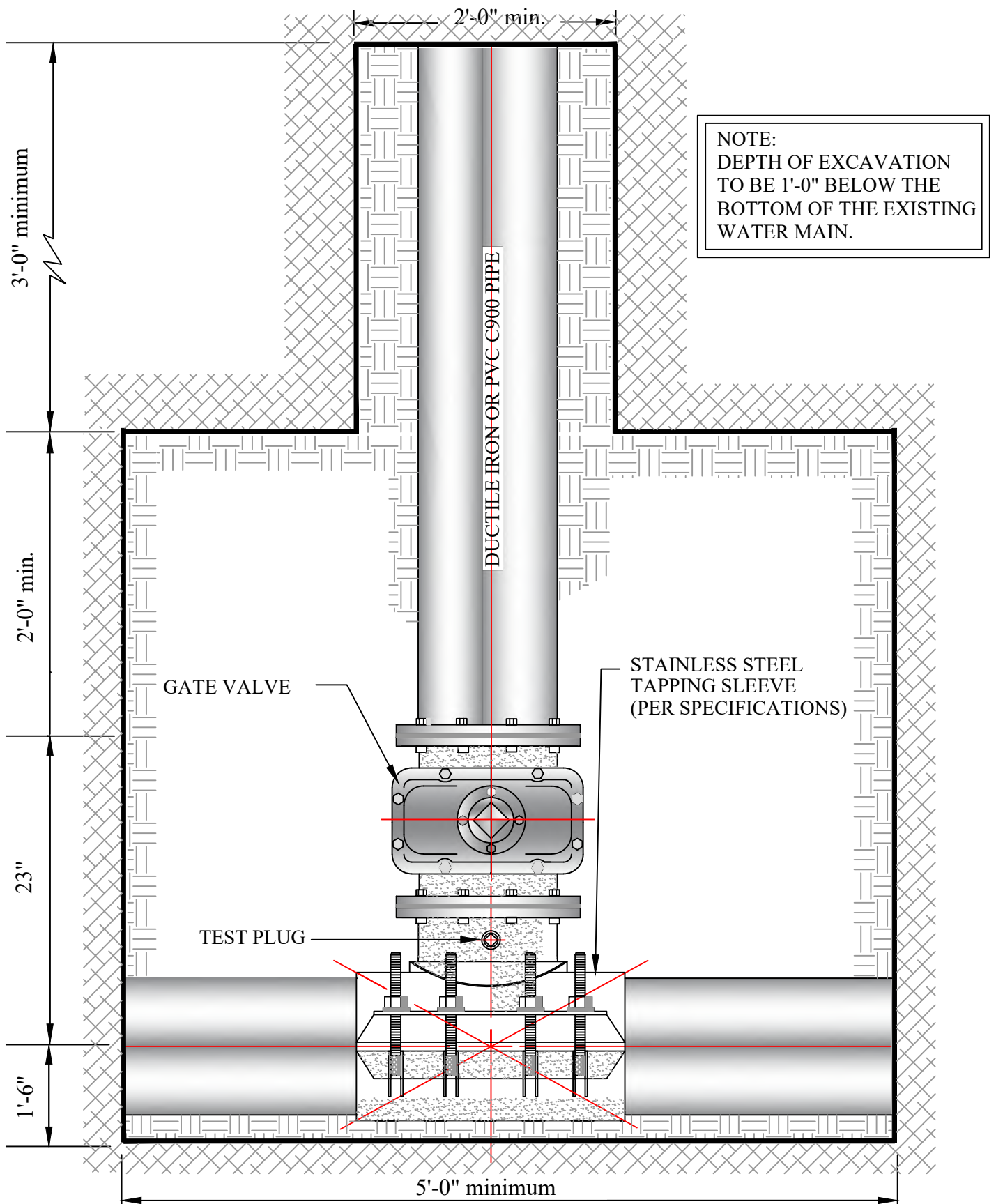


WATER METER PIT / VAULT

(FOR 8" WATER LINE)

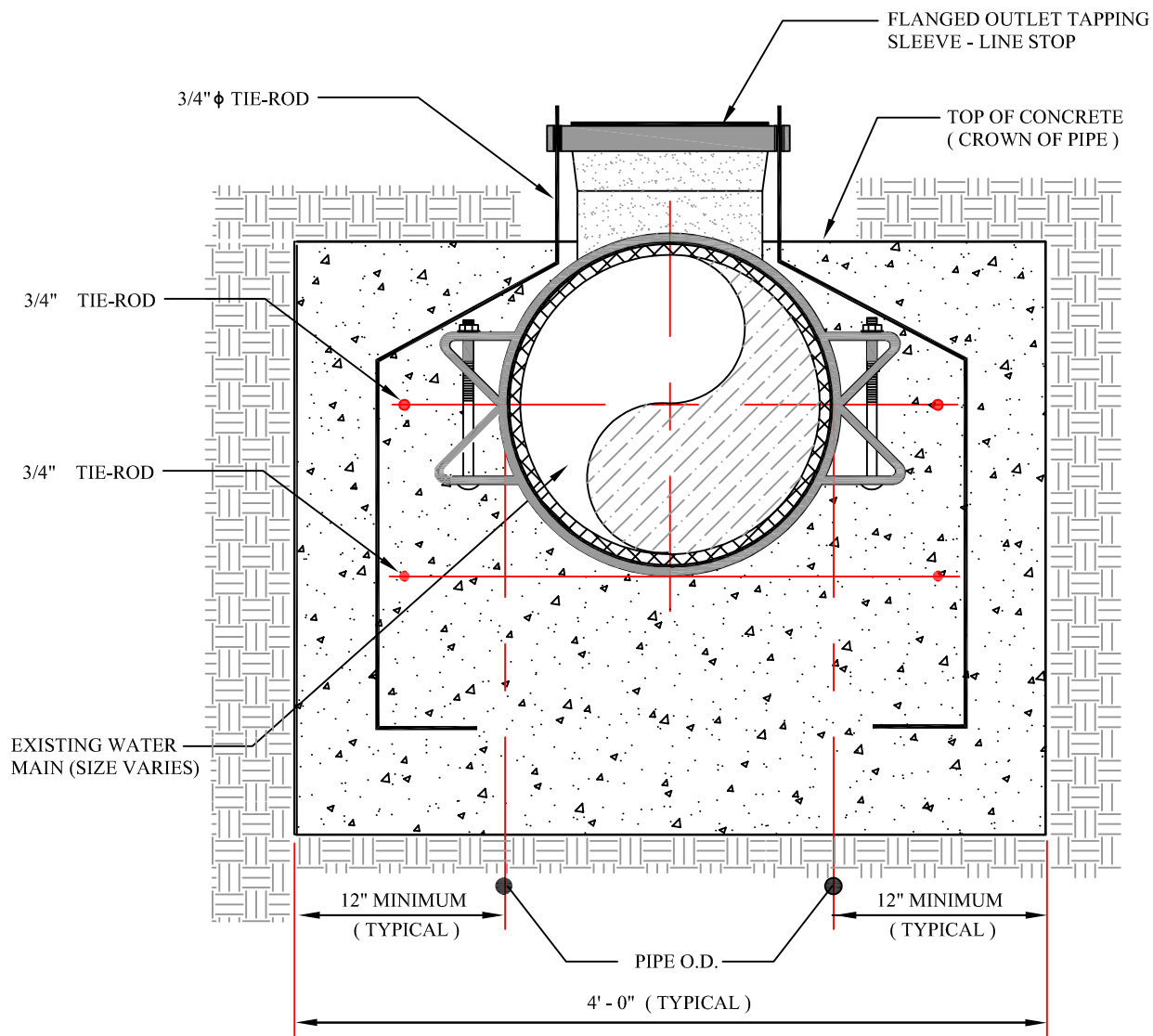
BOTTOM OF WATER LINE
TO BE SET 1'-0" MIN.
ABOVE TOP OF STONE

Revised: Dec. 2009



WET TAP CONNECTION

Revised: June 2020
Revised: Dec. 2009



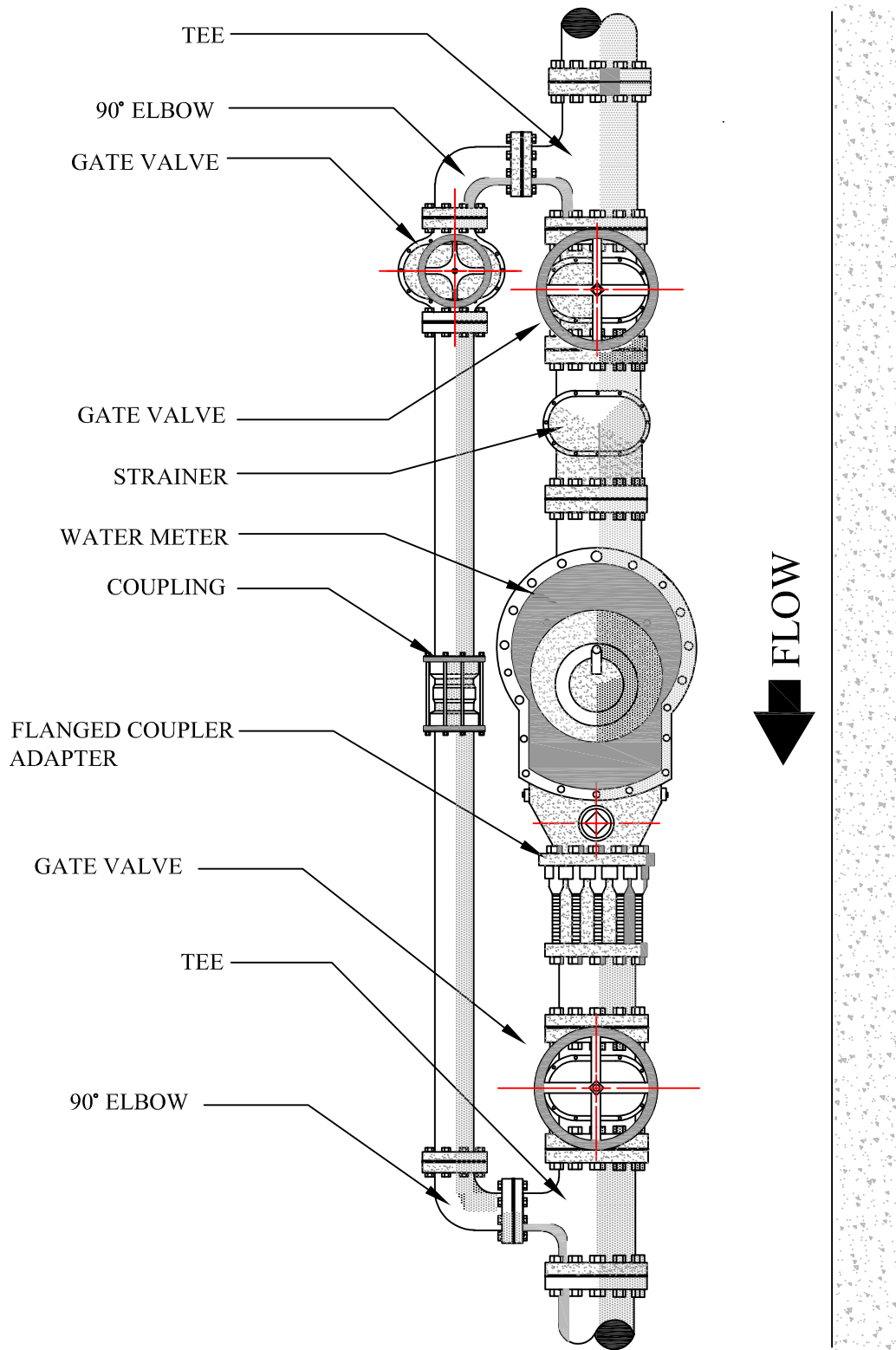
Section A - A

CONSTRUCTION NOTES :

1. MEGALUG GLANDS TO BE UTILIZED AT EVERY FITTING.
2. ALL D.I.P. PIPING TO BE GRIFFIN SNAP-LOK. (OR EQUAL)
3. ALL TIE RODS TO BE PAINTED WITH TWO (2) COATS OF BITUMASTIC PAINT.
4. PIPING , FITTINGS , OR VALVES THAT ARE TO BE ABANDONED IN-PLACE SHALL BE PROVIDED WITH A M.J. END CAP.

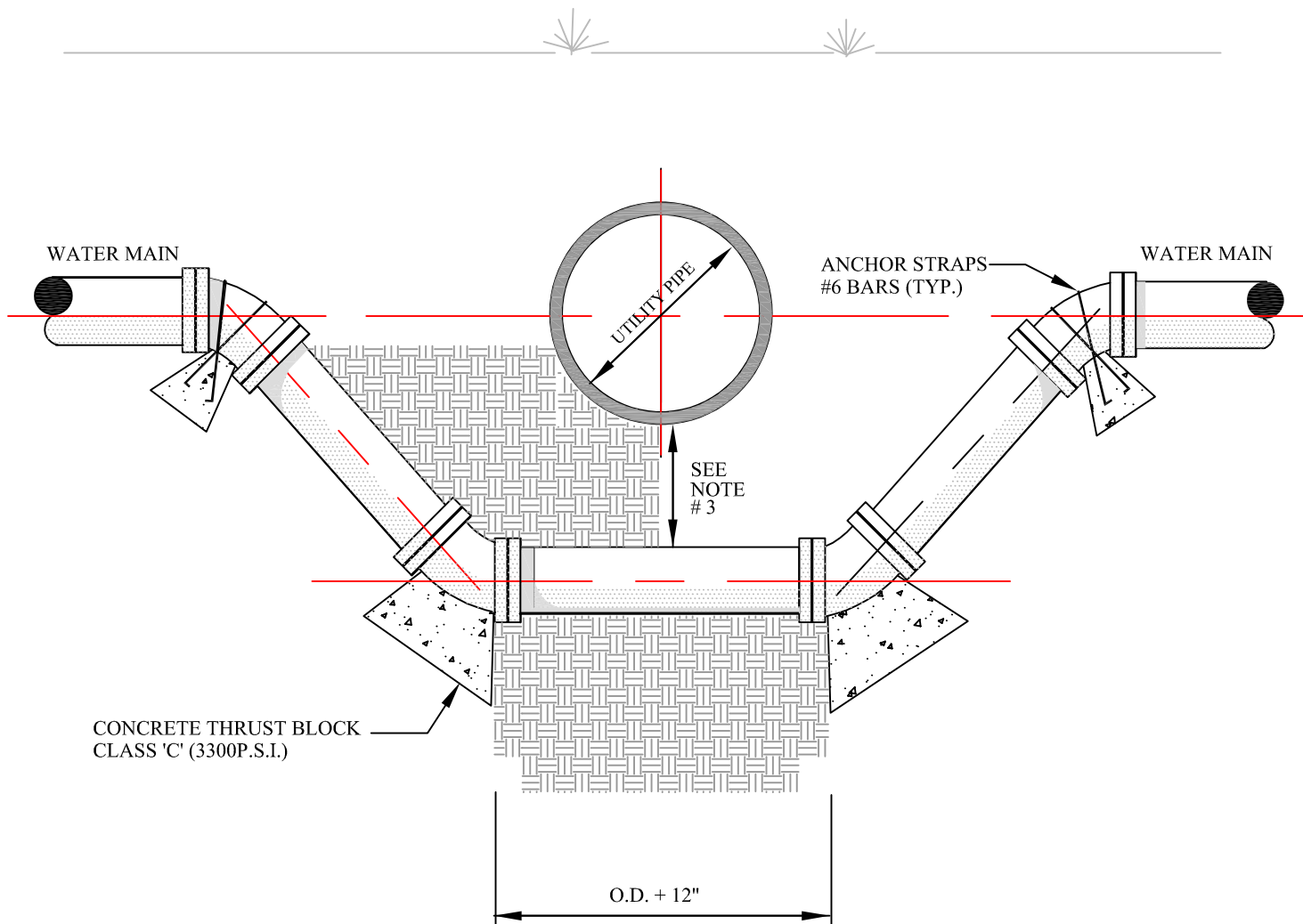
TAPPING SLEEVE - LINE STOP

Revised: Dec. 2009



METER INSTALLATION (COMMERCIAL)

Revised: Dec. 2009

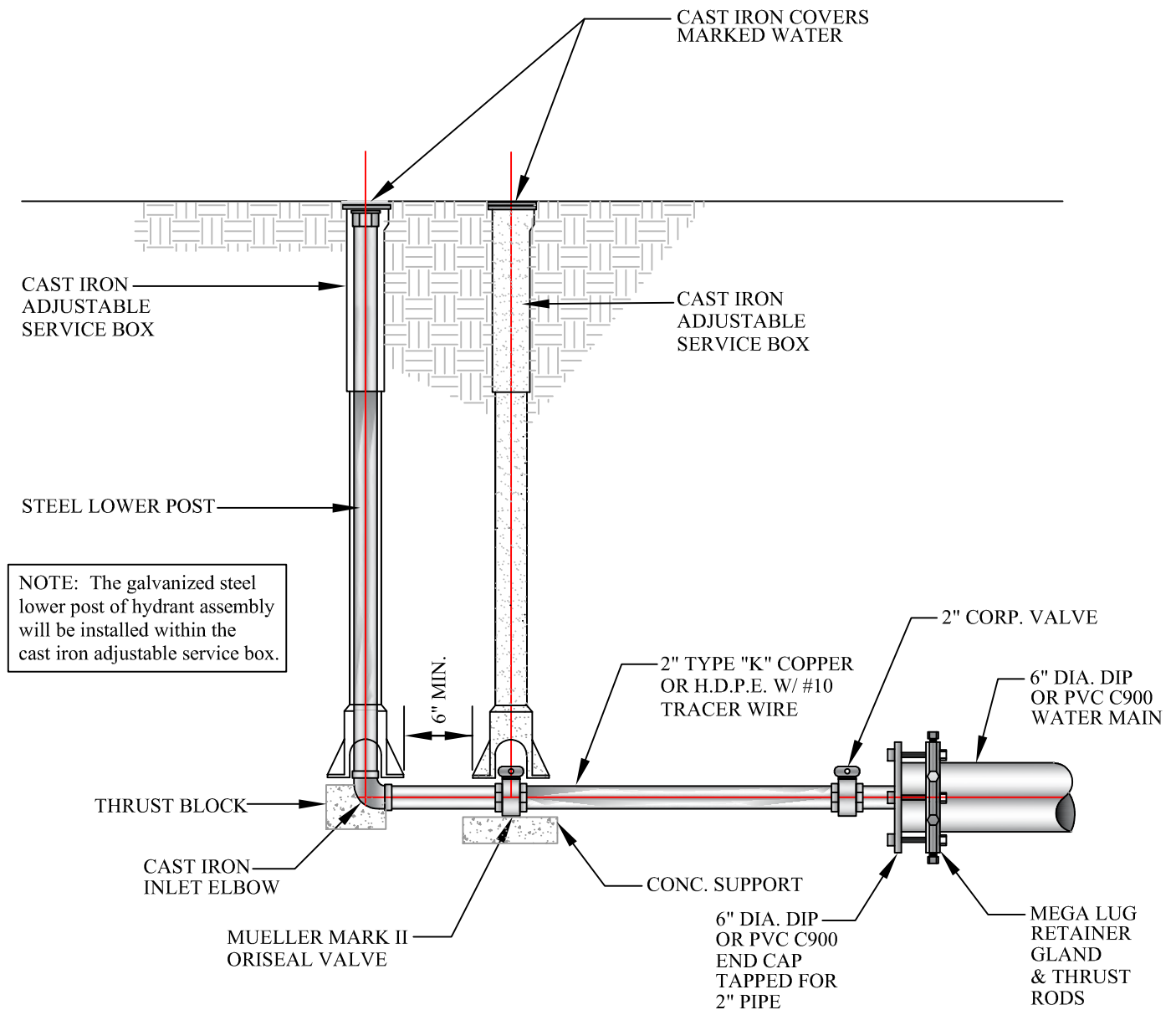


NOTES :

1. WATER MAIN MAY BE LOOPED ABOVE OBSTRUCTION , IF 3.5' MINIMUM COVER IS MAINTAINED ABOVE WATER MAIN.
2. CONCRETE THRUST BLOCKS SHALL BE PROVIDED AT ALL BENDS OR OTHER POINTS OF PIPE DIRECTION CHANGE.
3. HOLD 18" CLEARANCE WITH ALL UTILITY CROSSINGS WHERE POSSIBLE. IF LESS THAN 6" CLEARANCE IS UNAVOIDABLE , PROTECT PIPE WITH CONCRETE ENCASEMENT.
4. USE U.S. PIPE DUAL PURPOSE SLEEVE (OR APPROVED EQUAL) AS REQUIRED FOR CONNECTION TO EXISTING CUT MAIN.
5. CONTRACTOR TO INSTALL 1" CORPORATION TO TEST FOR MAIN SHUT DOWN. AFTER MAIN RELOCATION IS COMPLETE , FLUSH MAIN THROUGH CORPORATION, CAP BEFORE BACKFILLING.
6. ALL JOINTS TO HAVE MEG-A-LUGS.

WATER MAIN SWEEP

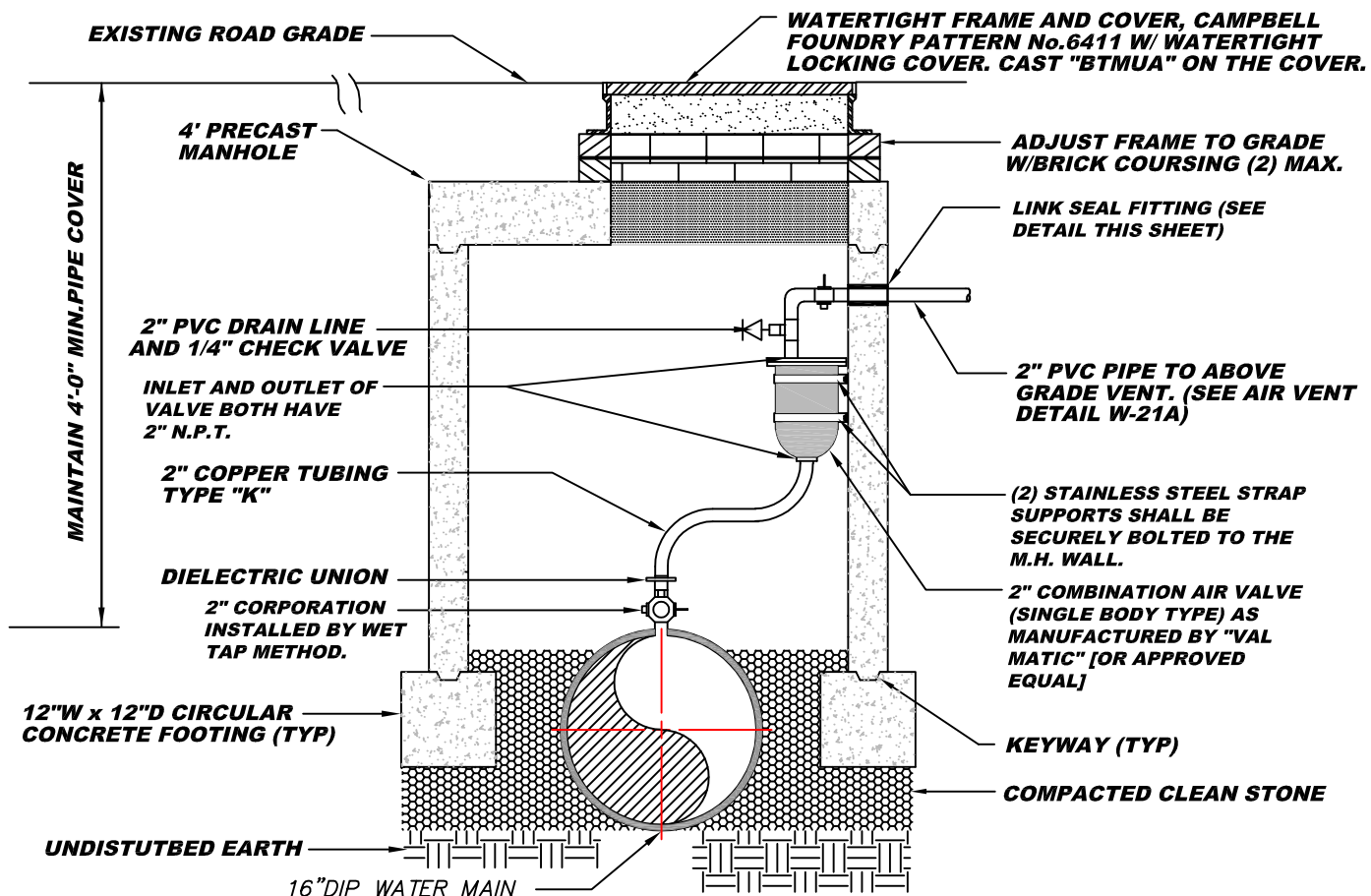
Revised: Dec. 2009



BLOW-OFF ASSEMBLY

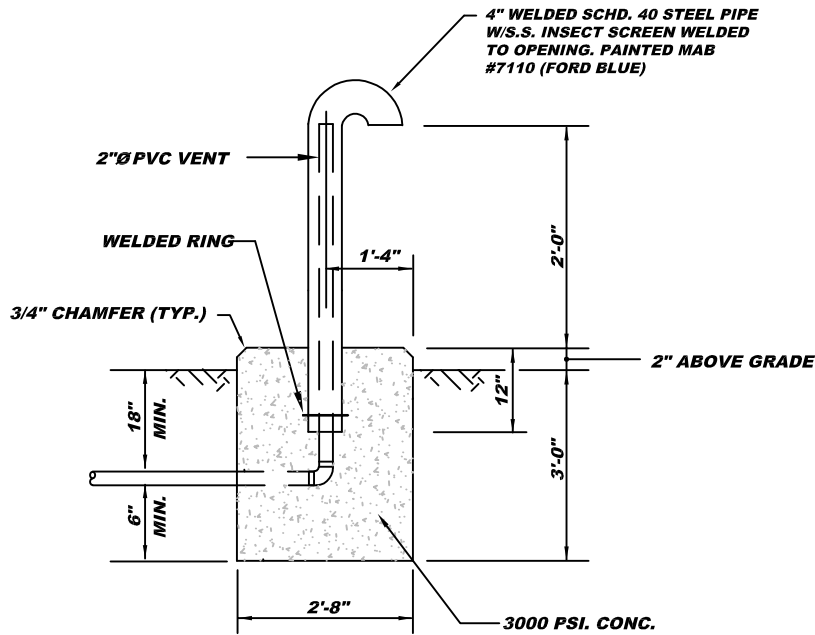
NOTE: The steel riser post of the Mueller A-408 post type flushing hydrant assembly will not be installed. At the upper union assembly fitting of the steel lower post, a 2" diameter close nipple fitting and 2" diameter screw on end cap will be installed at an elevation just below the metal cover for a cast iron service box.

Revised: June 2020
Revised: Dec. 2009

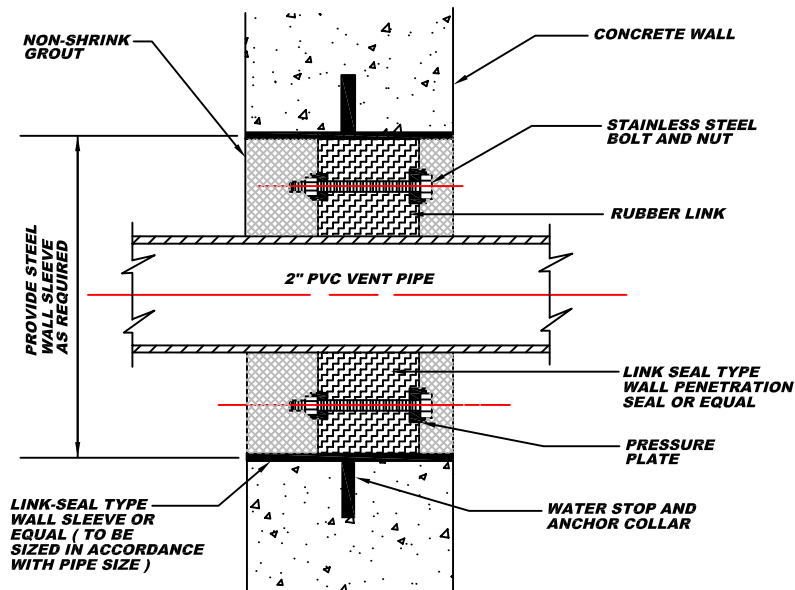


AIR RELEASE VALVE MANHOLE

Revised: Dec. 2009



VENT DETAILS for 2" AIR VALVES



LINK SEAL

AIR RELEASE VALVE DETAILS

Revised: Dec. 2009

SEWER SPECIFICATIONS

TABLE OF CONTENTS

Specifications for the Construction of Sewer System

| <u>Section Number</u> | <u>Title</u> | <u>Page Number</u> |
|---------------------------|---|------------------------|
| 1.0 | General | 1 |
| 2.0 | Excavations | 1 |
| 2.1 | Trench Excavation | 1 |
| 2.2 | Bracing and Shoring | 1 |
| 3.0 | Maintenance of Traffic | 1 |
| 4.0 | Backfilling | 2 |
| 5.0 | Pavement Restoration | 2 |
| 6.0 | Dewatering | 2 |
| 7.0 | Erosion Control | 2 |
| 8.0 | Piping | 3 |
| 8.1 | Bedding and Pipe Installation | 3 |
| 8.2 | Cleanup and Restoration | 4 |
| 8.3 | Sewer Pipe | 4 |
| 8.3.1 | General | 4 |
| 8.3.2 | Ductile Iron Pipe | 4 |
| 8.3.3 | Polyvinyl Chloride Pipe (PVC) | 5 |
| 8.3.4 | Polyvinyl Chloride C900 Pipe (Force Main) | 5 |
| 8.3.5 | High Density Polyethylene Pipe (Force Main) | 5 |
| 8.3.6 | Joints | 6 |
| 9.0 | Manholes | 7 |
| 9.1 | Precast Concrete Construction | 7 |
| 9.2 | Doghouse Manholes | 8 |
| 9.3 | Manhole Frames and Covers | 8 |
| 9.4 | Inside Drop Manholes | 9 |
| 9.5 | Connections to an Existing Manhole | 10 |
| 9.6 | Manhole Accessibility | 10 |
| 9.7 | Industrial Discharge Control Manhole | 10 |
| 10.0 | House Lateral Connections | 10 |
| 11.0 | Ejector Pumps | 11 |

| <u>Section Number</u> | <u>Title</u> | <u>Page Number</u> |
|---------------------------|------------------------------------|------------------------|
| 12.0 | Sanitary Sewer Testing | 11 |
| 12.01 | Low Pressure Hydrostatic Test | 12 |
| 12.02 | Low Pressure Pneumatic Test | 12 |
| 12.03 | Deflection Test For PVC Sewer Pipe | 13 |
| 13.0 | Pumping Stations | 13 |

LIST OF DETAILS

| | |
|-------------|--------------------------------------|
| Detail S-1 | Precast Concrete Manhole |
| Detail S-1B | PVC Lined Precast Concrete Manhole |
| Detail S-2 | Dog House Manhole |
| Detail S-3 | Manhole Frame and Cover |
| Detail S-4 | Watertight Manhole Frame and Cover |
| Detail S-5 | Drop Connection (Inside) |
| Detail S-5A | Manhole Drop Pipe Hanger |
| Detail S-5B | Drop Connection (External) |
| Detail S-6 | Typical Manhole Channel |
| Detail S-7 | Typical 4" House Connection |
| Detail S-8 | Deep House Connection for Sewer |
| Detail S-8A | Harco B&H Riser |
| Detail S-9A | Industrial Discharge Control Manhole |
| Detail S-9B | Industrial Discharge Control Manhole |
| Detail S-10 | Reset Manhole Casting |
| Detail S-11 | Valve & Access Pit |
| Detail S-12 | Not Used |
| Detail S-13 | Manhole Steps (Plastic) |
| Detail S-14 | Clean-Out Protection Box |

| | |
|--------------|---------------------------|
| Detail S-14A | Cover for Protection Box |
| Detail S-15 | Not Used |
| Detail S-16 | Not Used |
| Detail S-17 | Not Used |
| Detail S-18 | Style “CB” Sewer Saddle |
| Detail S-19A | 501 Ductile Iron Coupling |

--END OF TABLE OF CONTENTS--

SPECIFICATIONS FOR THE CONSTRUCTION OF SEWER SYSTEMS

1.0 GENERAL

The applicant shall design and construct a sanitary sewer collection system including, but not limited to, sewer lines, manholes, drop manholes, doghouse manholes, and all accessories capable of carrying the necessary sanitary flow from the proposed project.

2.0 EXCAVATIONS

Excavation shall not be carried below the required level. All excavations shall be kept free of water until the installation of the pipe has been completed and backfilling of the excavation is completed. Excess excavation below required level shall be backfilled with $\frac{3}{4}$ " crushed stone as directed by the Brick Utilities.

Unstable soil shall be removed and replaced with $\frac{3}{4}$ " crushed stone or crushed slag which shall be thoroughly tamped. Brick Utilities will determine what constitutes unstable soil and will specify the amount to be removed and replaced.

All applicable OSHA Rules and Regulations shall be followed.

2.1 Trench Excavation

Width of the trench at the top of the pipe shall be 6" minimum, 8" maximum, on each side of the pipe coupling. The bottom of the trench shall be rounded so that an arc of the circumference equal to 0.5 of the outside diameter of the pipe rests on undisturbed soil. Coupling holes shall be excavated accurately to size by hand. If a trench box is used, the bottom edges of the box shall at no time be below the proposed invert elevation of the pipe.

2.2 Bracing and Shoring

The contractor shall do all bracing, sheeting, and shoring necessary to perform and protect all excavation as required for safety of the workers, public, existing utilities, structures, pavements, and public and private property. When the sheet piling is driven below the bottom of the pipe or the structure, Brick Utilities may direct the contractor to leave the sheeting in place.

3.0 MAINTENANCE OF TRAFFIC

All work shall be performed in a manner that will ensure the least obstruction to traffic. The contractor shall at all times conduct his operation with not only the motorists' safety in mind, but also of the pedestrians and his own employees. Emergency vehicles shall be provided access at all times.

The contractor is responsible for submitting traffic control plans and acquiring all road opening, traffic detour, and road closing permits from the agency having jurisdiction over the roadway as well as Brick Utilities.

4.0 BACKFILLING

Backfilling shall be done with approved materials free from large clods or stones. Backfill materials in trenches shall be placed evenly and carefully around and over pipe in 6" maximum layers. Each layer shall be thoroughly and carefully tamped until one foot of cover exists over pipe.

The remainder of backfill materials shall be placed in one foot lifts maximum, moistened if necessary, and compacted in all areas. No compacting shall be done when the material is too wet.

All forms, trash, and debris shall be removed and cleared away from manholes and other structures. Approved backfill material may be from excavation or borrow. It shall be free from rocks, lumber, debris and frozen material. Backfill materials shall be placed evenly over entire trench in 6" maximum layers. Each layer shall be moistened and compacted with mechanical or hand tampers. In roadway or area to be paved, each layer shall be compacted to density equal to that of adjacent original materials, so that pavement can be placed immediately. Minimum compaction shall be 95% Standard Proctor density.

The trenches shall be backfilled at the end of each work day, except when the conditions require them to be left open overnight. When the trenches are left open overnight, temporary fencing or plates shall be installed at those openings.

Even though testing may indicate that the required density has been attained, the contractor will be responsible for correcting any settlement or damage to the utilities.

5.0 PAVEMENT RESTORATION

Existing pavement shall be restored in accordance with the rules and regulations of the agency having jurisdiction over the roadway. Said agency will determine if the roadway has been restored adequately.

6.0 DEWATERING

Dewatering shall be accomplished by methods which ensure that the groundwater will be drawn down to an elevation two (2) feet below the bottom of the bedding. Well point and deep well holes shall be compacted for the full depth to a density equal to in-situ soils.

Dewatering for the structures and pipelines shall commence when groundwater is first encountered and shall be continued as long as the excavation is open.

7.0 EROSION CONTROL

Erosion control measures taken at the site shall be in full conformance with and meet all requirements of the "Standard for Soil Erosion and Sediment Control – New Jersey State Soil Conservation Committee, Act of 1975."

A compliance certificate from the Ocean County Soil Conservation District shall be submitted to Brick Utilities.

8.0 PIPING

8.1 Bedding and Pipe Installation

Bedding material shall be broken stone, free from silt, clay or organic material, and shall conform to the requirements of the New Jersey State Department of Transportation Standards for No. 57 coarse aggregate.

Pipe shall be bedded true to line and grade (by use of laser only), and no blocking shall be used to bring the pipe to grade. Class C bedding shall be used for all pipe. Class C bedding shall be defined as the method of bedding sewers in approved granular material with a shaped bottom in undisturbed earth so as to fit the lower part of the sewer, for a width of at least 50% of the sewer diameter; and in which the remainder of the sewer is surrounded to a height of at least 0.5 feet above its top with approved granular materials, shovel placed and tamped to completely fill all spaces under and adjacent to the sewer; all under the direction and inspection of Brick Utilities.

PVC sewer pipe shall be laid carefully to the lines and grades shown on the drawings or as directed by Brick Utilities, and shall conform accurately thereto after the completion of the sewer. Particular care shall be taken that there is no sagging of the spigot at the joint, and that a true and even surface of the invert is obtained throughout the entire length of the sewer.

Where the sewer is to be laid without a special foundation, the earth forming the bed shall be free of large stones. The pipe shall then be evenly bedded in the earth, great care being taken to remove only enough of the earth to leave a uniform bed for the entire length of the pipe, except the bell, under which a recess shall be excavated to a sufficient depth to relieve it of any load and to allow ample space for making the joint. In case the bed shaped in the bottom of the trench is too low 3/4" stone must be properly placed into the bottom and thoroughly compacted and new bed shaped for the pipe. It is unacceptable to raise the grade of the pipe ramming earth beneath it. When the pipe has been bedded satisfactorily and the joint made, the recess around the bell shall be refilled with soil and enough soil shall be refilled and tamped on each side of the pipe to hold it securely in place, care being taken not to disturb the position of the pipe during this process.

Concrete cradle, where required, shall be constructed as directed. The concrete for the full width of the foundation shall be deposited continuously to the height of the outside bottom of the pipe. Before this concrete is set, the pipe shall be evenly bedded therein, so as to have a uniform support for its entire length, and the remainder of the concrete shall be immediately deposited in such a manner as to avoid changing the position of the pipe. Concrete shall be a minimum of 3,000 psi.

Concrete cradle shall be allowed to harden sufficiently to prevent consolidation of backfill, and wet concrete cradle shall be allowed to cure 24 hours before vehicle loads can be applied to that area of the trench. Steel plates may be used to cover the trench to protect the cradle from vehicle loads if the 24-hour undisturbed cure period cannot be provided.

Each pipe shall be laid so as to form a close joint with the next adjoining pipe, and bring the inverts continuously to the required line and grade.

Where the sewer is to be laid below groundwater level, it shall be laid on 3/4" crushed stone foundation, and the stone shall be deposited for the full width of the trench to the height of the outside

bottom of the pipe. The pipe shall then be bedded on this material and the remainder of the crushed stone deposited and carefully tamped so as to avoid disturbing the pipe but giving a uniform support to its entire length.

The installation of PVC sanitary sewer pipe shall conform to the requirements of ASTM Specification D2321, or latest revision, for “Standard Recommended Practice for Underground Installation of Flexible Thermoplastic Sewer Pipe.”

Extreme care is to be exercised in the placement of backfill around PVC sewer pipe. The most important factor affecting pipe performance and deflection is the placement of backfill between the invert of the pipeline and a level 12” above the top of the pipe. Material shall be placed and consolidated in this area to provide adequate side support to the pipe while avoiding both vertical and lateral displacement of the pipe from proper alignment.

8.2 Cleanup and Restoration

All excess material, trash, wood forms, and other debris will be cleaned up and disposed of properly. All areas shall be restored to their original condition or as required by the Ocean County Soil Conservation District.

8.3 Sewer Pipe

8.3.1 General

Materials used in the construction of sewers and force mains shall be polyvinyl chloride (PVC), ductile iron pipe (DIP) or high density polyethylene pipe (HDPE). Inverted siphons and force mains shall be constructed of ductile iron or PVC C900 or HDPE pipe as permitted by Brick Utilities. Inverted siphons shall consist of a minimum of two (2) parallel pipes with provision for flushing, and flow control gates provided. All sewer pipe installed with less than three (3) feet of cover or within ten (10) feet of an open stream or culvert, or crossing a stream, must be of ductile iron or HDPE encased in concrete or PVC 900 encased in concrete.

All standard specifications referred to herein, such as ASA, ASTM, AWWA and the like, shall be the latest revision thereof, at the time of application for final approval.

8.3.2 Ductile Iron Pipe

Ductile iron pipe shall be manufactured in accordance with ANSI A21.51 and shall be thickness Class 52 except where otherwise specified. Mechanical joints or push-on type joints shall conform to ANSI A21.11.

All fittings shall be mechanical joint type and shall conform to ANSI A21.10. Fittings shall conform to pressure ratings of 250 psi.

The pipe shall be furnished with the necessary rubber gaskets.

All exposed sewage piping at the pump station, in the wet well and valve pit, shall have flanged joints conforming to ANSI B16.1.

All ductile iron pipe and fittings shall have ceramic epoxy lining inside the conformance to ANSI A21.4. The type of ductile iron pipe and fittings utilized for the sewage application shall be U.S. Pipe's "PROTECTO 401" Lined Ductile Iron Pipe and Fittings or equal. The lining shall be double thickness (1/8") to the ends of the pipe and shall be provided with a bituminous seal coat. Pipe shall receive a standard coal-tar foundry dip on the outside. The weight and class shall be conspicuously indicated by the manufacturer on the outside of the pipe.

8.3.3 Polyvinyl Chloride Pipe (PVC)

Polyvinyl Chloride (PVC) pipe shall conform to the requirements of ASTM Specification D3034, "Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings." All pipe shall be minimum strength Class SDR-35.

All pipe shall be homogenous throughout and free from visible cracks, holes, foreign inclusions or other injurious defects. Each pipe shall not vary in length more than 1.0 inch in a length of 12.5 feet measured as mid-ordinate. Material properties shall meet the test requirements of ASTM Specification D1784, latest revision, for "Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds."

8.3.4 Polyvinyl Chloride C900 Pipe (Force Mains)

Polyvinyl chloride pipe shall be manufactured in accordance with ANSI 61, UL 1285 and shall be the thickness DR18 except where otherwise specified.

A metal tracing wire (#10 HMW/PE insulated) shall be wrapped around the polyvinyl chloride pipe continuously from manhole to manhole. The tracing wire shall be extended up to the top of each manhole. In addition, a metal marking tape designating buried force main shall be installed two feet (2') above the polyvinyl chloride pipe for its entire extension.

Brick Utilities requires that the polyvinyl chloride pipe product which shall be used is the JM Eagle LOC900™ PVC pipe material, Diamond Lok-21 restrained joint C900 PVC Pipe or approved equal.

8.3.5 High Density Polyethylene Pipe (Force Mains)

High density polyethylene pipe (HDPE) utilized for force mains shall be manufactured to the requirements of ASTM D3035 and AWWA C9.1-96 for sizes 1 1/4" through 3" IPS diameter. Pipe 4" IPS and DIPS 4" and above shall be manufactured to the requirements of ASTM F714 and AWWA C906-99 (IPS). Each production lot of pipe material shall be tested for melt index, density and % carbon. Each production lot of pipe shall be tested for dimensions and ring tensile strength. All HDPE pipe shall be minimum SDR 17 pipe dimension. The type of high density polyethylene pipe and fittings shall be manufactured by "Performance Pipe, a division of Chevron Phillips Chemical Company, L.P., or equal.

Permanent identification of pipe service shall be provided by co-extruding green color stripes longitudinally into the pipe outside surface. The striping material shall be the same material as the pipe

material except for color. IPS sized pipes shall have four equally spaced, longitudinal color stripes. DIPS sized pipes shall have three equally spaced pairs of longitudinal color stripes.

Polyethylene fittings and custom fabrications shall be molded or fabricated by the approved pipe manufacturer. All fittings and custom fabrications shall be pressure rated for the same internal pressure rating as the mating pipe. Reduced pressure rated fabrication fittings are prohibited. Molded polyethylene fittings shall be manufactured in accordance with ASTM D3261 and shall be so marked. Fabricated fittings shall be made by heat fusion joining specially machined shapes cut from pipe, polyethylene sheet rock or molded fitting.

Flange adapters shall be made with sufficient through-bore length to be clamped in a butt fusion-joining machine without the use of a stub-end holder. The sealing surface of the flange adapter shall be machined with a series of small v-shaped grooves (serrations) to promote gasketless sealing, or restrain the gasket against blowout.

Flange adapters shall be fitted with back-up rings pressure rated equal to or greater than the mating pipe. The back-up ring bore shall be chamfered or radiused to provide the flange adapter radius. Flange bolts shall be Grade 2 or higher.

MJ Adapters 4" through 16" diameter may be provided with optional Stainless Steel Stiffener upon request. MJ Adapters 14" diameter and above shall be provided with Heavy Duty Back-Up Ring Kits. All MJ Adapters above 16" diameter must be provided with Stainless Steel Stiffeners.

8.3.6 Joints

Joints for sewer pipes shall be as specified below:

Ductile Iron Pipe – Rubber gasket equal to Tyton or mechanical Joint.

PVC Pipe – Bell and Spigot with rubber ring.

HDPE Pipe

1. Heat fusing joining/joints between plain end and fittings shall be made by butt fusion. Joints between the main and saddle branch fittings shall be made using saddle fusion. The butt fusion and saddle fusion procedures used shall be procedures that are recommended by the pipe and fitting manufacturer. The individual making the heat fusion joints shall have the proper training in the manufacturer's recommended procedure and will have to have been certified not more than 12 months prior to completing any heat fusion joints.

2. Joining by Other Means – Polyethylene pipe and fittings may be joined together to other materials by means of the following:

- (a) Flanged connections (flange adapters and back-up rings);
- (b) Mechanical couplings designed for joining polyethylene pipes together or joining polyethylene pipe to another material;
- (c) MJ Adapters or
- (d) Electrofusion

When joining by other means, the installation instructions of the joining device manufacturer shall be observed.

PVC C900 Pipe

All of the Polyvinyl Chloride Fabricated fittings shall be HARCO Class 150 Gasketed PVC Fittings in conformance to AWWA C900 Standards including DR18 Requirements, or approved equal. All fitting should be restrained using EBAA Iron Series 2500 restraints, or approved equal and thrust blocks. All fitting restraints hardware to be Grade 316SS.

Connection to existing ACP lined or PVC sewer main - utilize 501 Ductile Iron coupling as manufactured by Romac or Hymax coupling by Krausz USA or equal (see Detail S-19).

9.0 MANHOLES

9.1 Precast Concrete Construction

Precast concrete manholes shall consist of precast reinforced concrete section, a conical or flat slab top section, and a base section conforming with the typical manhole details (See Detail S-1).

Precast manhole sections shall be manufactured in accordance with ASTM Designation C478. The minimum compressive strength of the concrete for all sections shall be 4,000 psi. The circumferential steel reinforcement for rise pipe, cone sections, and base walls shall be a minimum of 0.12/sq. in. per linear foot. Reinforcing in both layers of steel of the flat slab top sections and in the bottoms of bases shall be a minimum of 0.12/sq. in. per linear foot in both directions.

Where precast manhole structures are to be installed in areas which are subject to groundwater infiltration or heavy chemical influences, the interior of manhole structures shall be lined with a corrosion restraint system polyvinyl chloride liner as manufactured by the manhole structures manufacturer. The corrosion resistant system liner material will have been subjected to fungus resistance testing in accordance with ASTM G-21 and bacteria resistant testing in accordance with ASTM G-22 Procedure B. The flow channels and bench areas of the precast manhole structures shall also have to be lined with a corrosion resistant system polyvinyl chloride liner material. Brick Utilities shall determine if the precast manhole structures of a project will have to be the manhole structures with the interior corrosion resistant system polyvinyl chloride liner (See Detail S-1B). Monolithic thermoplastic liner system as manufactured by Predl systems is an acceptable alternative.

Joints of the manhole sections shall be formed entirely of concrete employing a round rubber gasket and, when assembled, shall be self-centering and make a uniform watertight joint. Except for those surfaces within the gasket groove, all inside surfaces of the bell or outside surfaces of the spigot, or both, on which the rubber gasket may bear during the closure of the joint and at any degree of partial closure, shall be parallel within one degree and have an angle of not more than two degrees with the longitudinal axis of the pipe. In joints formed entirely of concrete, the distance from either side of the gasket to the end of the bell or spigot shall not be less than $\frac{3}{4}$ ". The gasket spaces between the bell and spigot shall be so shaped as to provide either grooves or shoulders that will prevent the gasket from disengaging from its compression surface or being blown out by hydrostatic pressures. The gasket shall be the sole element utilized in sealing the joint from either internal or external hydrostatic pressure.

Manhole steps shall be of copolymer polypropylene type (See Detail S-13). All steps shall be built into walls of the precast sections to set in straight alignment so as to form a continuous ladder with a maximum distance of 12" between steps. The maximum distance between the first step and the rim of the manhole shall be 24" and minimum distance 16".

Each section of the precast manhole shall have not more than two holes for the purpose of handling and laying. These holes shall be tapered and shall be plugged with rubber stoppers and mortar after installation.

Precast base sections shall be installed on a firm stabilized foundation of twelve inch (12") thick (minimum) crushed stone.

Precast base sections may be supplied by the manufacturer with inverts precast, or the inverts may be cast in the field by the contractor. Inverts shall be smooth and accurately shaped to a semi-circular bottom conforming to the inside of the adjacent sewer sections. Changes in direction of the sewer and entering branches shall have a circular curve of as large a radius as the manhole will permit (See Detail S-6).

9.2 Doghouse Manholes

Doghouse manholes shall be constructed as shown in Detail S-2 and conform to the section, "Precast Concrete Construction," with the following exceptions:

A. Manhole riser section shall be placed on a precast concrete slab placed under the existing sewer pipe. Base slab shall be eight inch (8") thick (minimum) and shall be 12" in diameter larger than the manhole to be constructed.

B. Existing pipe shall be saw-cut to expose channel only after the new sloped bench has been constructed and the acceptance testing has been completed.

C. Cast in place concrete slab can be constructed for the base under the existing sewer pipe. Concrete for the cast in place concrete slab used will be 4,000 psi with #6 reinforcement bars placed in two levels on the top and bottom and 12" on center.

9.3 Manhole Frames and Covers

All manhole castings shall conform to ASTM A-48 Class 30 and be suitable for H-20 loading capacity. Standard manhole frames and covers shall be Pattern #1202B as manufactured by Campbell Foundry Company or equal (See Detail S-3). The only locking type of manhole permissible is the bolt-down type; cam-locking manholes will not be allowed. Watertight manhole frames and covers shall be Order No. 12022440 as manufactured by Campbell Foundry Company or equal (See Detail S-4). Frames shall weigh 275 pounds, minimum, and covers shall weigh 145 pounds, minimum. The letters "BTMUA" shall be cast integrally into the cover.

All casting for manhole frames and covers shall be close-grained, tough gray iron, free from cracks, holes, swells, and shrinkage distortion. All manhole castings shall be made accurately to the pattern and to the dimensions specified with carefully machine-milled bearing surfaces. Allowances

shall be made in the patterns so the specified thicknesses shall not be reduced. All covers which “rock” and do not lie solid after construction is finished will be rejected and shall be replaced by adequate covers at no additional cost to Brick Utilities. No plugging, burning-in or filling will be allowed. In the event that it is found that a manhole frame has to be adjusted, all work will be constructed in accordance with Detail S-10.

Watertight manhole covers shall be installed on manholes where the NAVD-88 elevation of the manhole rim is less than 10.0 or where the rim is less than 8.0 feet above the bed of an adjacent stream.

Watertight manhole covers shall also be installed on manholes in easements and/or outside of paved areas.

9.4 Inside Drop Manholes

Where the influent pipe invert is greater than two (2) feet higher than the manhole invert, an inside drop shall be required. A manhole with an inside drop connection shall have a minimum inside diameter of five (5) feet.

An inside drop connection shall be constructed according to Detail S-5, and the maximum distance between the invert of the pipe in and out of the manhole shall not exceed 6.0 feet.

For an Ocean County Utilities Authority (OCUA) manhole, the drop pipe shall be installed into the manhole bench in accordance with OCUA Rules and Regulations. For a Brick Utilities manhole, drop pipe shall be installed into the manhole bench to one-half the diameter of the pipe.

All manhole structures employing inside drops shall be outfitted with the components of the “RELINER” INSIDE DROP SYSTEM including the drop bowls, stainless steel adjustable clamping brackets and stainless steel nuts, bolts and washer. The bowl size shall be determined by incoming pipe size and flow rates. The bowl shall be installed as per manufacturer’s instructions using Grade SS316 fasteners. The approximately sized drop pipe of SDR 35 PVC shall be securely attached to the manhole wall using stainless steel “RELINER” Adjustable Clamping Brackets and stainless steel fasteners. A minimum of two brackets shall be used with a maximum spacing between the brackets of four to five feet. Silicone sealant shall be applied to the inside of drop bowl at the manhole wall. The connection of “RELINER” Drop Bowl to drop pipe shall be by flexible external pipe coupler. The turn-out at the base end of the drop pipe shall be accomplished with an appropriately angled PVC pipe elbow to provide a smooth transition into the channel flow. “RELINER” is manufactured by Duran, Inc. (See Detail S-5 and Detail S-5A).

Installation of an external drop connection into an existing sanitary manhole in lieu of inside drop connection will have to be approved by Brick Utilities. The construction of an external drop connection will be in accordance with Detail S-5B.

Ladder access shall not be hampered by the drop.

9.5 Connections to an Existing Manhole

The following requirements shall be met when connecting to an existing manhole, whether it is owned by Brick Utilities or the Ocean County Utilities Authority:

- A. During installation of the gravity sanitary sewer, the contractor shall allow no debris to enter the pipe. Flushing of the collection system into the existing pipe shall not be permitted.
- B. The owner of the manhole shall have the final say as to the approval or disapproval of any work done by the contractor when making the connection. Installation of an external drop connection into an existing sanitary manhole in lieu of inside drop connection will have to be approved by Brick Utilities. The construction of an external drop connection will be in accordance with Detail S-5B.
- C. Any settlement occurring over the connection made to the manhole shall be the responsibility of the contractor.
- D. The owner of the manhole shall receive at least 48 hours notice prior to any work done on the connection. No work shall be covered until it has been approved by the Authority owning the manhole.
- E. If a stub or knockout bulkhead has not been provided at the manhole, the connection shall be made with a coring machine. The use of pneumatic hammers, chipping guns, sledgehammers, or other means of providing a connection shall not be permitted under any circumstances. A watertight compressive neoprene boot as shown in Detail S-6 suitable for use with sanitary sewage, with stainless steel clamps, shall be used.

9.6 Manhole Accessibility

All manholes located in easements or off the paved right-of-way shall be accessible for servicing by the Brick Utilities Jet-Vac vehicle. The applicant shall submit for approval a procedure for stabilizing the access way.

9.7 Industrial Discharge Control Manhole

For any proposed sanitary sewer systems of buildings conveying medical and/or industrial wastewater from the buildings, the effluent sewer lines shall have the Industrial Discharge Control Manholes properly installed as part of the new sanitary sewer lines. The Industrial Discharge Control Manhole shall be installed within ten feet of the new building, as part of the new sanitary sewer line (See Detail S-9A and Detail S-9B).

10.0 HOUSE LATERAL CONNECTIONS

No lateral connections past the curb or property line shall be made before the sewer has been tested and approved.

House connections shall be made as shown on Detail S-7. The connection shall be made by use of a sanitary tee wye or a wye and 1/8 bend at the sewer pipe, thence in a horizontal direction to the lateral. Most lateral diameters are four (4) inch; however, a larger size may be required where the larger flows are anticipated.

The location of the sewer lateral is to be shown by cutting an “H” into the top of the curb. Sewer clean-outs shall not be installed in walkways and/or driveway aprons. The Contractor will have to install the appropriate clean-out protection box around any sewer clean-out stack pipe which has been found located in a paved area or will be subject to vehicle traffic. The construction of the sewer clean-out protection box will be in accordance with Detail S-14. The access frame and cover for the sewer clean-out protection box is shown on Detail S-14A.

A minimum slope of ¼ inch per foot shall be used on four-inch laterals. Lateral material shall be SDR-35 with double gasket type push-on coupling. Metallic cleanout plugs shall be used at the curb cleanout riser cap so the plug may be located with a metal detector. Flexible rubber couplings between the sewer pipe and the cleanout at the curb are not acceptable.

A new sanitary sewer lateral which is to be connected to an existing sanitary sewer line by the Contractor will use the appropriate sewer saddle fitting as manufactured by Romac Industries or equal (See Detail S-18). The ACP lined pipe shall be chipped away prior to installation.

The inspection of the installation of the house lateral from the curb cleanout to the building is under the jurisdiction of the Township of Brick Plumbing Department.

Deep-house connections and encasement chimneys shall be used where the invert of the sewer is greater than ten (10) feet below the finished grade (See Detail S-8). “Harco B&H Riser” unit as manufactured by Harrington Corporation is an acceptable alternative (See Detail S-8A).

11.0 EJECTOR PUMPS

If it is determined that a sewage ejector system is required the Brick Township Plumbing Department will provide information regarding the systems approved under the National Plumbing Code.

As part of the installation of the individual sewer force main, Brick Utilities requires that the Valve & Access Pit structure to be installed as part of the individual sewer force main. The construction of the Valve & Access Pit will be in accordance with Detail S-11.

For sewage ejector system, the prepared as built will indicate the location of the ejector line from the pump to its connection to the sewer main. All ejector pump piping shall have a #10 HMW/PE insulated tracer wire installed from the pump pit to the valve & access pit and from the tie-in at the valve & access pit to where it connects to the sewer main.

12.0 SANITARY SEWER TESTING

Testing shall not be conducted until as-built plans for the sanitary sewer systems have been approved by Brick Utilities and punch list items have been corrected. Prior to scheduling of the acceptance testing, all underground utilities and the road gravel for each project will have to have been installed.

The pressure test may be either a low pressure pneumatic test or a low pressure hydrostatic infiltration/exfiltration test. The contractor shall be required to furnish all labor, weirs, pumps, valves, gauges, testing materials and equipment.

12.01 Low Pressure Hydrostatic Test

If the ground water level is at or above the top of the pipe, the contractor shall dewater the sewer and conduct a satisfactory test to measure infiltration for at least 24 hours. The rate of infiltration shall not exceed 50 gallons per inch of inside diameter per mile of pipe per 24 hours. If leakage exceeds the specified amount, the contractor shall make the necessary repairs or replacements required to permanently reduce the leakage to within the specified limit, and the test shall be repeated until the infiltration conforms to the requirements specified herein. The test shall be conducted from manhole to manhole.

In the event that the ground water level is lower than the top of the pipe, the contractor shall conduct an exfiltration test. The test shall be conducted from manhole to manhole. The pipe shall be filled and additional water introduced into the manhole to raise the level two (2) feet above the top of the pipe in the upstream manhole. The contractor shall furnish all water required for exfiltration tests. The quantity of water to maintain this level is to be measured. The test shall not exceed 50 gallons per inch of inside diameter per mile of pipe per 24 hours. If leakage exceeds the specified amount, the contractor shall make the necessary repairs or replacements required to permanently reduce the leakage to within the specified limit and the test shall be repeated until the exfiltration conforms to the requirements specified herein.

12.02 Low Pressure Pneumatic Test

The test shall be performed from manhole to manhole and subsequent to completion of backfill but prior to replacement of pavements. The following procedure shall be implemented as a method of test:

- A. Each length of pipe shall be cleaned by passing a snug fitting ball or mandrel through the pipe.
- B. Plug all pipe outlets with suitable test plugs and brace all plugs securely to prevent blowout.
- C. If the pipe to be tested is submerged in ground water, a test pressure probe shall be inserted by boring or jetting into the backfill to the level of the center of the pipe and the back pressure determined while passing air through the probe. The amount of back pressure thus determined shall be added to all gauge pressures required for testing the submerged line.
- D. Add air slowly to the plugged pipe under test until the internal pressure is raised to 4.0 psi above back pressure.
- E. Check exposed pipe and plugs for abnormal leakage, by coating with a soap solution or by means of an approved smoke device. If failures are observed, bleed off the air, make repairs and re-pressurize.
- F. After an internal pressure of 4.0 psig above back pressure is obtained, allow at least 2 minutes for air temperature to stabilize, adding only the amount of air required to maintain 4.0 psig above back pressure.
- G. After the two-minute period, disconnect the air supply by valve action.
- H. When the pressure decreases to 3.5 psig above back pressure, start a stopwatch. Determine the time in seconds, for the interval during which the internal pressure drops to 2.5 psig above back pressure. The time interval shall not be less than the following tabulated value*

TIME IN MINUTES AND SECONDS

| | | | | | | | | |
|---------|-----|-----|-----|-----|-----|-----|-----|-----|
| TEST | 100 | 150 | 200 | 250 | 300 | 350 | 400 | 450 |
| LENGTH: | | | | | | | | |

Diameter:

| | | | | | | | | |
|----|------|------|------|-------|-------|-------|-------|------|
| 8 | 3-47 | 3-47 | 3-47 | 3-47 | 3-47 | 4-26 | 5-04 | 5-4 |
| 10 | 4-43 | 4-43 | 4-43 | 4-57 | 5-56 | 6-55 | 7-54 | 8-54 |
| 12 | 5-40 | 5-40 | 5-42 | 7-08 | 8-33 | 9-48 | 11-24 | 12-5 |
| 15 | 7-05 | 7-05 | 8-54 | 11-08 | 13-21 | 15-35 | 17-48 | 20-0 |

If the observed interval is less than the required interval, the leaks shall be located, repaired and the line retested.

*The above referenced table of tabulated values was obtained from the Uni-Bell PVC Pipe Association document Uni-B-6, "Recommended Practice for Low Pressure Air Testing of Installed Sewer Pipe." The table is noted as "Table XII" in this document. These recommendations are for all products not just PVC. Specific information on conducting this test can be found in Uni-B-6 document.

12.03 Deflection Test for PVC Sewer Pipe

Upon completion of the pipe installation and backfill to grade, pipe shall be tested for diametric deflection. Maximum allowable deflection shall be performed by using a "mandrel". In addition, installed sewer lines shall be lamped for each pipe run between sanitary manholes as part of the deflection test. The full diameter of the pipe shall be visible when viewed between consecutive manholes.

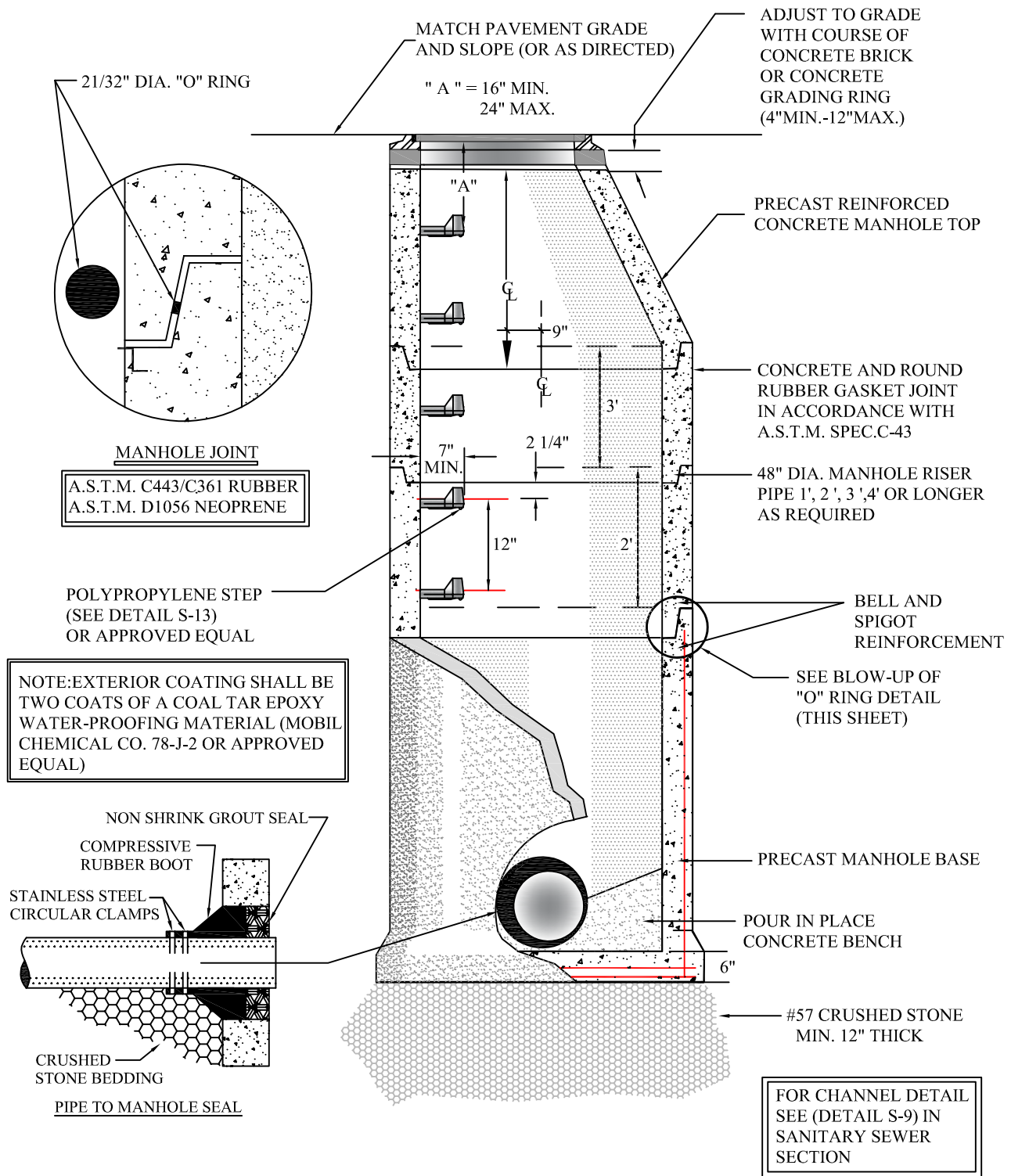
Any pipe in which the deflection exceeds 5% of the internal diameter of the pipe shall be removed and replaced.

13.0 PUMPING STATIONS

The use of pumping stations in new developments is strongly discouraged by Brick Utilities. Should the need for a pumping station present itself, Brick Utilities will make a determination as to the acceptance of such facility on a case-by-case basis.

Specifications for pumping stations will be provided when the need for said facility has been demonstrated and accepted by Brick Utilities.

**--END OF SPECIFICATIONS
FOR THE CONSTRUCTION OF SEWER SYSTEM--**



PRECAST CONCRETE MANHOLE

Revised: Dec. 2009

DETAIL S-1

| DRAWN BY | CHECKED BY | DATE | SCALE | REVISIONS |
|----------|------------|------------|-------|-----------|
| D.A.G. | S.T.S. | APRIL 2000 | NONE | AS NOTED |

NOTE: EXTERIOR COATING SHALL BE TWO COATS OF A COAL TAR EPOXY WATER-PROOFING MATERIAL (MOBIL CHEMICAL CO. 78-J-2 OR APPROVED EQUAL)

JOINT SECTIONS TO BE WRAPPED WITH CANUSA - WRAPID SEAL

COPOLYMER POLYPROPYLENE MANHOLE STEPS

NON-SHRINK GROUT SEAL

COMPRESSIVE RUBBER BOOT

STAINLESS STEEL CIRCULAR CLAMPS

CRUSHED STONE MIN. 8" THICK

PVC LINER

PIPE TO MANHOLE SEAL

PVC LINER (SEE SPEC'S)

57 CRUSHED STONE MIN. 12" THICK

PVC LINED PRE-CAST CONCRETE MANHOLE

Revised: Dec. 2009

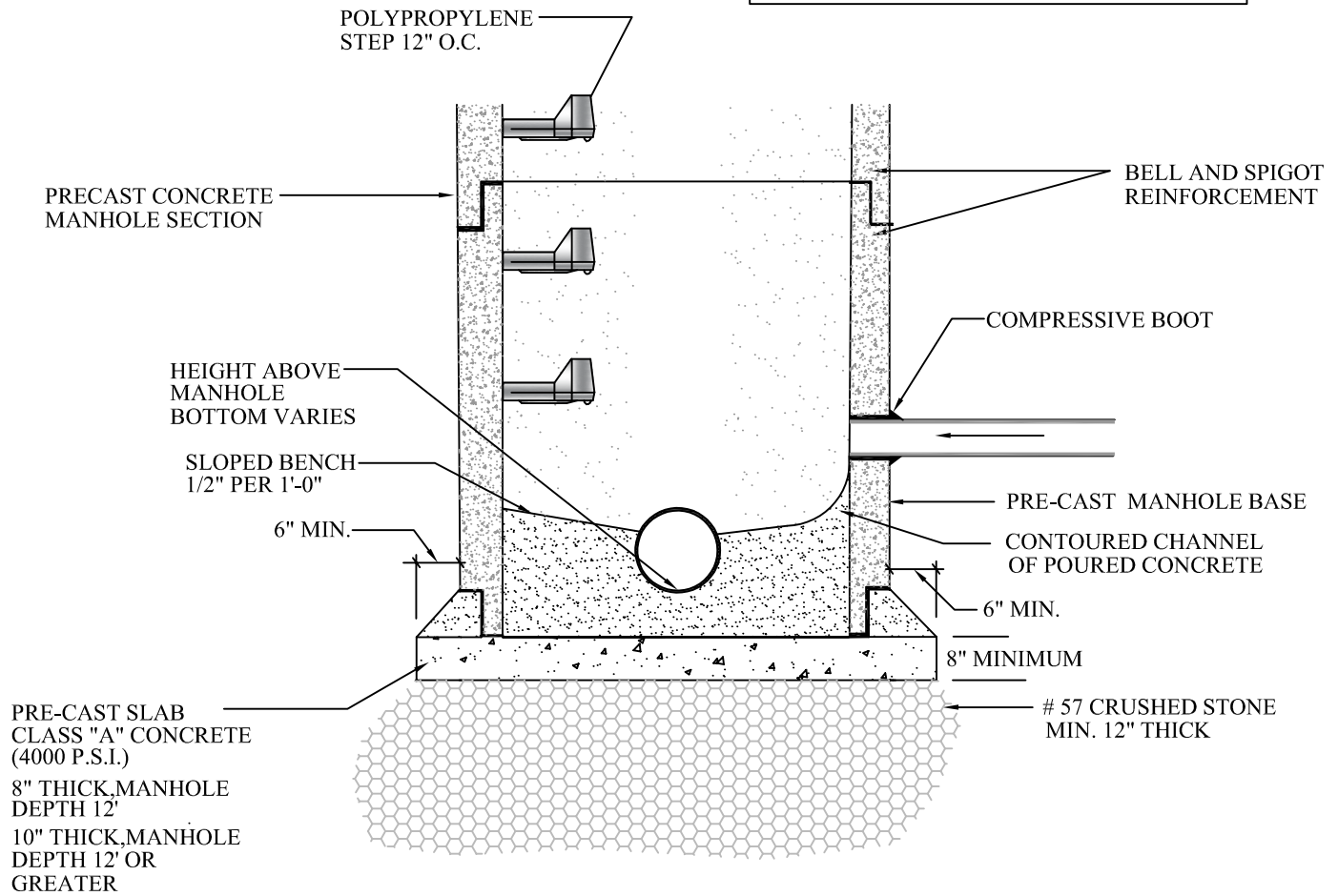


DETAIL S-1B

| DRAWN BY | CHECKED BY | DATE | SCALE | REVISIONS |
|----------|------------|------------|-------|-----------|
| D.A.G. | S.T.S. | APRIL 2000 | NONE | AS NOTED |

NOTE:

EXISTING PIPE TO BE SAW CUT
AFTER TESTING IS COMPLETED.



NOTE:

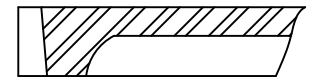
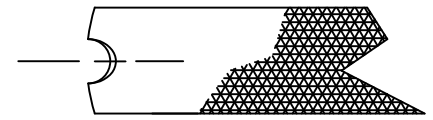
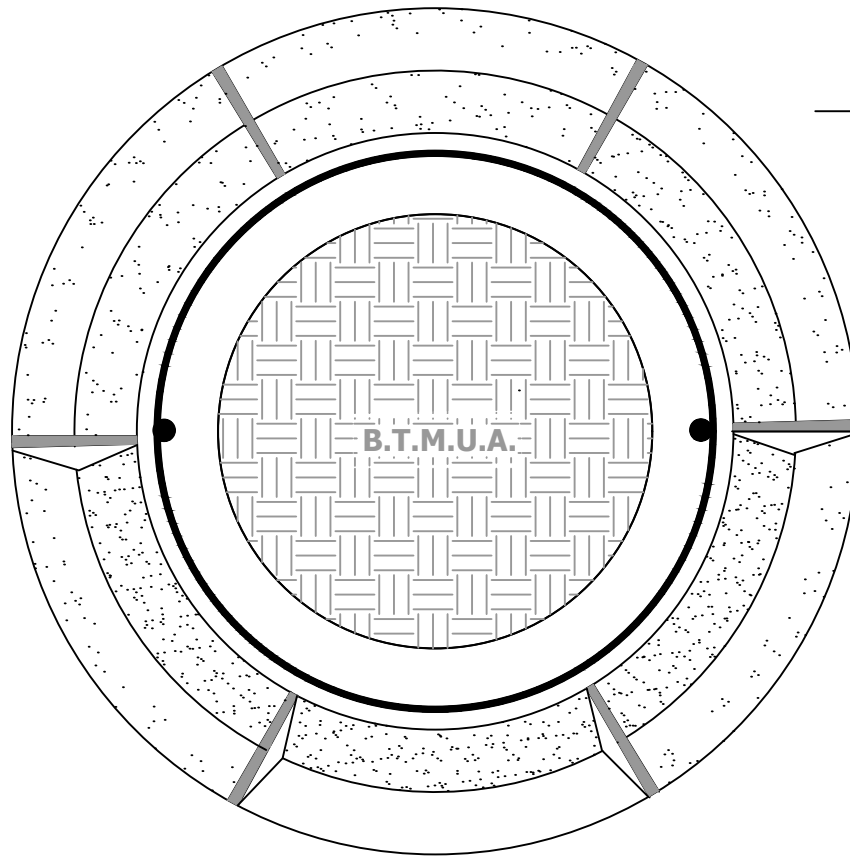
CONSTRUCT MANHOLE BY USING
PRE-CAST SLAB AND POURING
CONCRETE AROUND THE PIPE.
THE TOP OF THE EXISTING PIPE
WILL BE CUT OFF AFTER TESTING
IS COMPLETED.

DOGHOUSE MANHOLE

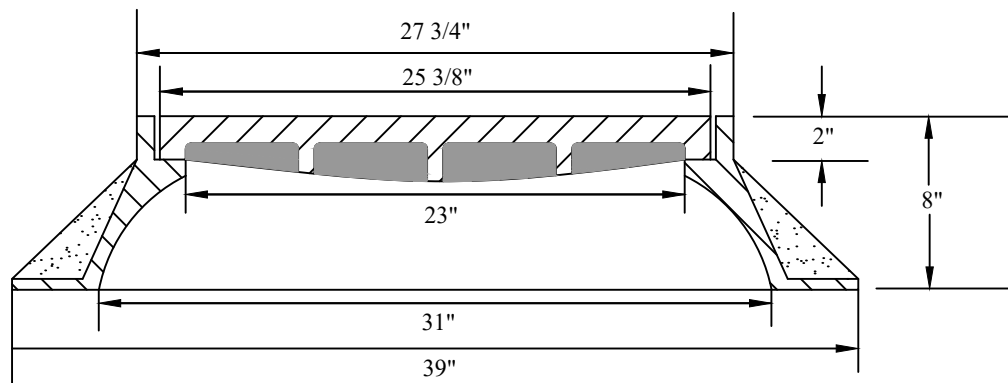
Revised: Dec. 2009

DETAIL S-2

| DRAWN BY | CHECKED BY | DATE | SCALE | REVISIONS |
|----------|------------|------------|-------|-----------|
| D.A.G. | S.T.S. | APRIL 2000 | NONE | AS NOTED |



**STANDARD
PICKHOLE**



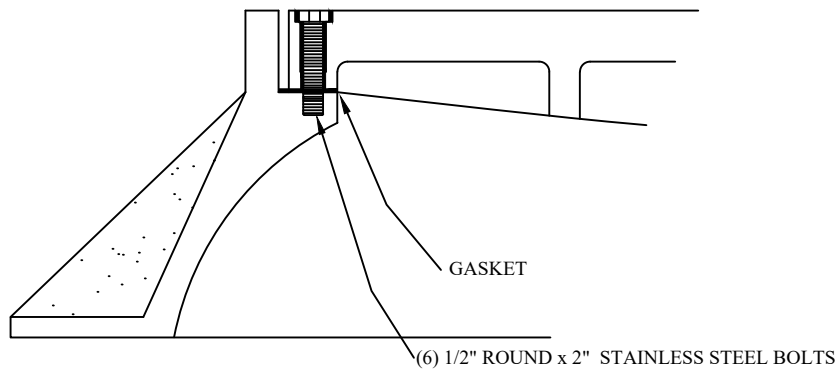
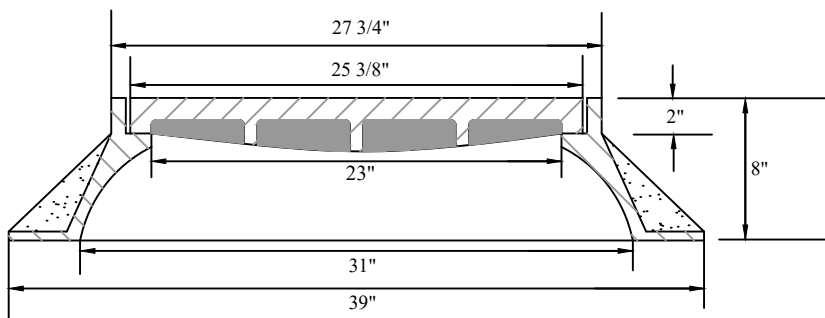
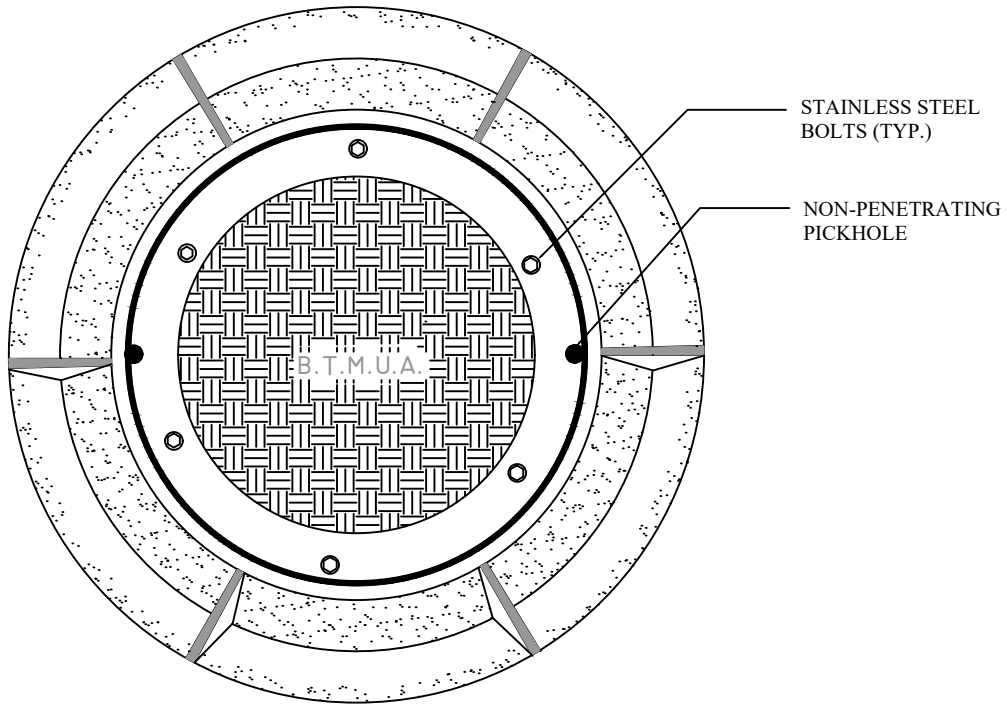
STANDARD MANHOLE FRAME AND COVER

PATTERN No. 1202B CAMPBELL FOUNDRY (OR EQUAL)

Revised: July 2020

DETAIL S-3

| DRAWN BY | CHECKED BY | DATE | SCALE | REVISIONS |
|----------|------------|------------|-------|-----------|
| D.A.G. | S.T.S. | APRIL 2002 | NONE | AS NOTED |



WATER TIGHT MANHOLE FRAME & COVER

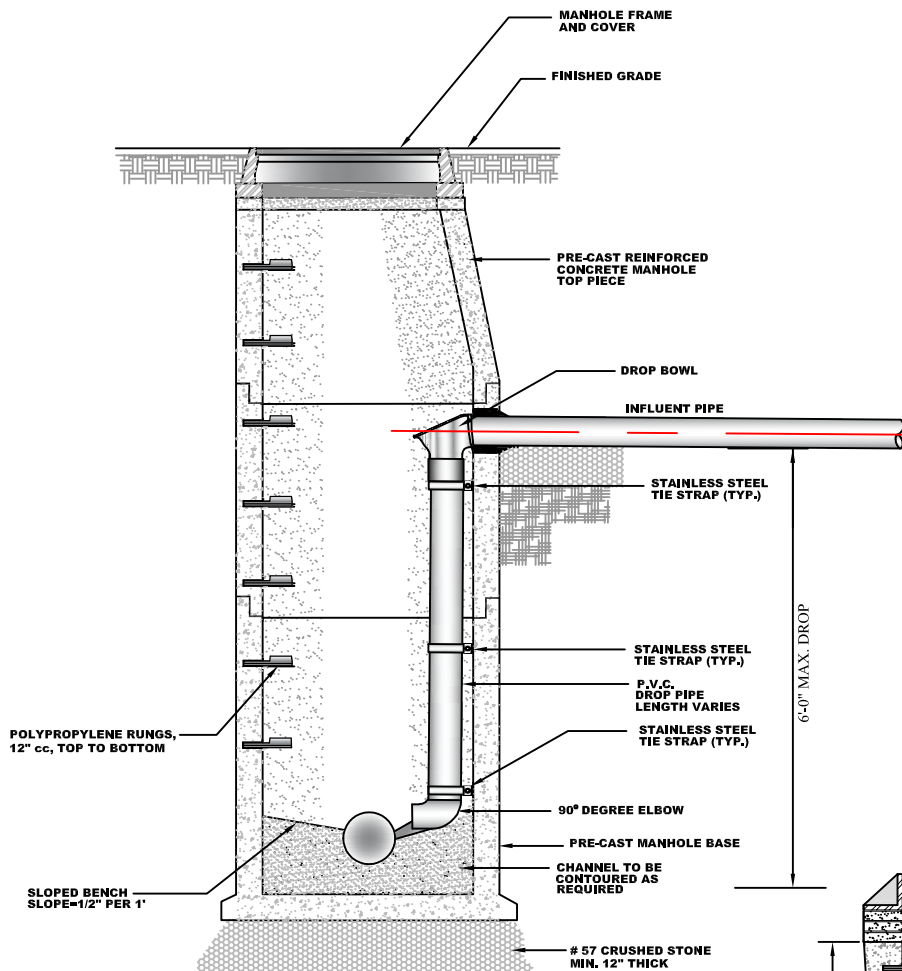
(BOLTED AND GASKETED)

ORDER No. 12022440 CAMPBELL FOUNDRY (OR EQUAL)

Revised: July 2020

DETAIL S-4

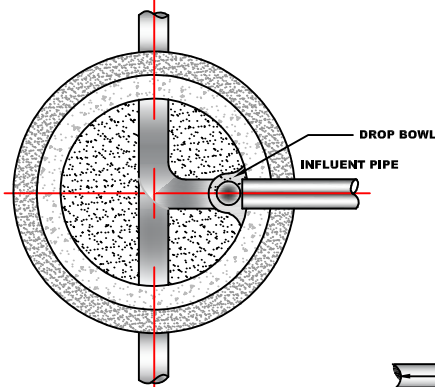
| DRAWN BY | CHECKED BY | DATE | SCALE | REVISIONS |
|----------|------------|------------|-------|-----------|
| D.A.G. | S.T.S. | APRIL 2000 | NONE | AS NOTED |



DROP DETAIL (INSIDE)
CONCRETE 48\"/>

NOTES:

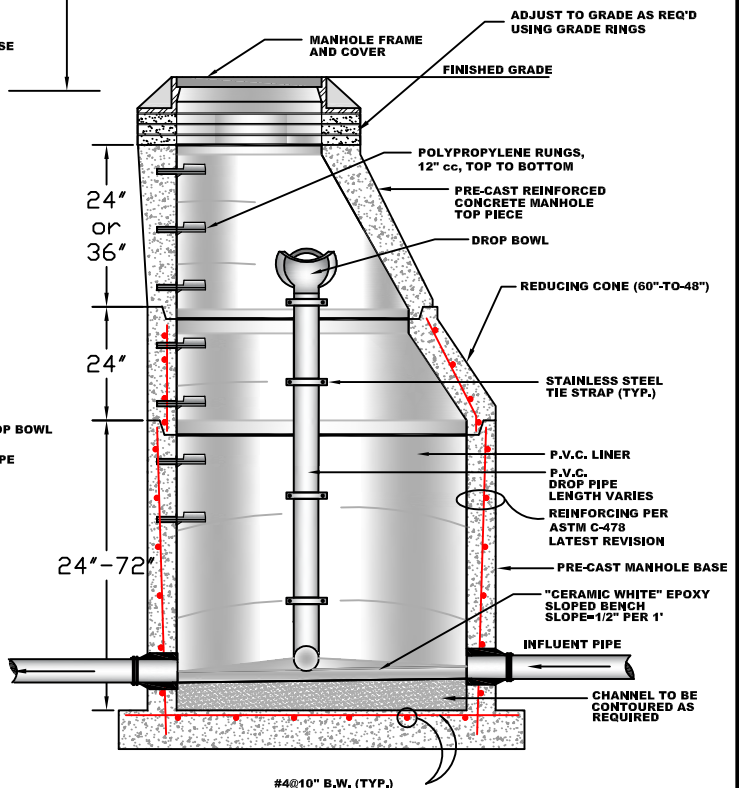
1. ALL INSIDE DROP CONNECTIONS SHALL USE THE DROP BOWL AS PRODUCED BY:
RELINER-DURAN INC.
53 MT. ARCHER RD.
LYME CT. 06371
(860) 434-0277 FAX: (860) 434-3195 OR EQUAL.
2. DROP BOWL MODEL "A-6" SHALL BE USED FOR ALL 8\"/>



PLAN VIEW

- NOTE:**
1. STAINLESS STEEL TIE STRAPS SHALL BE INSTALLED IN SUCH A MANNER TO ALLOW FOR FUTURE REMOVAL. FIRST STRAP SHALL BE INSTALLED WITHIN 6\"/>

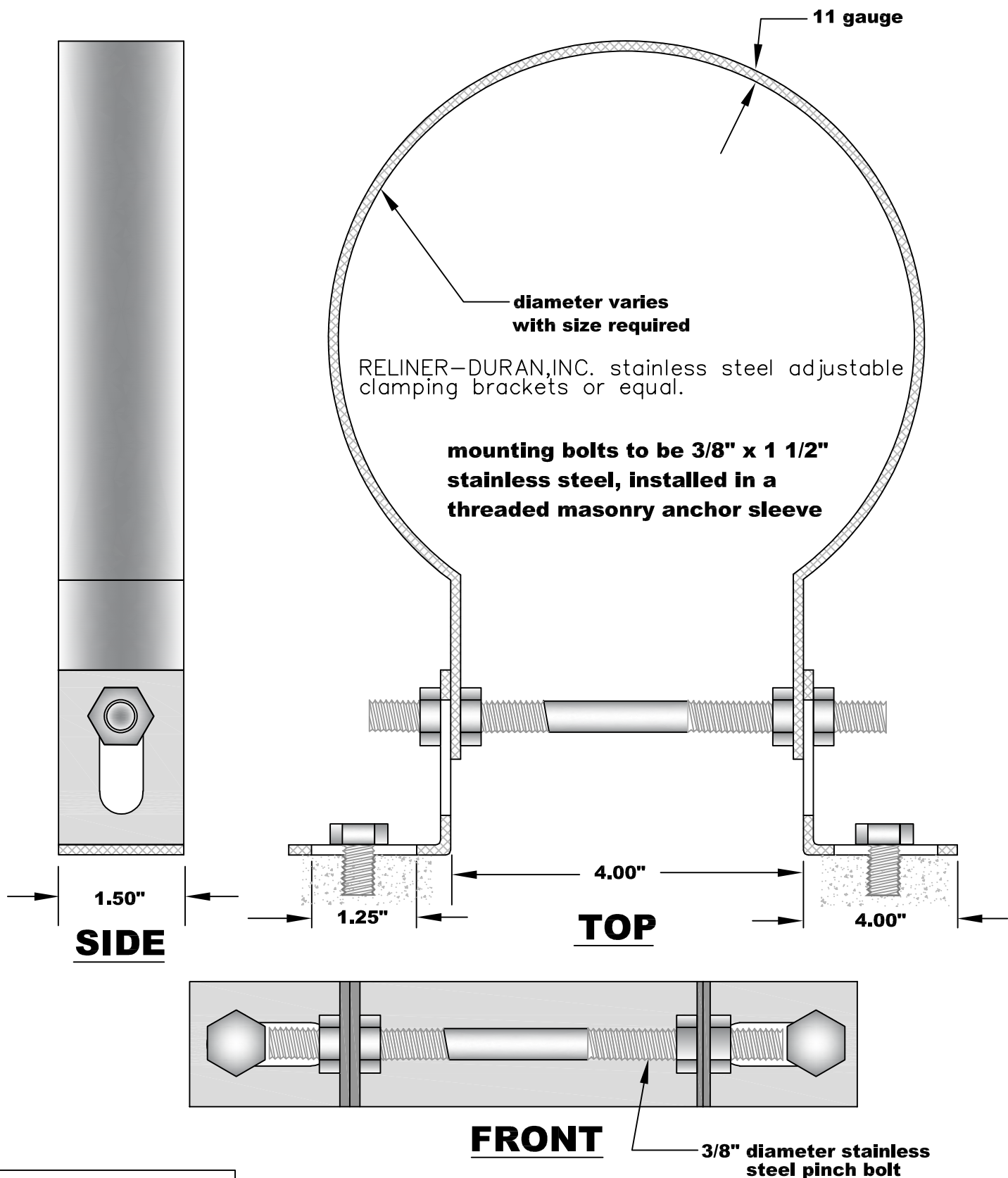
2. MANHOLES WITH INSIDE DROPS SHALL HAVE A MINIMUM 5'-0\"/>



SECTION
PVC LINED 60\"/>

DROP CONNECTION (INSIDE)

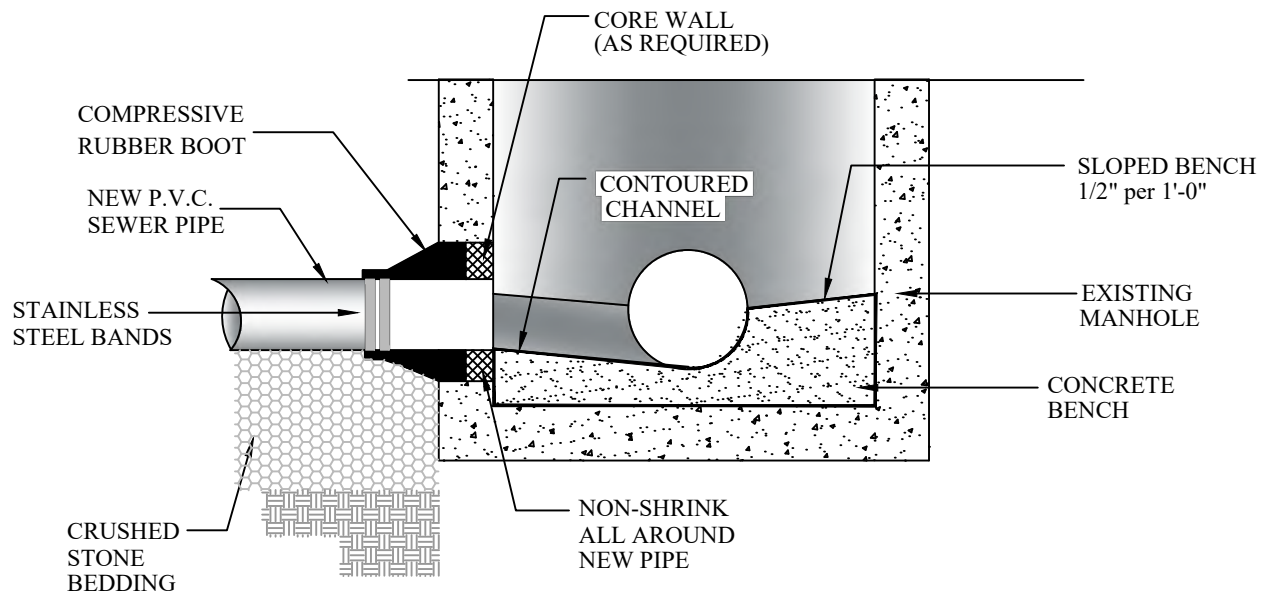
Revised: Dec. 2009



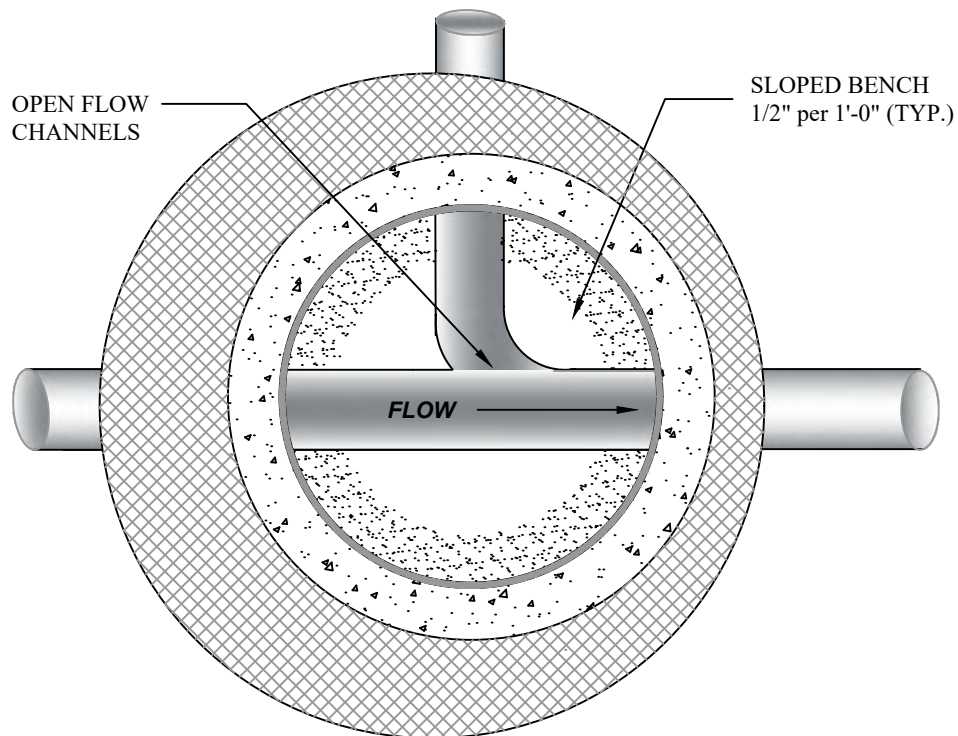
**ALL COMPONENTS TO
BE STAINLESS STEEL**

Manhole Drop Pipe Hanger

Revised: Dec. 2009

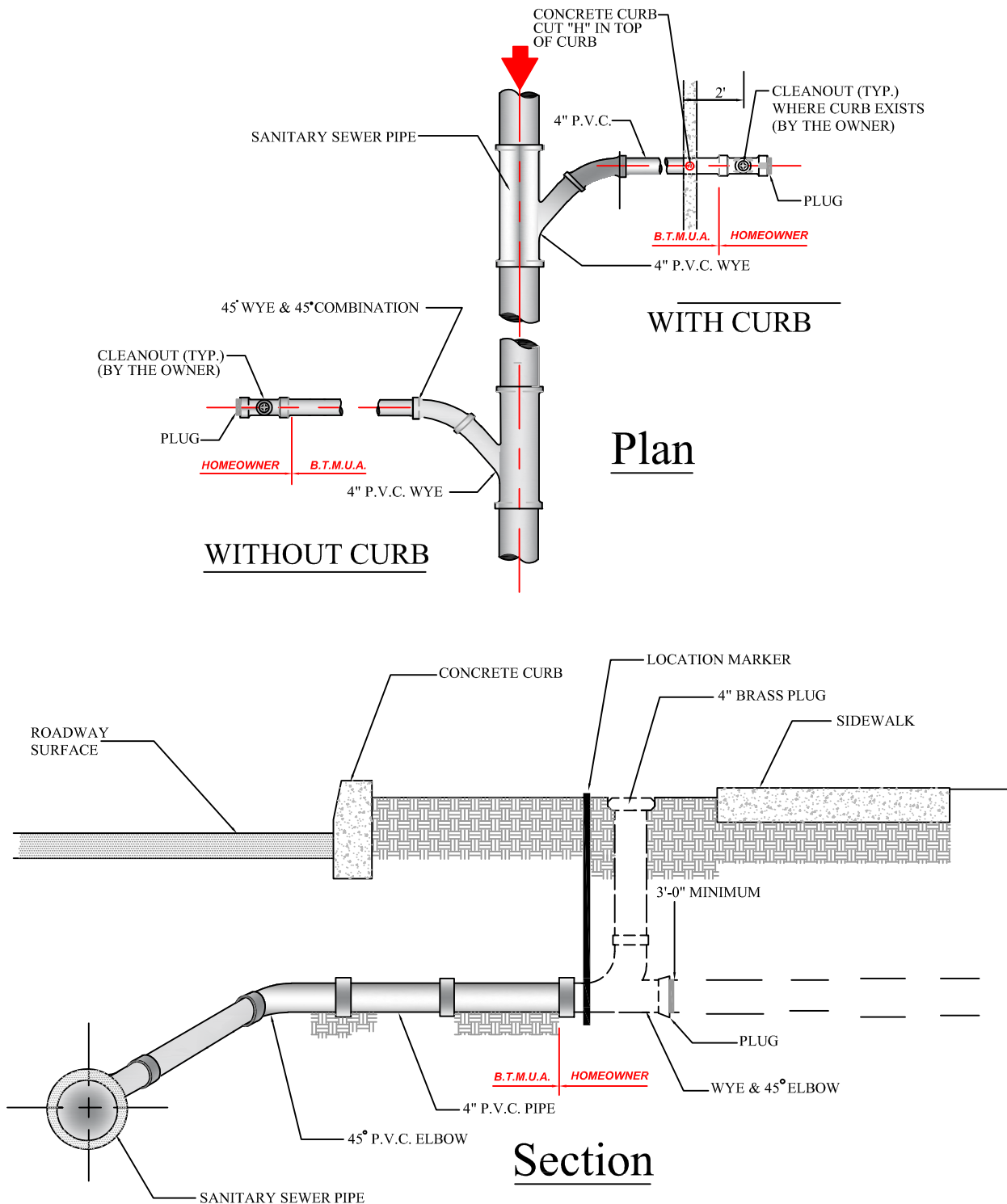


CONNECTION TO EXISTING MANHOLE



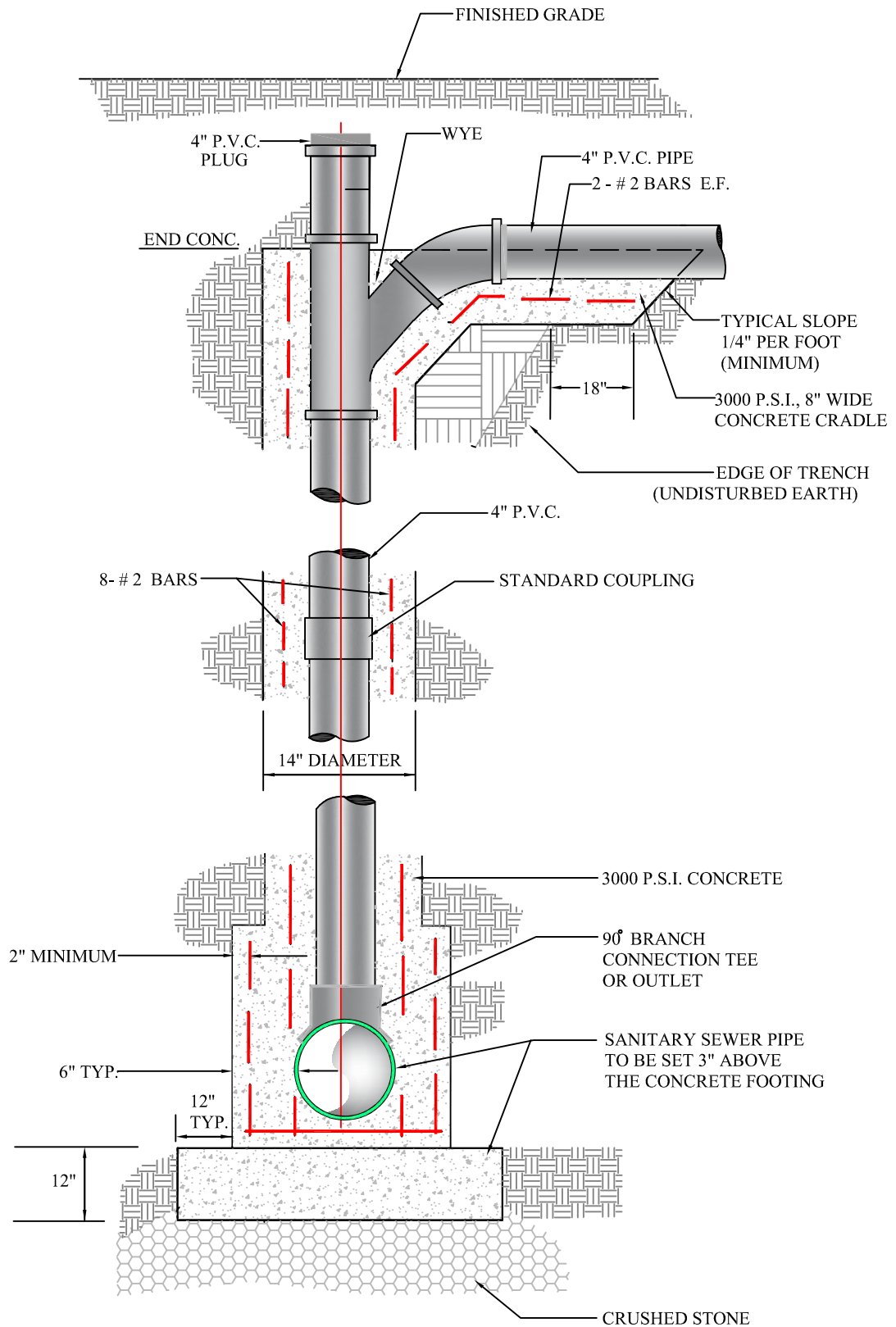
TYPICAL MANHOLE CHANNEL

Revised: Dec. 2009



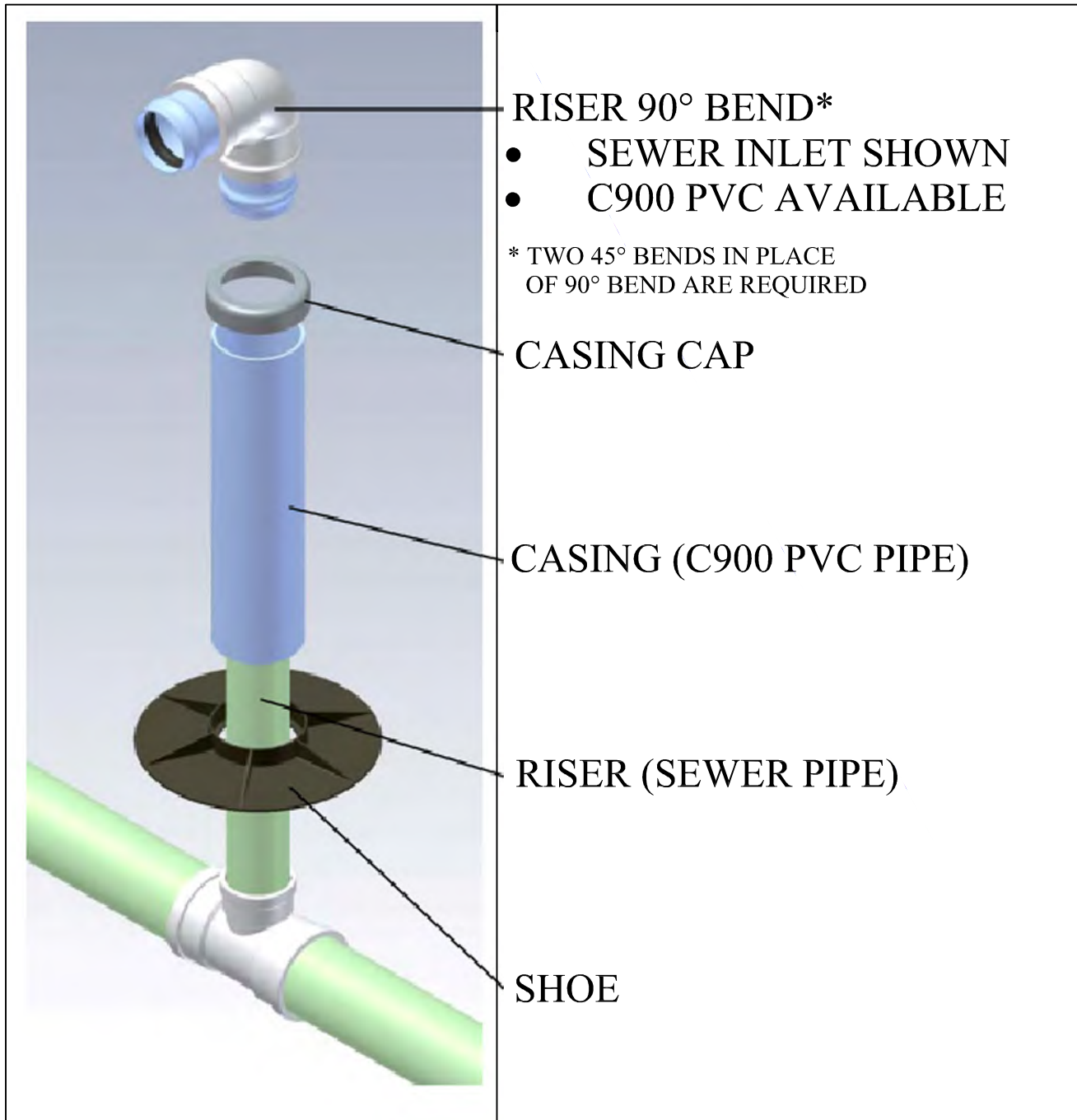
Typical 4" House Connection

Revised: Dec. 2009

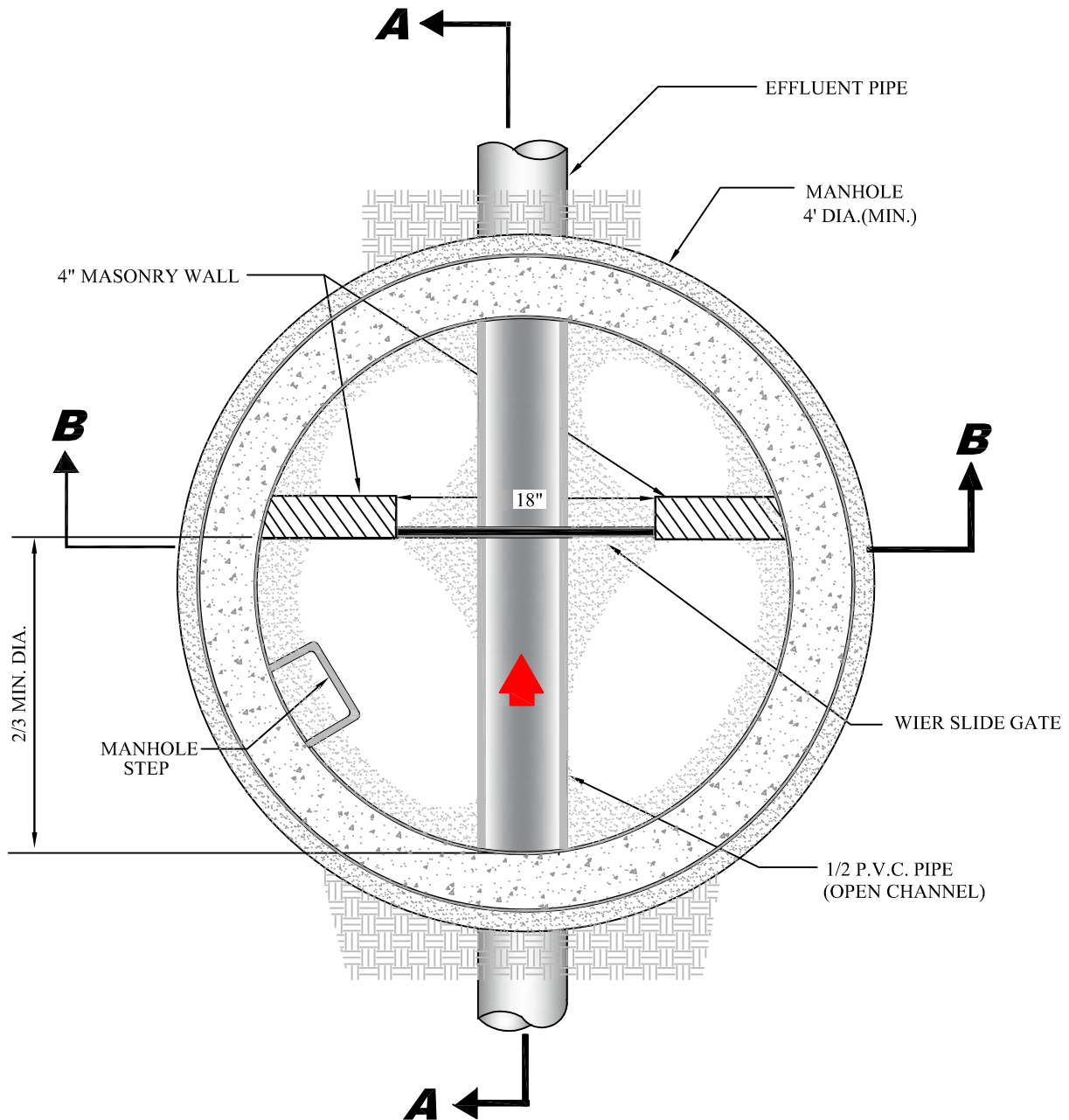


DEEP HOUSE CONNECTION

Revised: Dec. 2009



HARCO B&H RISER

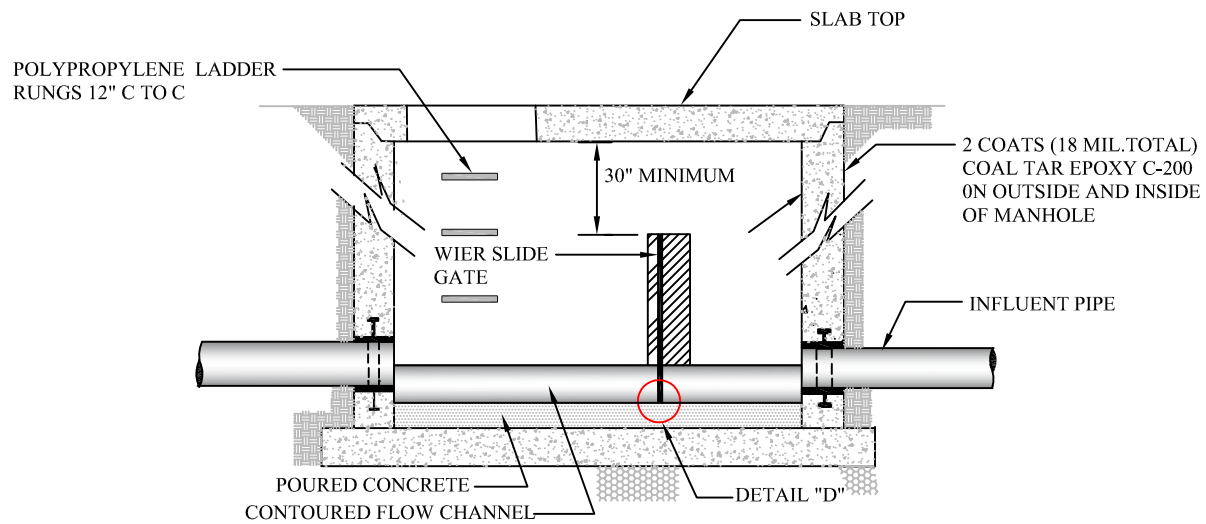


INDUSTRIAL DISCHARGE CONTROL MANHOLE

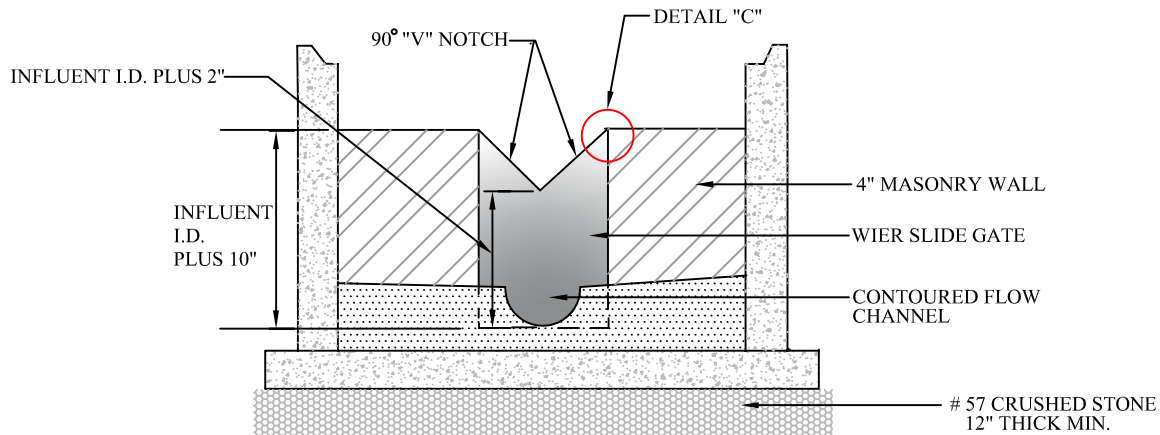
Revised: Dec. 2009

DETAIL S-9A

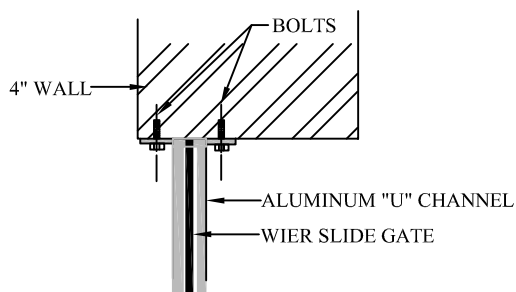
| DRAWN BY | CHECKED BY | DATE | SCALE | REVISIONS |
|----------|------------|------------|-------|-----------|
| D.A.G. | S.T.S. | APRIL 2000 | NONE | AS NOTED |



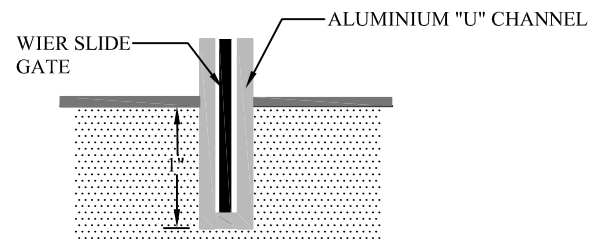
SECTION "A"-"A"



SECTION "B"-"B"



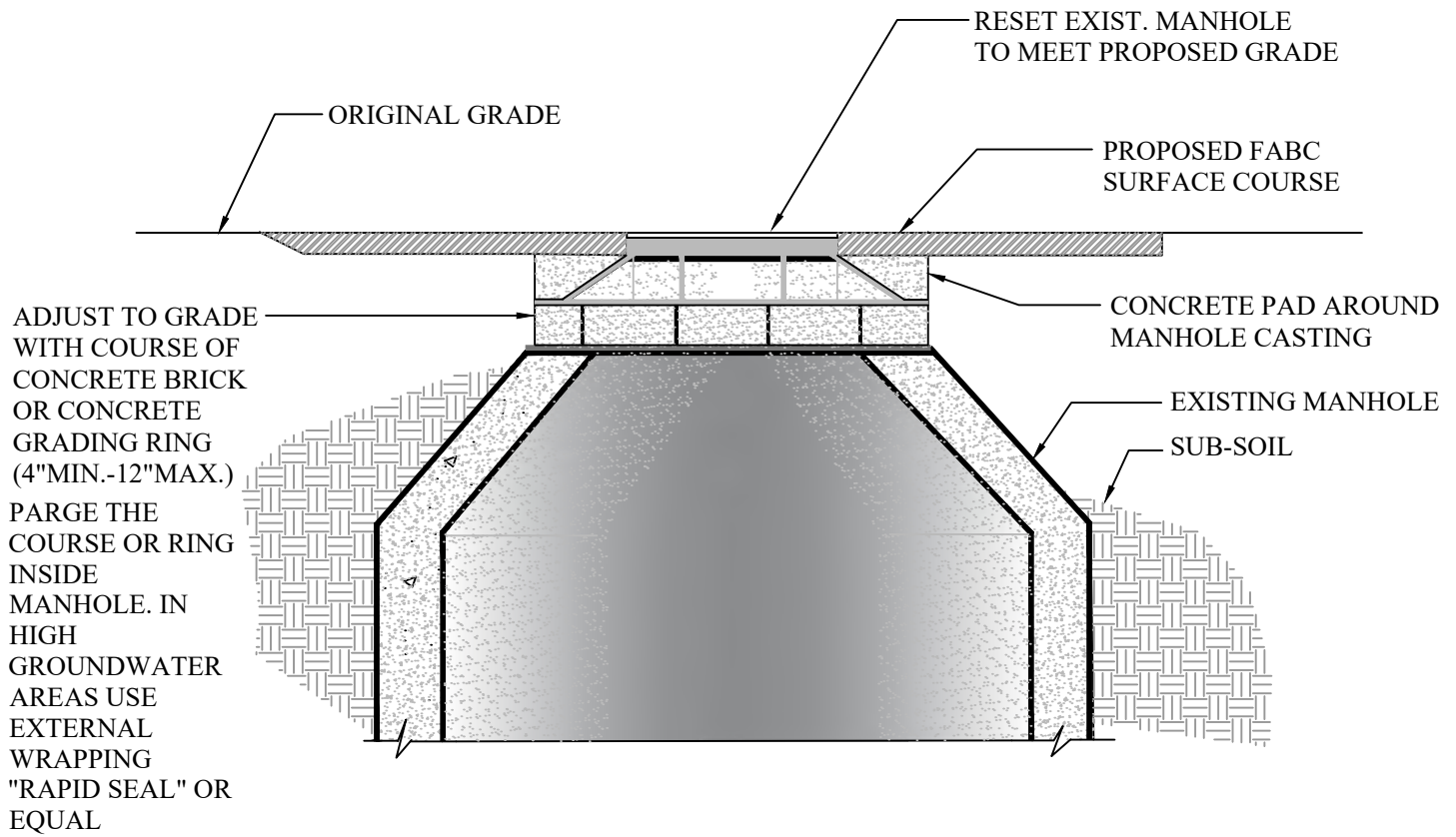
DETAIL "C"



DETAIL "D"

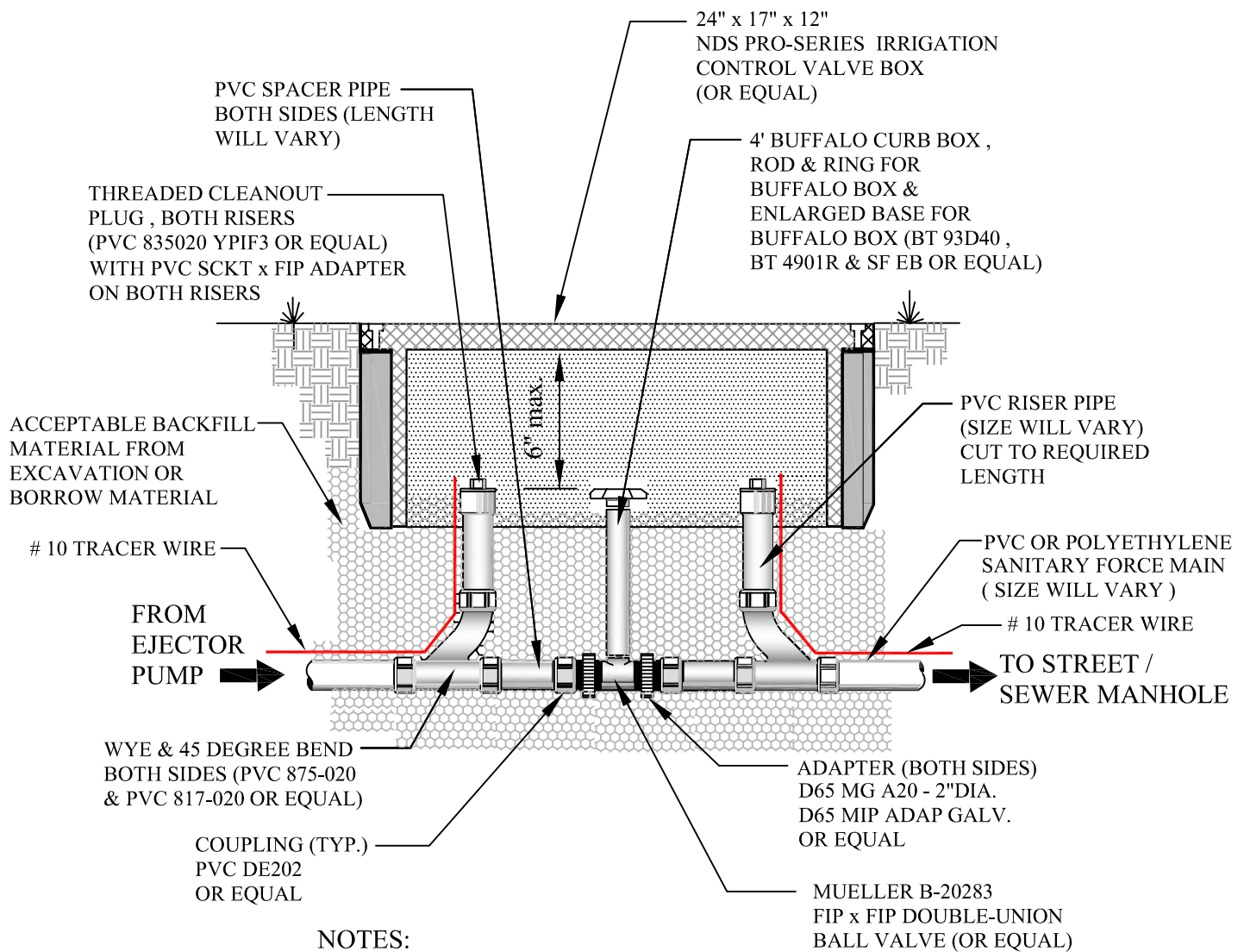
INDUSTRIAL DISCHARGE CONTROL MANHOLE

Revised: Dec. 2009



RESET MANHOLE CASTING

Revised: July 2020



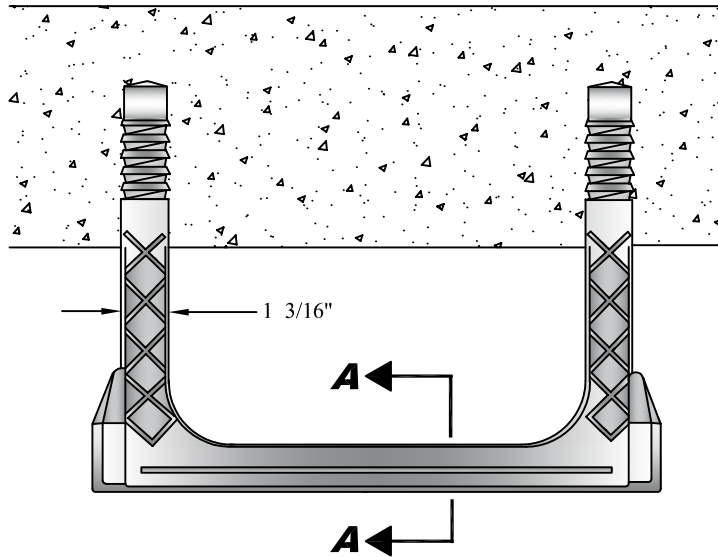
NOTES:

1. VALVE ACCESS PIT TO BE LOCATED INSIDE THE CURBLINE.
2. SANITARY FORCE MAIN TO BE SET AT A DEPTH OF 4'-0".
3. COVER OF BOX WILL NOT HAVE ANY NOTATION OTHER THAN THE "H" CUT IN THE CURB.
4. ALL PVC PIPE SHALL BE SCHEDULE 80.
5. ALL POLYETHYLENE PIPE SHALL BE SCHEDULE SDR 17.
6. PROVIDE APPROVED TRANSITION COUPLING BETWEEN PVC AND POLYETHYLENE PIPE.
7. PROVIDE # 10 TRACER WIRE, WIRE TO BE WRAPPED AROUND THE LENGTH OF PIPE, STRIPPED 1'-0" EACH END.

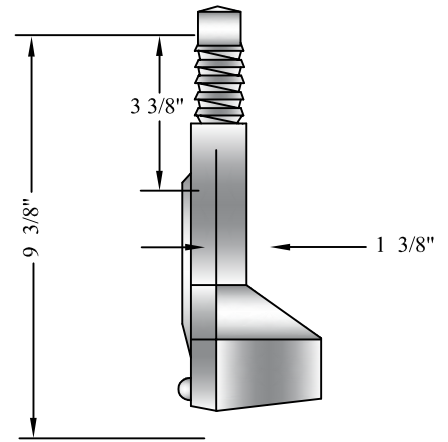
VALVE & ACCESS PIT

(INDIVIDUAL SEWER FORCE MAIN)

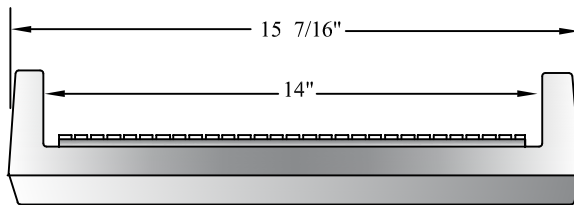
Revised: Dec. 2009



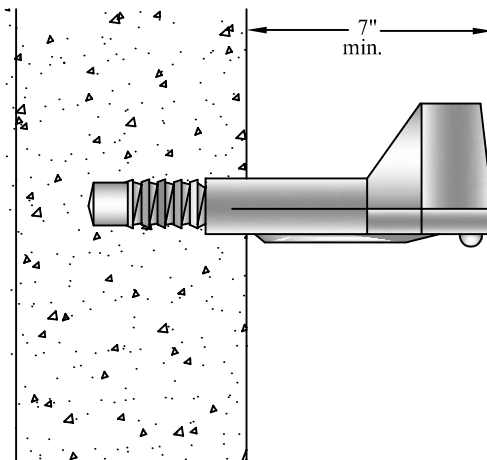
TOP VIEW



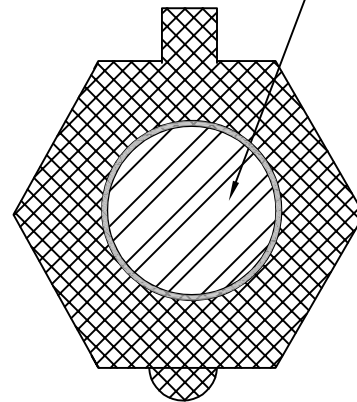
SIDE VIEW



FRONT VIEW



1/2" GRADE 60 STEEL
REINFORCEMENT

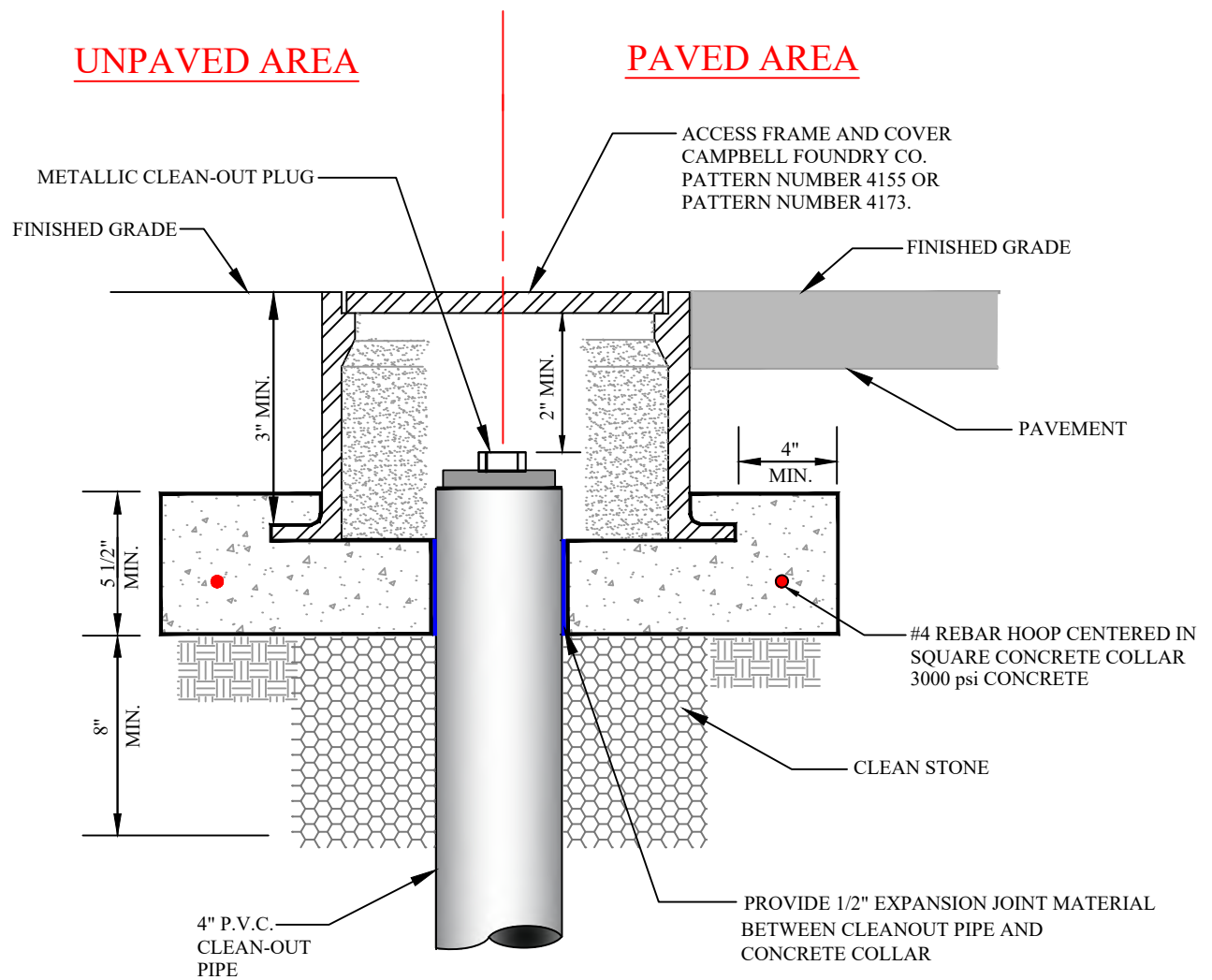


SECTION A - A

COPOLYMER POLYPROPYLENE PLASTIC MANHOLE STEPS

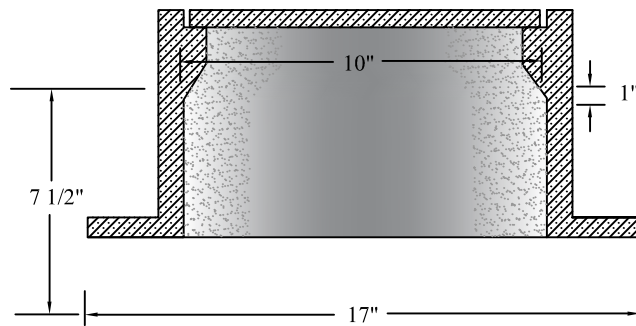
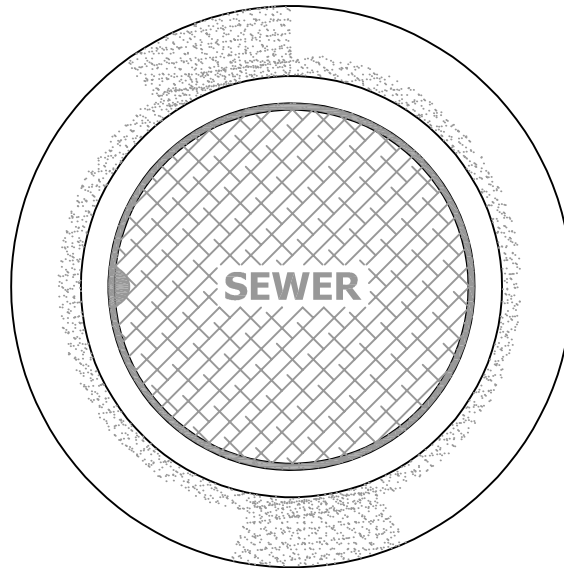
Revised: Dec. 2009

TRAFFIC AREA

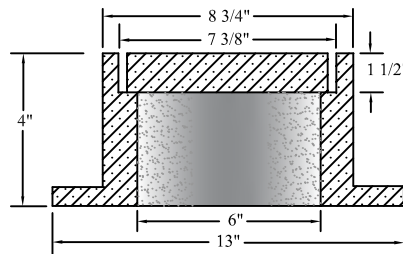
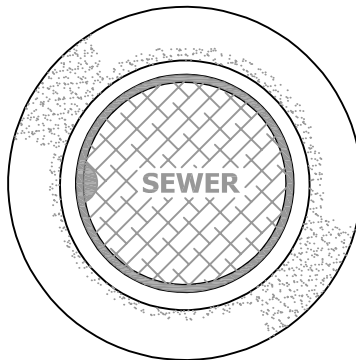


CLEANOUT PROTECTION BOX

Revised: Dec. 2009



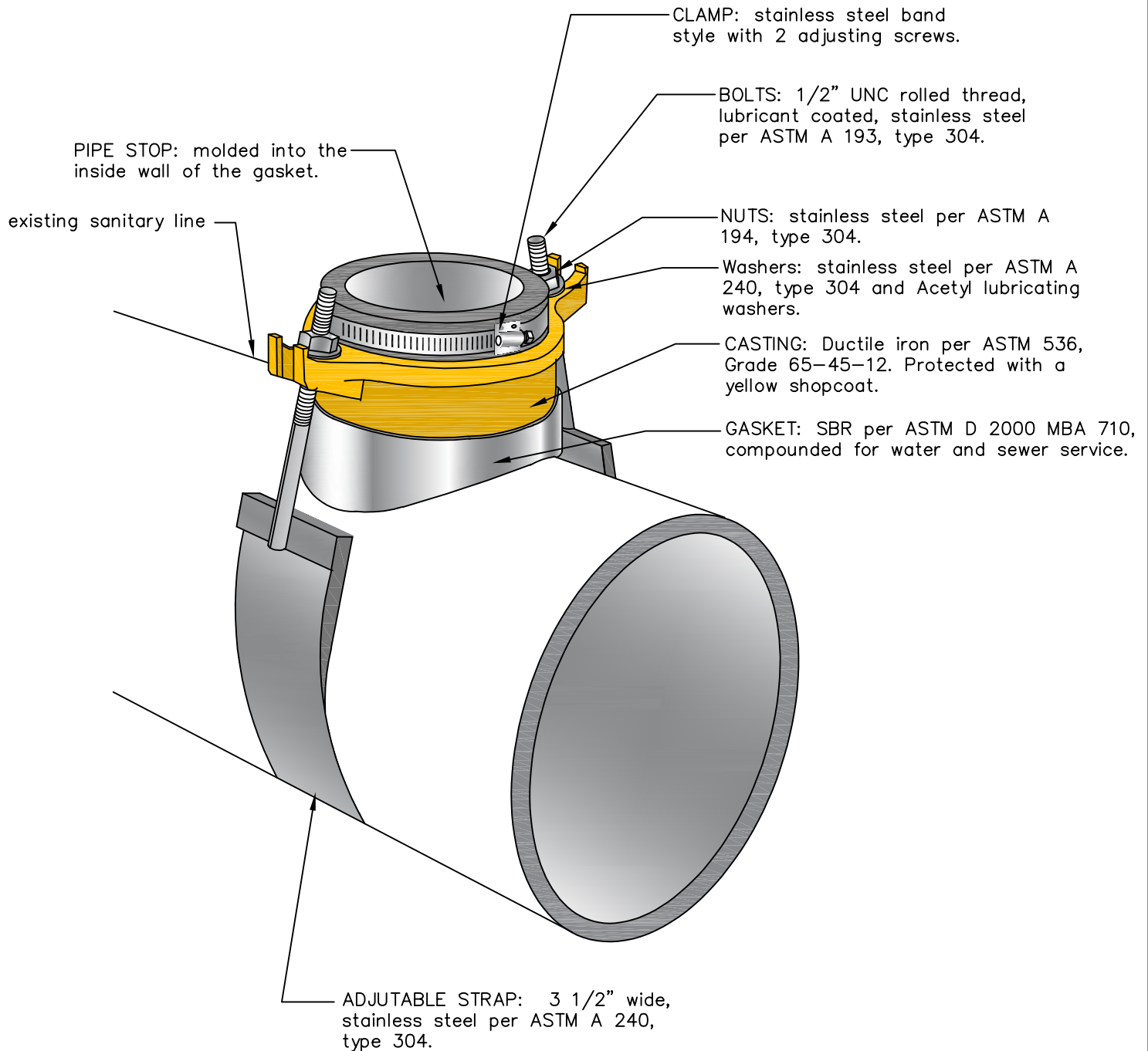
PATTERN NUMBER 4155
FOR 6" CLEAN-OUT



PATTERN NUMBER 4173
FOR 4" CLEAN-OUT

NOTE :
ACCESS FRAME AND COVER
AS MANUFACTURED BY
CAMPBELL FOUNDRY CO.

Revised: Dec. 2009



STYLE "CB" SEWER SADDLE

AS MANUFACTURED BY ROMAC INDUSTRIES OR APPROVED EQUAL

Revised: Dec. 2009



The application of **Fusion Bonded Epoxy** must be used with this coupling in accordance with **AWWA-C213-01**.

**ALL BOLTS, NUTS AND WASHERS
TO BE TYPE 316 STAINLESS STEEL**

501 DUCTILE IRON COUPLING