



GUIDANCE AND STANDARD SPECIFICATIONS

2019

A Guide for Engineers, Contractors, Developers, and Homeowners

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Introduction

The purpose of this document is to provide guidance to engineers, developers, contractors and homeowners in design of infrastructure that will connect to the Brunswick Sewer District (BSD) owned and maintained municipal sanitary sewer system. The specifications and standards listed are based on BSD preferences at the time of publication. They are not intended to be all encompassing or excluding of any items or materials.

Prior to design, construction, and/or connection, plans and ideas should be submitted to the BSD for review and comment. Alternate materials and design standards will be considered. The BSD, like any organization, is constantly changing and improving. If an engineer, contractor, developer, or homeowner has ideas or designs that can help the BSD to accomplish its mission, the BSD will consider them. The mission of the District is:

“To protect the health and environment of the communities we serve through wastewater collection and treatment in an environmentally responsible, efficient, and reliable manner.”

If you have suggestions, ideas, new technology, or other information that will help the BSD to achieve it's mission, please share them with us at info@brunswicksewer.org or 207-729-0148.

ALL CONNECTIONS TO THE BSD SANITARY SEWER SYSTEM REQUIRE A PERMIT. The BSD must be notified of any work that occurs on the municipal sewer system and any private lines (services) that are connected to the municipal system. This includes connections of accessory apartments, new installations, repairs to existing services, new developments, homeowners' associations, private (non-septic) systems and any other work that may have an impact on the sanitary sewer system. The BSD recommends we be contacted prior to conducting any work so we can determine if the work impacts the sewer system.

If you are in doubt of any requirements, please contact us. Our staff will be glad to assist you. All of our contact information can be found at brunswicksewer.org or facebook.com/brunswicksewer.

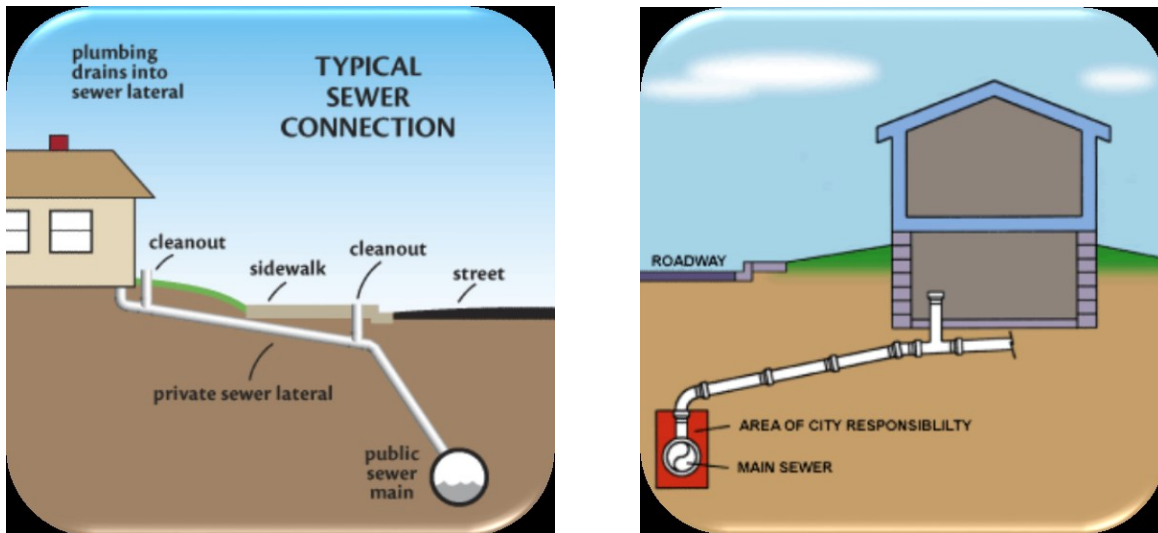
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Private vs Public

One question that often comes up is who owns the sewer or “who is responsible.” In the town of Brunswick, the BSD is responsible for “main” line sewers. Main line sewers are generally larger diameter pipes (6”-30”) and run parallel to the road or right of way. Owners are responsible for sewer “laterals” or “services” that are usually smaller diameter pipe (3”-6”) and run perpendicular to the road right of way. It is important to note that homeowners, or customers, are responsible for the entire length of the lateral connection to the point at which it connects to the main line sewer, even if that section is within the town right of way or road. See Figure 1 below for limits of responsibility and ownership.

Figure 1: Limit of Responsibility



It is important to note that connection hardware, such as wyes and tees, that connect to, and have the same diameter of, the public sewer, are considered the responsibility of the BSD. The drawing to the right illustrates that vertical piping directly over a main line sewer is also the responsibility of the BSD.

For more information about the responsibilities of owners and the BSD, please see our “Policy on Maintenance & Repair of Wastewater Service Pipe” at <http://www.brunswicksewer.org/pdf/20130413-ServiceRepairPipe.pdf>.

Standard Connection to the Sewer System (Households)

Permit Required

A permit is needed for all new connections to the BSD sanitary sewer system. Repair or maintenance of sewer service/lateral pipe, including privately owned pipe on private property, also requires a permit from the District. A change in use of property, depending on the nature of the change, may also require a permit from the BSD. Interior building plumbing does not require a permit from the BSD. A permit from the Town of Brunswick should be obtained for interior plumbing work. If you question whether a project requires a permit, please contact the BSD. Many times, there is no fee for a permit.

To obtain a permit, simply fill out our online permit application form at:

<http://goo.gl/forms/SoRtu9V9q3xbarCt1>. The same form is used for all types of connections. If you don't have access to the internet or do not have an email address, stop by the administrative offices at 10 Pine Tree Road, Brunswick, Maine to fill out an application. Our staff will be happy to assist.

Costs

Costs are determined by the BSD management based on additional flow proposed for the project and current rates, as established by the trustees. Current rates can be found here:

<http://www.brunswicksewer.org/rpi.html>

There is no cost for permits associated with repair or maintenance of sewer lines. Change of use permits that do not introduce new flow to the sewer are at no cost. All projects that introduce new flow, and thus have an impact on the BSD system, are assessed an entrance charge. For more specific information about how entrance charges are calculated, see section 6 of the BSD entrance charge program at <http://www.brunswicksewer.org/pdf/200003-EntranceChargeProgram.pdf>

Procedures

Prior to commencing work on any project that requires a connection, or will affect an existing connection, to the BSD, contact us. We are happy to assist and point customers in the right direction.

The process begins with filling out an online permit application.

<http://goo.gl/forms/SoRtu9V9q3xbarCt1>. Upon submittal, applicants will receive an automated response that states the BSD has received the application. This is NOT a permit to connect to the sewer, it is only a confirmation that your application has been submitted. BSD staff will

review the application and determine the appropriate entrance charge, if any. In some cases, additional information may be required. Applicants will be contacted by BSD staff if additional information is required.

Once an appropriate entrance charge is determined, applicants will receive an email from the BSD stating the amount of the entrance charge and providing options on how to pay it. Entrance charges can be paid online, in person, or by mail. Once payment is received, applicants will be provided with a permit number by email. A valid email is required to obtain a permit. There are no paper permits provided. The permit number is all that is needed. The permit number will be referenced by BSD and the Town of Brunswick for services related to the connection.

Once a permit number is provided, the permit to connect is valid and work may commence. If work does not take place within one (1) year of the application, a new permit must be obtained. Prior to backfilling any work, the BSD must be notified so we can arrange inspection services. Please notify BSD as early as possible and at least 24 hours prior to excavation, to allow adequate time to schedule the inspection. See below for more info on the inspection process.

Inspection

Inspection of construction in progress, prior to backfilling pipes, by BSD personnel is essential. Failure to notify the BSD so that inspection can occur as work proceeds may result in having to re-excavate work at owner's or contractor's expense. Inspection procedures are dependent upon the project type. It is best to notify the District at least 24 hours prior to commencing work so we can schedule our staff to meet the applicant's needs. Inspection services can be arranged by calling 207-729-0148 during regular business hours or by emailing info@brunswicksewer.org.

The BSD generally does not charge for inspection services, however inspections that take more than four (4) hours, due to size and scope of the project or reinspection, will be at the expense of the applicant. This fee will be in addition to the assessed entrance charge.

Additional Information

The Brunswick Sewer District website at www.brunswicksewer.org includes information on how to contact BSD staff, BSD policies, and BSD forms. We can be reached at 207-729-0148 or by email at info@brunswicksewer.org. Another option is to stop by the office during regular business hours, currently Monday through Thursday from 7:00 a.m. to 5:00 p.m. Our staff is always available and happy to assist.

Commercial Services

Permits are required for ALL work associated with connections to the Brunswick Sewer District sanitary sewer system, whether on public or private property. See “Standard Connection to the Sewer System” section for information about the permit process, procedures, and inspection services. The same permit is used for all types of connections.

Commercial services differ from residential services in three ways. (1) The calculation of the entrance charge, (2) the ability to petition for a recalculation of the entrance charge, and (3) the application of fractional flows for a change in use of a property.

Entrance Charge Calculation

The fee is based on the volume of flow generated by the average dwelling unit, determined historically to be 175 gallons per day (GPD). The flow unit (175 GPD) allows comparison of residential and non-residential uses, so that all projects constructed can be consistently and uniformly assessed their fair portion of the cost of sanitary sewer facilities to serve growth.

For any new commercial development, or change in use, applicants are required to submit engineering data, satisfactory to the District, that projects the amount of wastewater flow that will be generated by the project. The proposed flow, in gallons per day (average), is then divided by 175 gpd to determine the amount of flow units to be assessed. The number of flow units is multiplied by the current rate (schedule G) to determine the entrance charge. The minimum charge for new projects or development is one (1) flow unit. Residential housing is assessed at one flow unit per residence, regardless of the type or number of rooms.

Fractional Flow for Change in Use

When a change in use of a property or building results in an increase in flow of less than 90 gpd, an assessment of 0.5 flow units will be made.

When a change in use of an existing building or property is expected to generate more than 90 gpd, the number of flow units is calculated as the projected increase of flow divided by the average dwelling unit flow of 175 gpd. When determining the average increase in flow, the proposed total flow is compared to the average current use over the previous three-year period. For example, take a restaurant wanting to increase the number of seats. The projected total flow from the restaurant after the expansion is 300 gpd. The average use over the previous three years is 200 gpd. The number of new flow units would be $(300\text{gpd}-200\text{gpd})/175\text{gpd}$ or 0.57 flow units.

If the same restaurant decided to do a smaller expansion that was expected to increase flow by only 50 gpd, the number of additional flow units would be 50 gpd divided by 175 gpd or 0.29 flow units. A minimum of 0.5 flow units would be assessed.

Petition for Recalculation

Non-residential commercial development is afforded the opportunity for a recalculation of the entrance charge if actual flow is significantly different from anticipated flow. Both the applicant (developer) and the BSD can petition for a recalculation once in the first three years after the development is brought online. After three years neither party can petition for recalculation. The difference between actual flow and estimate flow must vary by more than 10% for a recalculation to be valid.

For more information on the recalculation procedure please see the BSD entrance charge program at <http://www.brunswicksewer.org/pdf/200003-EntranceChargeProgram.pdf>. Refer to section IX for more details on the procedure and criteria that must be met.

Sewer Main Extensions

On some occasions a new development will occur beyond the limits of where sewer lines currently extend. Or, a new development will have public streets that will require an extension of public sewer infrastructure to be owned and maintained by the Brunswick Sewer District. For these circumstances the BSD has developed a facilities extension policy. The full policy is available at <http://www.brunswicksewer.org/pdf/2001FacilitiesExtensionPolicy.pdf>.

Premise of Facilities Extension Policy

The policy has two basic premises. The first is to ensure that there is a consistent plan for wastewater treatment facilities within the BSD boundary. The second premise is to ensure that those who benefit from a sewer extension are the ones who pay for it. The BSD, at its sole discretion, may participate in costs of a sewer extension provided that it recoups those costs in a reasonable time, usually within ten (10) years, and there is no burden or costs on existing customers. Any sewer extension must meet the requirements of the facilities extension policy, the BSD charter, and be approved by both the BSD Board of Trustees and the Town of Brunswick. Each proposal to extend facilities is considered on a case-by-case basis.

Key Points of Facilities Extension Policy

- If the BSD chooses to participate in a facility extension, it does so at its sole discretion. There is no obligation by the BSD to participate in cost sharing.
- Costs incurred by the BSD will be recouped through an assessment on new users.
- It is the responsibility of the BSD to ensure current users are protected from additional costs resulting from extensions.
- The BSD will maintain a facilities plan that indicates what form extensions will take, in compliance with town of Brunswick planning.
- The BSD may require that facilities are larger, in addition to, or different from those that are proposed by the developer, if at its sole discretion, the Board determines it is in the best interest of the District.
- Any party that considers himself or herself aggrieved by the determination of the BSD with regards to the policy may appeal the decision to the Board of Trustees.

The process to extend sewer facilities is not straightforward. It is considered on a case-by-case basis for each development. The best advice is to contact the BSD as early in the design process as is feasible. 207-729-0148 or info@brunswicksewer.org.

Standard Specifications

Description

The work covered by this section comprises the furnishing of all pipe, connections, fittings, materials, labor, and equipment required to perform all operations in connection with the excavating, trenching, removal of unsuitable materials, and backfilling for all piping, manholes, and other such structures, as may be required.

At the current time, the BSD is not requiring the contractors to test materials. The BSD will clean and inspect sewer lines and manholes upon substantial completion. **If, at the sole discretion of BSD, work is found to be defective, the Contractor shall, at its own expense, repair the defective work.**

Work to Comply with Town of Brunswick or Maine Department of Transportation (MDOT) Requirements

All work within public rights of way of the Town of Brunswick shall comply with Town of Brunswick specifications and details. Street opening permits, obtained from the Town of Brunswick, are required for work in the road way. Town of Brunswick requirements supersede requirements laid out in this document.

All work within public rights of way of the State of Maine shall comply with MDOT specifications and details. Permits from the MDOT may be required. MDOT requirements supersede requirements laid out in this document.

Basis of Specification

The basis of these specifications and details are based on MDOT Standard Specifications. If an item or detail is not shown in this document, refer to MDOT. Other state agencies specifications and details also apply. For example, refer to Maine DEP best management practices for dealing with erosion control issues.

The Brunswick Sewer District has a full array of supporting documentation and policies on its website at Brunswicksewer.org. For full rules and regulations, entrance charge calculations, facilities extensions, repair of pipe, and billing inquiries, visit brunswicksewer.org.

Construction Methods and Materials

General Excavation

All excavations shall be made to such depth and width as will provide suitable room for building the structures they are to contain for sheeting, shoring, pumping and draining, and for removing peat, silt, clay or other materials which the Engineer may deem unsuitable for foundation. The width of the excavation shall be kept as small as practicable to carry on the work.

Trench Excavation

Trench excavation shall be made by open cut sufficient to accommodate the pipe or structure at the depths indicated on the plans. Excavations shall be made to such a point as to allow a minimum of eight inches (8") of bedding material to be placed beneath the bottom of all barrels, bells or couplings of all pipes installed. The banks of the excavation shall be properly braced and sheeted. The maximum clear width of trench at the top of the pipe shall not be more than the outside diameter of the pipe plus two (2) feet. The bottom of the trench shall be accurately graded to provide a uniform layer of bedding material for each section of pipe. Trench excavation shall include the satisfactory removal and disposal of all unusable surplus material.

Rock Excavation

Rock excavation shall be to the minimum depths previously specified for bedding material. In all excavations for sewers, ledge or boulders shall be removed from insides of trenches to a plane eight inches (8") outside the outside wall of the pipe, unless permission to do otherwise is expressly given by the BSD.

Where rock is encountered in excavation it shall be removed preferably by hammering or grinding methods and if necessary, by blasting, or as directed otherwise by the Engineer. The Contractor is to check with all existing utilities adjacent to blasting area for acceptable time period for blasting prior to each blast. Blasting operations shall be in complete compliance with all OSHA requirements. The proper signing procedures warning oncoming traffic of blasting shall be strictly enforced. All rock blasts shall be covered with suitable cover and proper precautions shall be taken to avoid damage.

Where sewers, water, steam, telephone, electrical or other utility ducts or lines, manholes or other structures have been exposed during excavation, such structures shall be adequately protected from damage before proceeding with the blasting. The Contractor at the Contractor's expense shall promptly repair any structures damaged by blasting. Selected fill material shall be furnished to replace the excavated ledge.

Water in Trenches

Excavations are to be kept free from water. Pumps, well points or other suitable methods are to be used when necessary and shifted frequently to avoid drainage from too long a distance. All water pumped or bailed from the excavation is to be conveyed to a suitable point of discharge, in a manner satisfactory to the owner, that meets all federal state and local regulations. No water from trenches shall be discharged to the public sewer without prior written consent from the Brunswick Sewer District.

Backfilling around Structures

Unsuitable material (such as excessive moisture content, large rocks and ledge) will not be acceptable for backfill. Approved backfill material shall be deposited in twelve inch (12") horizontal layers, thoroughly compacted by adequate mechanical means to the satisfaction of the BSD per each horizontal layer.

Backfilling Trenches

The Contractor shall first place and consolidate a eight-inch (8") layer of approved screened stone on all trench bottoms. After the pipe has been laid, additional screened stone shall be placed and consolidated to the top of the pipe. The trench shall then be carefully backfilled with cover sand deposited in six-inch (6") layers, thoroughly consolidated by mechanical tampers, until the pipe has at least twelve (12) inches of cover sand over the top of the pipe. The remainder of the trench shall be backfilled as follows:

The area between a line twelve (12) inches over the top of the pipe and a line twenty-four (24) inches below the top of the trench or bottom of pavement shall be carefully backfilled in not over twelve (12) inch layers using suitable material taken from the excavation or fill hauled in for the purpose.

All trench backfill above the top of the pipe shall be consolidated by a vibratory compaction system. Contractor is responsibility for settlement of trenches, and any settlement which may occur, shall be repaired by the Contractor at its own expense. Regardless of the method of compaction, the backfill from the top of the pipe must be consolidated to a minimum density of 95 percent of the maximum density determined by ASTM Method D1557 (Modified Proctor). The remaining twenty-four (24) inches to the top of the trench shall be filled with 21" of MDOT D gravel and 3" of MDOT A gravel, unless otherwise specified by the Town of Brunswick or Maine Department of Transportation. The gravel shall be placed, graded and tamped in 6-inch layers to the finished surface.

Material below Trench Grade

The Contractor shall furnish and place selected fill material or screened stone below trench grade, as directed and to such depths as determined by the Engineer. These materials shall be used only when, in the opinion of the Engineer/District, the existing material below trench grade is unsuitable for properly placing bedding material and laying pipe.

Selected Material

Any selected material required for filling above trench grade, in addition to surplus earth from trench excavation, shall be placed by the Contractor. Selected material shall be clean granular material free from loam, sod, roots, or other organic material and from stones larger than 6-inches in diameter and shall conform to the following table:

Sieve Designation	Percentage by Weight Passing Square Mesh
6"	100%
No. 40	0-70%
No. 200	0-10%

Screened Stone

All screened stone shall be clean granular material free from loam, sod, roots, or other organic material and shall conform to the following table:

Sieve Designation	Percentage by Weight Passing Square Mesh
1"	100%
$\frac{3}{4}$ "	90-100%
$\frac{1}{2}$ "	20-55%
No. 4	0-5%

Cover Sand

The fine granular material required for cover above the screened rock to a point twelve (12) inches over the top of the sewer pipe shall contain no stones over $\frac{3}{4}$ - inch diameter and shall be of such gradation to be free draining and readily compactable. There shall be no more than 7% passing the No. 200 sieve.

Define other referenced soils?

Clean Up

All surplus material shall be removed and disposed of as specified after refilling of trenches. The removal of surplus material, cleaning up of trench surfaces along streets and premises shall closely follow the pipe laying. If cleaning operations are not carried out, the BSD may suspend

pipe laying until the cleanup is satisfactory. Where hardened surfaces or roadways, driveways, or walls are dug up or interfered with, special attention is to be given to the refill and the consolidation before its resurfacing.

The Contractor shall continually provide street sweeping on roadways used by its vehicles to reduce dust, siltation and nuisance problems.

Gravity Sewers

General

Sewers shall be furnished and installed at locations shown on plan, and to the line and grade indicated on plan (if applicable). All piping shall be complete, including fittings, connections to existing structures, and other miscellaneous items of work.

Pipe

All PVC pipe of the sizes shown on plans shall be manufactured by Johns-Manville or CertainTeed Products Corp. or approved equal and shall meet extra strength minimum of SDR-35 of the requirements of ASTM Specifications D- 3034-73.

Service Fittings

Contractor shall furnish and install wyes and wyes shall be made of the same material as the main line pipe. Tee type connections are not allowed.

Pipe Installation

Excavations shall be made to a point at least eight (8) inches below the pipe to accommodate the bedding material as previously specified.

All excavations are to be kept dry while pipe is being laid and until each joint and pipe has been observed by the Engineer, and approval given to commence backfilling operations. Pipe shall be laid in strict accordance with the pipe manufacturer's published recommendations. Any pipe which is not laid to grade and alignment shall be re-laid to the satisfaction of the BSD.

All Gravity sewers and storm sewers shall be laid with laser beam unless other means are approved by the BSD.

Manholes

General

The Contractor shall furnish, construct and install all manholes, complete, including the excavation, precast reinforced concrete base, barrel sections, cone section at the top of the structure, cast in place concrete slabs for drop manholes, required number of manhole steps per depth, frame and cover, backfill and all accessories to complete the manholes as specified on the Drawings (as applicable)

Materials

Brick – shall be Grade H (hard) brick conforming to the Federal Specifications for Building Brick (common) Designations SS-B-656 and amendments thereto, new and of first quality, solid, sound, hard burned through out of uniform color, and equal in quality to samples which shall have been approved by the Engineer.

Precast Concrete Structure – The precast concrete sections shall conform to ASTM C478, Standard Specifications for "Precast Reinforced Concrete Manhole Sections."

Manhole Steps – Manhole steps shall be aluminum and shall conform to ASTM B221, Alloy 6061-T6 or steel reinforced polypropylene.

Precast Concrete Grade Rings – Grade Rings shall be precast reinforced concrete with a minimum 4,000 psi after 28 days.

Frame and Cover – Manhole covers and frames shall be General Foundries heavy duty (124xx) or equal.

Mortar – Mortar, except as otherwise specified, shall consist of one-part Portland Cement Type II, and one-part Mortar Cement and four parts Mortar Sand. Sand shall be approved by the BSD.

Installation: Manhole Concrete Barrel Sections & Bases

Manholes of precast reinforced concrete sections and bases shall be furnished with steps 12" o.c.; with a minimum 5-inch wall thickness for all barrel sections; and with a wall thickness varying from minimum 5-inches at the bottom to 8-inches at the top of all cone sections.

All joints shall be sealed with a double strip of self-sealing butyl rubber based flexible joint sealant in rope form. Exterior surface of all concrete manholes shall be painted with two coats of Bituplastic No. 28 or an approved equal. All exterior surfaces of manholes will be water proofed with approved asphalted coating.

The top uppermost reinforced concrete section shall be set at a grade that will allow minimum of two (2) courses and a maximum of five (5) courses of brick and mortar before setting the cast iron frame and cover.

Tables and Inverts

Tables and inverts shall be as shown on plans and shall be constructed of brick or epoxy coated concrete. Inverts shall have the exact shape of the sewers which are connected, and any change in size or direction shall be gradual and even.

Watertight Work Required

The entire work of constructing manholes must be carried on in a manner to insure watertight work. Any leak in manholes shall be caulked and completely repaired from the exterior of the manhole or the entire work shall be removed and rebuilt. All pipe openings shall have an approved neoprene boot meeting ASTM C-443 to insure a watertight seal between the pipe and manhole.

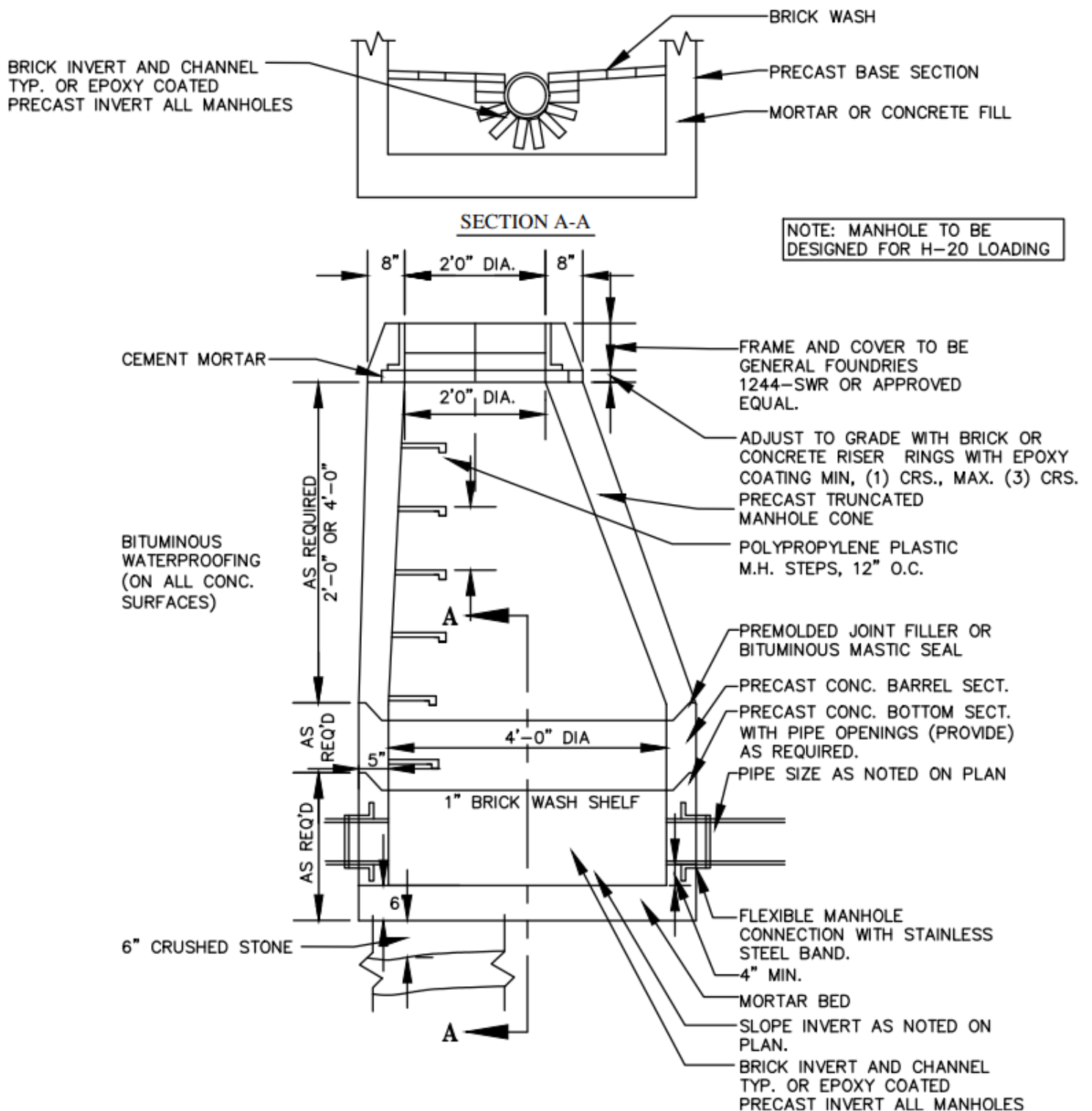
Record Drawings Required

For all construction work on main line sewers, contractors are required to provide electronic format (pdf) record drawings. Drawings shall be clearly stamped and labelled "RECORD DRAWINGS" with the date of submittal and preparer's name clearly labelled.

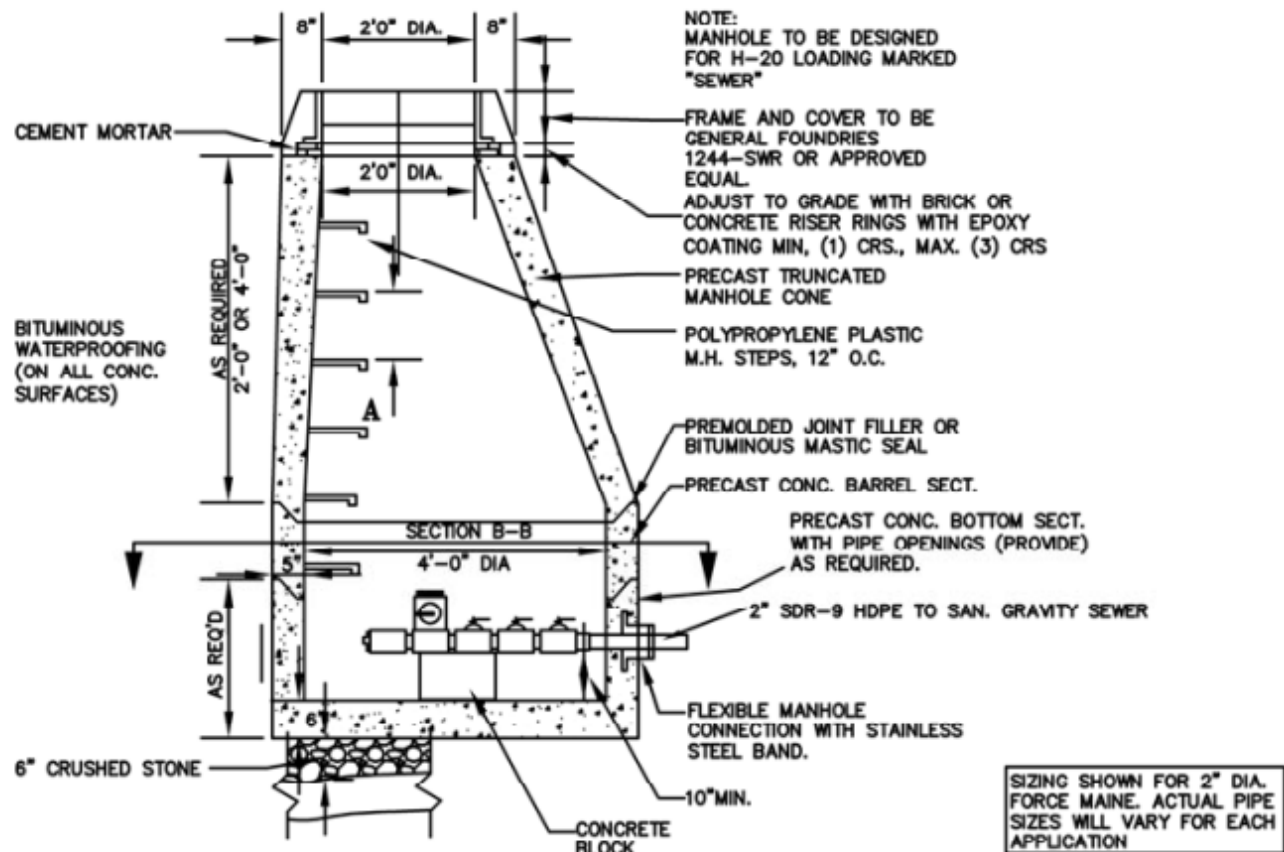
For all work on sewer services or laterals that extend beyond the sewer right of way and is perpendicular to the main line sewer, the BSD will take ties to pipes and generate tie cards. This work will be completed by the BSD as inspections occur.

Standard Details

SD-1: Sewer Manhole (NTS)

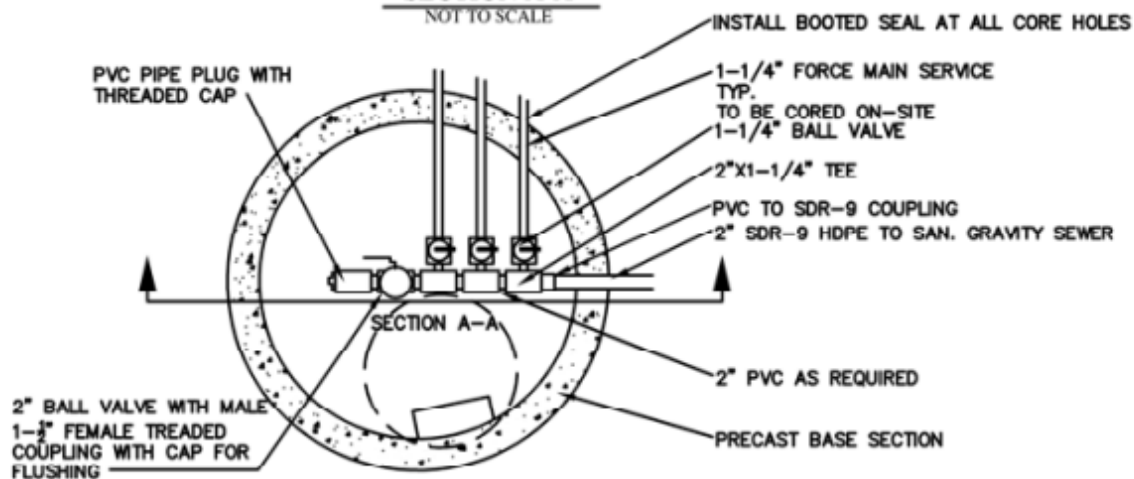


SD-2: Force Main Manhole with Cleanout (NTS)



SECTION A-A

NOT TO SCALE



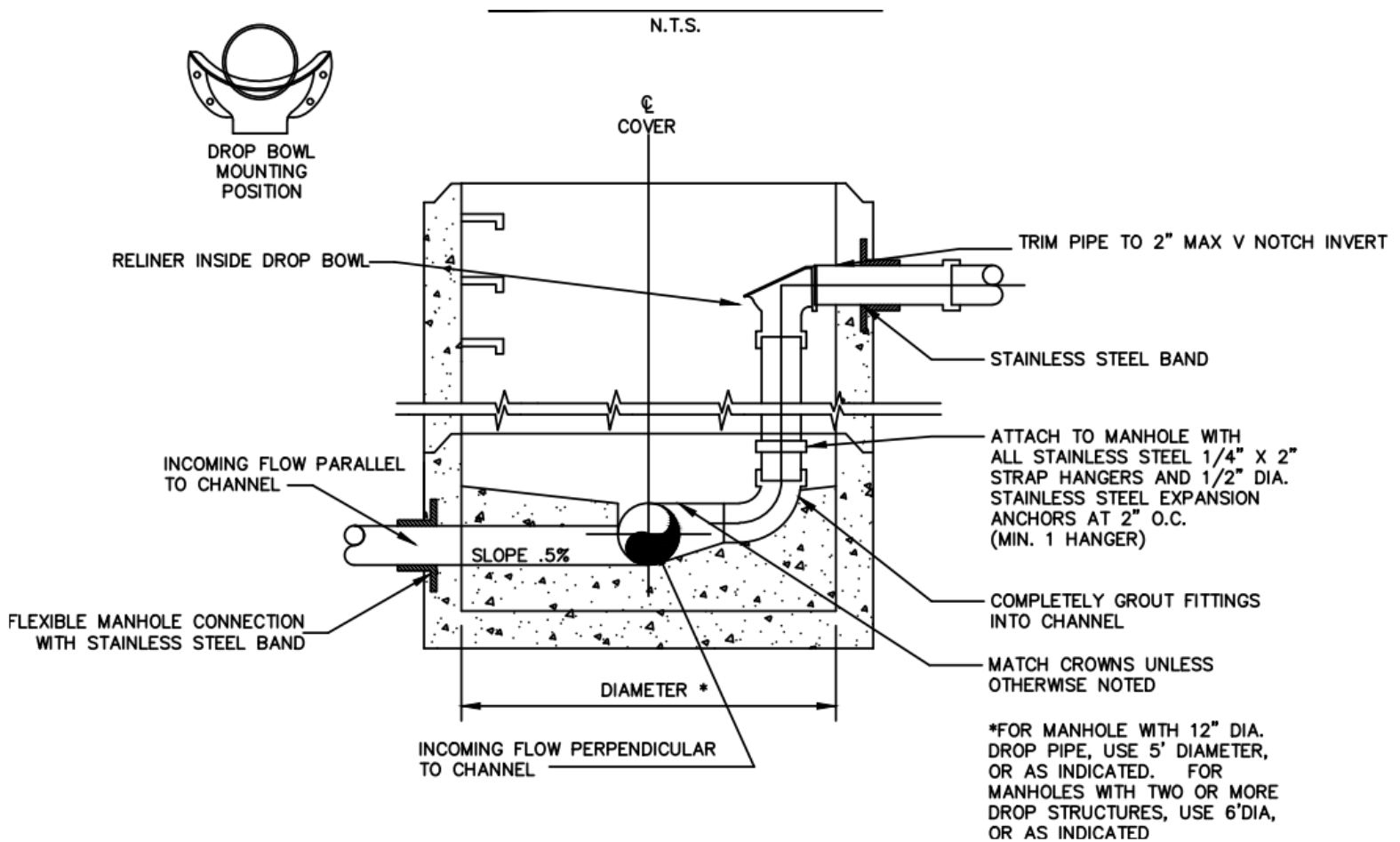
SECTION B-B

NOT TO SCALE

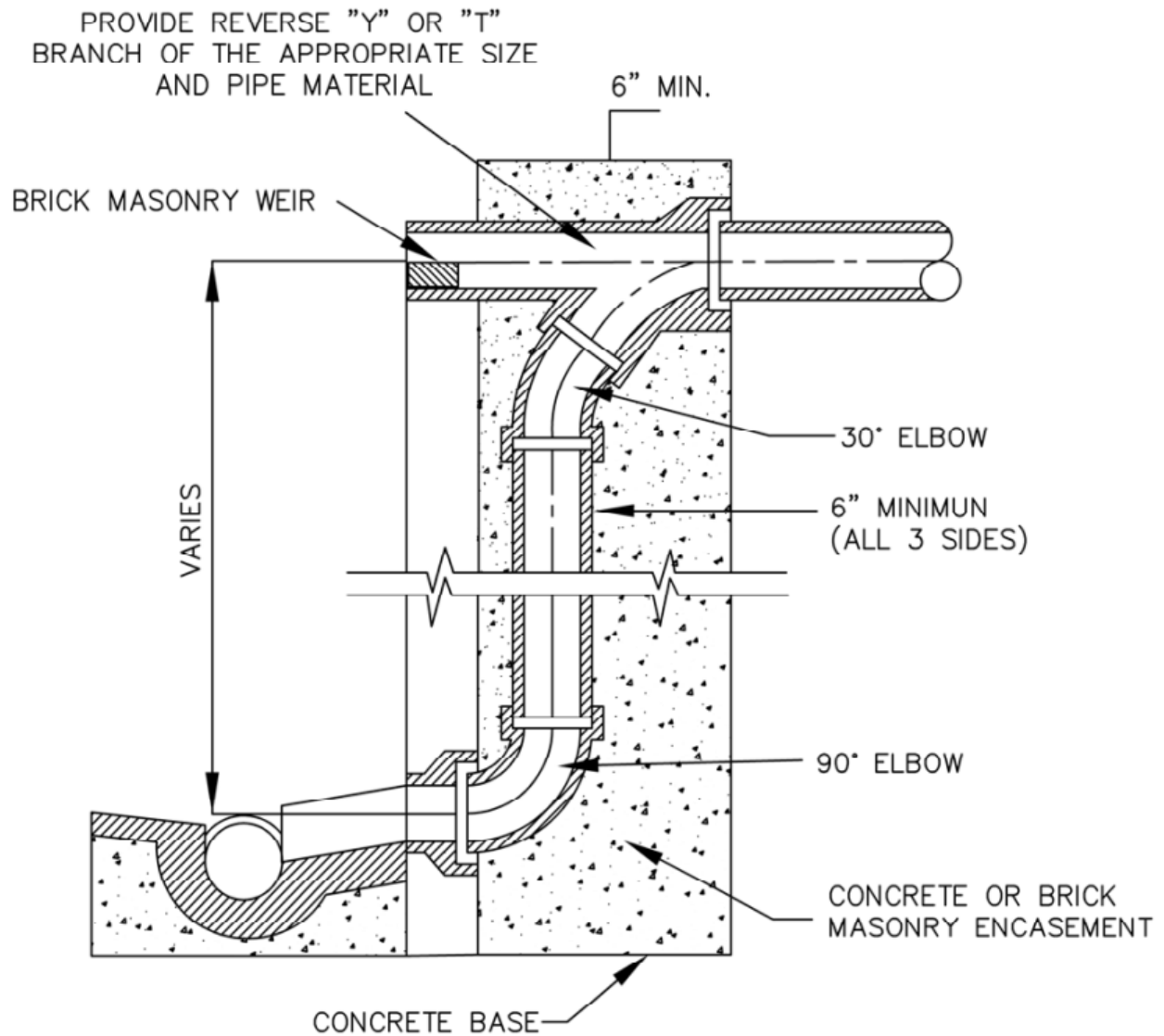
NOTES:

1. 4'-0" I.D. TYPICAL. SOME STRUCTURES MAY REQUIRE LARGER I.D. PROVIDE SHOP DRAWINGS.
2. DRAINAGE STRUCTURES TO BE DESIGNED FOR H-20 LOADING.
3. PIPE SIZES AND INVERTS AS NOTED ON PLANS.
4. ALL PVC PIPE TO BE SCH 40 UNLESS OTHERWISE NOTED.

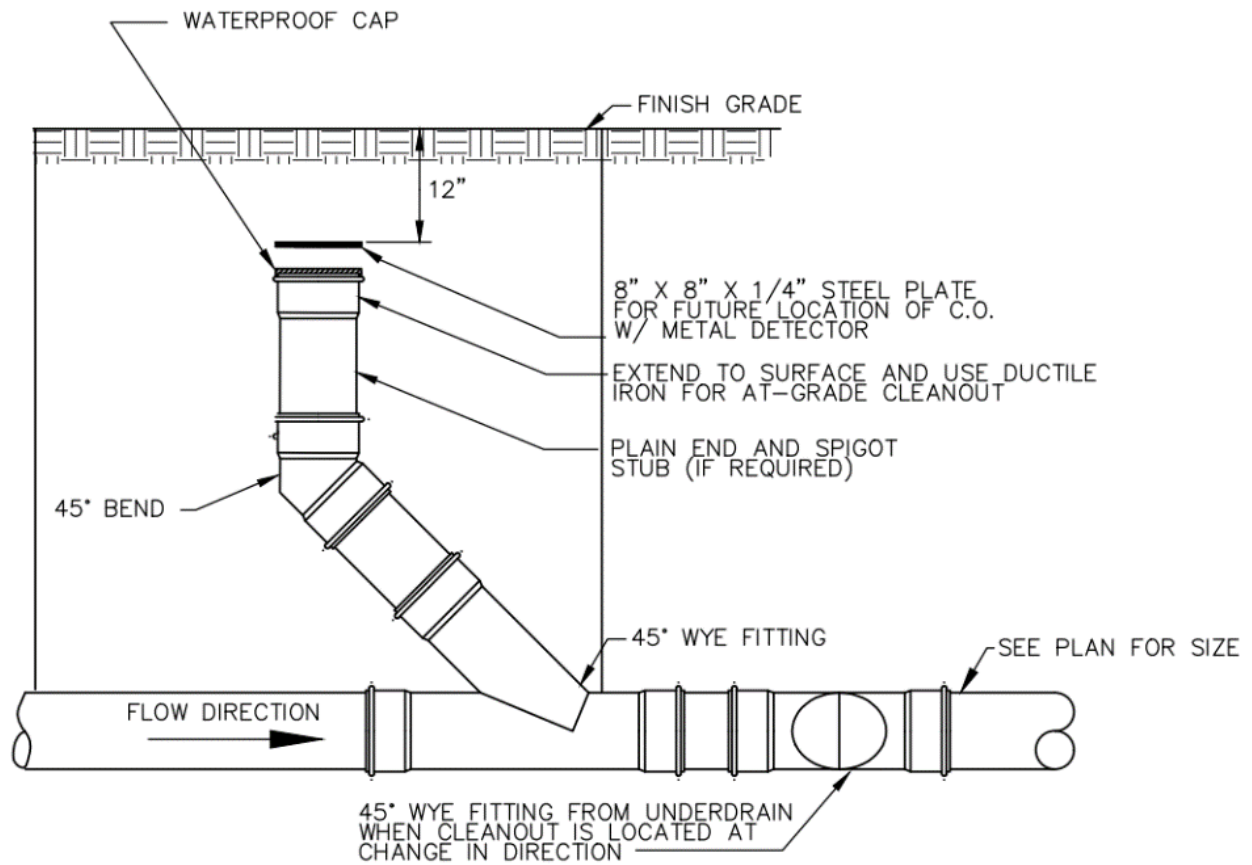
SD-3: Inside Drop Manhole with PVC Pipe (NTS)



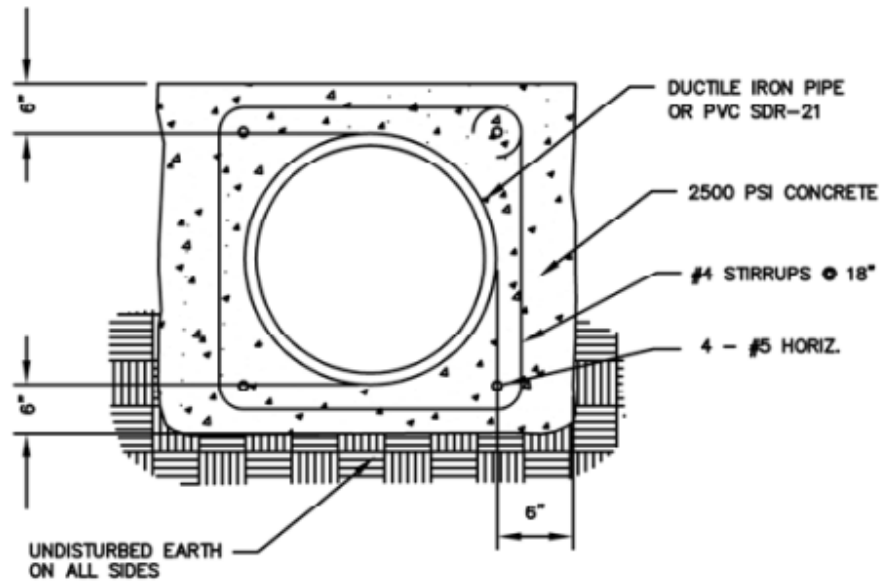
SD-4: Typical Exterior Drop Inlet (NTS)



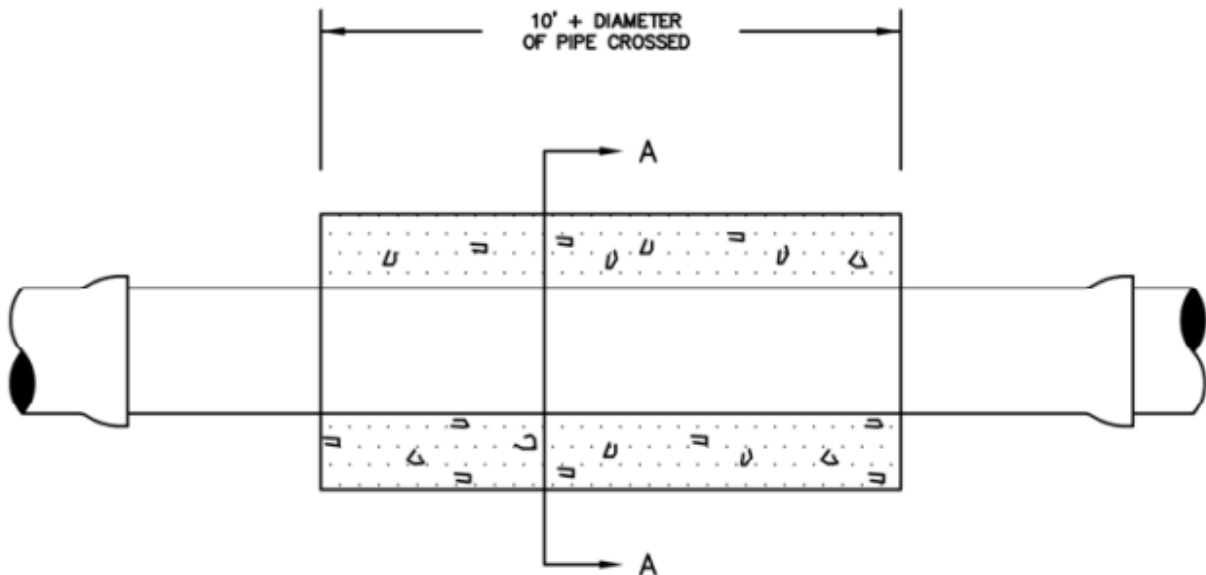
SD-5: Sewer Clean Out (NTS)



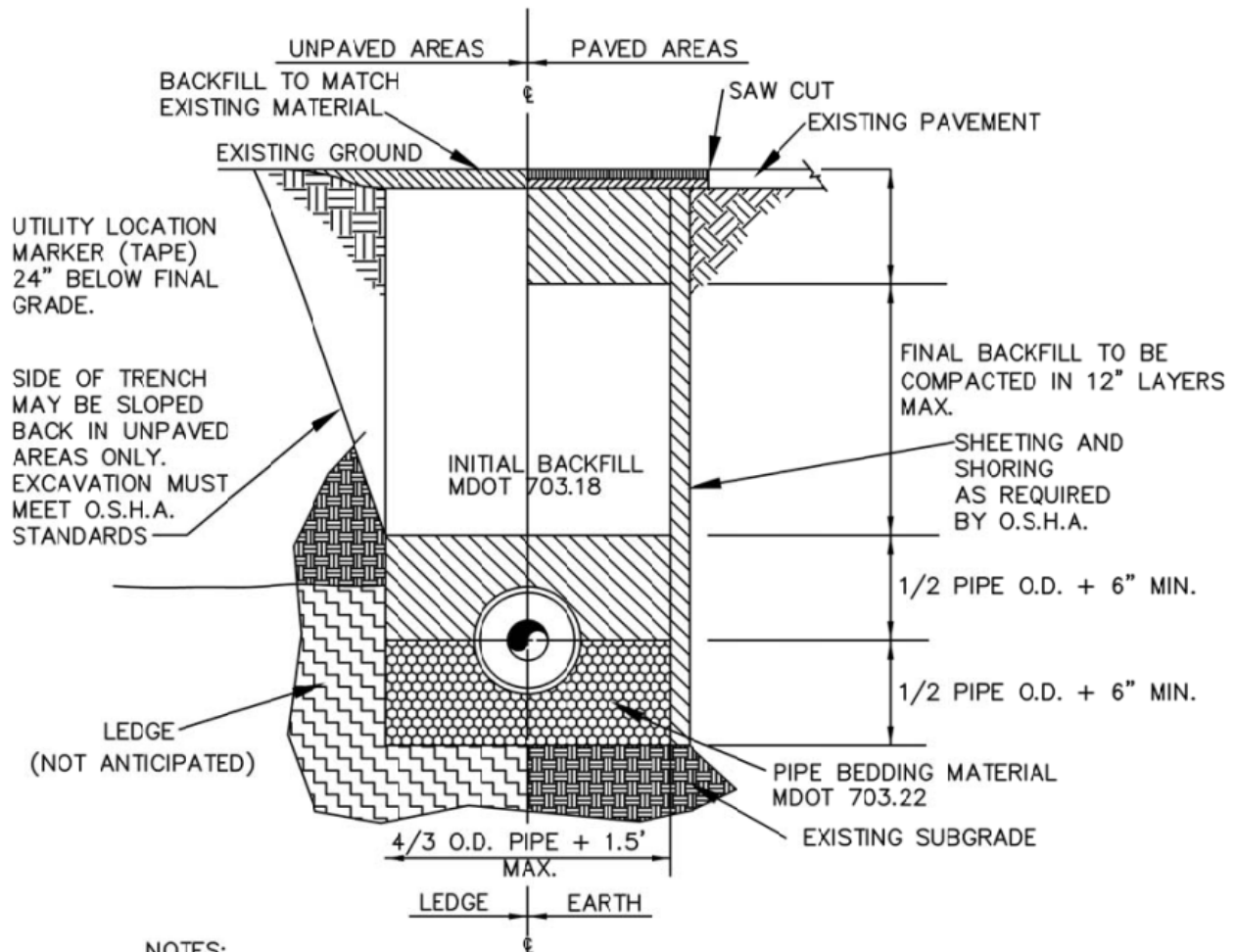
SD-6: Concrete Encased Pipe (NTS)



SECTION A-A



SD-7: Typical Trench Detail (NTS)



NOTES:

1. INSTALL 3 FOOT LONG IMPERVIOUS DAMS IN BEDDING/INITIAL BACKFILL MATERIAL EVERY 100 FEET TO PREVENT TRENCH GROUNDWATER FROM BEING CHanneled ALONG BEDDING/INITIAL BACKFILL
2. REFER TO LATEST MDOT SPECIFICATIONS FOR BEDDING AND BACKFILL REQUIREMENTS.
3. INITIAL BACKFILL TO BE 12 INCHES OVER TOP OF PVC PIPE ONLY.