City of Shorewood

MANUAL OF CONSTRUCTION STANDARDS

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FORWARD

This manual outlines certain materials and standards that should be incorporated into the preparation of plans and specifications and implemented into construction for city infrastructure, including sanitary sewer, storm sewer, watermain, streets, and landscaping. The requirements contained in this document are minimum general requirements for construction within the City of Shorewood. The City Engineer or city staff may require additional information and increase the minimum requirements on any project. Projects and submittals may require approval from the Planning Commission and City Council. Conditions of these approvals may exceed the requirements outlined in this manual.

Additional permits and/or requirements of other government agencies may exceed requirements contained in this manual.

This manual is NOT a specification and is intended to provide technical design and construction requirements. Developers and their Engineers in charge of design and construction activity within the city are expected to prepare a complete and competent set of plans & specifications for their work.

This manual is intended as a reference source of information, standards and data. Particular sections or information in this manual may be incorporated into project specifications by reference as deemed appropriate by the city, provided this manual is made available to those to whom the reference is intended. Developers and their Engineers must comply with the requirements outlined in this manual.

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City of Shorewood Design Standards & Guidelines

SECTION 1 - DEFINITION OF TERMS

The following terms and definitions are not currently found in city code.

Benchmark: A permanent or semi-permanent physical mark of know elevation. The elevation shall be tied to the U.S.G.S. Sea Level Datum.

Builder: The person applying for and receiving a building permit to perform the work requested in said permit.

City Council: Governing body of the City of Shorewood.

City Engineer: The duly appointed City Engineer of the City of Shorewood or his/her designated representatives.

Construction Activity: Activities including clearing, grading, and excavating, that result in land disturbance. This includes a disturbance to the land that results in a change in the topography, existing soil cover, both vegetative and nonvegetative, or the existing soil topography that may result in accelerated stormwater runoff that may lead to soil erosion and movement of sediment. Construction activity does not include routine maintenance performed to maintain the original line and grade, hydraulic capacity, and original purpose of the facility.

Contractor: A person under contract with the City or Developer to install municipal or public improvements.

Developer: A person or firm that develops land through construction of public and/or private improvements. The developer may be the owner and/or developer.

Double Frontage: A lot with two public streets forming boundary (not a corner lot).

Escrow: The deposition of funds in an account maintained by the City specifically for the purpose of ensuring fulfillment of certain obligations assumed by the section.

Grade: The average elevation of the finished ground.

Grade:
(Percentage of) The rise or fall of a street in feet and tenths of a foot for each one hundred (100) feet of horizontal distance measured at the centerline of the street.

Final/ Finish Grade: Required as built record drawing of each development or lot determined by approved Final Grade Plan. Must be submitted to the city for approval and prior to final acceptance of a project.

LSWMP: Local Surface Water Management Plan. This is also referred to as a Surface Water Management Plan, or a SWMP.

MS4 Permit: MPCA general permit authorizing the discharge of stormwater associated with small municipal separate storm sewer systems (MS4) under the NPDES/SDS permit program.

NPDES Construction Stormwater Permit: MPCA general permit authorizing the discharge of stormwater associated with construction activity under the NPDES/SDS program.

Plans: The approved drawings which include plan views, profiles, cross sections, working drawings, details, and supplemental drawings, or exact reproductions thereof, which show the location, character, dimensions, extent, limits and all else necessary to complete the work covered by the project.

Plat:
(Approved) A final plat that has been accepted by the City Council and is recorded at the Hennepin County Court House.

Record Plans:
(As Built) The corrected or adjusted construction plans that accurately show the finished final distances, elevations, dimensions, details and all other changes to reflect the actually completed work as constructed.

Right of Way Width:
The distance between property lines measured at right angles or radially to the centerline of the street.

Sight Triangle: Required area "sight triangle" to visually see vehicles, pedestrian, non-motorized transit before conducting turning movements, whether signed or non-signed intersections. The sight triangle shall be as defined by City Code as beginning at the intersection of the projected property lines of two intersecting streets, thence 30 feet along one property line, thence diagonally to a point 30 feet from the point of beginning. No structures or plantings in excess of 30 inches above the street center line grade shall be permitted in the sight triangle.

Specifications: The body of written directives, provisions, and requirements made pertaining to the methods or manner of performing the work, the quantities, and the quality of materials to be furnished under the contract; and outlining the obligations and responsibilities of the parties to the contract; and setting forth the method of payment and the duration of the work.

Standard Details: Detailed drawings or plates approved by the City.

Transportation Plans/Studies: Previous studies approved by City Council determining local and regional corridor connections in part by City staff, City Engineer, County staff, County Engineer, and MnDOT Engineers determining corridor, traffic volumes, design and access spacing or improvements.

Trees:

See the current version of City of Shorewood Tree Preservation and Replacement Policy

SECTION 2 – SPECIFICATION REFERENCE

1. General Conditions.

The "Standard General Conditions of the Construction Contract" (latest version), and Supplementary Conditions shall govern the work of all persons engaged in the performance of work in the City of Shorewood.

The General Conditions are prepared by the Engineers Joint Contract Documents Committee, issued and published jointly by the American Council of Engineering Companies, the American Society of Civil Engineers, and the National Society of Professional Engineers.

2. Watermain, Sanitary Sewer, and Storm Sewer Construction.

A. Watermain, sanitary sewer and storm sewer construction shall conform to the current edition of the applicable provisions of the "Standard Utilities Specification for Trench Excavation and Backfill/Surface Restoration Watermain and Service Line Installation and Sanitary Sewer and Storm Sewer Installation" as published by the City Engineers Association of Minnesota, (CEAM).

B. Copies of the Standard Utilities Specification are available to download free of charge from: www.ceam.org .

C. The standards and guidelines in this manual shall serve to supplement or modify the referenced specification. Portions of referenced specifications not specifically affected by the supplemented information of modification shall remain in effect as originally written.

3. Grading, Street, and Surface Improvements.

A. All of Divisions II and III, and any specifically referenced Division I sections of the Minnesota Department of Transportation (Mn/DOT), "Standard Specifications for Construction", current edition, together with all the Supplemental Specifications and Mn/DOT Technical Memoranda in force thirty (30) calendar days prior to bid date and referencing the use of English units of measure, shall apply to all construction performed in the City of Shorewood except as modified in this document. Unless noted, the requirements in this document are in addition to the Mn/DOT Specification section being referenced.

Mn/DOT Division	Applicable
I	Only when specifically referenced
II	Always

III	Always

B. References to the standard specifications shall serve to supplement or modify the referenced specification. Portions of referenced specifications not specifically affected by the supplemented information or modification shall remain in effect as originally written.

5. Construction Requirements.

The Contractor shall always maintain the following documents on site during construction:

A. The applicable edition of Mn/DOT Standard Specification for Construction.

B. Any Supplemental Specifications to the applicable edition of Mn/DOT Standard Specification for Construction.

C. Any Technical Memoranda specifically referenced or linked to the execution of the Contract Documents.

D. Mn/DOT Standard Plates specifically referenced or linked to the execution of the Contract Documents.

E. The applicable edition of the Minnesota Manual of Uniform Traffic Control Devices (MN MUTCD)

F. City Engineers Association of Minnesota (CEAM) Standard Specifications

G. Current Plans

H. Current Specifications

SECTION 3 – GENERAL ENGINEERING REQUIREMENTS

1. General

A. Any changes or modifications to the approved plans or approved specifications shall be submitted to the city, via digital format, to be approved by the City Engineer before they are implemented.

B. The city or its Engineer will provide onsite inspections of the new development/reconstruction work as directed. The cost of all inspections and related items will be charged back to the Developer per the Developer's Agreement. The city must be notified a minimum of 48 hours in advance of all tests or inspections required. Failure to notify or to provide adequate notice will require the tests to be repeated or infrastructure to be removed and reinstalled.

C. All work within city right of way shall be approved by the City through its right of way permitting application, ROWAY. City shall be contacted a minimum of 48 hours prior to any work occurring within City right-of-way, work occurring on City owned or publicly owned property, or work related to connecting to City utilities. Information pertaining to fees, permit costs, and security are found in the City's Master Fee Schedule.

D. All road closures or disturbances must be approved by the City through its right of way permitting application, ROWAY, as well as any other applicable jurisdictional agencies. All traffic control measures must conform to the latest edition of the MN Manual of Uniform Traffic Control Devices (MMUTCD). Notification of all closures must be made to the city and local emergency services departments 14 days prior to any work. Information pertaining to fees, permit costs, and security are found in the City's Master Fee Schedule.

E. Existing County and State roadways shall per permitted by the respective agencies, as needed for the project. The city will review the need for open cutting of local roads on a case-by-case basis. Utilities, which are to be augured or directionally drilled, shall be specified on the plan.

F. All contractors installing utilities or working within existing city right of way must register with the city through ROWAY, pay the registration fee, submit the applicable permit through ROWAY, and pay the permit fee prior to starting construction.

SECTION 4 – GRADING

1. Topsoil – Sodding and Seeding
2. Landscaping

1. Topsoil – Sodding and Seeding.

A. Grading and construction plans shall include a narrative including BMP's for salvaging, managing, and reuse of the sites topsoil. This includes topsoil sampling and testing, amending as necessary, and soil bed preparation.

B. All pervious areas outside of building pad and structural improvement areas shall be scarified after site grading and before topsoil placement. The ripping/tilling shall comply with all provisions MnDOT 2547.3. After soil ripping, heavy equipment use on de-compacted soil shall be minimized.

C. Topsoil moved during construction shall be redistributed in turf establishment areas to a minimum depth of six (6) inches with wide-tracked vehicles to minimize compaction to the maximum extent practical. Disturbed boulevard areas shall be seeded and mulched or sodded as required by the City.

D. On City lead projects, all imported topsoil shall meet MnDOT Specification 3877.2G – Organic Topsoil Borrow, also commonly referred to as 50/50.

2. Landscaping

A. See the Shorewood's Tree Preservation and Replacement Policy for listing of approved species.

SECTION 5 – EROSION AND SEDIMENT CONTROL

1. Performance Standards
2. Maintenance of Erosion and Sediment Control Measures

1. Performance Standards.

In general, this Section does not require the use of any particular method to control erosion and sedimentation. The City and other jurisdictions including, but not limited to: Minnehaha Creek Watershed, Riley Purgatory Bluff Creek Watershed, and Minnesota Pollution Control Agency, shall evaluate and monitor the proposed measures to determine if they follow current "Best Management Practices" and engineering standards, as well as meet all requirements of the agency permits.

A. General Requirements

a. The smallest practical area of land shall be exposed at any given time during construction and shall be exposed for the shortest period of time practical.

b. All development shall consider the natural limitations of the topography and soil as to create the best potential for preventing soil erosion. Areas of deep cuts and high fills should be avoided when possible, and natural contours should be followed as closely as possible.

c. Erosion and sediment control measures shall be coordinated during the different stages of development. All downstream perimeter measures shall be installed prior to commencement of any earth moving activities. A note shall be included in the plans indicating that these measures shall be installed by the contractor and inspected by the City prior to the commencement of any site work.

d. Natural vegetation and plant covering shall be retained whenever practical. Areas immediately adjacent to natural watercourses and wetlands shall follow all jurisdictional permitting requirements. Temporary vegetation, mulching, blanketing or other cover shall be used to protect critical areas and permanent vegetation shall be installed as soon as practical.

e. At the discretion of the City or other permitting agencies, additional erosion and sediment control measures may be required when working within watersheds of impaired waters or waters with identified total maximum daily loads (TMDLs).

B. Erosion and Sediment Control Standards

a. The natural drainage system shall be used to the extent practical for storage, volume reduction and conveyance of runoff (although pretreatment may be necessary).

b. A combination of sediment basins, silt traps, buffers and/or temporary ponding areas shall be used to control erosion and prevent sediment from leaving the construction site.

c. Inlet protection is required at all inlets on the site, as well as at inlets on adjacent streets that may receive sediment-laden runoff, to prevent sediment from entering the storm sewer system and downstream water bodies.

d. Erosion and sediment controls may include, but are not limited to: silt fencing, rock construction entrances, straw mulch, vegetation, sediment basins, check dams, temporary and permanent blankets, hydromulching, regular street sweeping, etc. Disturbed areas that have not been worked on for a 7-day period must be stabilized with approved methods.

e. All slopes to be graded at or steeper than 3:1 shall have temporary erosion control blanket or other approved erosion control installed immediately after completion of grading.

f. All soil stockpiles shall have perimeter protection and temporary seeding.

g. Energy dissipation must be installed at pipe outlets within 24 hours of connection.

h. Pond Emergency Overflows (EOFs) shall be permanently reinforced.

i. Perimeter protection shall be installed along constant contours. Where not possible, perimeter protect is to be broken and hooked upslope to slow water and provide localized ponding.

j. No continuous slope of 4:1 or greater shall be left unbroken for more than 75’. A check shall be used to break slope until vegetation is established (silt fence, biorolls, etc.).

k. Proposed conveyance swales shall have temporary erosion control blanket and/or ditch checks at a minimum of every lot line, depending on potential channel velocities. Additional checks may be required for areas with excessive velocity potential.

l. When necessary, a channel and berm shall be constructed at the foot of exposed slopes to control runoff. The channeled water shall be diverted to a sediment control device.

m. Stormwater shall be directed offsite so as not to cause downstream erosion or nuisance conditions. Additional downstream measures may be required at the discretion of the City Engineer.

n. Dewatering operations shall discharge into a sediment control device for sediment removal and energy dissipation prior to ultimate discharge. Excessive sediment-laden water will not be permitted to leave the site.

o. The site and all erosion and sediment control devices must be inspected weekly (or within 24 hours of a rainfall event of 0.5" or more) during active construction. Inspection logs shall be kept onsite and may be requested by the City for verification.

p. A site actively under construction shall have adjacent streets and haul roads swept daily or more frequently, as determined by City staff. Excessive sediment tracking is an indication that other erosion control measures or BMP's have failed on site. Sediment tracking often becomes a nuisance and safety concern for the traveling public and shall be actively managed.

C. Dust Control Measures

a. Temporary mulching or seeding shall be applied to open soil to minimize dust.

b. Barriers such as snow fences, commercial wind fences and similar materials shall be used to control air currents and blowing soil if the City determines it is necessary.

c. Exposed soil shall be watered, as necessary, to control dust as directed by the City.

2. Maintenance of Erosion and Sediment Control Measures.

A. To guarantee continuous maintenance of erosion control systems, the developer shall provide escrow funds or a letter of credit in an amount determined by the City through the Development Agreement.

B. The cleanup and restoration needed on adjoining properties, City streets, storm sewers, etc., due to sediment leaving the development, shall be the responsibility of the developer. Sediment tracked offsite by vehicles shall be swept, or otherwise removed daily.

C. The developer shall be responsible for maintaining all erosion and sediment control devices in a condition that will ensure that they will function properly, including: removal of sediment when accumulation reaches 1/3 of silt fence height, or ½ of ditch check, inlet protection or sediment basin design capacity.

D. The site and all erosion and sediment control devices will be inspected weekly (or within 24 hours of a rainfall event of 0.5" or more) during active construction by city staff or its designated representative. Any device deemed inadequate, or any instance of sediment leaving the site, must be corrected by the end of the next business day. Inspection logs will be emailed to the developer and shall be retained until the project is accepted and all sediment and erosion control permits have been closed out. If required maintenance measures are not employed promptly an issuance of a Stop Work Order will occur. If not managed or taken care of, fees for services completed by City Staff are applicable but not limited to the City's Master Fee Schedule.

E. All temporary erosion and sediment control devices shall be removed within 30 days of final stabilization. Verification of MPCA NPDES permit Transfer and/or Notice of Termination (N.O.T.) shall be submitted to the City.

SECTION 6 – STORMWATER MANAGEMENT

1. General
2. Materials
3. Construction Requirements

1. General

Engineers and developers shall follow the most stringent storm water management requirements permitted for the project. Potential requirements include City of Shorewood, Minnehaha Creek Watershed, Riley Purgatory Bluff Creek Watershed, and Minnesota Pollution Control Agency-NPDES.

Shorewood requirements are listed under Section 5 of the city's Surface Water Management Plan (SWMP). The minimum threshold for requiring the preparation of a SWMP is the net increase of 1,000 SQ FT of impervious surface in areas that do not already have designed and permitted storm water management infrastructure. If the project requires a stormwater management permit from a watershed and/or the MPCA, the project will not be required to acquire approval from the city for its SWMP requirements.

2. Materials

1. Storm Sewer Pipe
    a. Storm sewers shall be reinforced concrete pipe conforming to ASTM C-76 Wall B standards for round pipe or ASTM C-507 for elliptical pipe. Alternate materials will be considered in green areas if requested by the developer or engineer.

    b. Storm sewer pipe joints shall be "O" ring joints conforming to ASTM C-361.

2. Draintile Pipe
    a. Perforated PVC drain pipe, SDR35 (ASTM D3034). Place cleanouts at pipe ends and at 200 foot spacing. Tracer wire complying with Section 7.2.K must be installed with draintile pipe for locating purposes.
    b. Perforated PVC drain pipe, A-2000 (ASTM D2412). Place cleanouts at pipe ends and at 200 foot spacing. Tracer wire complying with Section 7.2.K must be installed with draintile pipe for locating purposes.

3. Manholes, catch basins and inlets
    a. Pre-cast reinforced concrete conforming to ASTM C-478. Voids between the storm sewer pipe and manhole, catch basins, or inlet sections shall be filled with non-shrink grout.

    b. Steps shall be Neenah R-1981-J, or approved equal, sixteen (16) inches on center.

4. Outlet Control Structures
    a. shall have a hot-dipped galvanized grate in two sections.

5. Adjusting Rings

a. HDPE adjusting rings as manufactured by Ladtech, Inc or approved equal. HDPE adjusting ring sealant shall be butyl caulk as manufactured by Ladtech, Inc. or approved equal.

6. Chimney Seals
    a. Manufactured by Infi-Shield Sealing Systems, or approved equal. The seal shall be made of ethylene propylene diene monomer (EDPM) rubber with a minimum thickness of 50 mils. The seal shall meet the requirements of ASTM C-433, F-411, and C-923. Each band shall have a 2-inch mastic strip on the top and bottom edge. The mastic shall be non- hardening butyl rubber sealant and shall seal to the cone/top slab of the manhole and over the lip of the casting. An inspection tab shall be secured to the top of the casting frame.

7. Sump Pump Connection Boxes
    a. 12" X 12" x 12" as manufactured by NDS or approved equal.

8. Castings
    a. Inlet and catch basin frame and grates in curbed areas shall be Neenah R-3067-V, or approved equal.

    b. Inlet and catch basin frame and grates in non-paved areas shall be Neenah R-4342, or approved equal.

    c. Manhole frame and closed grates shall be Neenah R-1642-B, or approved equal, embossed with the words "Storm Sewer".

3. Construction Requirements

1. Closed Circuit Television – Storm sewers shall be cleaned and televised as required by the City. All runs of sewer between manholes shall be straight and true. Test results, logs, reports and videotapes shall become the property of the City.

2. The contractor shall stamp the concrete curb with the letter "SS" at the location where the storm sewer draintile crosses under the curb for the Sump Pump Connection Boxes.

SECTION 7 – WATER SUPPLY

1. General
2. Materials
3. Construction Requirements

1. General

A. Watermains shall be extended to the development property lines as required by the City and all necessary fire hydrants (as required in the Uniform Fire Code) shall be provided. Extensions of the public water supply systems shall be designed to provide public water service to each lot with the minimum distance necessary. Watermains shall be routed to provide a loop of the City water system, promoting water quality and fire safety.

B. Static pressures from the City's water model may be provided. Designers shall field verify static and residual pressures near the project site and flow test nearby hydrants. City public works staff must be notified of the testing and must be present during the test.

C. Any building that has a fire suppression system installed in it will be required to have a 6" or greater water supply line and separate supply lines for domestic and fire service.

D. The need for a fire suppression system must be verified with the local building official or Fire Marshall/Chief.

E. Fire department connection lock box locations to be verified with the Fire Chief. Lock boxes must be purchased from the City of Shorewood.

F. Fire hydrants shall be located at high points in the line, on dead ends, and a minimum of 400 feet or as directed by the Fire Marshall/Chief.

2. Materials

A. Open Cut Watermain Materials

a. Mainline Pipe:
   i. Polyvinyl Chloride (PVC) pressure pipe conforming to the current requirements of AWWA C900 (DR 18) for pipe diameters 4.0-inch through 12.0-inch or AWWA C900 (DR 25) for pipe diameters 14.0-inch through 24.0-inch.
   ii. The pipe will be manufactured in cast iron outside diameters and will have an integral bell and spigot with an elastomeric gasket conforming to ASTM D3139.
   iii. The pipe and components will meet the requirements of ANSI/NSF 61 for the conveyance of potable water.

b. Hydrant Leads or other locations approved by staff.

i. Ductile Iron Pipe, Class 52 with conductive gaskets or conductivity strips will be used for watermains.
ii. Mechanical Class 350 ductile iron fittings will be used.
iii. Ductile iron pipe watermain shall be in accordance with ANSI Specification A-21.51. All pipes shall be furnished with standard thickness cement mortar lining conforming to ANSI Specification A-21.4. All pipes shall have push-on joints as specified in AWWA C-111 and shall be electrically conductive. Minimum class of pipe to twelve (12) inches in diameter shall be Class 52 and minimum class over twelve (12) inches in diameter shall be Class 51. Alternate material types will be considered if requested by the Developer / Engineer.
iv. The Contractor shall furnish and install polyethylene encasement and galvanic cathodic protection on all ductile iron main and all appurtenances in accordance with the referenced specification.

B. Trenchless Watermain Construction Material

a. Fusible C900/C905 PVC: Butt joint fused PVC pressure pipe conforming to the current requirements of AWWA C900 (DR 18) for pipe diameters 4.0-inch through 12.0-inch or AWWA C905 (DR 21) for pipe diameters 14.0-inch through 24.0-inch. However, structurally stronger pipe may be required to ensure resistance to pulling stresses. Pipe shall be manufactured in ductile outside diameters. The pipe and components shall meet the requirements of ANSI/NSF 61 for the conveyance of potable water.
b. Pipe fusing shall meet manufacturer requirements.

C. High Density Polyethylene (HDPE) Pipe – only on segments with no services.

a. The pipe to be used shall be (HDPE) pressure pipe conforming to the requirement of AWWA C-906 of a 235 psi working pressure. The grade used shall be resistant to aggressive soils or corrosive substances present. Unless otherwise specified, the dimensions and tolerances of the pipe barrel shall conform to ductile iron pipe equivalent outside diameters.
b. HDPE pipe shall have butt-fused joints.

D. Fittings
a. All fittings will be coated with a 6-8 mil nominal thickness fusion bonded epoxy conforming to the requirements of ANSI/AWWA C550 and C116/A21.
b. All fittings, valves, hydrants, and restraining rods will be protected by using sacrificial anode bags, ASTM B843-AZ63B as manufactured by Anode Sales Company, or an approved equal.

c. All fittings, valves, hydrants, etc., will be secured utilizing stainless steel bolts as manufactured by NSS Industries or approved equal.
d. Joint restraints shall be megalug or approved equal. All Restraining devices (megalugs) will be coated with a 6-8 mil nominal thickness, fusion bonded epoxy conforming to the requirements of ANSI/ AWWA C550 and C116/A21.
e. Adaptors, backup rings, and oversize sleeves will be provided for transitions and connections to dissimilar types of pipe materials. All sleeve fittings will be long mechanical joints.
f. Fittings shall be ANSI Specification A-21.10, cast or ductile iron, mechanical joint or flanged, and shall conform to the same specifications as the ductile iron pipe.
g. All fittings will have been manufactured in the year of construction or prior calendar year.

E. Water Service Pipe

a. Water service lines may be type "K" copper or PE with compression fittings and a minimum of 1" in diameter for residential installations. For runs longer than one hundred (100) feet, 1.5" service shall be extended from the main to beyond the back of curb. Multi-family, commercial and industrial connections shall be evaluated on a case by case basis.

b. Copper pipe shall conform to ASTM B88, Seamless Copper Water Tubing, Type K, Soft Annealed Copper. Copper water service pipe connections will be flared type.

c. Water service lines may be SDR 9 CTS (Copper Tube Size). Polyethylene (PE) service pipe conforming to Grade PE-3408 or PE-4710 and shall be rated for 200 psi working pressure, SDR9. Service must be installed with tracer wire. PE water service pipe connections will be compression type.

d. Stainless steel saddles shall be provided for all corporation stops larger than 1.5 inches and for all connections to existing pipes and new plastic pipes.

e. All copper fittings shall be compression type. Flared type will not be allowed.

F. Corporation Stops, Curb Stops, Tapping Saddles and Curb Boxes

a. All water service pipe and appurtenances shall use compression type connections. Flare type connections are not allowed. The following will be considered as the basis for quality of products:

WATER SERVICE PIPE & APPURTENANCES					
ITEM:	**SERVICE PIPE SIZE**	**COMPRESSION TYPE** Valves & Fittings For **TYPE K COPPER & POLYETHYLENE PIPE**			
		FORD MODEL #		**A.Y. McDONALD / SMITH BLAIR MODEL #**	**MUELLER MODEL #**
Corporation Stop		**FORD**		**A.Y. McDONALD**	**MUELLER**
	3/4"	FB600-3-NL		74701B	B-25000-N
	1"	FB600-4-NL		74701B	B-25000-N
	1. 5"	FB600-6-NL		74701B	B-25000-N
	2.0"	FB600-7-NL		74701B	B-25000-N
Tapping Saddle		**FORD** For DIP WMN	**FORD** For PVC WMN	**SMITH-BLAIR** for DIP WMN	**SMITH-BLAIR** for PVC WMN	**MUELLER**
	3/4"	F202	FS323	313	372	N/A
	1"	F202	FS323	313	372	N/A
	1.5"	F202	FS323	313	372	N/A
	2.0"	F202	FS323	313	372	N/A
Curb Stop		**FORD**		**A.Y. McDONALD**		**MUELLER**
	3/4"	B22-333M-NL		76104		P-25154-N
	1"	B22-444M-NL		76104		P-25154-N
	1. 5"	B22-666M-NL		76104		P-25154-N
	2.0"	B22-777M-NL		76104		P-25154-N
Curb Box	1.5" Diam. for 3/4" to 1.25" Curb Stops	FORD 8'- EM2-80-56		A.Y. MCDONALD 5614		H-10300
Curb Box	2" Diam. for 1.5" to 2" Curb Stops	FORD 8'- EM2-80-57		A.Y. MCDONALD 5615		N/A

G. Valves

a. Gate valves shall be resilient seat valves conforming with AWWA C-509 or AWWA C-515.

b. Butterfly valves conforming with AWWA-504 for 150 psi minimum working pressure shall be used on water main twelve (12) inches in diameter and larger.

H. Hydrants shall be Waterous Pacer type WB-67-250, UL, 250 psi rating and shall conform to the following requirements:

a. Two 2-1/2” hose connections w/ Nat. Std. threads.

b. One 4-1/2” pumper connection w/ 5” Storz Nozzle.

c. 5-1/4” valve opening

d. 6” diameter hub w/ mechanical joint fittings.

e. 1-1/2” pentagon operating nut.

f. 7’-6” cover.

g. 16” traffic section.

h. Counter-clockwise opening.

i. Epoxy coated base.

j. 304 Stainless steel base bolts.

k. Bronze cross arm and epoxy coated upper and lower valve washers.

l. Hydrant flag or marker as approved by Public Works.

I. Curb boxes shall be eight feet long at full extension and shall be adjusted as required to match finished grade. Curb boxes shall be provided with a stationary rod.

J. All threaded items used in the City of Shorewood, including but not limited to mechanical joint connectors, flanged joint connectors, mainline valves, saddles, corporation stops, hydrants, and air release valves shall be furnished to the nominal size as specified with ENGLISH threads.

K. Utilities Location System –

a. Tracer Wire

i. All wire shall be rated for direct burial use at 30 volts. The insulation color shall meet the APWA color code standard for identification of buried utilities (blue for water, green for sewer). High density polyethylene (HDPE) insulation shall be RoHS compliant and utilize virgin grade material.

ii. Tracer wire for open cut trench installation shall be #12 AWG copper clad steel (CCS) wire with 30 mil HDPE insulation, as manufactured by Copperhead Industries, or approved equal.

iii. Tracer wire for directional drilling applications shall be #12 AWG Extra High Strength CCS wire with 45 mil HDPE insulation as manufactured by Copperhead Industries, or approved equal. The Contractor shall use a smaller wire gauge if increased breaking strength is needed.

iv. Tracer wire for pipe bursting, bore and jack or slip lining applications shall be SoloShot TM tracer wire, 7 x 7 stranded CCS with 50 mil HDPE insulation as manufactured by Copperhead Industries or approved equal.

b. Connectors

i. Trace wire connectors will be filled with silicone waterproofing sealant suitable for direct bury applications according to UL 486D test standard.

ii. All mainline trace wires must be interconnected in intersections, at mainline tees and mainline crosses. At tees, the three wires will be joined using a single 3-way lockable connector. At crosses, the four wires will be joined using a 4-way connector. The use of two 3-way connectors with a short jumper wire between them is an acceptable alternative.

iii. Where two wires are connected end to end along a continuous run, the connectors will be DBSR Aqua as manufactured by King Innovation or approved equal.

iv. Where a trace wire is branched off of the mainline trace wire for a service or intersecting main, the connector will be DryConn™ Direct Bury Lug Aqua as manufactured by King Innovation or approved equal.

v. Where three wires are connected the connector will be SnakeBite Connector as manufactured by Copperhead Industries or approved equal. The mainline trace wire will not be cut to create a three-way splice.

L. At-Grade Access Boxes

a. Tracer wire access boxes for at-grade installation shall be SnakePit as manufactured by Copperhead Industries, or approved equal. Covers shall

be cast iron, with locking pentagon nut and appropriate labeling, and color coded per utility. Covers shall have two tracer wire terminals inside the cover, with a removable electrical shunt between the terminals.

M. Test Stations

a. Tracer wire test stations to be installed at hydrants shall be Cobra T3 test station as manufactured by Copperhead Industries, or approved equal. The test station shall have two terminals with jumper, and shall include an HDPE or stainless steel flange for mounting to the hydrant. The test station shall be mounted on a 24.0-inch length of 1.0-inch diameter schedule 40 PVC pipe.

N. Galvanic Cathodic Protection

a. Galvanic Anodes

i. Each anode shall be furnished with a lead wire attached to one end of the steel core. The entire connection shall be insulated with an electrical potting compound. The cable attached to the anode shall be No. 12 AWG, Type TW or THWN solid, single conductor copper.

ii. Each anode shall conform to the following chemical composition:

Element	Percentage
Aluminum	0.010 Maximum
Manganese	0.50 to 1.30
Copper	0.02 Maximum
Nickel	0.001 Maximum
Zinc	0.05 Maximum
Iron	0.03 Maximum
Silicon	0.05 Maximum
Other	0.05 Each or 0.30 Maximum Total
Magnesium	Remainder

iii. The anode shall be prepackaged in a permeable cloth bag filled with a mixture of 75 percent ground hydrated gypsum, 20 percent powdered bentonite, and 5 percent anhydrous sodium sulfate.

b. Cables

i. All cables for test stations shall be Type THWN, stranded, copper, size as shown on the plans.

ii. All cables for pipe joint bonds shall be Type HMW/PE, stranded, copper, sized in accordance with the design criteria.

3. Construction Requirements

A. Tracer wire shall be provided on all plastic watermain pipe, including services. Installation shall comply with city standard details and install per manufacturer's recommendations.

B. The City shall inspect all water supply facilities before they are covered.

C. The contractor shall stamp the concrete curb with the letter "W" at the location where the water service crosses under the curb.

D. Tapping of any watermain must be cleared through the City. Hydrants and curb stops are to be operated by City of Shorewood employees only.

E. Trench widths at the top of the excavation may vary depending upon the depth of the trench and the nature of the material encountered. However, the maximum allowable width of the trench at the level of the top of pipe shall be the outside diameter of the pipe plus 24".

F. When the bottom of the trench is soft, or where in the opinion of the City representative, unsatisfactory foundation conditions exist, the Contractor shall excavate to a depth to insure proper foundation. The excavation shall be brought up to grade with thoroughly compacted materials.

G. House service pipe must be laid with sufficient waving to allow not less than one foot extra length per two hundred (200) feet and in such a manner as to prevent rupture by settlement.

H. Hydrostatic test requirement is holding one hundred and fifty (150) psi for two hours.

I. Water shall be installed at a minimum depth of seven and one-half (7.5) feet.

J. Watermain valve spacing shall be such that no more than 20 residential units or 2 commercial / industrial units will be vulnerable to a single watermain break.

K. Hydrants shall be placed at each intersection and spacing shall not exceed 400 feet, or as required by the Fire Chief.

L. Valves shall be placed on all leads of mainline tees and crosses and at locations as determined by Public Works.

M. Joints in copper tubing shall be kept to a minimum and not more than one joint per seventy-feet (70) in length. Joints are not allowed within ten (10) feet of the building.

N. The curb stop must be brought to proper grade.

O. If the curb stop is located in the driveway, it must have a Ford Type A1 Meter Box to protect the top of the curb stop.

P. Bent curb stops shall be replaced by the Contractor.

Q. No water pipe shall be connected with any pump, well tank, or piping that is connected with any other water supply other than the municipal system.

R. No person shall permit water from the water system to be used for any purpose except upon his own premise unless written consent is first obtained from the City.

S. No water service pipe shall be laid under a building or permanent structure.

SECTION 8 – SANITARY SEWER

1. General
2. Materials
3. Construction Requirements

1. General

Sanitary sewer main shall be extended to the development property line as required by the City. Public sanitary sewer main and service connections shall be approved by the City and installed to provide service to each lot with the minimum distance necessary. Service cleanouts and inspection manholes shall be provided as directed by the City.

2. Materials

A. Pipe - Mainline:
   a. Smooth-walled polyvinyl chloride pipe (PVC) shall be used for gravity sewers 8" through 15" diameter up to a maximum cover of twenty (20) feet and shall conform to ASTM Specification D-3034. A continuous extrusion process using Type 1, Grade 1 material as defined in ASTM Specification D-1784, shall be used to produce pipe. SDR 35 pipe shall be used up to twenty (20) feet in depth; SDR 26 shall be used from twenty (20) feet to thirty (30) feet in depth. Materials for depths exceeding thirty (30) feet shall be evaluated on a case by case basis.

   b. Over 15" Diameters: Smooth-walled polyvinyl chloride pipe and fittings shall conform with the requirements of ASTM F679 with a minimum wall thickness for a minimum pipe stiffness of 46, for depths less than 20.0-feet, unless otherwise specified in the plans. A minimum SDR of 26 shall be used for depths exceeding 20.0-feet, unless, unless otherwise specified on the plans.

   c. Ductile Iron Pipe shall be used for outside manhole drops and for the the last 20 feet to the manhole.

B. Pipe – Services:
   a. Minimum SDR 26 for all service pipe and service wyes is required.

   b. Four (4) inch sanitary sewer services are required on residential homes. The City must approve commercial applications.

   c. New sewer services connected to existing sanitary mains shall utilize a Tap Saddle Pressure Kit as manufactures by Fernco or approved equal.

C. Manholes
   a. Pre-cast reinforced concrete conforming to ASTM C-478. All structures shall have pre-cast pipe connection openings with watertight resilient rubber boots for the pipe to manhole connections.

   b. Steps shall be Neenah R-1981-J, or approved equal, 16" on center.

D. Chimney seals
    a. Manufactured by Infi-Shield Sealing Systems, or approved equal. The seal shall be made of ethylene propylene diene monomer (EDPM) rubber with a minimum thickness of 50 mils. The seal shall meet the requirements of ASTM C-433, F-411, and C-923. Each band shall have a 2-inch mastic strip on the top and bottom edge. The mastic shall be non- hardening butyl rubber sealant and shall seal to the cone/top slab of the manhole and over the lip of the casting. An inspection tab shall be secured to the top of the casting frame.

E. Castings
    a. Neenah R-1642-B, or approved equal, embossed “Sanitary Sewer”.

F. Tracer Wire
    a. All wire shall be rated for direct burial use at 30 volts. The insulation color shall meet the APWA color code standard for identification of buried utilities (blue for water, green for sewer). High density polyethylene (HDPE) insulation shall be RoHS compliant and utilize virgin grade material.

    b. Tracer wire for open cut trench installation shall be #12 AWG copper clad steel (CCS) wire with 30 mil HDPE insulation, as manufactured by Copperhead Industries, or approved equal.

    c. Tracer wire for directional drilling applications shall be #12 AWG Extra High Strength CCS wire with 45 mil HDPE insulation as manufactured by Copperhead Industries, or approved equal. The Contractor shall use a smaller wire gauge if increased breaking strength is needed.

    d. Tracer wire for pipe bursting, bore and jack or slip lining applications shall be SoloShot TM tracer wire, 7 x 7 stranded CCS with 50 mil HDPE insulation as manufactured by Copperhead Industries or approved equal.

G. Connectors
        i. Trace wire connectors will be filled with silicone waterproofing sealant suitable for direct bury applications according to UL 486D test standard.

        ii. All mainline trace wires must be interconnected in intersections, at mainline tees and mainline crosses. At tees, the three wires will be joined using a single 3-way lockable connector. At crosses, the four wires will be joined using a 4-way connector. The use of two 3-way connectors with a short jumper wire between them is an acceptable alternative.

iii. Where two wires are connected end to end along a continuous run, the connectors will be DBSR Aqua as manufactured by King Innovation or approved equal.

iv. Where a trace wire is branched off of the mainline trace wire for a service or intersecting main, the connector will be DryConn™ Direct Bury Lug Aqua as manufactured by King Innovation or approved equal.

v. Where three wires are connected the connector will be SnakeBite Connector as manufactured by Copperhead Industries or approved equal. The mainline trace wire will not be cut to create a three-way splice.

H. At-Grade Access Boxes
   a. Tracer wire access boxes for at-grade installation shall be SnakePit as manufactured by Copperhead Industries, or approved equal. Covers shall be cast iron, with locking pentagon nut and appropriate labeling, and color coded per utility. Covers shall have two tracer wire terminals inside the cover, with a removable electrical shunt between the terminals.

3. Construction Requirements

A. Outside drop manholes are required when influent pipe is more than 24" above the manhole invert. The outside drop pipe and the first pipe section upstream of the drop shall be DIP Class 52 pipe with stainless hardware and shall have galvanic cathodic protection. See section on watermain for cathodic protection requirements.

B. Inside drop manholes are NOT allowed.

C. Prior to placing the sanitary sewer into service the system shall be cleaned by flushing and vacuuming the system. Sedimentation and debris shall not be washed through the system.

D. In areas where uncompleted sanitary sewer manholes are subject to flooding, the contractor shall make the sanitary sewer system watertight by using pneumatic balls.

E. The City shall inspect all sanitary sewer construction before it is covered.

F. The contractor shall stamp the concrete curb with the letter "S" at the location where the sewer service crosses under the curb.

G. Tracer Wire shall be provided on all sanitary sewer, including all services.

H. Closed Circuit Television - All sanitary sewers shall be cleaned and televised. All runs of sewer between manholes shall be straight and true. Test results, logs, reports and videotapes shall become the property of the City.

I. Testing shall be completed according to the latest version of City Engineers Association of Minnesota-Standard Specification including pressure testing and deflection testing.

J. Mandrel – Maximum five (5) percent deflection for all PVC pipe, thirty (30) days after installation.

K. Qualified individuals shall perform all testing required in these guidelines. Copies of the test results shall be submitted to the City.

L. The sewer service line must be installed at a minimum depth of ten (10) feet, except if greater depth is required for gravity service to the residence or commercial building.

M. Services shall be installed at a slope not less than ¼ inch per foot (2%).

N. Ninety (90) degree bends are not permitted on a sanitary sewer service. The use of two forty-five (45) degree bends and a length of pipe to make a sweeping bend is permitted.

O. Cleanouts must be installed at least every one-hundred (100) feet on lengthy sewer services. Cleanouts must also be installed wherever a bend is installed. Cleanout caps must be metal and weather tight.

P. All excavations required for the installation of the building sewer shall be open trench work unless otherwise approved by the City.

Q. Whenever possible, the building sewer shall be brought to the building at an elevation below the basements floor. The depth shall be sufficient to afford protection from frost.

R. No sewer service line shall be installed under a building or permanent structure.

S. Tracer wire shall be installed to the end of the sewer service stub

SECTION 9 – STREETS

1. General
2. Materials
3. Construction Requirements

1. General

The location and design of streets shall consider existing and planned streets, accommodate anticipated traffic circulation, topography conditions, runoff of stormwater, public convenience, safety, and the proposed land uses of the property to be served. Private streets are also allowable on a case-by-case basis.

A. Standard Street Section
   1. A geotechnical investigation and analysis shall be performed and it shall provide recommendations for the street sections based on soil conditions and projected traffic.
   2. The minimum street section based on subgrade which passes test rolling shall consist of:

Typical Street Section	
Bituminous Wear Course	2.0”
Bituminous Non-Wear Course	2.0”
Aggregate Base	8.0”
Select Granular Borrow	24”
Draintile	Yes
Geotextile Fabric Type 5	Yes

B. Intersections - Streets shall intersect at right angles. In no case shall the angle formed by the intersection of two streets be less than sixty-degrees (60). Intersections having more than four entering street segments are prohibited.

C. Centerline Grades - All centerline grades shall be at least 0.75 percent and shall not exceed five (5) percent for Collectors and eight (8) percent for all other streets. Whenever possible, grades within fifty (50) feet of intersections shall not exceed three (3) percent.

D. Access-Collector Streets.

   a. Direct vehicular access from individual lots to collector streets shall be limited to the extent possible and approved on a case-by-case basis. Local street access to arterial streets shall be at intervals of not less than 1/4 mile and through existing and established crossroads. Access along collector streets will be restricted and controlled on the final plat.

   b. Access to commercial or industrial developments shall be provided to maximize safe efficient travel within and adjacent to the subdivision.

E. Private Streets-street sections and configurations shall be evaluated on a case-by-case basis and may be permitted as allowed per city code.

F. Cul-de-sacs - The use of cul-de-sacs is acceptable where appropriate due to existing topography, vegetation, etc. In no case shall a street ending in a cul-de-sac exceed five hundred (500) feet unless approved by the Fire Chief. Lot lines abutting cul-de-sacs shall be radial except in extreme cases where the City may grant permission for an alternate configuration. All cul-de-sac designs must accommodate the turning movements for emergency vehicles.

G. Street Arrangements - The arrangement of streets in new developments or plats shall be laid out so as to provide a continuation of existing streets of adjoining areas, whether in the City or in adjoining governmental developments. Streets shall be constructed to the development property line where required.

H. Temporary Cul-de-sacs - Temporary cul-de-sacs will be required where a future public street will connect to a temporary street stub. The maximum length of a street with a temporary cul-de-sac shall be seven hundred and fifty (750) feet. The minimum surface diameter shall be sixty feet (60), without curb and gutter.

2. Materials.

A. Street construction materials shall be in conformance with the Minnesota Department of Transportation, Standard Specifications for Construction, current Edition and all subsequent revisions, except as specifically altered or modified herein.

B. Fill materials shall be subject to the approval of the Engineer. All materials found to be unsuitable for fill shall not be used. This fill material may be either the granular unclassified excavated material from the project or approved granular materials hauled onto the site. All materials intended for use as fill shall be clean and free from rocks, roots, stumps, clay lumps, and other deleterious material.

C. Aggregate Base shall be Class 5 in accordance with MnDOT 2211.

D. Geotextile Fabric – MnDOT Type V (3733)

E. Bituminous material shall conform to Mn/DOT 3151. All asphalt binder shall meet AASHTO M 320, Specification of Performance Graded Asphalt Binder. Only asphalt binder from a certified source will be allowed.

F. Bituminous surface mixture shall be in accordance with Mn/DOT 2360.

1. Streets with AADT less than 2300
    a. Non-wearing Course – Type SP12.5 Mix (2,B) SPNWB230B

b. Wearing Course – Type SP 9.5 Mix (2,C) SPWEA240C

2. Streets with AADT more than 2300
   a. Non-wearing Course – Type SP12.5 Mix (3,B) SPNWB330B
   b. Wearing Course – Type SP 9.5 Mix (3,C) SPWEA340C

3. Aggregate shall meet the requirements of Mn/DOT 3139 and the gradations for each type of mix.

G. Tack coat is required between bituminous lifts and on the edges of adjacent structures such as curb and gutter and driveways. Bituminous material for tack coat shall be Anionic Emulsified Asphalt SS-1 in accordance with Mn/DOT 2357.

H. Material for concrete curb and gutter shall be in accordance with Mn/DOT 2531.

I. Subsurface draintile shall be as specified in Section 6.2.2. Draintile is required along the outside edge of all streets, crossing the road between low point structures, and as necessary to allow for sump pump service connections, and as required by the Engineer.

J. Permanent pavement markings for application on the final bituminous wearing course shall be:

   a. Mulit-Component Liquid Pavement Markings, in accordance with MnDOT specification sections 2582 and 3590.

   b. Drop-on glass beads, in accordance with MnDOT specification sections 2582 and 3592.

   c. The City reserves the right to request water-based paint in certain locations.

K. All signing materials shall conform to the requirements of MnDOT specification 3352 and all supplemental specifications thereto.

L. City street name placards for public streets shall be white lettering on a green background; private streets shall be white lettering on a blue background.

M. All signs shall be constructed in accordance with the "Manual for Uniform Traffic Control Devices" latest edition shall apply.

3. Construction Requirements

A. The contractor shall stamp the concrete curb with the letter "S" at the location where the sewer service crosses under the curb, with the letters "SS" at the

location where the draintile for the sump pump connection box crosses under the curb, and with the letter “W” at the location where the water service crosses under the curb.

B. Stop signs are needed at all commercial and industrial exits onto local roadways.

C. Subgrade areas which do not pass test roll shall be corrected as approved by the City. Correction options include:
    a. Aerating and recompacting subgrade soils.
    b. Subcutting the subgrade and filling with suitable on-site soil, stabilizing aggregate or select granular borrow.

SECTION 10 – SIDEWALKS AND TRAILS

1. General
2. Materials
3. Construction Requirements

1. General.

Trail Requirements.

A. Trail design shall conform to the requirements of the most current edition of the "MnDOT Bikeway Facility Design Manual" produced by the Minnesota Department of Transportation. All city owned bituminous trails shall be a minimum of eight feet wide, unless otherwise approved by the city.

B. All pedestrian ramps for trails and sidewalks shall meet the requirements as maintained by MnDOT at http://www.dot.state.mn.us/ada/design.html.

C. Trail and sidewalk locations should be evaluated in association with the Master Sidewalk and Trail Plan, the City's Comprehensive Plan, and adjacent pedestrian facility systems.

D. Sidewalks and trails shall not be located less than one foot from the property line, or be adjacent to the curb except as determined to be necessary. Sidewalks and trails in commercial and industrial areas shall be located to conform to the anticipated pedestrian flow of the development.

E. Sidewalks and trails shall slope a maximum of 2.0% towards the street and the profile grades shall conform to the street grades.

F. Sidewalks shall be constructed of concrete and have a recommended width of six feet (6') (where space is limited five feet (5') will also be acceptable) unless otherwise required by the City.

G. Trail width shall be eight (8') feet unless otherwise required by the City. In cases where the trail also serves as an access route for a utility main or a stormwater maintenance feature, wider and/or heavier trail sections may be required.

H. Trails shall be constructed of bituminous over an aggregate base. The aggregate base shall exceed the width of the trail by 1 (one) foot on each side.

I. The City may require accent or security lighting. Such lighting shall be in a form and style approved by the City.

J. Trails shall be located within easements or dedicated right-of-way.

K. Trail improvements shall provide definition to discourage trespassing onto private property. Such definition may include open fencing, landscaping, and/or berms.

L. All sidewalks and trails shall be designed to meet the requirements of the Americans with Disabilities Act (ADA). Pedestrian curb ramps detail design shall file the most current version of MnDOT ADA Standard Plans and shall be referenced specification and construction documents.

2. Materials

Materials used for trail and sidewalk construction shall meet the same requirements of those used for street construction.

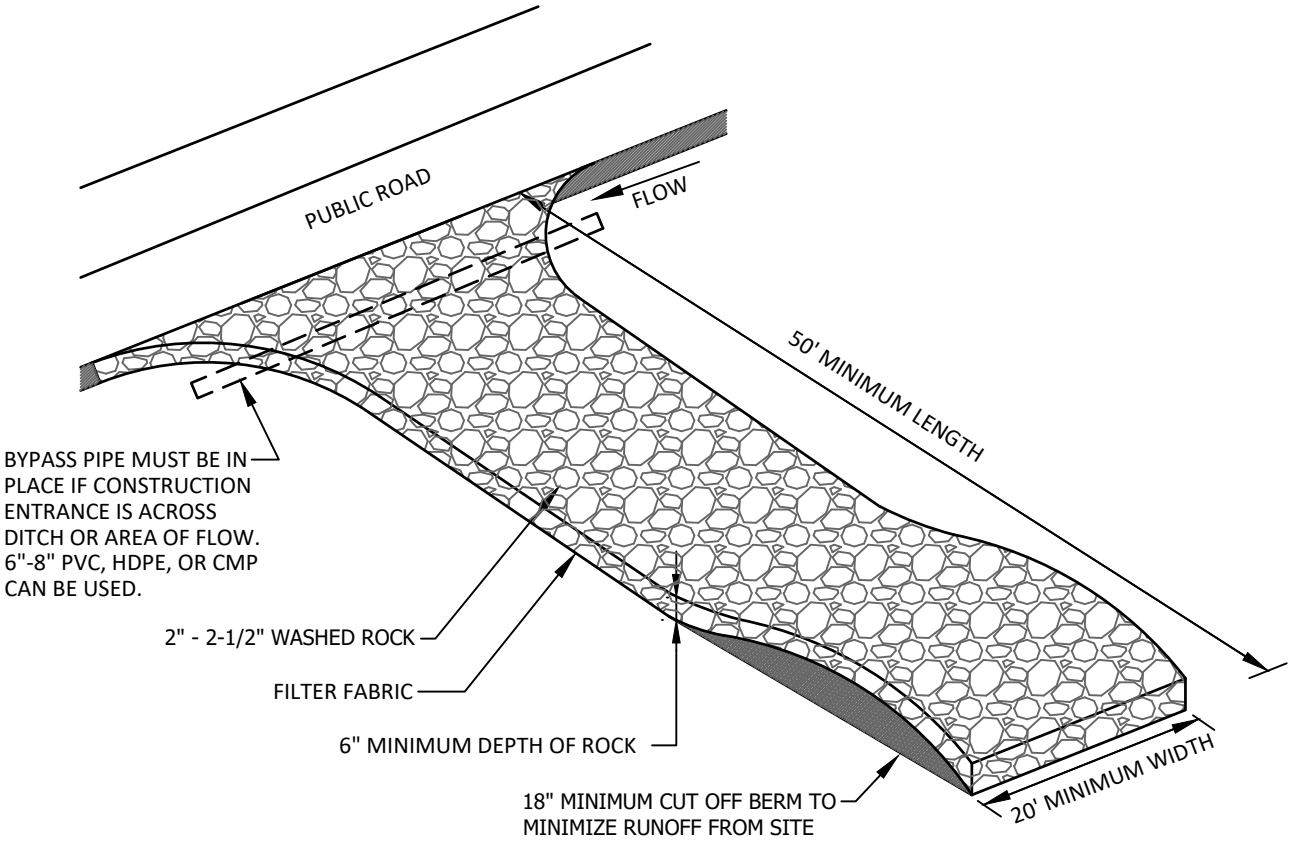
3. Construction Requirements

Construction requirements used for trail and sidewalk construction shall meet the same requirements of those used for street construction.

APPENDIX A
STANDARD DETAILS

TABLE OF CONTENTS

STANDARD DETAIL PLATES
FOR THE CITY OF SHOREWOOD, MN



NOTES:

1. FILTER FABRIC SHALL BE PLACED UNDER ROCK OR MULCH TO STOP MUD MIGRATION THROUGH MATERIAL.

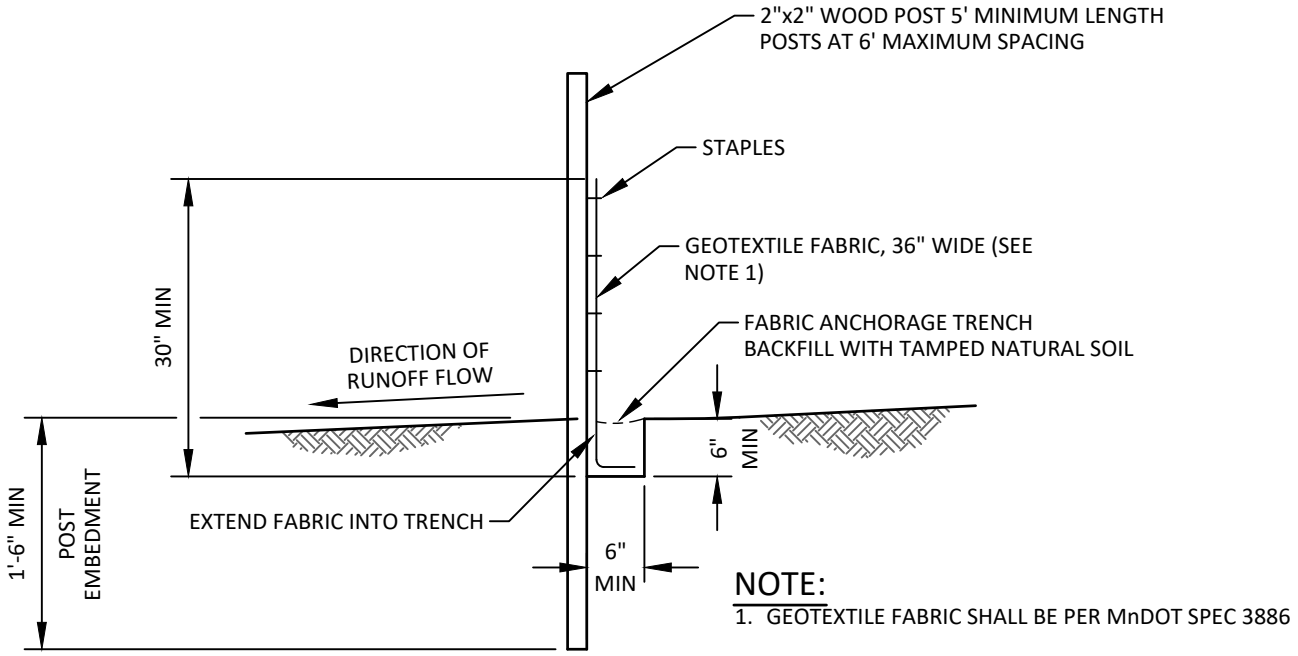
City of Shorewood

ROCK CONSTRUCTION ENTRANCE

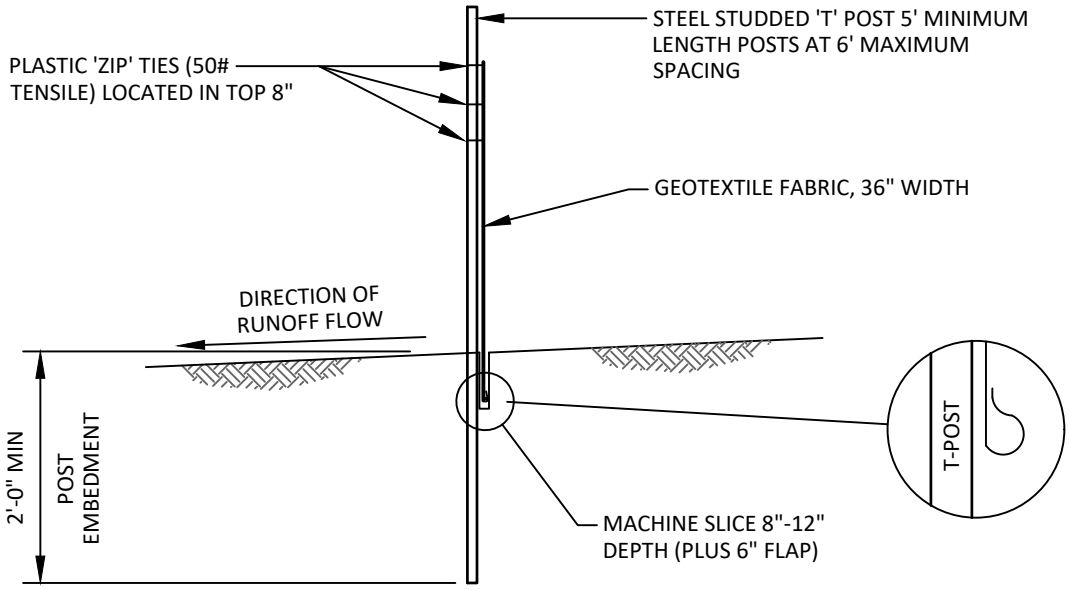
STANDARD DETAILS

REVISED: NOV. 2025

ERO-01

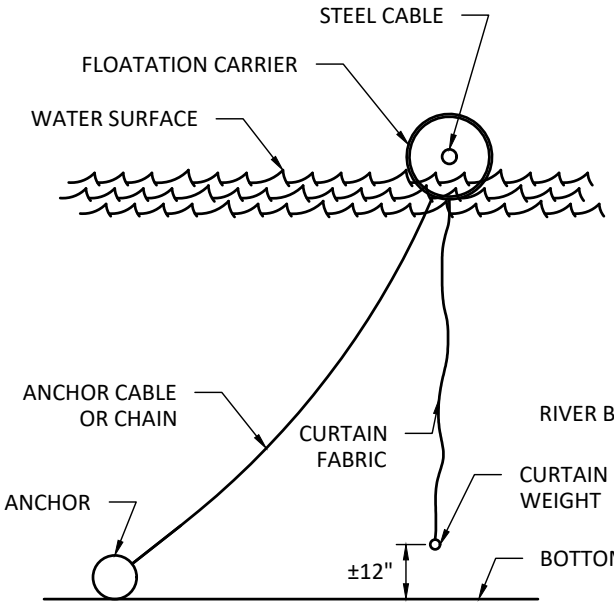


SILT FENCE - PREASSEMBLED

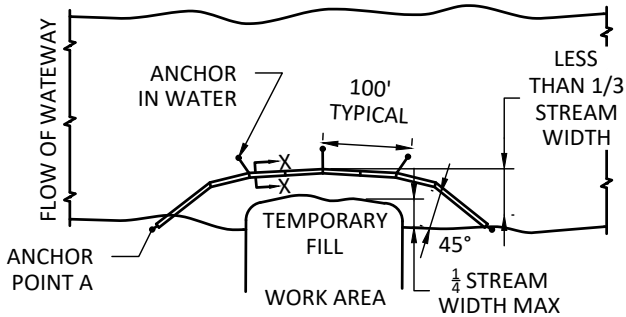


SILT FENCE - PREASSEMBLED AND MACHINE SLICED

City of Shorewood	SILT FENCE - PREASSEMBLED AND MACHINE SLICED	STANDARD DETAILS	
		REVISED: NOV. 2025	ERO-02



NOTE:
DOUBLE SILT FENCES SHOULD BE SPACED 10' APART.



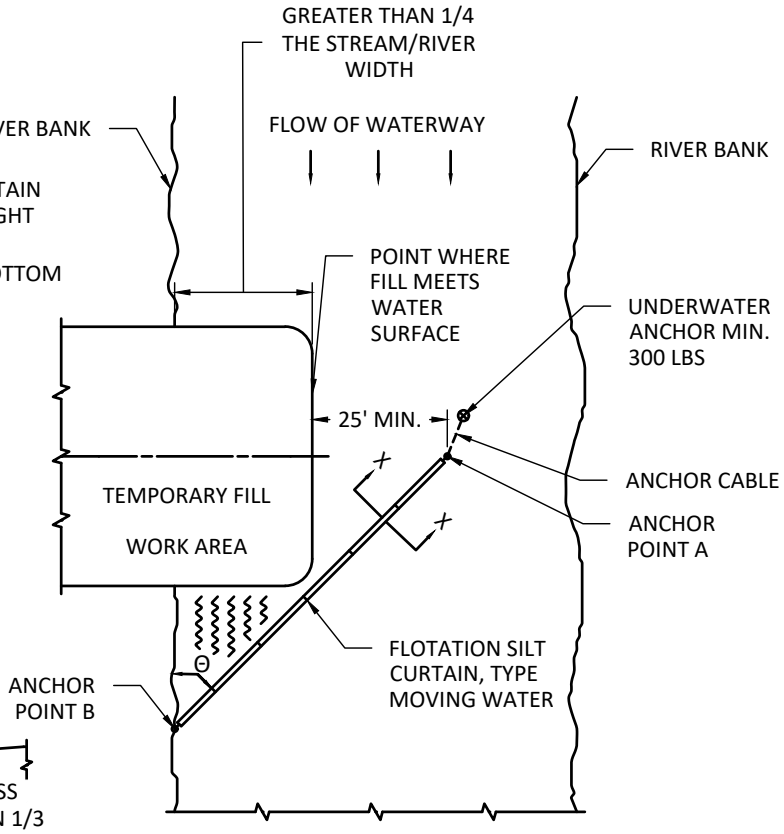
PLAN VIEW

FLOTATION SILT CURTAIN - TYPE WORK AREA (SPEC. 3887)

FOR CONTAINING OVERFLOWS FROM WEIRS, STANDPIPES, SETTLING PONDS

DESIGN GUIDELINES:

WHEN TEMPORARY FILL ENCROACHES LESS THAN 1/4 OF THE WIDTH OF STREAM.
MAXIMUM WATER VELOCITY: 5 FT/SEC.
MAXIMUM WATER DEPTH: 11 FT.



∠Θ	RIVER VELOCITY
45°	SLOW, LESS THAN 3 FT./SEC.
35°	MODERATE, 3 - 5 FT./SEC.

PLAN VIEW

FLOTATION SILT CURTAIN - TYPE MOVING WATER (SPEC. 3887)

FOR CONTAINING OVERFLOWS FROM WEIRS, STANDPIPES, SETTLING PONDS

DESIGN GUIDELINES:

WHEN TEMPORARY FILL ENCROACHES MORE THAN 1/4 OF THE WIDTH OF STREAM BUT LESS THAN 1/3 WIDTH OF THE STREAM.
MAXIMUM WATER VELOCITY: 5 FT/SEC.
MINIMUM WATER DEPTH: 3 FT.
MAXIMUM WATER DEPTH: 11 FT.

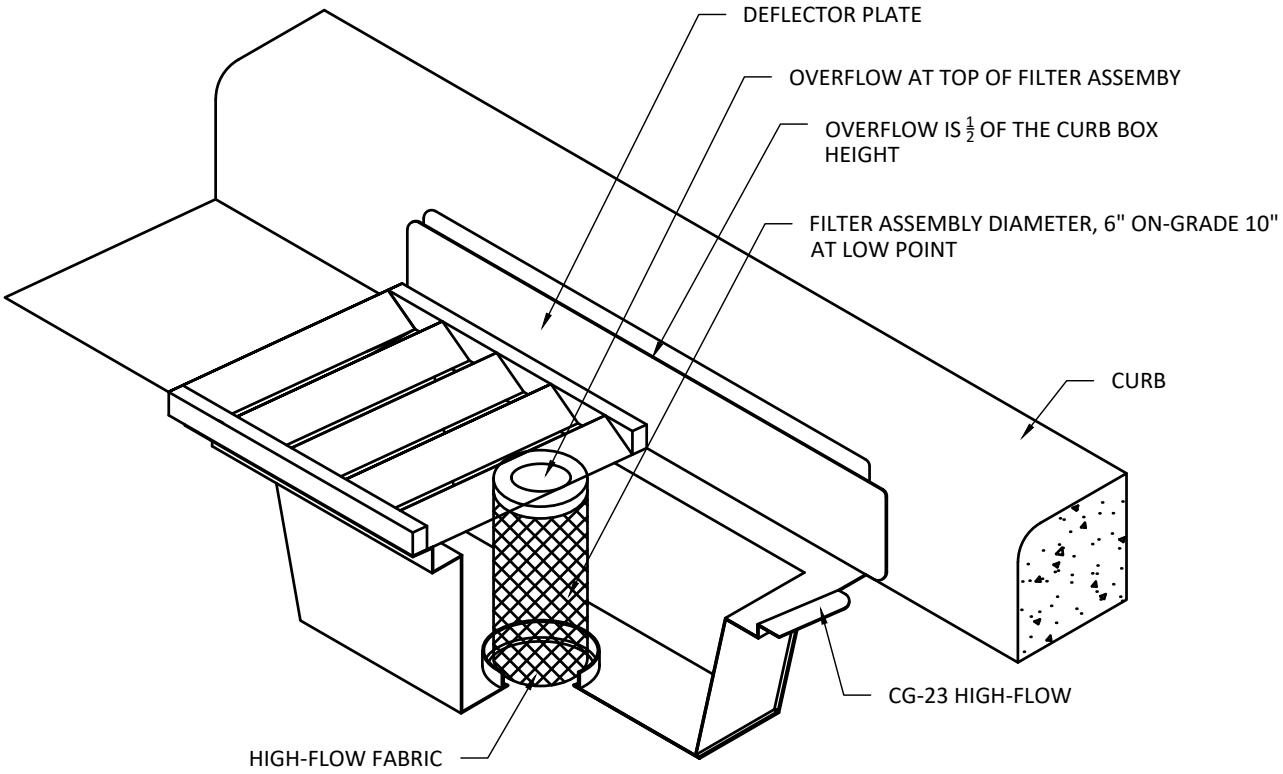
City of Shorewood

FLOATING SILT CURTAIN

STANDARD DETAILS

REVISED: NOV. 2025

ERO-03



NOTES:

1. WIMCO ROAD DRAIN CB-23 HIGH FLOW INLET PROTECTION CURB AND GUTTER MODEL OR CITY APPROVED EQUAL.

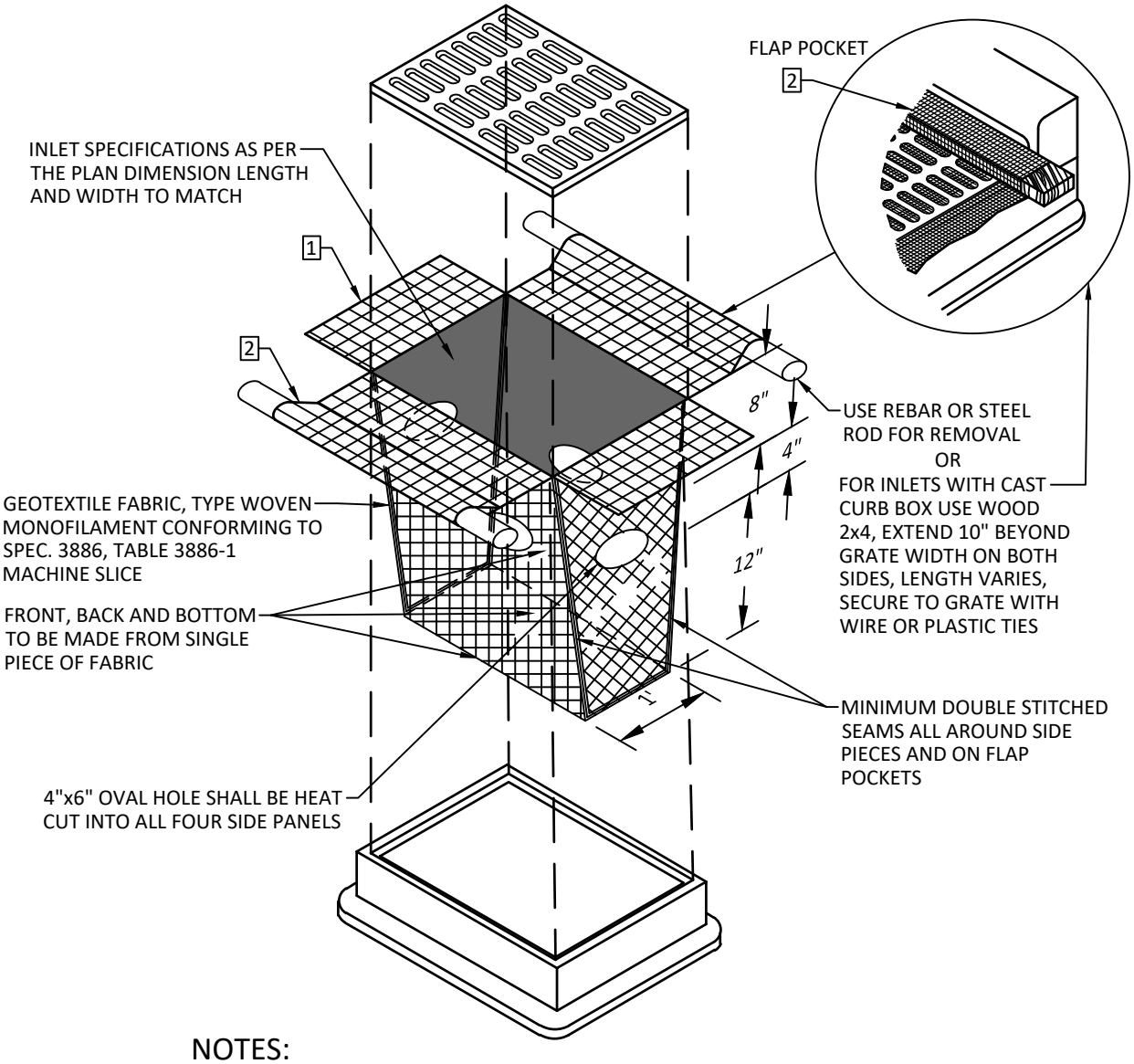
City of Shorewood

INLET PROTECTION - CATCH BASIN INSERT AFTER PAVING

STANDARD DETAILS

REVISED: NOV. 2025

ERO-04



NOTES:

1 INLET PROTECTION DEVICES SHALL BE MAINTAINED OR REPLACED AT THE DIRECTION OF THE ENGINEER. MANUFACTURED ALTERNATIVES APPROVED AND LISTED ON THE DEPARTMENTS EROSION CONTROL PRODUCT ACCEPTABILITY LIST MAY BE SUBSTITUTED. WHEN REMOVING OR MAINTAINING INLET PROTECTION, CARE SHALL BE TAKEN SO THAT THE SEDIMENT TRAPPED ON THE GEOTEXTILE FABRIC DOES NOT FALL IN THE INLET. ANY MATERIAL FALLING INTO THE INLET SHALL BE REMOVED IMMEDIATELY.

2 FINISHED SIZE, INCLUDING POCKETS WHERE REQUIRED, SHALL EXTEND A MINIMUM OF 10" AROUND THE PERIMETER TO FACILITATE MAINTENANCE OR REMOVAL.

FLAP POCKETS SHALL BE LARGE ENOUGH TO ACCEPT WOOD 2x4.

INSTALLATION NOTES:

DO NOT INSTALL PROTECTION IN INLETS SHALLOWER THAN 30", MEASURED FROM THE BOTTOM OF THE INLET TO THE TOP OF THE GRATE.

TRIM EXCESS FABRIC IN THE FLOW LINE TO WITHIN 3" OF THE GRATE.

THE INSTALLED BAG SHALL HAVE A MINIMUM SIDE CLEARANCE, BETWEEN THE INLET AND THE BAG, MEASURED AT THE BOTTOM OF THE OVERFLOW HOLES, OF 3". WHERE NECESSARY THE CONTRACTOR SHALL CLINCH THE BAG, USING PLASTIC ZIP TIES, TO ACHIEVE THE 3" CLEARANCE. THE TIES SHALL BE PLACED AT A MAXIMUM OF 4" FROM THE BOTTOM OF THE BAG.

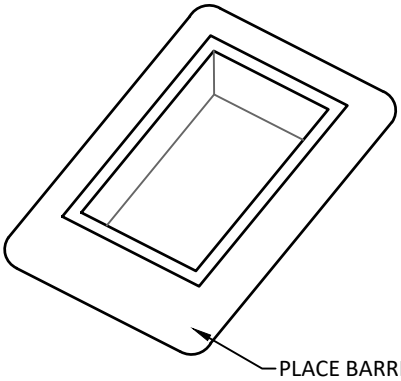
City of Shorewood

INLET PROTECTION - GEOTEXTILE BAG

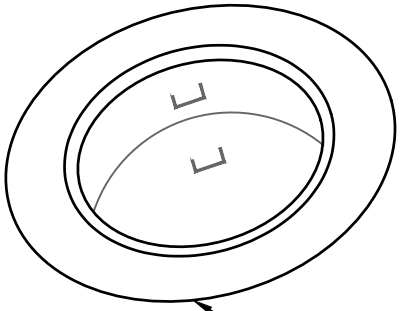
STANDARD DETAILS

REVISED: NOV. 2025

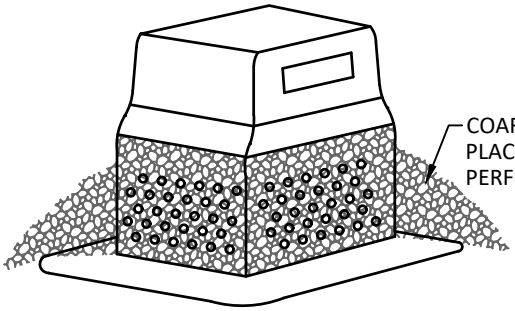
ERO-05



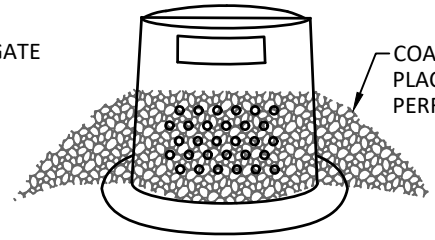
PLACE BARRIER FRAME
ATOP PRE-CAST TOP SLAB



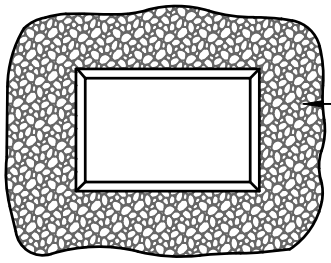
PLACE BARRIER FRAME
ATOP PRE-CAST TOP SLAB



COARSE FILTER AGGREGATE
PLACED TO COVER
PERFORATIONS

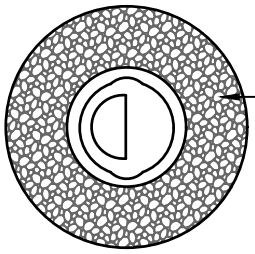


COARSE FILTER AGGREGATE
PLACED TO COVER
PERFORATIONS



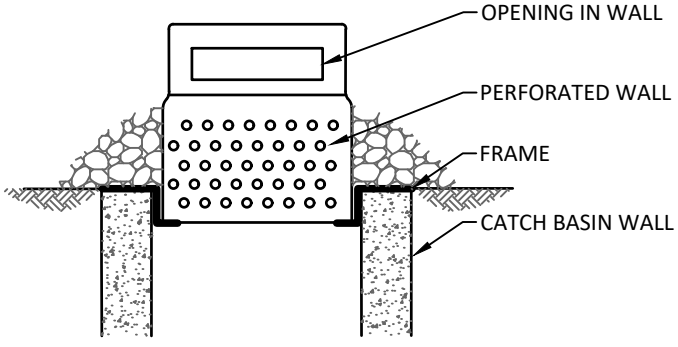
COARSE FILTER AGGREGATE
PLACED TO COVER
PERFORATIONS

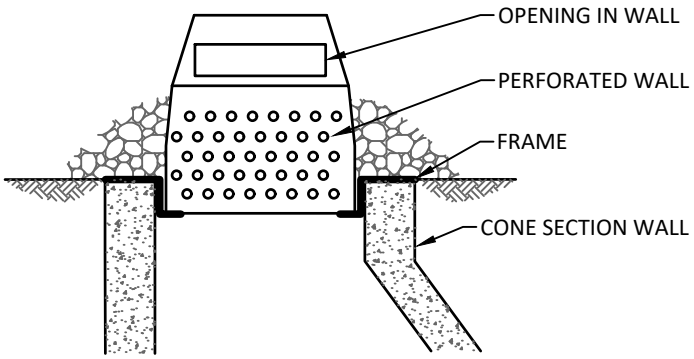
TOP VIEW



COARSE FILTER AGGREGATE
PLACED TO COVER
PERFORATIONS

TOP VIEW





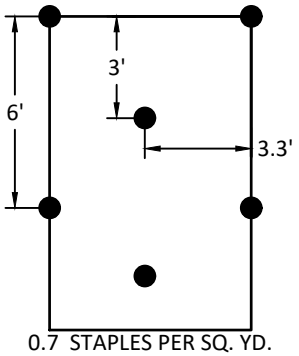
City of Shorewood

INLET PROTECTION - PERFORATED WALL

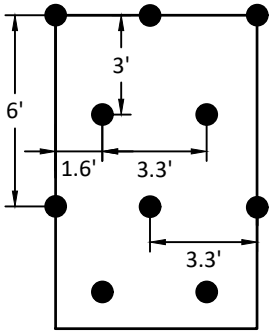
STANDARD DETAILS

REVISED:
NOV. 2025

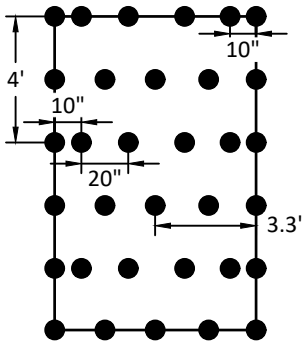
ERO-06



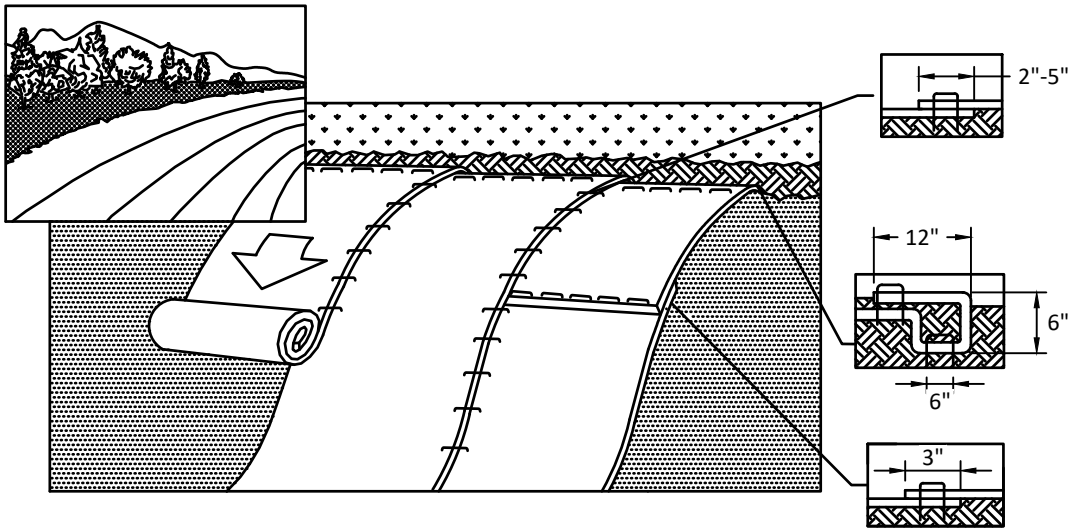
0.7 STAPLES PER SQ. YD.
4:1 SLOPES



1.15 STAPLES PER SQ. YD.
3:1 SLOPES



3.75 STAPLES PER SQ. YD.
HIGH FLOW CHANNEL &
SHORELINE



NOTES:

1. PREPARE SOIL BEFORE INSTALLING BLANKETS, TO A SMOOTH GRADE SO THAT BLANKET HAS DIRECT CONTACT WITH SOILS, INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED.
2. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE BLANKET IN A 6" (15cm) DEEP X 6" (15cm) WIDE TRENCH WITH APPROXIMATELY 12" (30cm) OF BLANKET EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE BLANKET WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" (30cm) APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" (30cm) PORTION OF BLANKET BACK OVER SEED AND COMPACTED SOIL. SECURE BLANKET OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" (30cm) APART ACROSS THE WIDTH OF THE BLANKET.
3. ROLL THE BLANKETS (A.) DOWN OR (B.) HORIZONTALLY ACROSS THE SLOPE. BLANKETS WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL BLANKETS MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING OPTIONAL DOT SYSTEM , STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.
4. THE EDGES OF PARALLEL BLANKETS MUST BE STAPLED WITH APPROXIMATELY 2"-5" (5cm-12.5cm) OVERLAP DEPENDING ON BLANKET TYPE. TO ENSURE PROPER SEAM ALIGNMENT, PLACE THE EDGE OF THE OVERLAPPING BLANKET (BLANKET BEING INSTALLED ON TOP) EVEN WITH THE COLORED SEAM STITCH ON THE PREVIOUSLY INSTALLED BLANKET.
5. CONSECUTIVE BLANKETS SPLICED DOWN THE SLOPE MUST BE PLACED END OVER END (SHINGLE STYLE) WITH AN APPROXIMATE 3" (7.5cm) OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" (30cm) APART ACROSS ENTIRE BLANKET WIDTH.
6. IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" (15cm) MAY BE NECESSARY TO PROPERLY SECURE THE BLANKETS.

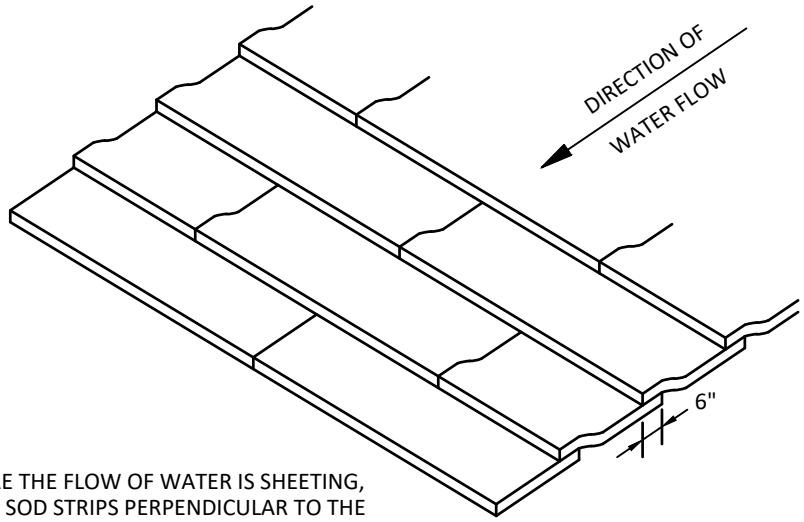
City of Shorewood

EROSION CONTROL BLANKET INSTALLATION

STANDARD DETAILS

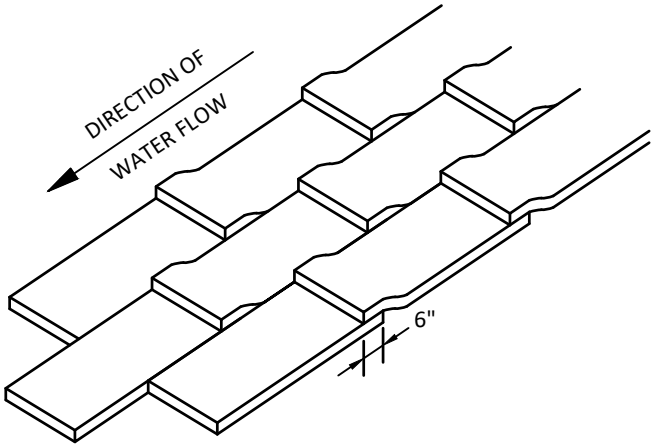
REVISED: NOV. 2025

ERO-07



WHERE THE FLOW OF WATER IS SHEETING, PLACE SOD STRIPS PERPENDICULAR TO THE DIRECTION OF WATER FLOW.

SHINGLING SOD



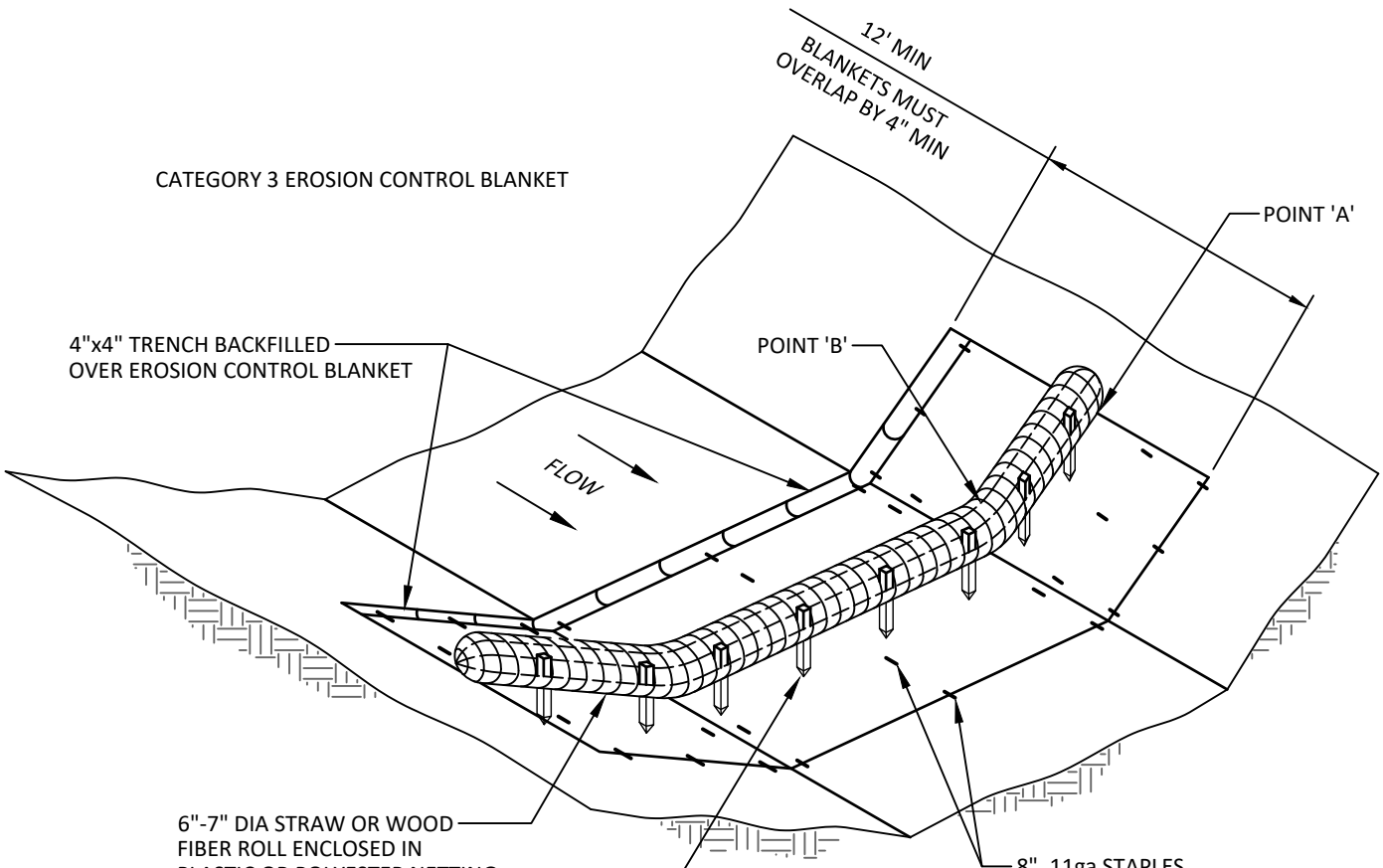
OVERLAPPING SOD

WHERE THE FLOW OF WATER IS CONCENTRATED, PLACE SOD STRIPS PARALLEL TO THE DIRECTION OF WATER FLOW.

NOTE:

ALTHOUGH PEGGING OF SOD IS NOT SPECIFICALLY REQUIRED IT IS UNDERSTOOD THAT THE CONTRACTOR WILL BE RESPONSIBLE FOR THE SUCCESSFUL ESTABLISHMENT OF THE SOD INCLUDING REPAIR OR REPLACEMENT OF SOD WHICH BECOMES DISPLACED OR DAMAGED DUE TO LACK OF PROTECTION OR PROPER CARE.

City of Shorewood	SOD INSTALLATION	STANDARD DETAILS	
		REVISED: NOV. 2025	ERO-08



NOTE:

POINT 'A' MUST BE 1'-0" MIN HIGHER THAN POINT 'B' TO ENSURE THAT WATER FLOWS OVER THE DITCH CHECK AND NOT AROUND THE ENDS

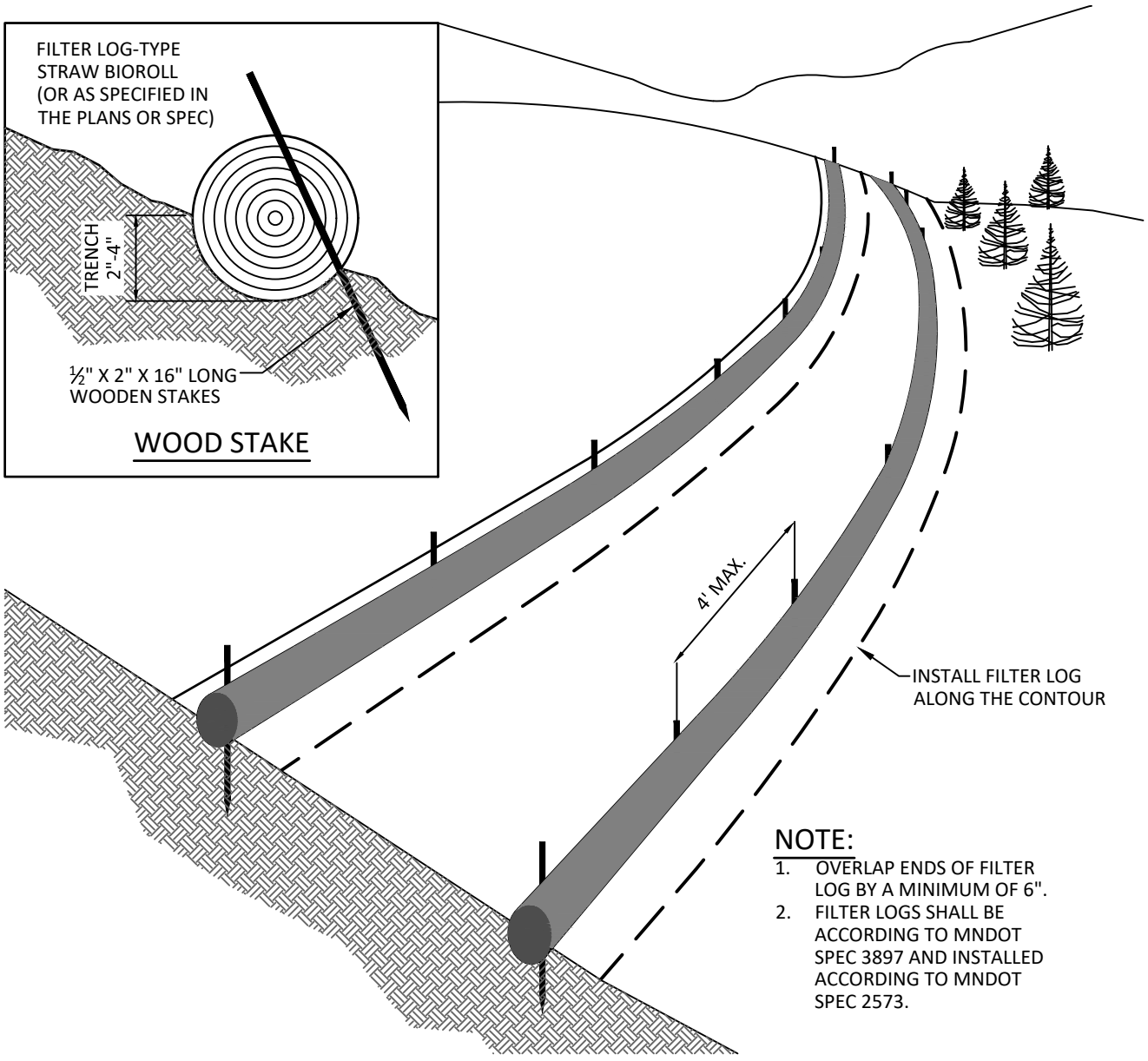
City of Shorewood

DITCH CHECK-BIOROLL

STANDARD DETAILS

REVISED: NOV. 2025

ERO-09



NOTE:

1. OVERLAP ENDS OF FILTER LOG BY A MINIMUM OF 6".
2. FILTER LOGS SHALL BE ACCORDING TO MNDOT SPEC 3897 AND INSTALLED ACCORDING TO MNDOT SPEC 2573.

City of Shorewood

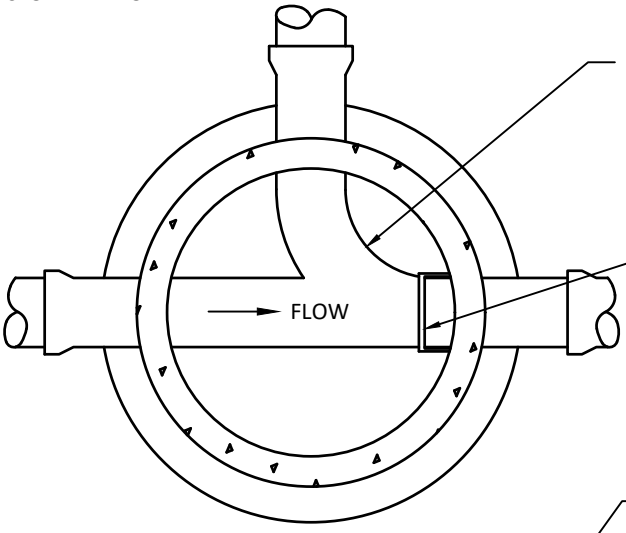
PERIMETER PROTECTION - EROSION LOG

STANDARD DETAILS

REVISED: NOV. 2025

ERO-10

PRECAST INVERT MUST BE 1/2 DIAMETER OF THE PIPE AND BENCHES SLOPED 2" TOWARD THE INVERT.

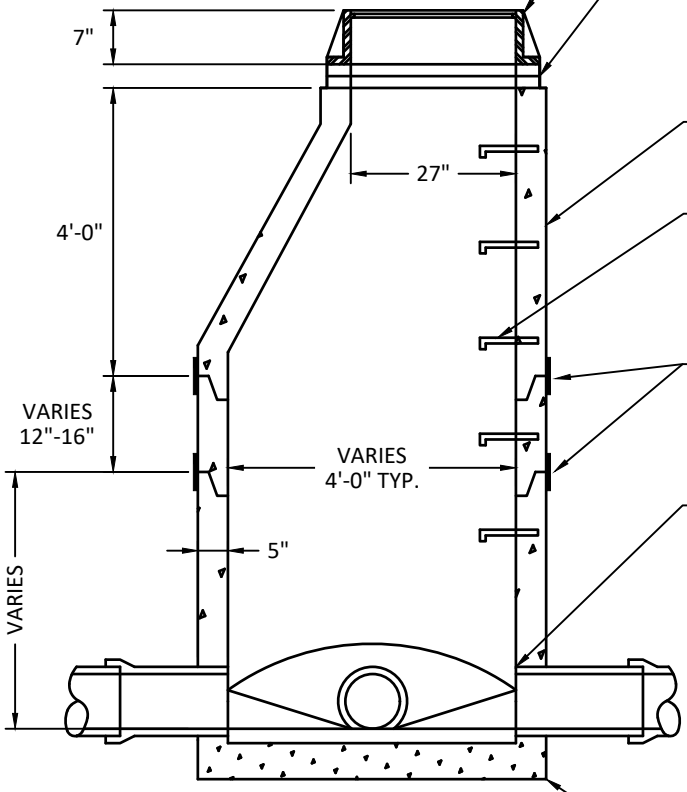


CURVE INVERT IN DOWNSTREAM DIRECTION.

CASTING	A	B
R1642B	27"	7"

MANHOLE STEPS SHALL BE PLACED SO THAT OFFSET VERTICAL PORTION OF CONE IS FACING DOWNSTREAM.

PLAN



SECTION

NEENAH FRAME AND COVER OR EQUAL, LETTERED "SANITARY SEWER" WITH 2 CONCEALED PICK HOLES.

MINIMUM OF 2 AND MAXIMUM OF 5 CONCRETE ADJUSTMENT RINGS WITH FULL BED OF MORTAR BETWEEN EACH RING (1 RING WITH MORTAR = 0.2') OR HDPE ADJUSTING RINGS BEDDED WITH SEALANT MANUFACTURED BY LADTECH, INC. OR APPROVED EQUAL. AN EXTERNAL CHIMNEY SEAL (INFI-SHIELD OR OTHER APPROVED NEOPRENE SEAL) SHALL BE FURNISHED AND INSTALLED AROUND THE CASTING AND ALL ADJUSTMENT RINGS.

MNDOT TYPE "B" ECCENTRIC PRECAST CONCRETE CONE SECTION TYPICAL FOR ALL MANHOLES.

MANHOLE STEPS, NEENAH R1981-SP OR EQUAL, 16" ON CENTER.

ALL JOINTS IN MANHOLE TO HAVE "O" RING RUBBER GASKETS.

8" WIDE, 1/4" THICK BITUMINOUS MASTIC WRAP FULL CIRCUMFERENCE.

PRECAST BARREL WITH INTEGRAL BASE & POURED INVERT REQUIRED.

PIPE SHALL BE CUT OUT FLUSH WITH INSIDE FACE OF WALL.

KOR-N-SEAL MANHOLE BOOT OR EQUAL SHALL BE PROVIDED FOR EACH INVERT.

DOGHOUSES MUST BE GROUTED ON INSIDE AND OUTSIDE.

BLOCK STRUCTURES NOT ALLOWED.

MINIMUM THICKNESS OF PRECAST BASE IS 6" FOR STRUCTURE 14' DEEP OR LESS, AND INCREASES 1" IN THICKNESS FOR EVERY 4' OF DEPTH GREATER THAN 14'.

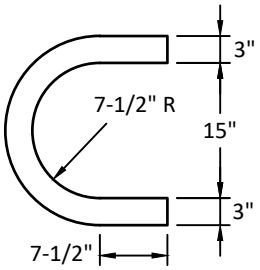
City of Shorewood

SANITARY SEWER MANHOLE

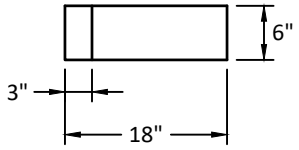
STANDARD DETAILS

REVISED: NOV. 2025

SAN-01



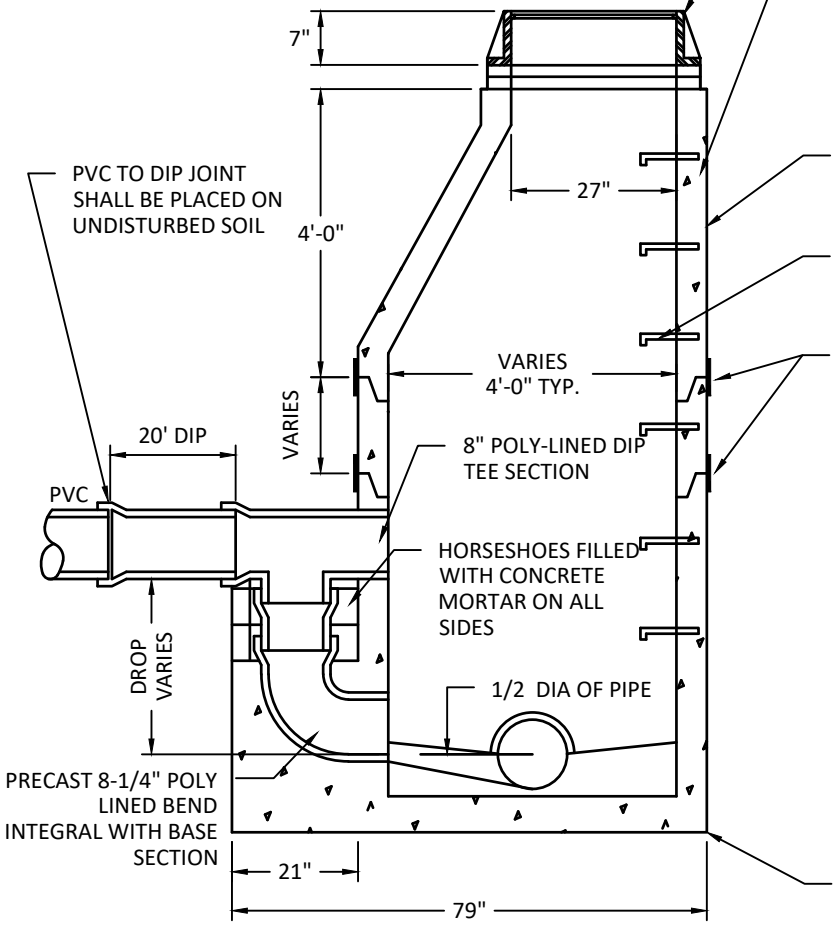
PLAN



SECTION

CASTING	A	B
R1642B	27"	7"

HORSESHOE DETAILS



SECTION

NEENAH FRAME AND COVER OR EQUAL, LETTERED "SANITARY SEWER" WITH 2 CONCEALED PICK HOLES.

MINIMUM OF 2 AND MAXIMUM OF 5 CONCRETE ADJUSTMENT RINGS WITH FULL BED OF MORTAR BETWEEN EACH RING (1 RING WITH MORTAR = 0.2') OR HDPE ADJUSTING RINGS BEDDED WITH SEALANT MANUFACTURED BY LADTECH, INC. OR APPROVED EQUAL. AN EXTERNAL CHIMNEY SEAL (INFI-SHIELD OR OTHER APPROVED NEOPRENE SEAL) SHALL BE FURNISHED AND INSTALLED AROUND THE CASTING AND ALL ADJUSTMENT RINGS.

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8" WIDE, 1/4" THICK BITUMINOUS MASTIC WRAP FULL CIRCUMFERENCE.

ALL JOINTS IN MANHOLE TO HAVE "O" RING RUBBER GASKETS.

PRECAST BARREL WITH INTEGRAL BASE & POURED INVERT REQUIRED.

PIPE SHALL BE CUT OUT FLUSH WITH INSIDE FACE OF WALL.

KOR-N-SEAL MANHOLE BOOT OR EQUAL SHALL BE PROVIDED FOR EACH INVERT.

DOGHOUSES MUST BE GROUTED ON INSIDE AND OUTSIDE.

MINIMUM THICKNESS OF PRECAST BASE IS 6" FOR STRUCTURE 14' DEEP OR LESS, AND INCREASES 1" IN THICKNESS FOR EVERY 4' OF DEPTH GREATER THAN 14'.

BLOCK STRUCTURES NOT ALLOWED.

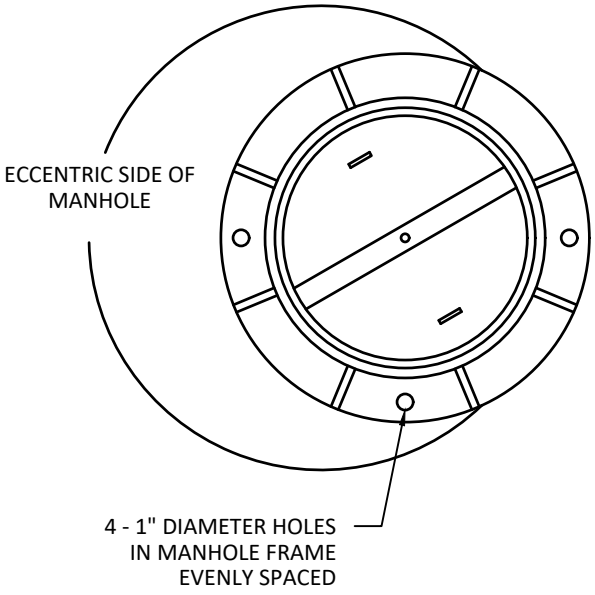
City of Shorewood

SANITARY SEWER DROP INLET MANHOLE

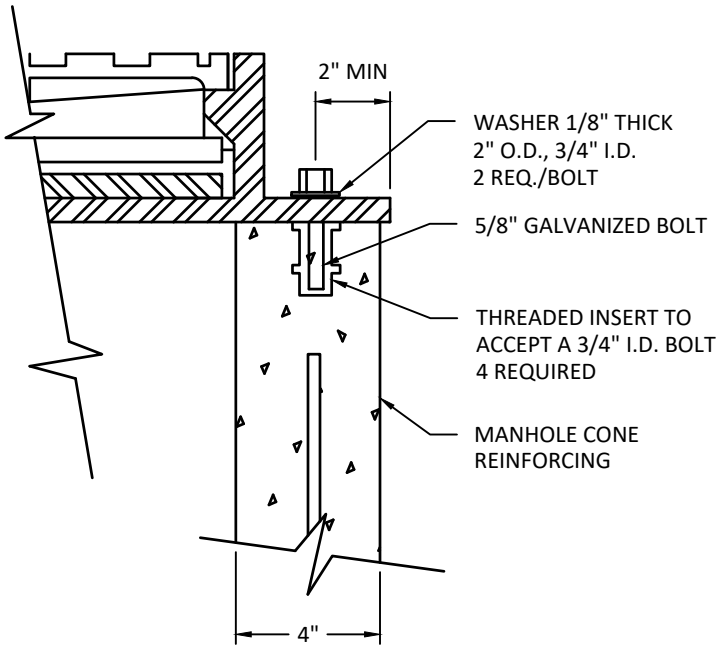
STANDARD DETAILS

REVISED: NOV. 2025

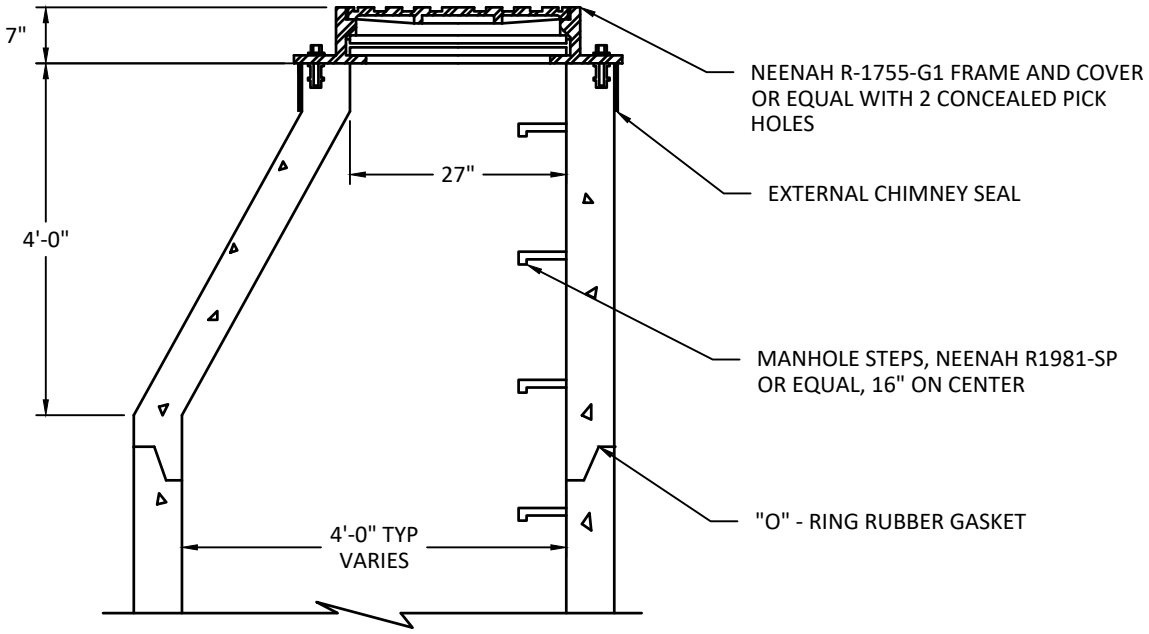
SAN-02



PLAN VIEW TOP COVER REMOVED



TIE DOWN DETAIL



ECCENTRIC WATERTIGHT MANHOLE

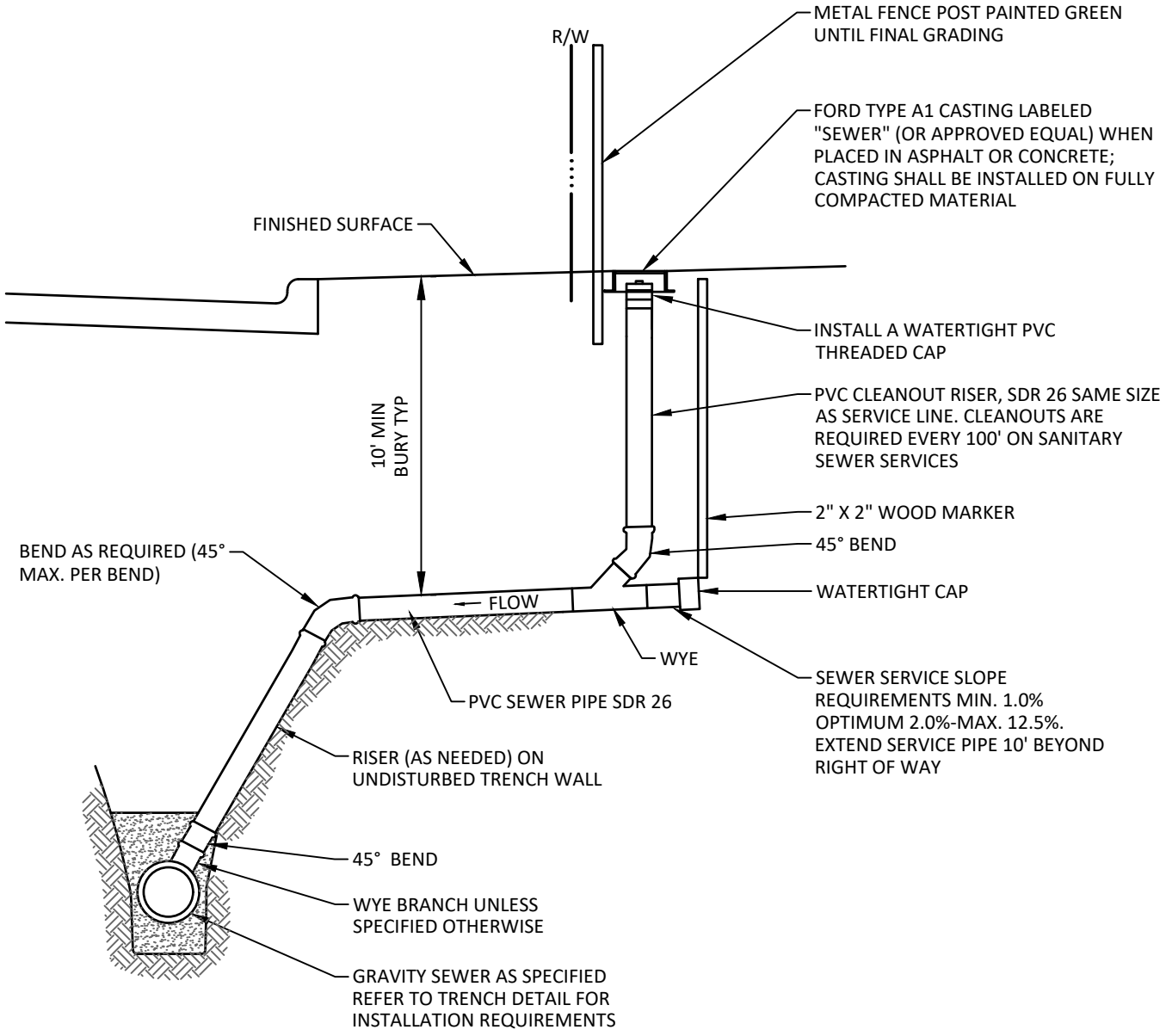
City of Shorewood

WATERTIGHT CASTING FOR SANITARY SEWER MANHOLE

STANDARD DETAILS

REVISED: NOV. 2025

SAN-03



NOTE:

1. ALL SEWER CLEANOUTS SHALL BE PLACED ONE FOOT OUTSIDE THE RIGHT OF WAY.

City of Shorewood

SEWER SERVICE CONNECTION - WITH CLEANOUT

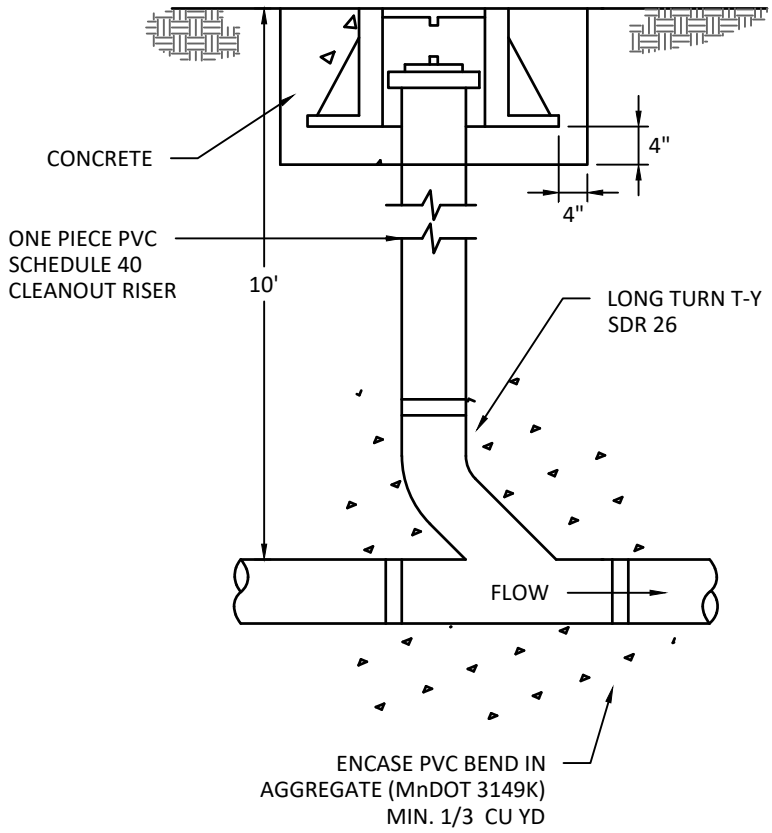
STANDARD DETAILS

REVISED: NOV. 2025

SAN-04

NOTES:

1. 6 HUB WITH THREADED PVC PLUG.
2. ENCLOSE LONG SWEEP BEND OR COMBINATION WYE IN CONCRETE AS SHOWN.
3. FORD A1 LOCKING EQUAL ENCASED IN CONCRETE AS SHOWN WITH #4 REBAR EACH SQUARE EMBEDDED INTO CONCRETE (INCIDENTAL TO CLEANOUT).
4. CLEAN-OUTS ARE REQUIRED EVERY 100' ON SANITARY SEWER SERVICES.
5. CLEAN-OUTS SHALL BE LOCATED OUTSIDE OF THE ROADWAY.



IN LINE CLEANOUT

City of Shorewood

PVC SERVICE LINE CLEANOUTS

STANDARD DETAILS

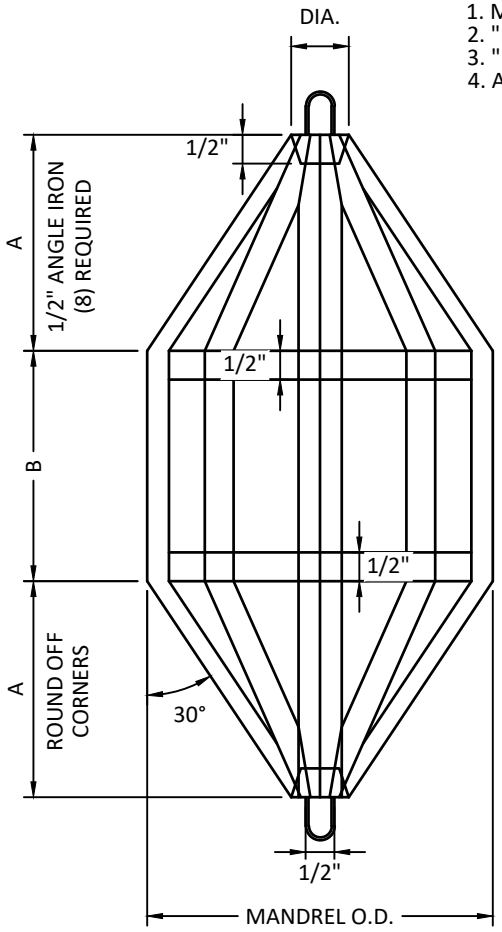
REVISED: NOV. 2025

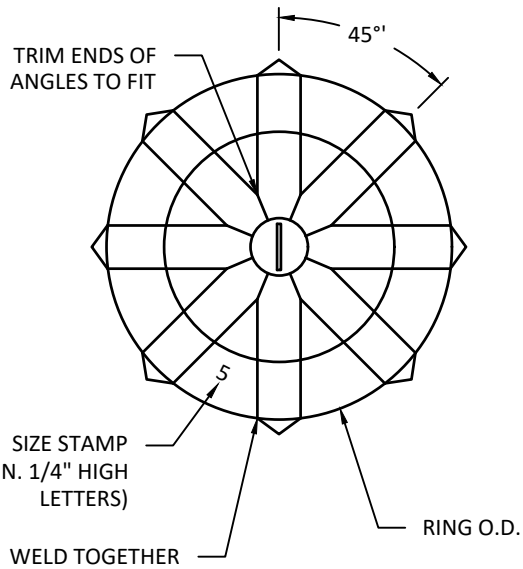
SAN-05

ASTM D3034		SDR 35			SDR 26				
PIPE SIZE	A	BASE INSIDE DIAMETER	MANDREL OUTSIDE DIAMETER	RING OUTSIDE DIAMETER	B	BASE INSIDE DIAMETER	MANDREL OUTSIDE DIAMETER	RING OUTSIDE DIAMETER	B
INCHES	INCHES	INCHES	INCHES	INCHES	INCHES	INCHES	INCHES	INCHES	INCHES
6	4	5.742	5.46	4.74	3.6	5.612	5.33	4.62	3.5
8	6	7.665	7.28	6.57	4.9	7.488	7.11	6.40	4.7
10	6	9.563	9.08	8.37	6.4	9.342	8.87	8.16	6.2
12	8	11.361	10.79	10.08	7.9	11.102	10.55	9.84	7.7
15	9	13.898	13.20	12.49	10.0	13.575	12.90	12.19	9.7

NOTES:

1. MANDREL OUTSIDE DIAMETER = BASE INSIDE DIAMETER X 0.95.
2. "B" DIMENSION FOR 6" PIPE IS FOR 1" NPS PIPE.
3. "B" DIMENSION FOR 8", 10", 12", 15" PIPE IS FOR 1¼" NPS PIPE.
4. ADJUST "B" DIMENSION AS REQUIRED FOR OTHER PIPE SIZES.





GO, NO-GO 5% DEFLECTION TESTING
MANDREL FOR FLEXIBLE SEWER PIPE

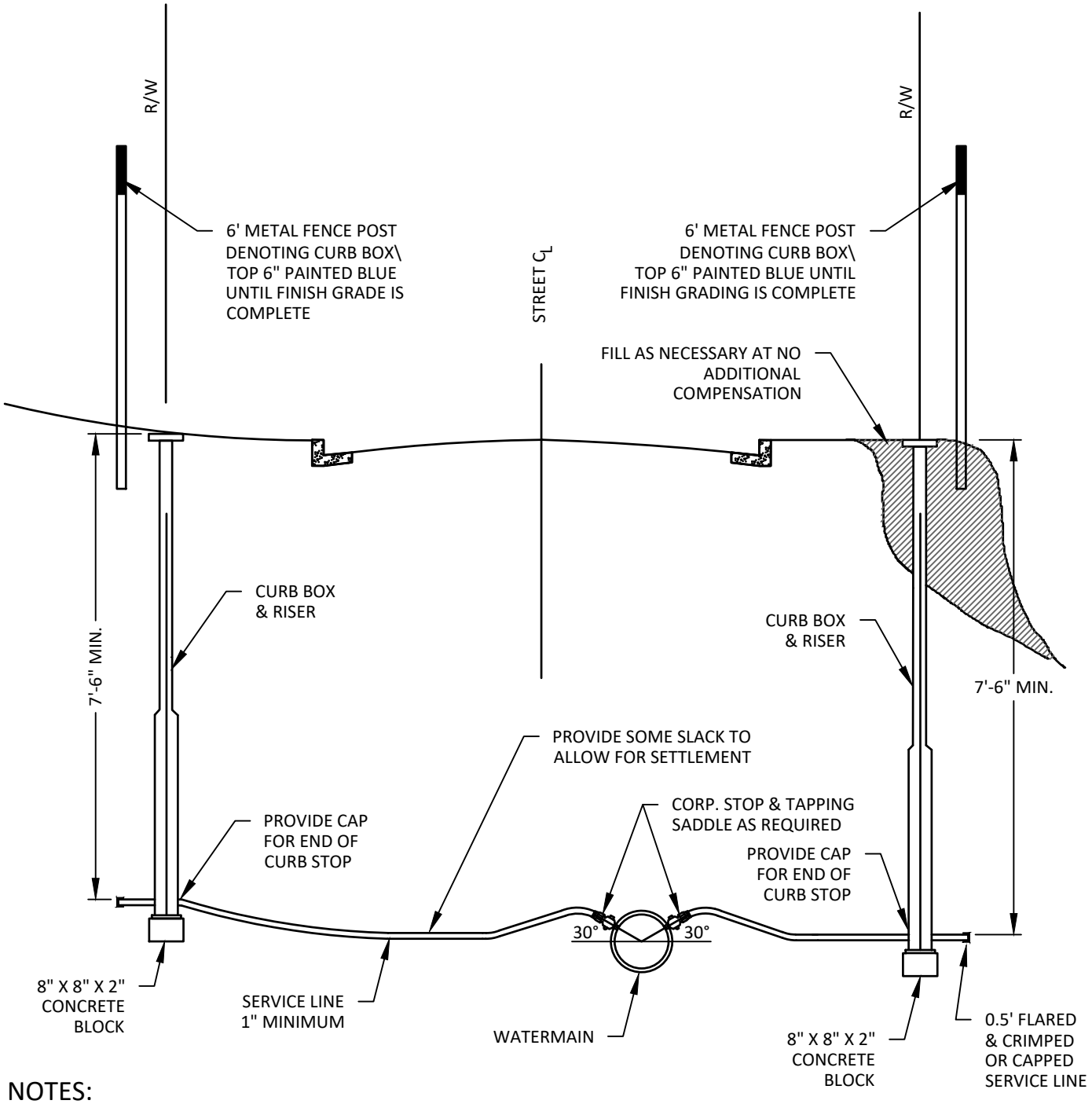
City of Shorewood

MANDREL DETAIL

STANDARD DETAILS

REVISED: NOV. 2025

SAN-06



NOTES:

1. THE SERVICE LINE BETWEEN THE MAIN LINE AND CURB BOX SHALL BE ONE CONTINOUS PIECE, SPLICES WILL NOT BE PERMITTED.
2. SADDLE REQUIRED ON ALL EXISTING PIPES, 6" D.I.P OR SMALLER, AND ALL P.V.C.
3. CURB BOXES LOCATED WITHIN PAVED SURFACE SHALL RECEIVE A FORD AI METER BOX COVER.

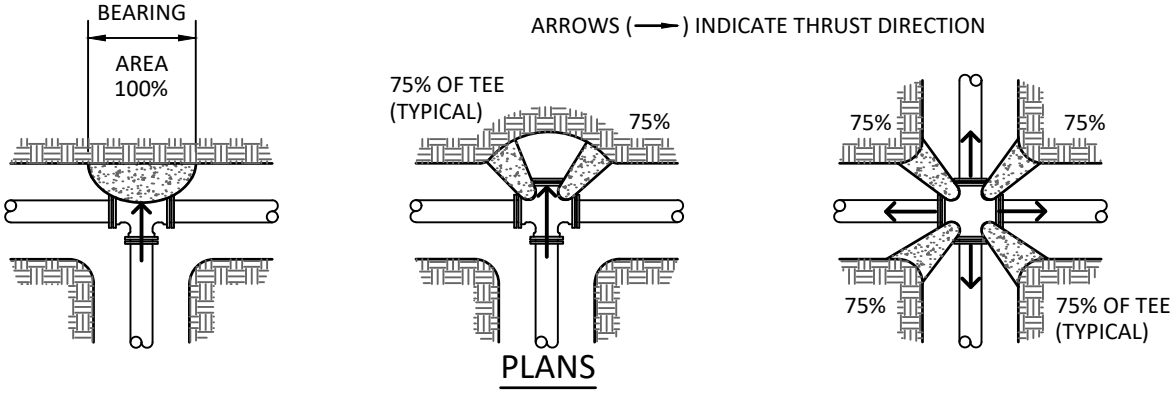
City of Shorewood

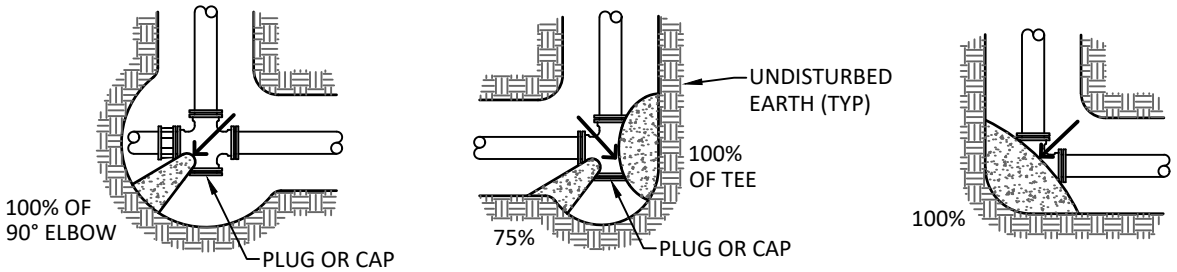
WATER SERVICE CONNECTION

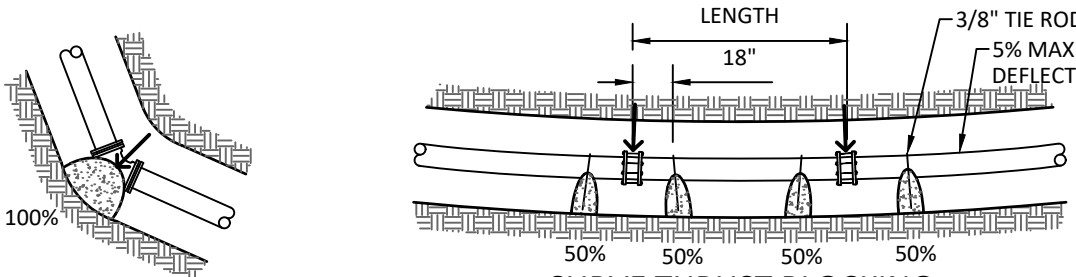
STANDARD DETAILS

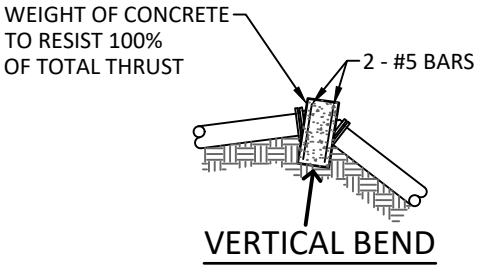
REVISED: NOV. 2025

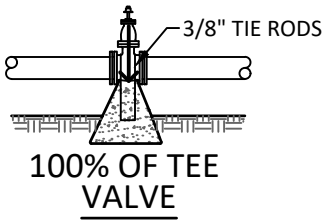
WAT-01

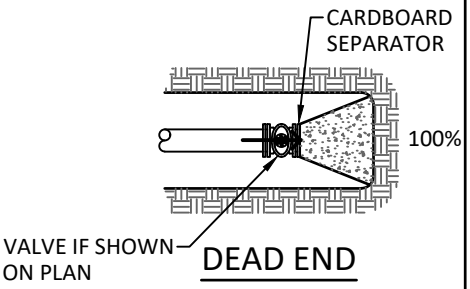












100% BEARING AREA (SQ FT)				
PIPE SIZE	DEAD END OR TEE	90° ELBOW	45° ELBOW	22 1/2° ELBOW
4	2.4	3.4	1.9	0.9
6	4.9	6.9	3.8	1.9
8	8.4	11.8	6.4	3.4
10	13.7	19.3	10.5	5.4
12	19.4	27.3	14.9	7.7
14	26.3	37.0	20.1	10.3
16	34.0	47.9	26.2	13.3
18	43.9	61.8	33.7	17.2
20	54.3	76.4	41.7	21.2
24	77.9	109.8	59.8	30.5

NOTE:

BEARING AREAS ARE BASED ON 250 LB MAXIMUM PRESSURE AND SOIL BEARING STRENGTH OF 2000 LB/SQ FT.

NOTES:

1. FIGURE (100%) AT THRUST BLOCK INDICATES PERCENT OF TOTAL THRUST TO BE APPLIED FOR BEARING AREA.

2. CONCRETE FOR THRUST BLOCKS TO BE 2000 PSI.

3. RESTRAINING RODS ARE REQUIRED AT ALL TEES AND AT BENDS DEFLECTING 22-1/2° OR MORE.

4. WRAP THE PIPE WITH POLYETHYLENE WRAPPING PRIOR TO POURING THE THRUST BLOCK.

5. SEE SOILS REPORT FOR BEARING STRENGTH OF SOIL. IN ABSENCE OF A SOILS REPORT, AN AVERAGE SOIL (SPADABLE MEDIUM CLAY) CAN BE ASSUMED TO HAVE A BEARING STRENGTH OF 2000 PSI.

6. THRUST BLOCKS ARE NOT REQUIRED ON PVC WITH SOLVENT WELDED JOINTS.

SIDE THRUST PER 100 LB/SQ IN PRESSURE PER DEGREE OF DEFLECTION			
PIPE SIZE	SIDE THRUST-LB	PIPE SIZE	SIDE THRUST-LB
4	35	14	377
6	72	16	486
8	122	18	665
10	197	20	790
12	278	24	1150

MULTIPLY THRUST BY DEGREE OF DEFLECTION TO OBTAIN TOTAL THRUST

City of Shorewood

THRUST BLOCKS

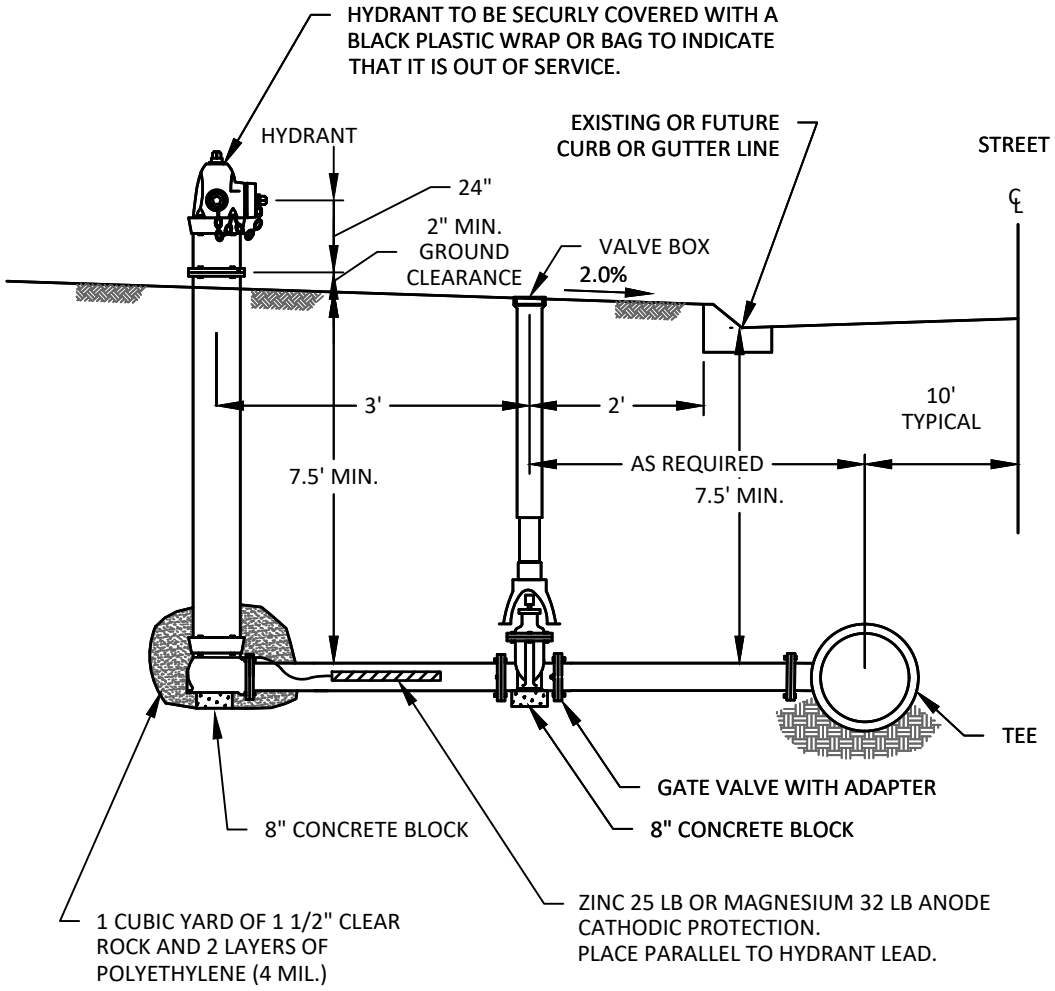
STANDARD DETAILS

REVISED: NOV. 2025

WAT-02

"HYDRANTS SHALL BE WATEROUS PACER" (WB67-250
PACER OR EQUAL - WITH OIL RESERVOIR)

NOZZLE ARRANGEMENT
TWO 2-1/2" HOSE STORZ NOZZLES
ONE 4-1/2" PUMPER STORZ NOZZLES



NOTES:

1. ALL HYDRANTS SHALL HAVE WEEP HOLES. DRAIN HOLES BELOW NORMAL WATER TABLE TO BE PLUGGED AND SHALL BE EQUIPPED WITH TAG STATING "PUMP AFTER USE".
2. MINIMUM 7.5' COVER OVER MAIN.
3. ALL THREE NOZZLE CAPS SHALL BE PAINTED PRIOR TO DELIVERY WITH SIERRA BRAND REFLECTIVE PAINT CODE M0525 SIERRA SILVER. THE PAINT SHALL BE APPLIED PER MANUFACTURER'S SPECS.
4. ALL JOINTS SHALL BE RESTRAINED VIA MEGA-LUGS MECHANICAL JOINT RESTRAINT.
5. ALL HYDRANTS TO BE PLUMB TO VERTICAL AXIS, MAXIMUM ALLOWABLE DEVIATION TO BE 1/2" PER FOOT OF HYDRANT.

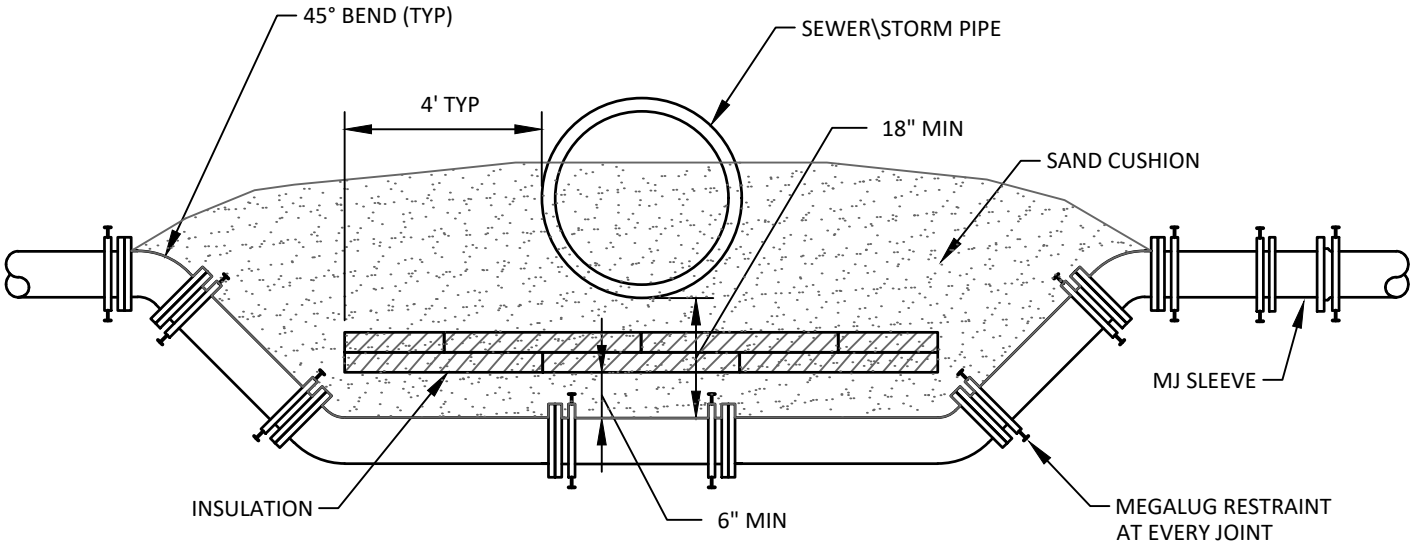
City of Shorewood

TYPICAL HYDRANT INSTALLATION

STANDARD DETAILS

REVISED: NOV. 2025

WAT-03



NOTES:

1. PROVIDE MEGALUG RESTRAINT AT JOINT ON BENDS AND AS SHOWN THIS DETAIL.
2. COAT ALL ANCHORAGE AS PER SPECS.
3. PROVIDE SAND CUSHION BETWEEN TOP OF WATERMAIN AND BOTTOM OF SEWER\STORM PIPE, MIN DIMENSIONS AS SHOWN THIS DETAIL.
4. INSULATION TO BE 4" THICK POLYSTYRENE WITH OFFSET JOINTS.

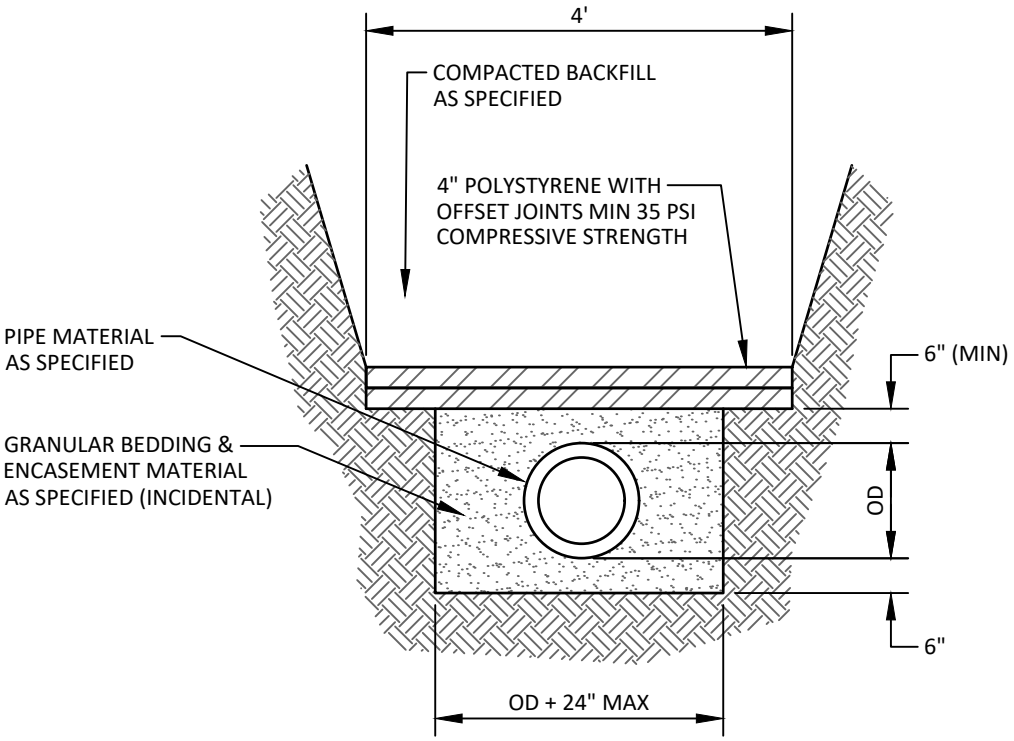
City of Shorewood

WATERMAIN INSULATION & LOWERING

STANDARD DETAILS

REVISED: NOV. 2025.

WAT-04



NOTES:

1. GRASSY AREAS REQUIRE INSULATION WHEN LESS THAN 5.5 FEET OF COVER OR AS DIRECTED BY THE ENGINEER.
2. AREAS SUSCEPTIBLE TO TRAFFIC REQUIRE INSULATION WHEN LESS THAN 6.5 FEET OF COVER OR AS DIRECTED BY THE ENGINEER.

City of Shorewood

INSULATION DETAIL

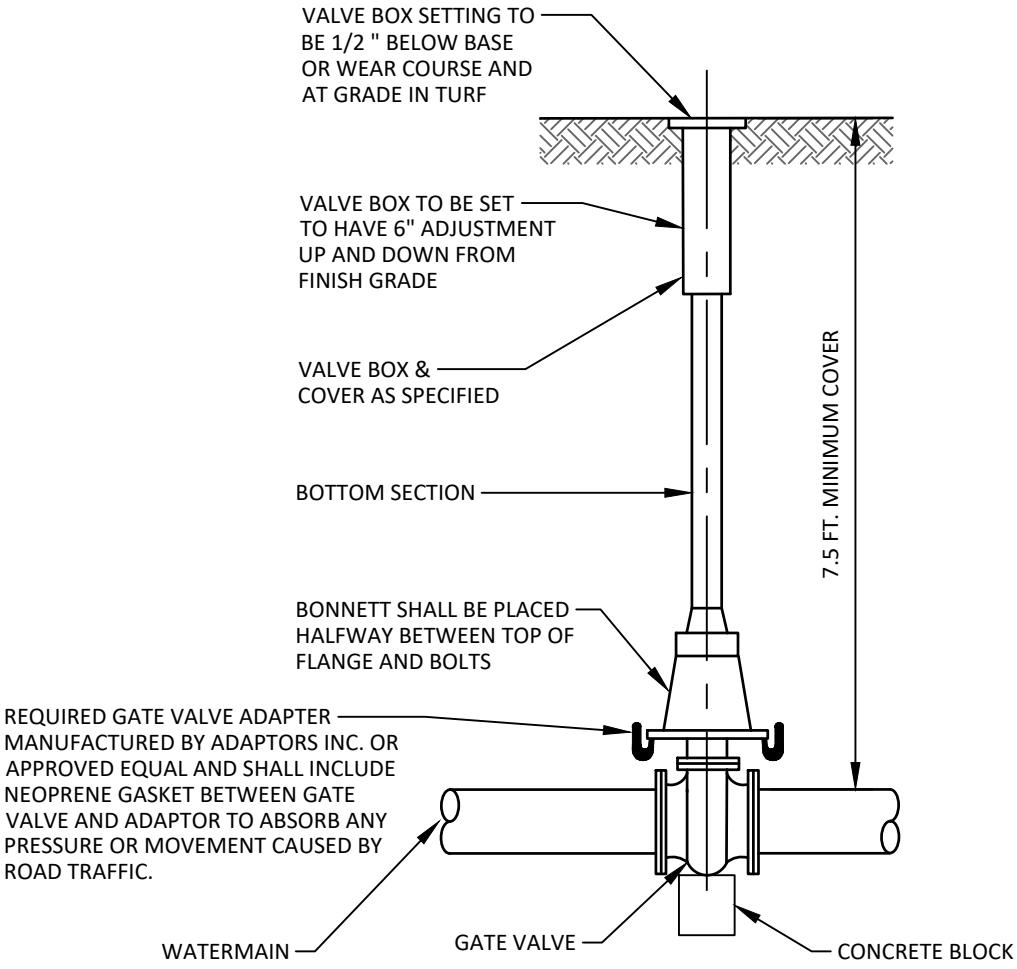
STANDARD DETAILS

REVISED: NOV. 2025

WAT-05

NOTES:

1. VALVE BOX SHALL BE CENTERED ON OPERATING NUTS, STRAIGHT, FREE FROM DEBRIS, AND ALL SECTIONS UNBROKEN
2. VALVES IN EASEMENTS SHALL HAVE CHANNEL POST WITNESS MARKERS WITH REFLECTIVE "GV" SIGN
3. DEEP VALVES SHALL HAVE NUT EXTENSIONS INSTALLED TO ELEVATION TO ACCOMMODATE STANDARD 10' KEY; BOTTOM NUT SHALL BE BOLTED TO VALVE NUT AND ONLY ONE SECTION
4. COMPACTION WITH MECHANICAL TAMPER AROUND VALVE BOX SHALL BE PLACED AND COMPACTED WITH 2' LIFTS TO ACHIEVE 95% COMPACTION
5. GATE VALVES LOCATED WITHIN THE CONCRETE SIDEWALK SHALL INCLUDE A METAL SEPARATOR BETWEEN THE VALVE BOX AND THE CONCRETE
6. VALVE INSULATION TO INCLUDE ANODE BAG.



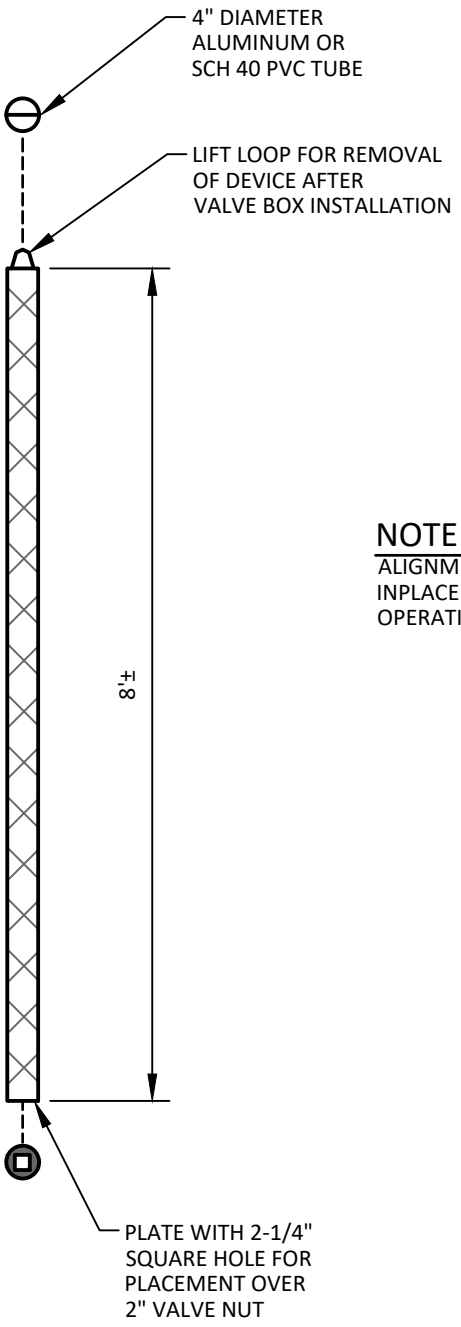
City of Shorewood

GATE VALVE AND BOX INSTALLATION

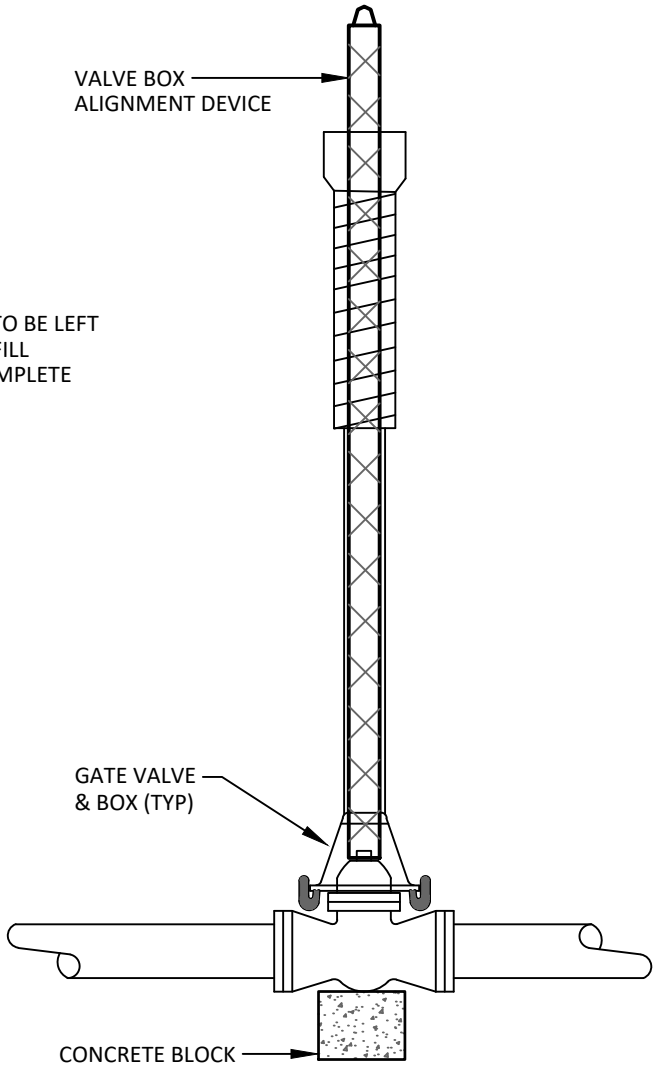
STANDARD DETAILS

REVISED: NOV. 2025

WAT-06



NOTE:
ALIGNMENT DEVICE TO BE LEFT INPLACE UNTIL BACKFILL OPERATIONS ARE COMPLETE



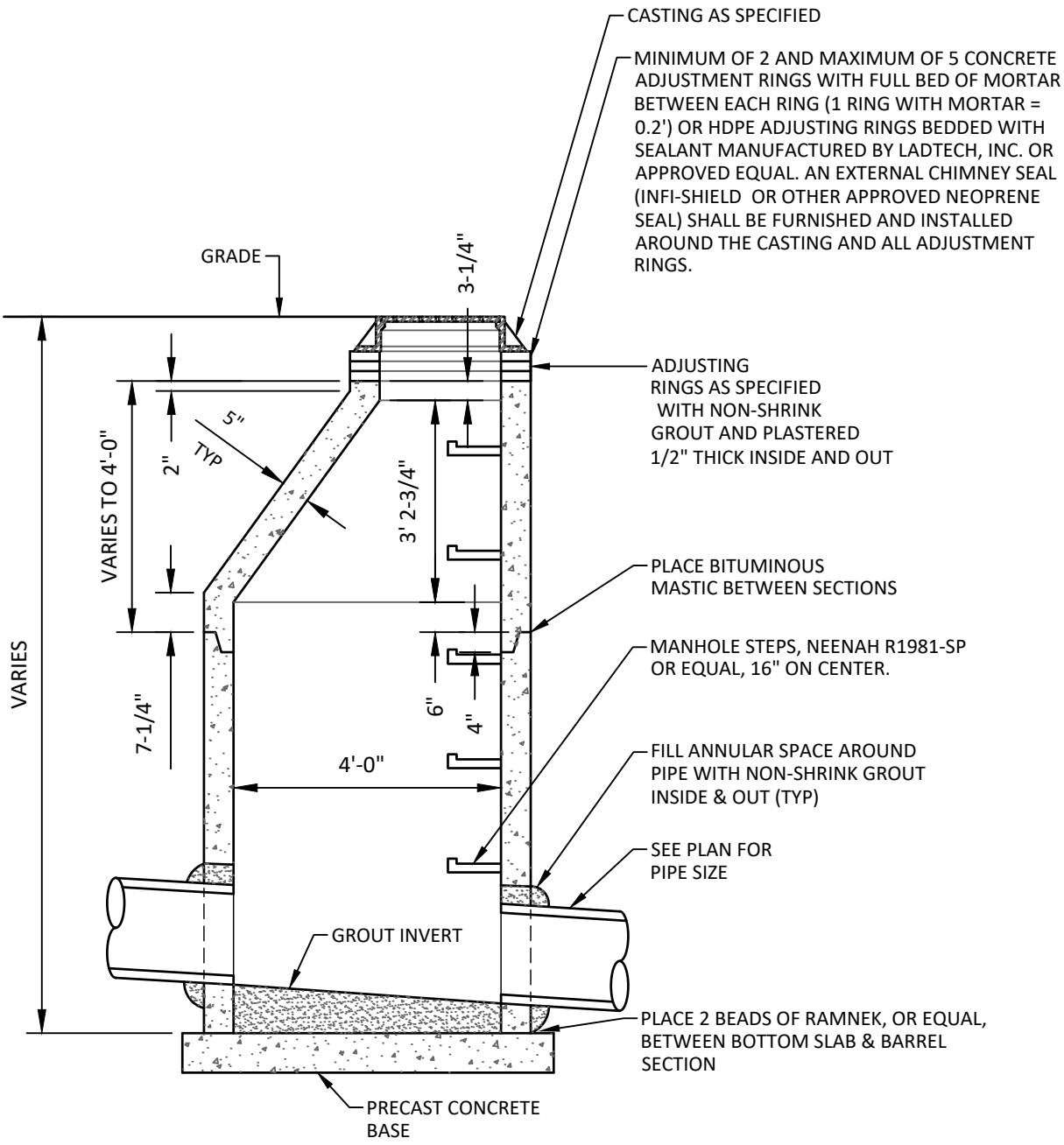
City of Shorewood

GATE VALVE BOX ALIGNMENT DEVICE

STANDARD DETAILS

REVISED: NOV. 2025

WAT-07



City of Shorewood

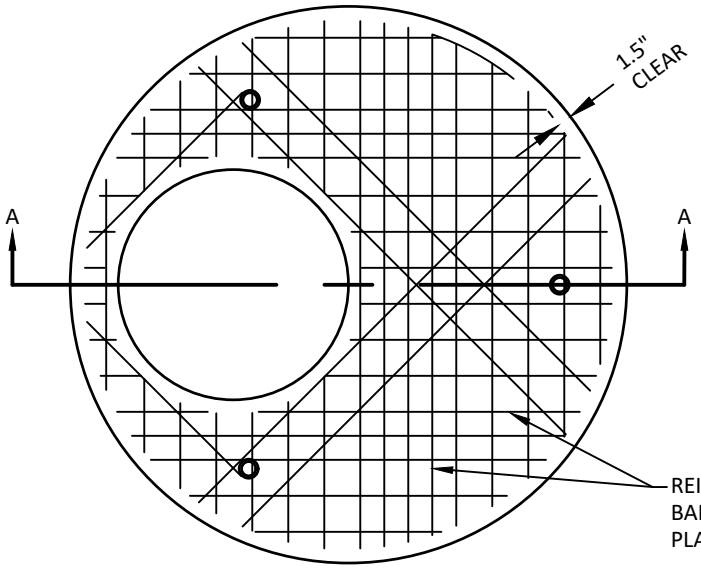
STORM SEWER MANHOLE

STANDARD DETAILS

REVISED: NOV. 2025

STO-01

TYPICAL DESIGN 4020
MANHOLE/CATCH BASIN

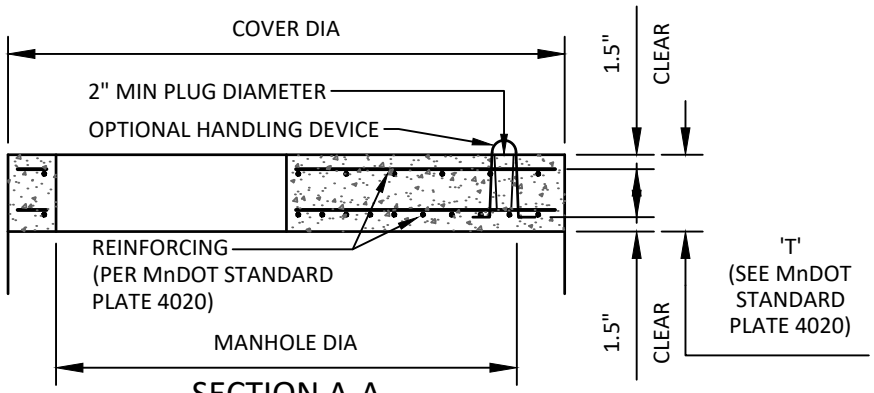


PLAN OF COVER TOP BARS NOT SHOWN

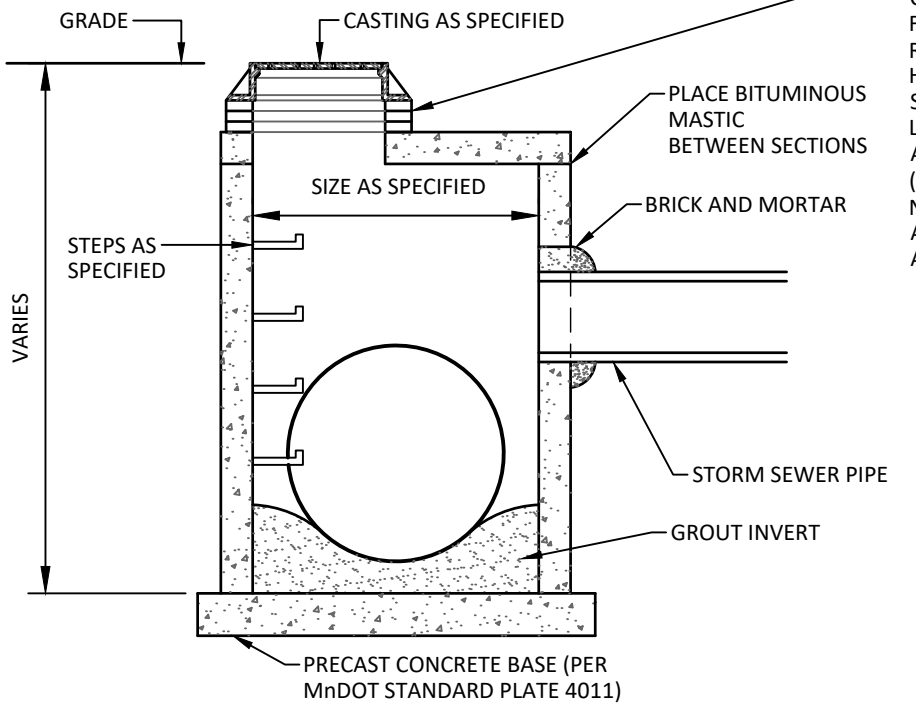
NOTES:

1. AASHTO HS 25 LOADING MAX FILL HEIGHT 15'
2. THE # 4020 SHALL BE PERMANENTLY MARKED ON THE TOP COVER
3. EQUIVALENT STEEL AREAS IN WIRE MESH MAY BE USED
4. REINFORCEMENT PER SPEC 3301, GRADE 60 A SINGLE HOOP OF 8ga STEEL WIRE

DESIGNATION:
DESIGN DIAMETER -
STANDARD PLATE #
DESIGN 48-4020



SECTION A-A



MINIMUM OF 2 AND MAXIMUM OF 5 CONCRETE ADJUSTMENT RINGS WITH FULL BED OF MORTAR BETWEEN EACH RING (1 RING WITH MORTAR = 0.2') OR HDPE ADJUSTING RINGS BEDDED WITH SEALANT MANUFACTURED BY LADTECH, INC. OR APPROVED EQUAL. AN EXTERNAL CHIMNEY SEAL (INFI-SHIELD OR OTHER APPROVED NEOPRENE SEAL) SHALL BE FURNISHED AND INSTALLED AROUND THE CASTING AND ALL ADJUSTMENT RINGS.

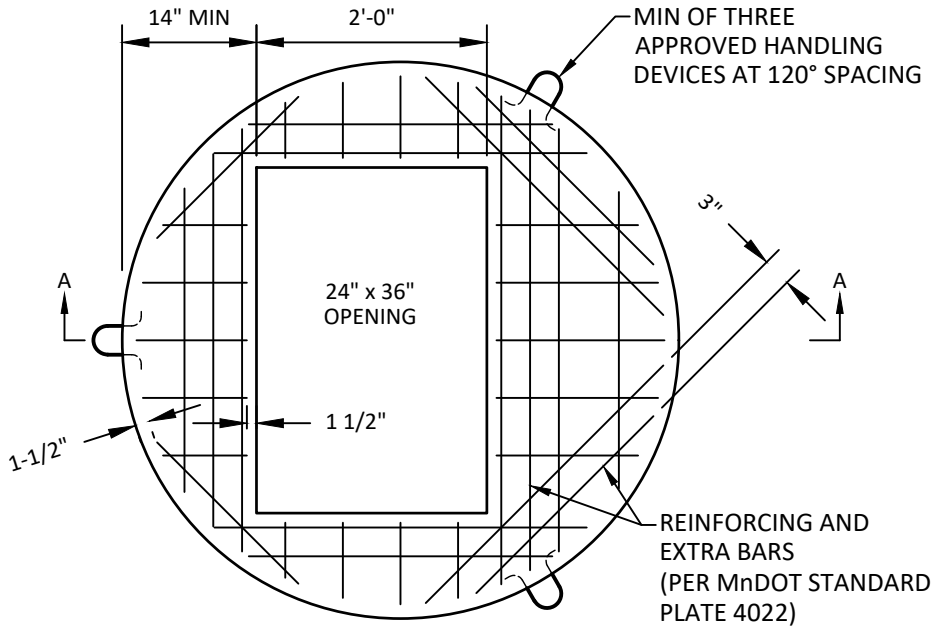
City of Shorewood

STORM SEWER STRUCTURE DESIGN 4020

STANDARD DETAILS

REVISED: NOV. 2025

STO-02



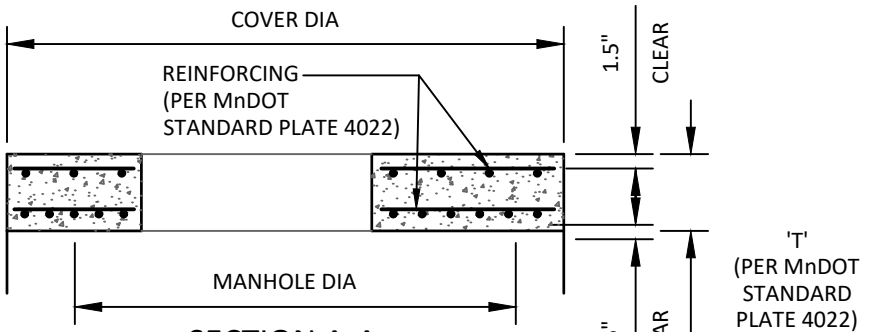
TYPICAL DESIGN 4022 CATCH BASIN

NOTES:

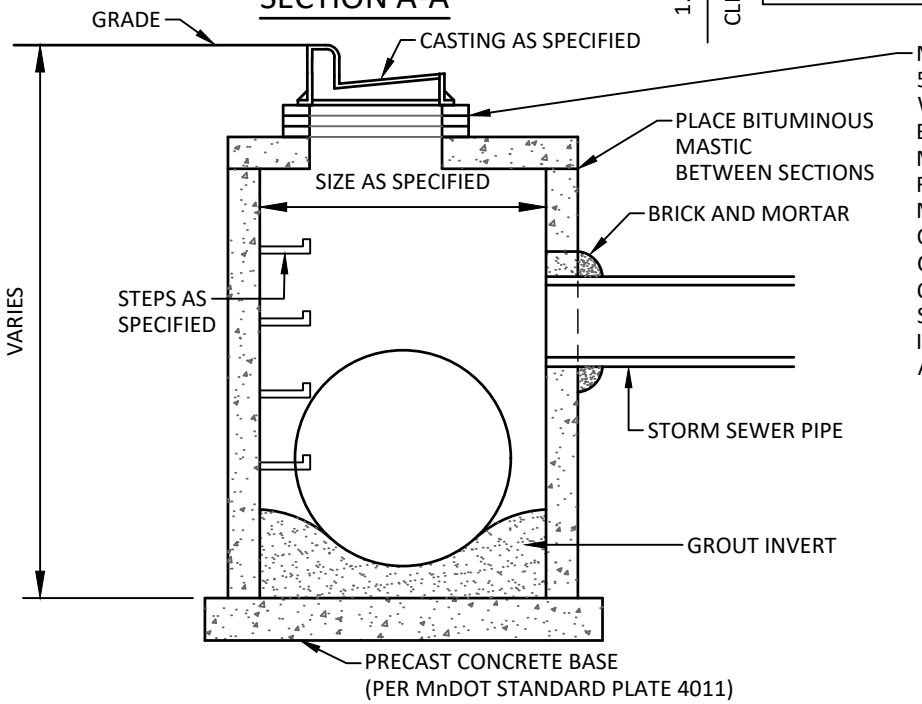
1. AASHTO HS 25 LOADING MAX FILL HEIGHT 15'
2. THE # 4022 SHALL BE PERMANENTLY MARKED ON THE TOP COVER
3. EQUIVALENT STEEL AREAS IN WIRE MESH MAY BE USED
4. REINFORCEMENT PER SPEC 3301, GRADE 60 A SINGLE HOOP OF 8ga STEEL WIRE

DESIGNATION:
DESIGN DIAMETER - STANDARD PLATE # DESIGN 48-4020

PLAN OF COVER TOP BARS NOT SHOWN



SECTION A-A



MINIMUM OF 2 AND MAXIMUM OF 5 CONCRETE ADJUSTMENT RINGS WITH FULL BED OF MORTAR BETWEEN EACH RING (1 RING WITH MORTAR = 0.2') OR HDPE ADJUSTING RINGS BEDDED WITH SEALANT MANUFACTURED BY LADTECH, INC. OR APPROVED EQUAL. AN EXTERNAL CHIMNEY SEAL (INFI-SHIELD OR OTHER APPROVED NEOPRENE SEAL) SHALL BE FURNISHED AND INSTALLED AROUND THE CASTING AND ALL ADJUSTMENT RINGS.

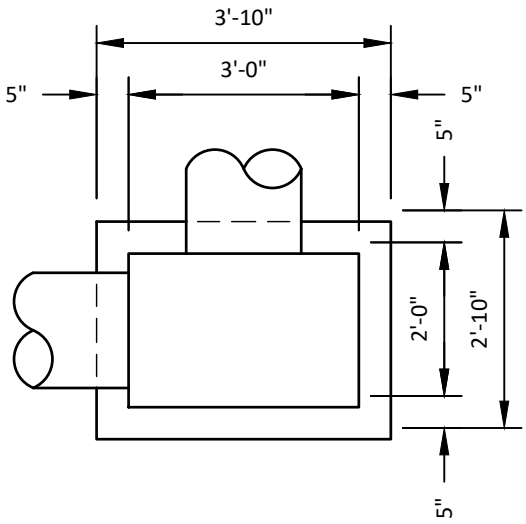
City of Shorewood

STORM SEWER STRUCTURE DESIGN 4022

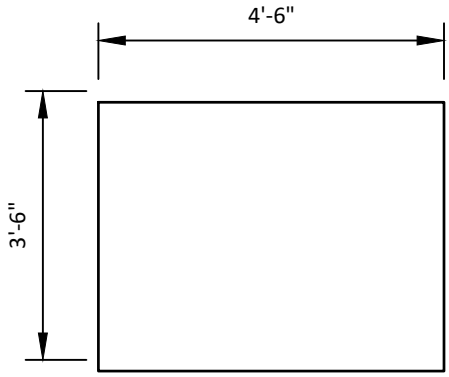
STANDARD DETAILS

REVISED: NOV. 2025

STO-03

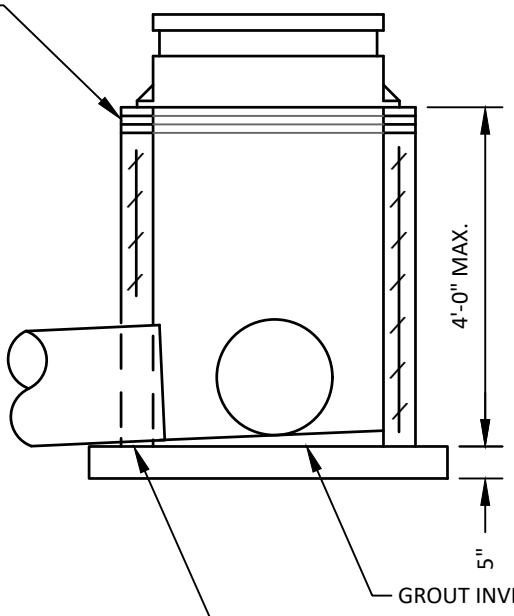


CATCH BASIN PLAN



BASE SLAB PLAN

MINIMUM OF 2 AND MAXIMUM OF 5 CONCRETE ADJUSTMENT RINGS WITH FULL BED OF MORTAR BETWEEN EACH RING (1 RING WITH MORTAR = 0.2') OR HDPE ADJUSTING RINGS BEDDED WITH SEALANT MANUFACTURED BY LADTECH, INC. OR APPROVED EQUAL. AN EXTERNAL CHIMNEY SEAL (INFI-SHIELD OR OTHER APPROVED NEOPRENE SEAL) SHALL BE FURNISHED AND INSTALLED AROUND THE CASTING AND ALL ADJUSTMENT RINGS.



SECTION

NOTES:

1. CASTING PER CONSTRUCTION DOCUMENTS
2. PIPE CUT-OUTS PER CONSTRUCTION DOCUMENTS
3. DOGHOUSES MUST BE GROUTED INSIDE & OUT
4. MIN REINFORCING SHALL BE WIRE FABRIC HAVING AN AREA OF NOT LESS THAN 0.12 SQ IN PER FOOT IN BOTH DIRECTIONS

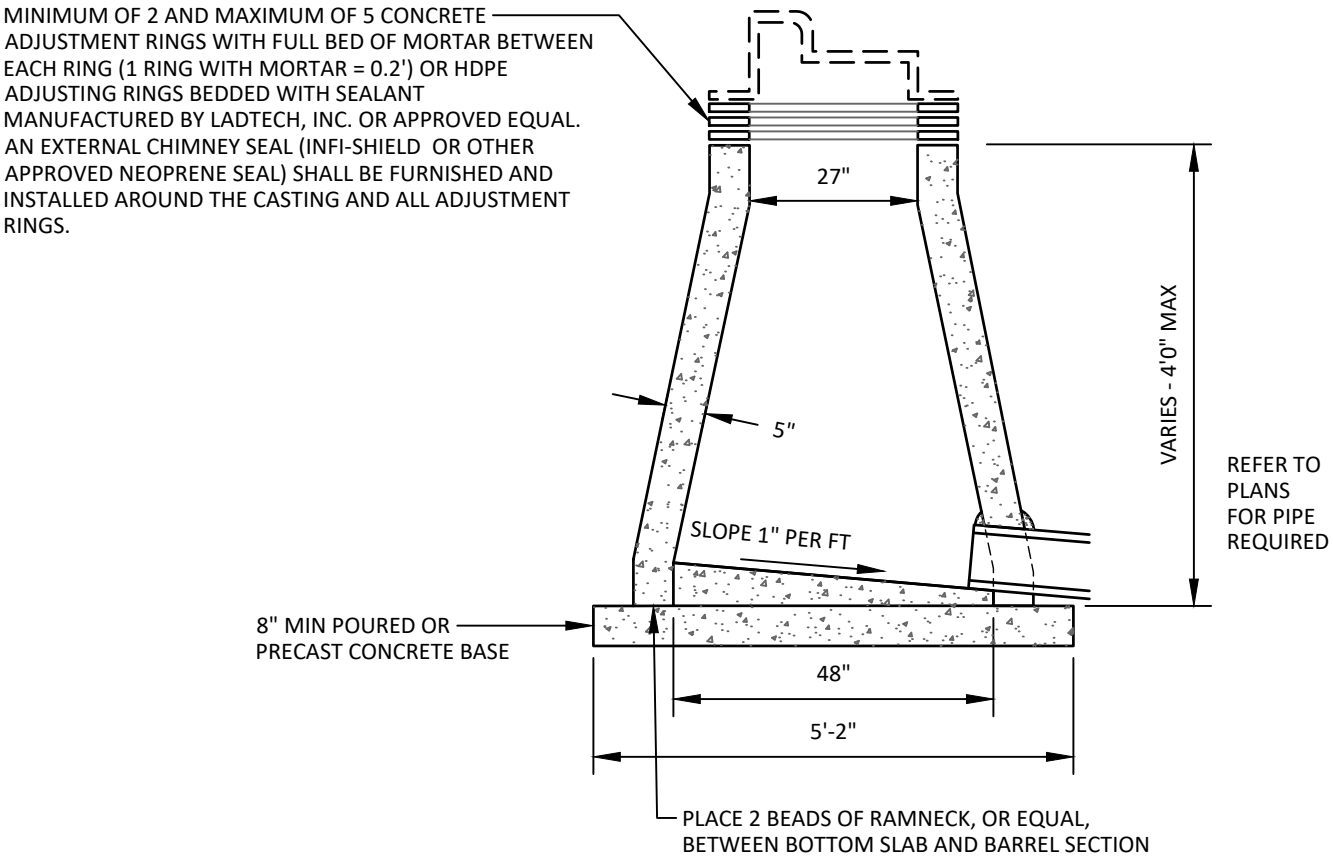
City of Shorewood

CATCHBASIN 2' X 3' BOX

STANDARD DETAILS

REVISED: NOV. 2025

STO-04

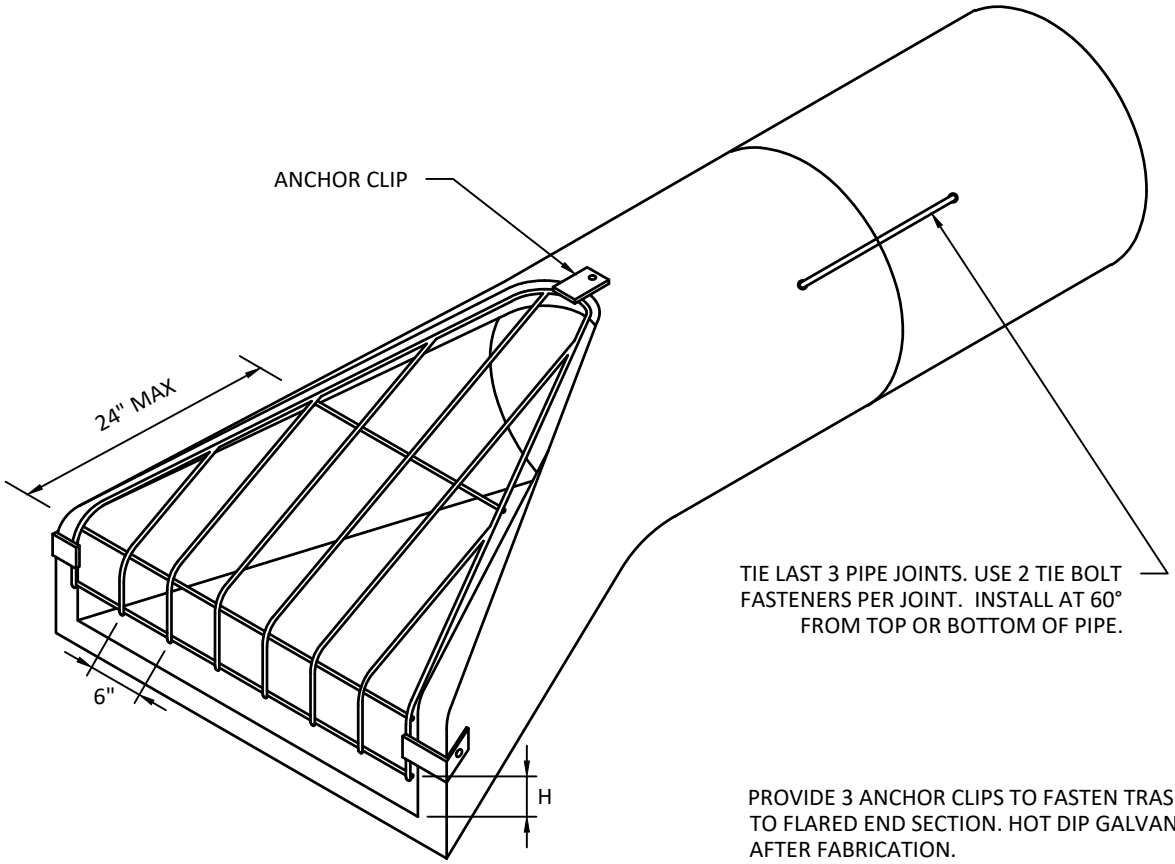


NOTES:

1. CASTING PER CONSTRUCTION DOCUMENTS.
2. PIPE CUT OUTS PER CONSTRUCTION DOCUMENTS.
3. DOGHOUSES MUST BE GROUTED INSIDE AND OUT.

City of Shorewood	CATCHBASIN MANHOLE DESIGN G	STANDARD DETAILS	
		REVISED: NOV. 2025	STO-05

SEE STANDARD PLATE NO. STO-07 FOR RIPRAP PLACEMENT.



PROVIDE 3 ANCHOR CLIPS TO FASTEN TRASH GUARD TO FLARED END SECTION. HOT DIP GALVANIZE AFTER FABRICATION.

ANCHOR BOTH SIDES.

TRASH GUARD SIZING

PIPE SIZE	BARS	'H'	BOLTS
12" - 18"	(NO TRASH GUARD FOR 12" - 18")		
21" - 42"	1" O.D.	6"	3/4"
48" - 72"	1-1/4" O.D.	12"	1"

City of Shorewood

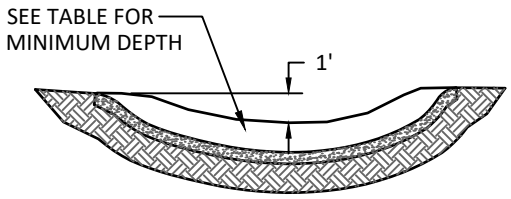
FLARED END SECTION AND TRASH GUARD

STANDARD DETAILS

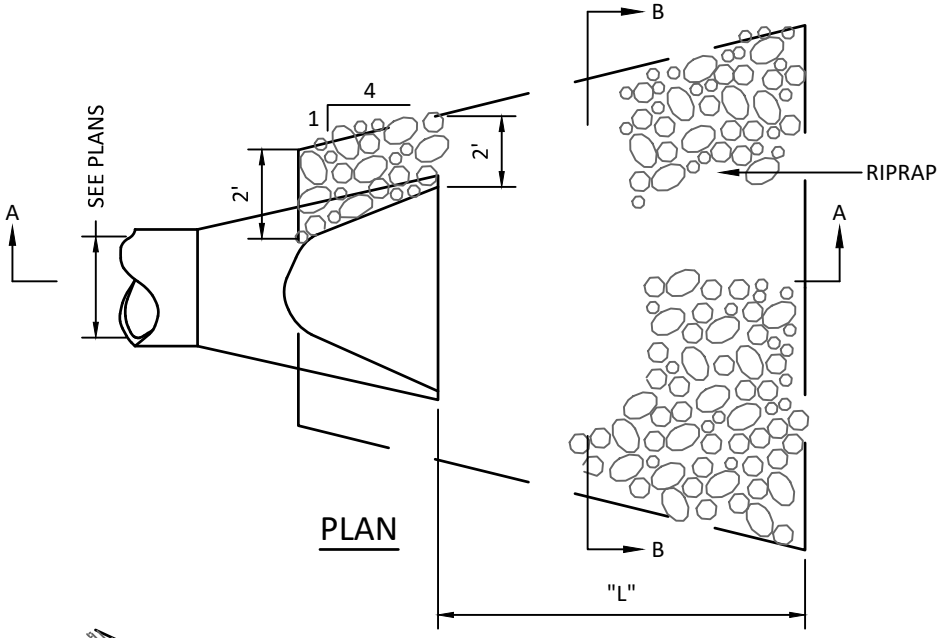
REVISED: NOV. 2025

STO-06

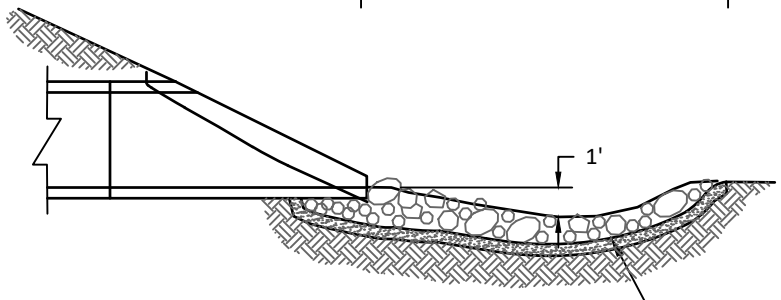
		CLASS II d50=6"	CLASS III d50=9"	CLASS IV d50=12"
ROUND PIPE DIA (IN)	L (FT)	12" DEPTH RIPRAP (CU YD)	18" DEPTH RIPRAP (CU YD)	24" DEPTH RIPRAP (CU YD)
12	8	5	8	10
15	8	5	8	10
18	10	6	10	15
21	10	8	15	15
24	12	10	15	20
27	12	10	15	20
30	14	15	20	25
36	16	18	25	30
42	18	20	30	40
48	20	20	40	50



SECTION B-B



PLAN



SECTION A-A

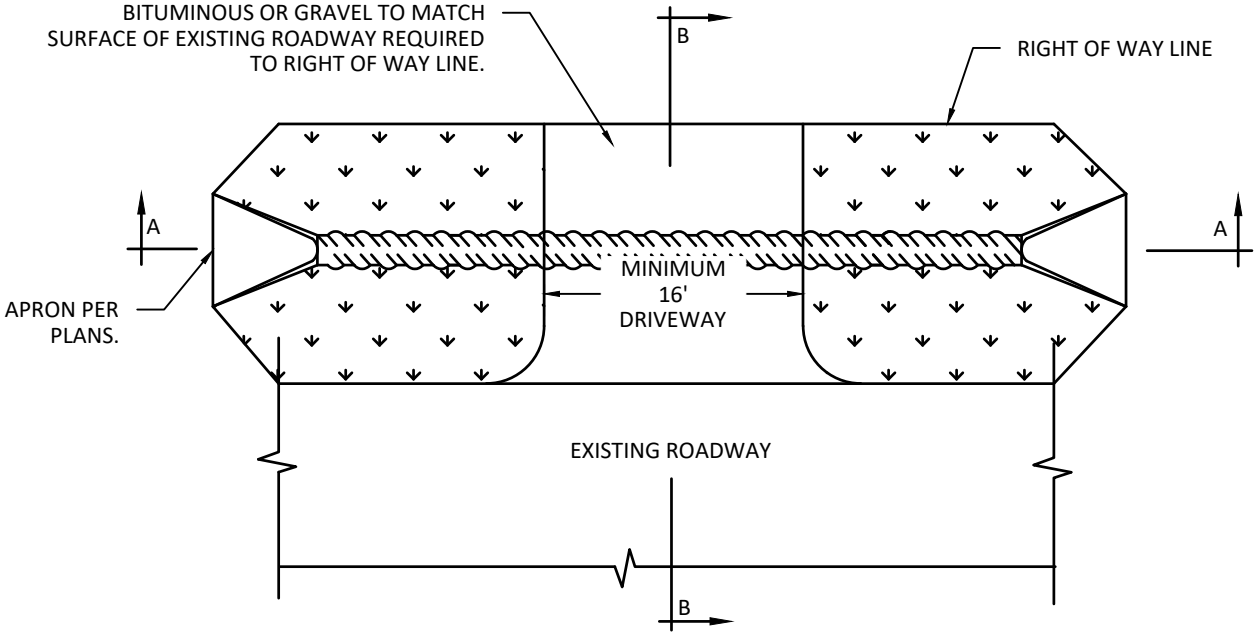
City of Shorewood

RIPRAP AT OUTLETS

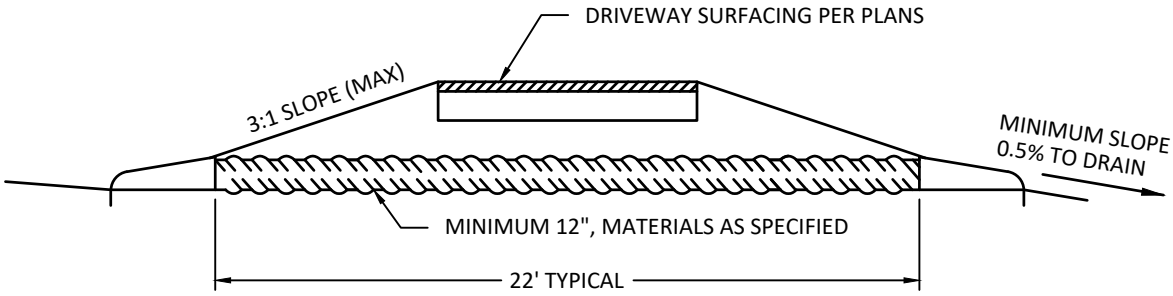
STANDARD DETAILS

REVISED: NOV. 2025

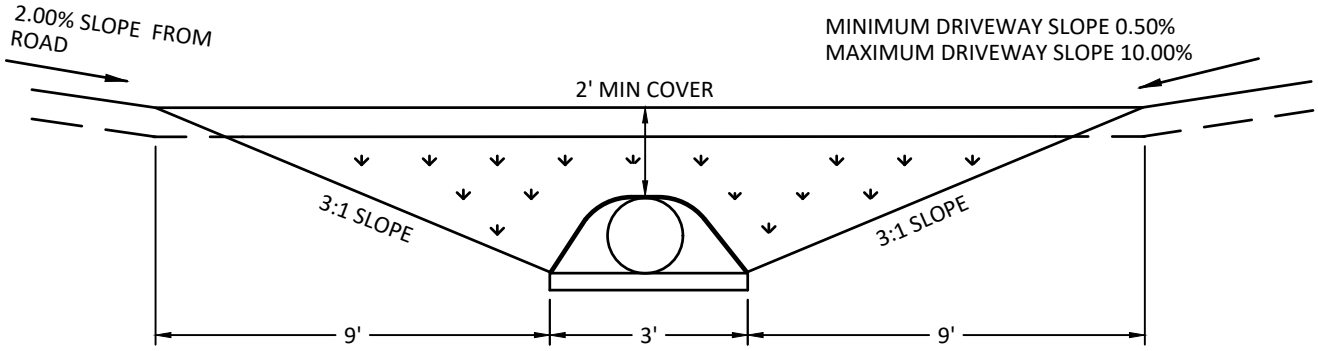
STO-07



PLAN



SECTION A-A



SECTION B-B

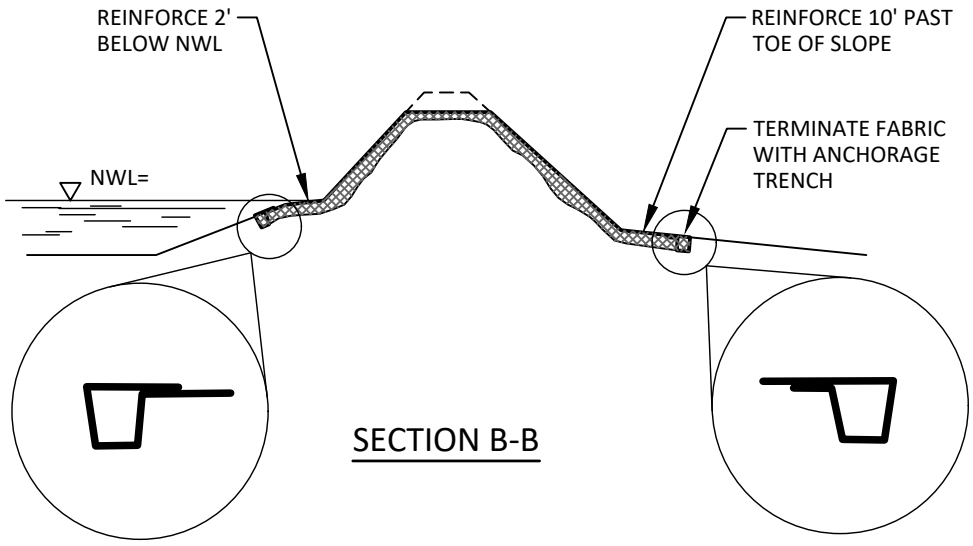
City of Shorewood

RURAL RESIDENTIAL DRIVEWAY

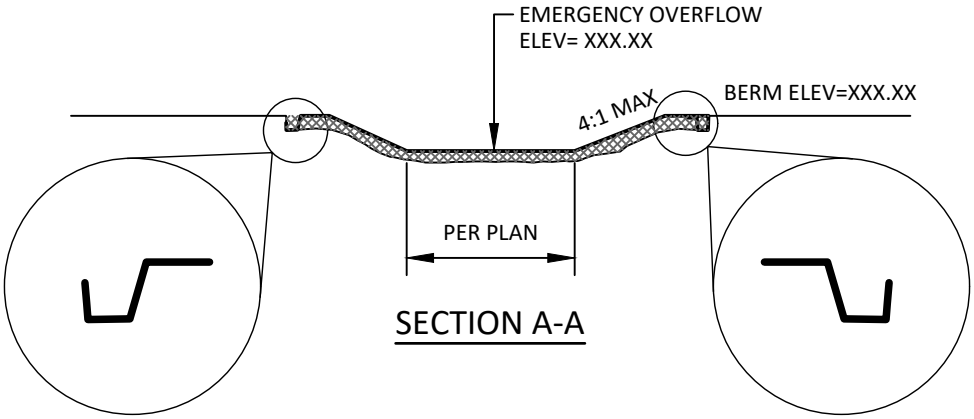
STANDARD DETAILS

REVISED: NOV. 2025

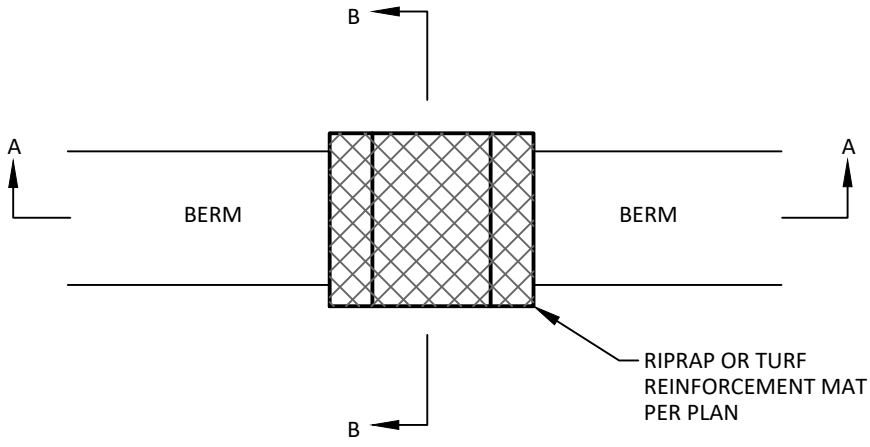
STO-08



SECTION B-B



SECTION A-A



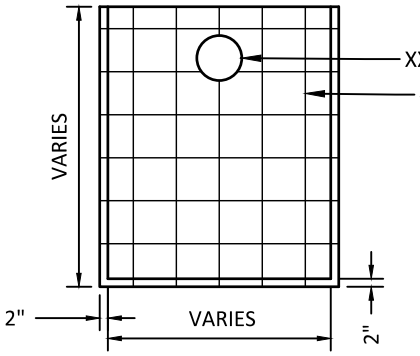
City of Shorewood

OVERFLOW DETAIL

STANDARD DETAILS

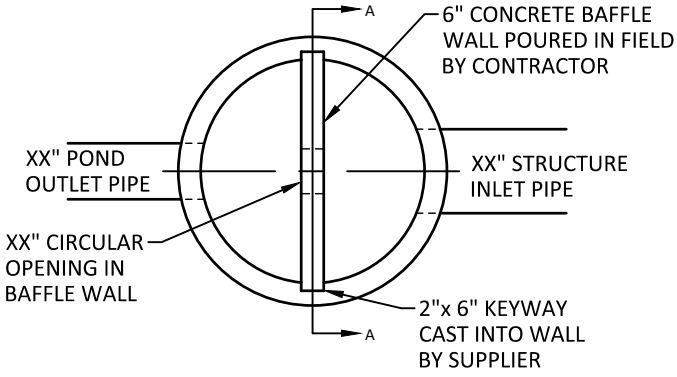
REVISED: NOV. 2025

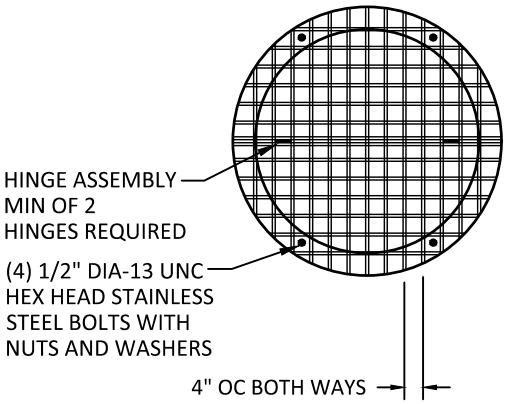
STO-09



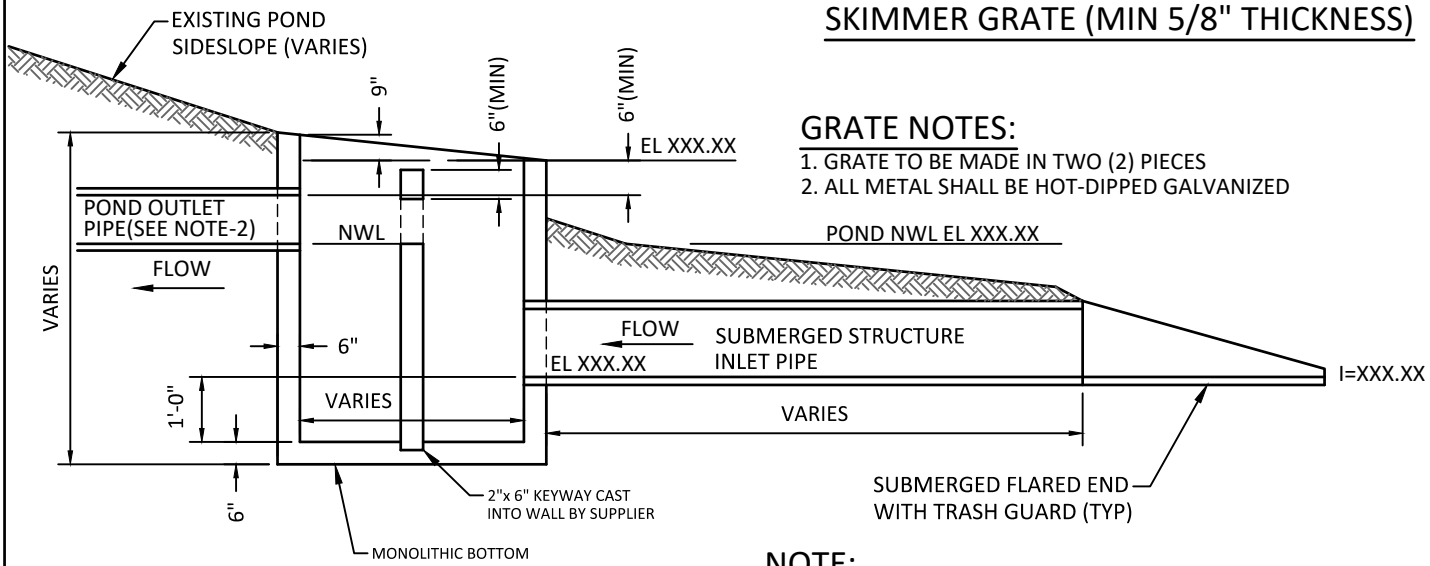
CONCRETE BAFFLE WALL
SECTION A-A

POND	100 YR	NWL	ORIFICE Ø	INLET Ø	INLET EL.	OUTLET Ø	OUTLET Ø	OUTLET Ø





TWO-PIECE POND
SKIMMER GRATE (MIN 5/8" THICKNESS)



SECTION VIEW

GRATE NOTES:
1. GRATE TO BE MADE IN TWO (2) PIECES
2. ALL METAL SHALL BE HOT-DIPPED GALVANIZED

NOTE:
1. ALL PIPE JOINTS SHALL BE TIED
2. BAFFLE WALL SHALL BE CONSTRUCTED TO PREVENT LEAKAGE AROUND THE WALL

City of Shorewood

POND SKIMMER WITH RATE CONTROL BAFFLE

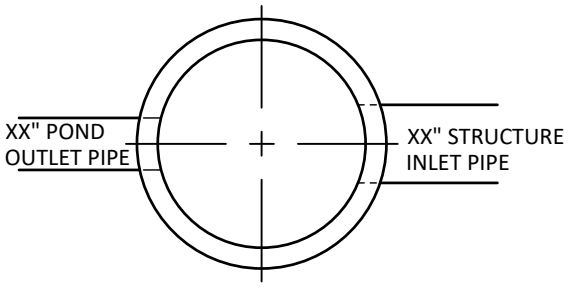
STANDARD DETAILS

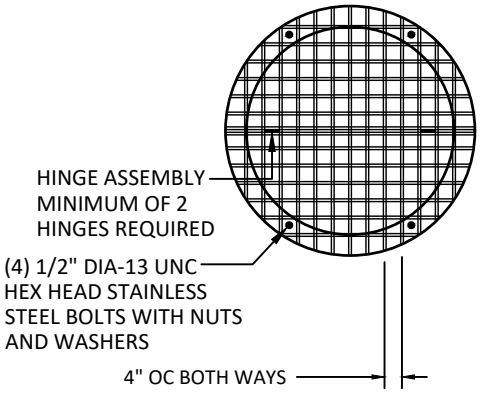
REVISED: NOV. 2025

STO-10

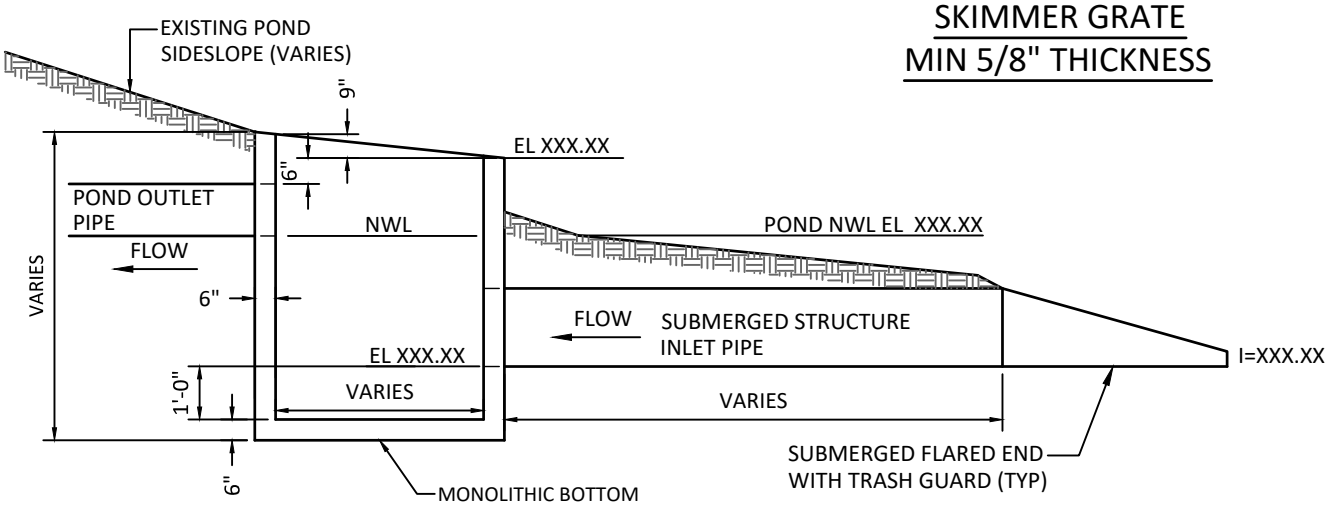
GRATE NOTES:

1. GRATE TO BE MADE IN TWO (2) PIECES
2. ALL METAL SHALL BE HOT-DIPPED GALVANIZED





TWO-PIECE POND SKIMMER GRATE MIN 5/8" THICKNESS



SECTION VIEW

NOTE:

1. ALL PIPE JOINTS SHALL BE TIED.

POND	100 YR	NWL	ORIFICE Ø	INLET Ø	INLET EL.	OUTLET Ø	OUTLET EL.	OUTLET %

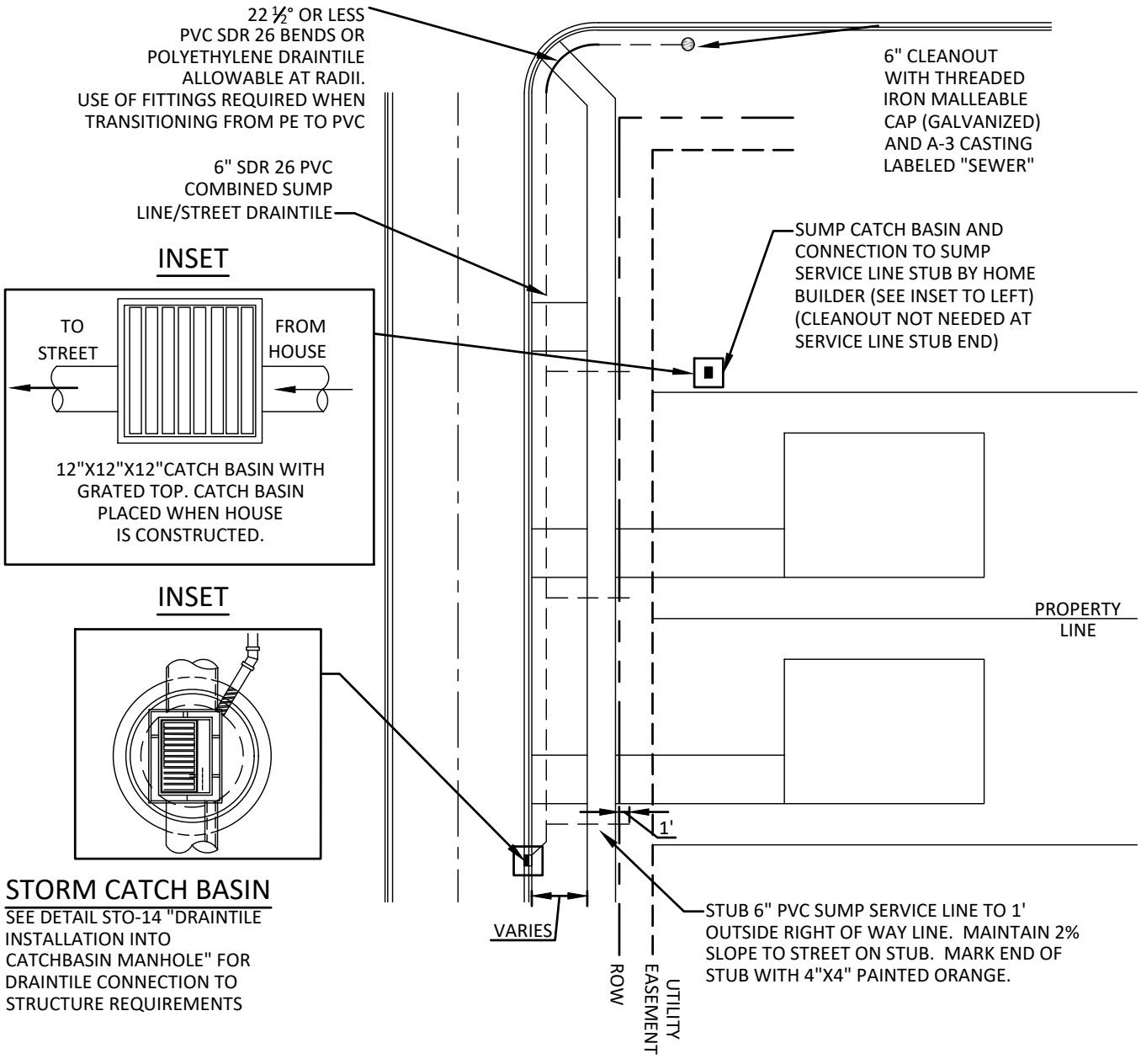
City of Shorewood

POND SKIMMER STRUCTURE

STANDARD DETAILS

REVISED: NOV. 2025

STO-11



NOTES:

1. 6" PVC SUMP LINE TO BE INSTALLED AT STREET SUBGRADE PER DETAILS AND TO CONNECT TO NEAREST DOWNSTREAM CATCH BASIN.
2. EXTEND 6" PVC SUMP SERVICE 1' PAST ROW. STAMP CURB WITH "SS".
3. CLEANOUTS REQUIRED AT DRAINTILE ENDING POINTS. CONFIGURE CLEANOUTS TO PROVIDE MAINTENANCE ACCESSIBILITY TO ALL DRAINTILE.
4. INSTALL 4" X 4" POST ADJACENT TO EACH SUMP FOR PROTECTION DURING CONSTRUCTION.
5. CLEAN OUT TO BE PLACED ON PROPERTY LINE AT END OF LAST SERVICE LINE. IF SERVICE FALLS IN DRIVEWAY THE MAINLINE WILL BE EXTENDED BEYOND DRIVEWAY/ALLEY TO ENSURE THE CLEANOUT IS IN GREEN SPACE.

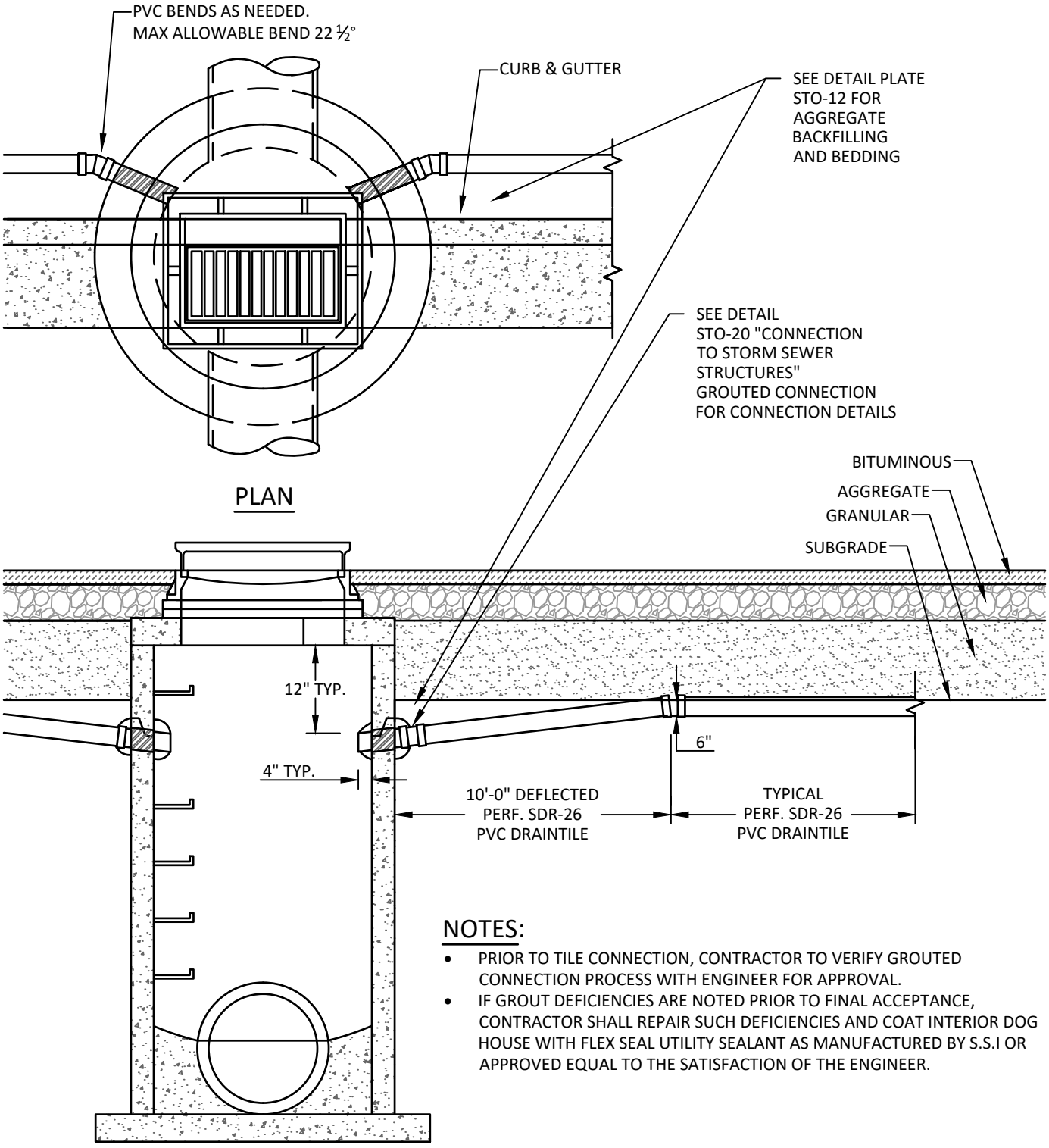
City of Shorewood

PVC SUMP LINE BEHIND CURB

STANDARD DETAILS

REVISED: NOV. 2025

ST0-12



NOTES:

- PRIOR TO TILE CONNECTION, CONTRACTOR TO VERIFY GROUTED CONNECTION PROCESS WITH ENGINEER FOR APPROVAL.
- IF GROUT DEFICIENCIES ARE NOTED PRIOR TO FINAL ACCEPTANCE, CONTRACTOR SHALL REPAIR SUCH DEFICIENCIES AND COAT INTERIOR DOG HOUSE WITH FLEX SEAL UTILITY SEALANT AS MANUFACTURED BY S.S.I OR APPROVED EQUAL TO THE SATISFACTION OF THE ENGINEER.

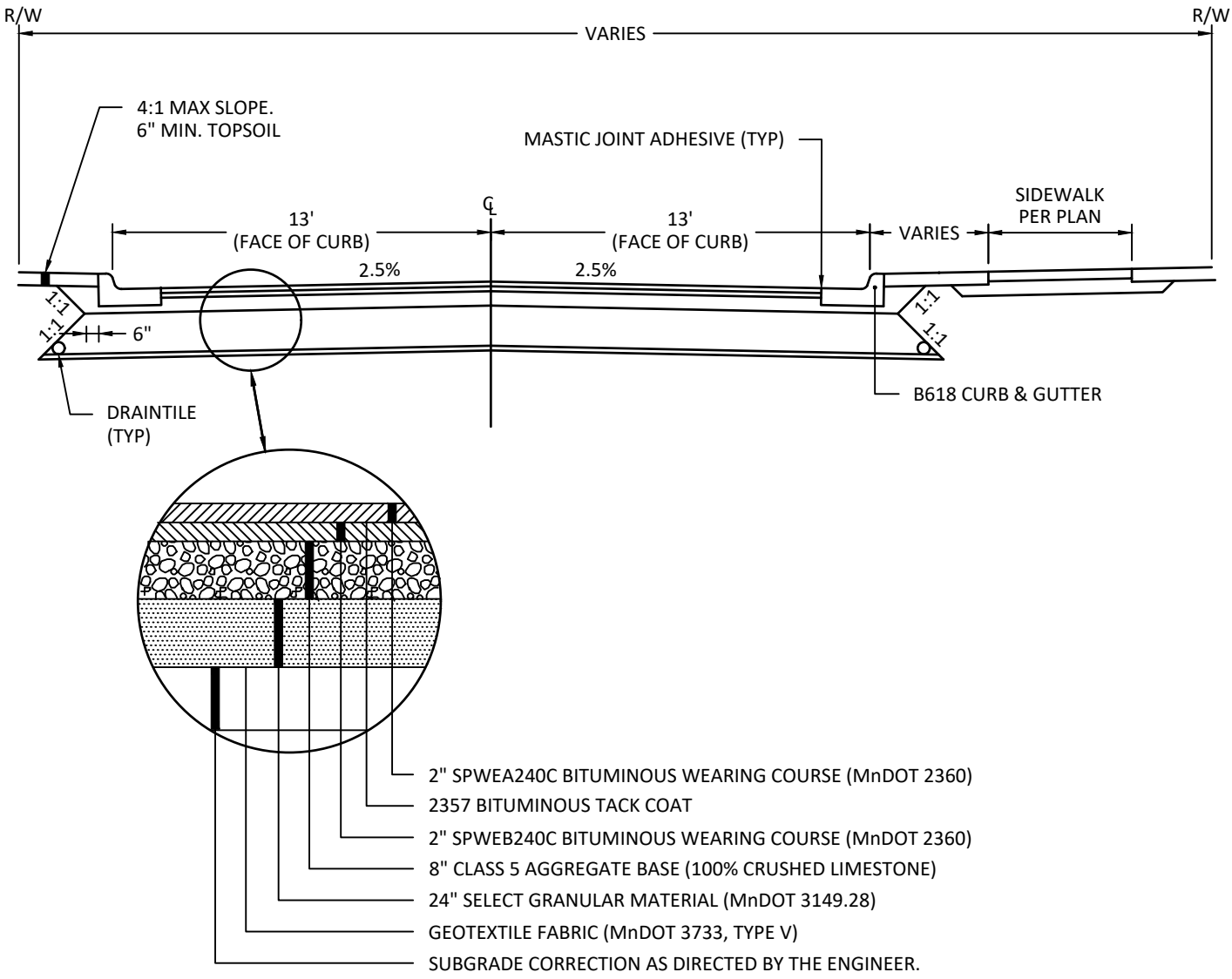
City of Shorewood

DRAINTILE INSTALLATION INTO CATCHBASIN MANHOLE

STANDARD DETAILS

REVISED: NOV. 2025

ST0-13



NOTES:

1. DRAINTILE SHALL BE INSTALLED BEHIND CURB IN ALL AREAS.
2. THE CITY RESERVES THE RIGHT TO INCREASE THE STREET SECTION BASED ON SOIL CONDITIONS.
3. CONSTRUCT FINAL LIFT OF BITUMINOUS WEAR COURSE ONE FREEZE/THAW CYCLE AFTER UTILITIES ARE INSTALLED.
4. PAVEMENT SLOPES AT INTERSECTION LOCATIONS MAY VARY FROM THOSE SHOWN IN TYPICAL SECTION.

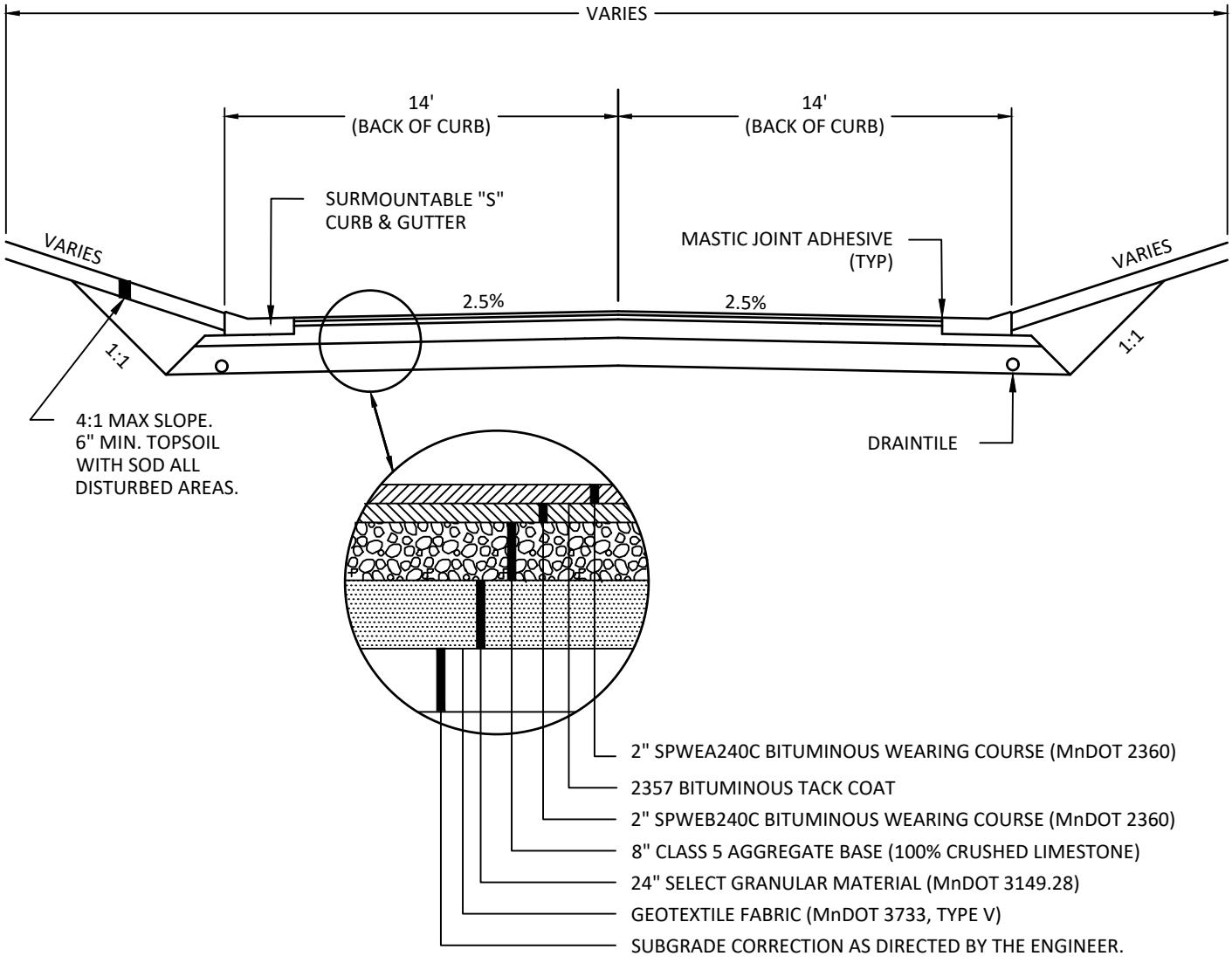
City of Shorewood

TYPICAL URBAN RESIDENTIAL BARRIER CURB STREET DETAIL

STANDARD DETAILS

REVISED: NOV. 2025

RDW-01



NOTES:

1. DRAINTILE SHALL BE INSTALLED BEHIND CURB IN ALL AREAS.
2. THE CITY RESERVES THE RIGHT TO INCREASE THE STREET SECTION BASED ON SOIL CONDITIONS.
3. CONSTRUCT FINAL LIFT OF BITUMINOUS WEAR COURSE ONE FREEZE/THAW CYCLE AFTER UTILITIES ARE INSTALLED.
4. PAVEMENT SLOPES AT INTERSECTION LOCATIONS MAY VARY FROM THOSE SHOWN IN TYPICAL SECTION.

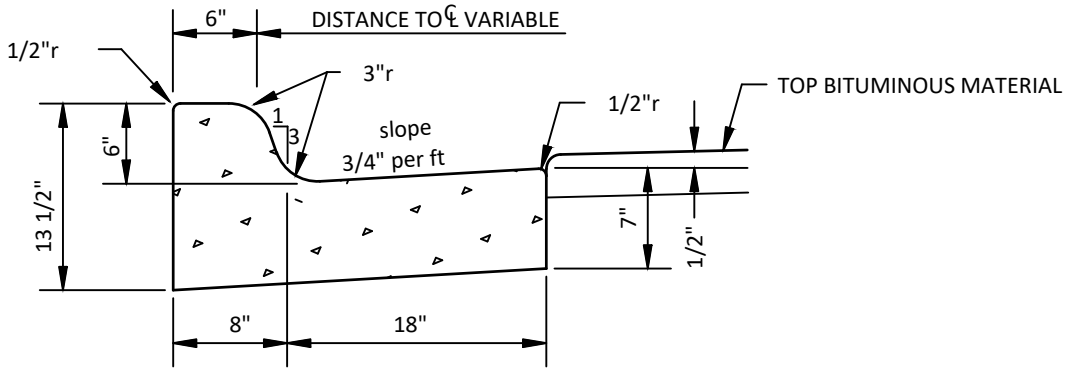
City of Shorewood

TYPICAL URBAN RESIDENTIAL SURMOUNTABLE CURB STREET DETAIL

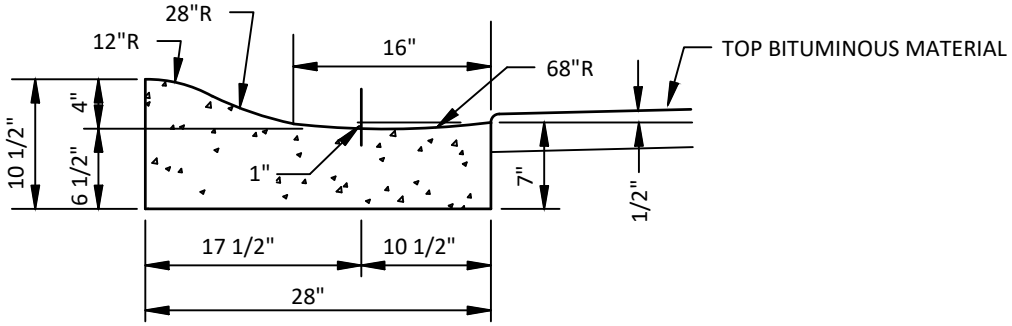
STANDARD DETAILS

REVISED: NOV. 2025

RDW-02



MnDOT B618 CONCRETE
CURB AND GUTTER



SURMOUNTABLE CONCRETE
CURB AND GUTTER

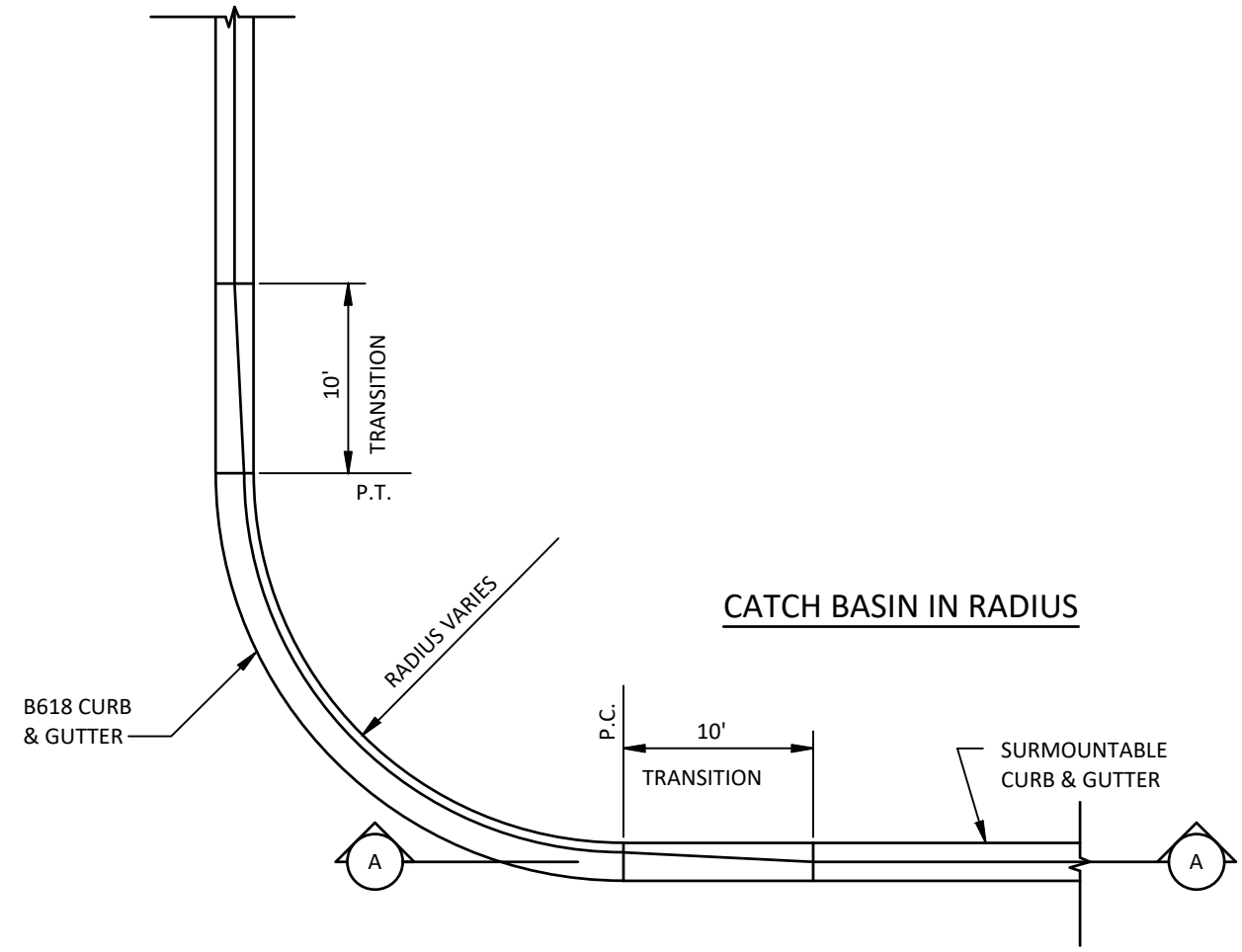
City of Shorewood

TYPICAL CONCRETE CURB & GUTTER

STANDARD DETAILS

REVISED: NOV. 2025

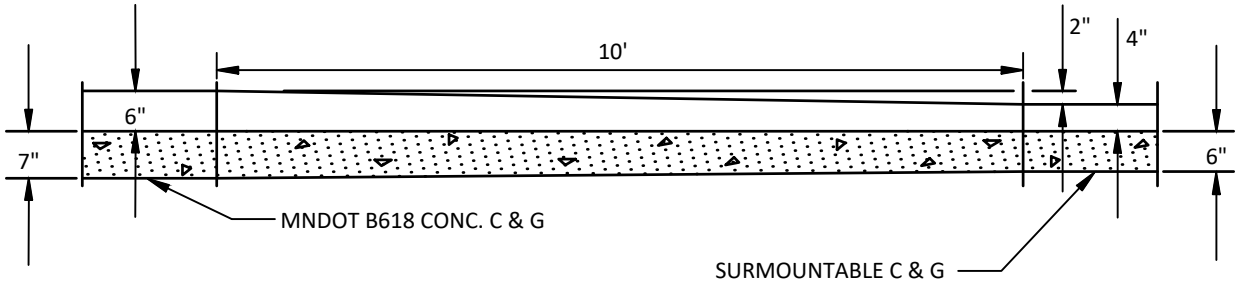
RDW-03



CATCH BASIN IN RADIUS

TYPICAL RESIDENTIAL RADIUS - 20'

TYPICAL COLLECTOR RADIUS - 30'



SECTION A-A

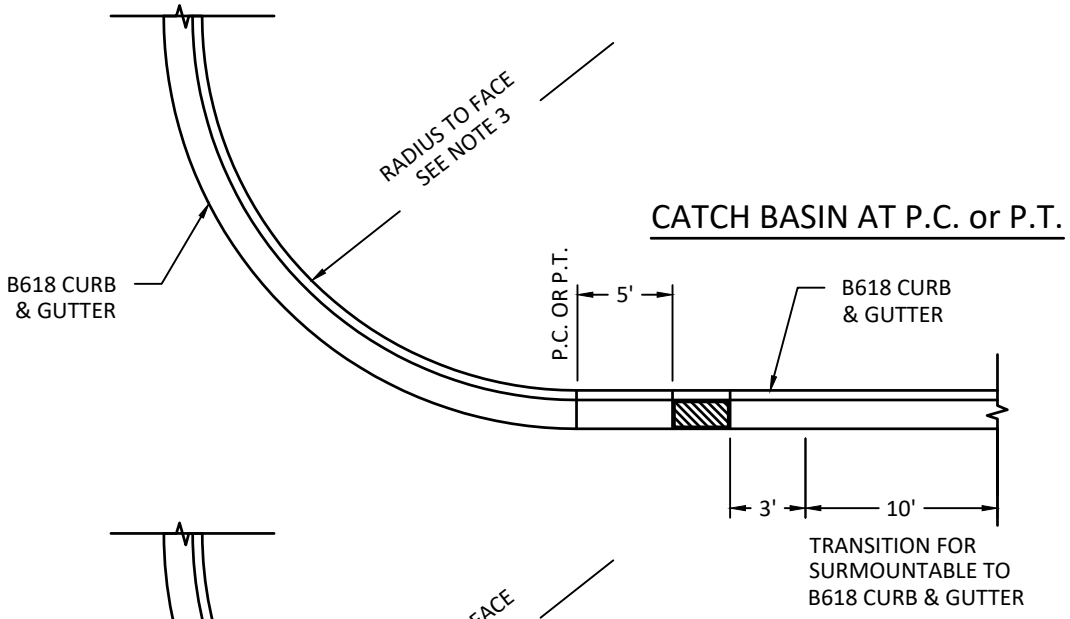
City of Shorewood

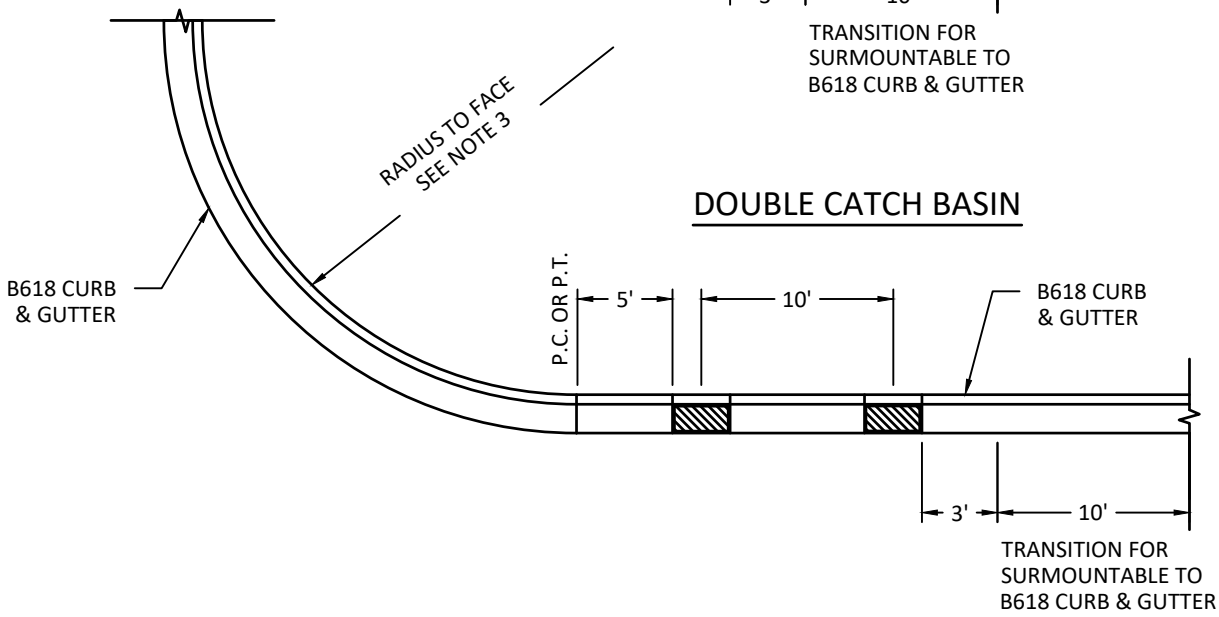
CONCRETE CURB & GUTTER RADIUS

STANDARD DETAILS

REVISED: NOV. 2025

RDW-04





NOTE:

1. ALL RADII ARE MEASURED TO FACE OF CURB.
2. NO CATCH BASINS WILL BE CONSTRUCTED IN THE INTERSECTION RADII OR AT MID-RAD POINTS.
3. 30' RADII WILL BE REQUIRED AT INTERSECTIONS OF ALL COLLECTOR TO RESIDENTIAL STREETS.
   20' RADII WILL BE REQUIRED AT INTERSECTIONS OF ALL RESIDENTIAL TO RESIDENTIAL STREETS.

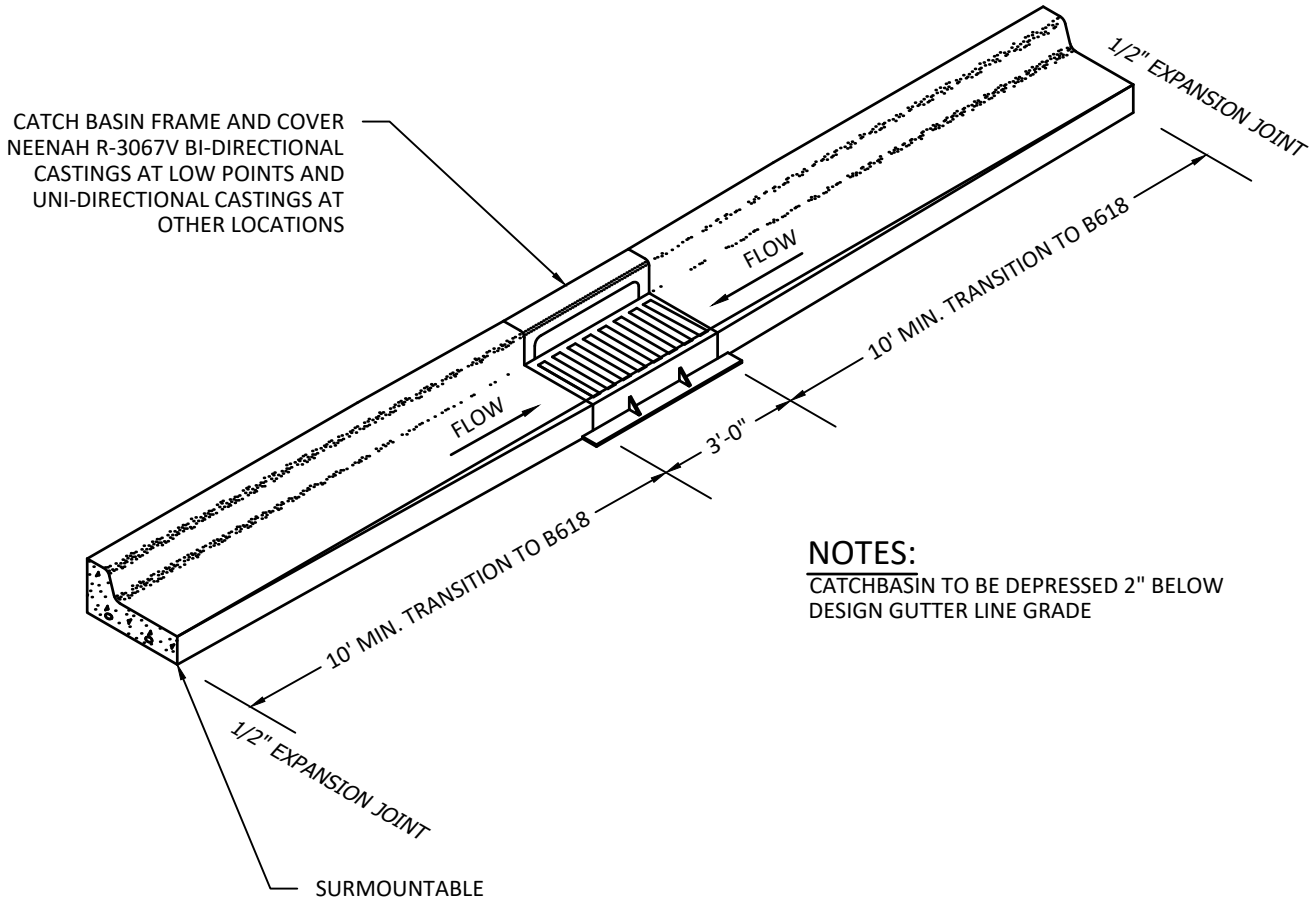
City of Shorewood

CONCRETE CURB & GUTTER RADIUS WITH CATCH BASIN

STANDARD DETAILS

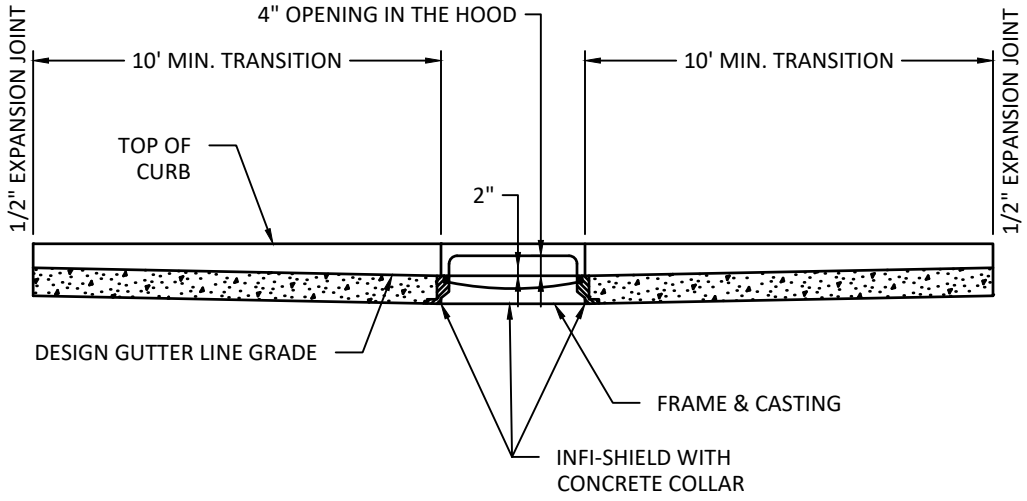
REVISED: NOV. 2025

RDW-05



NOTES:

CATCHBASIN TO BE DEPRESSED 2" BELOW DESIGN GUTTER LINE GRADE



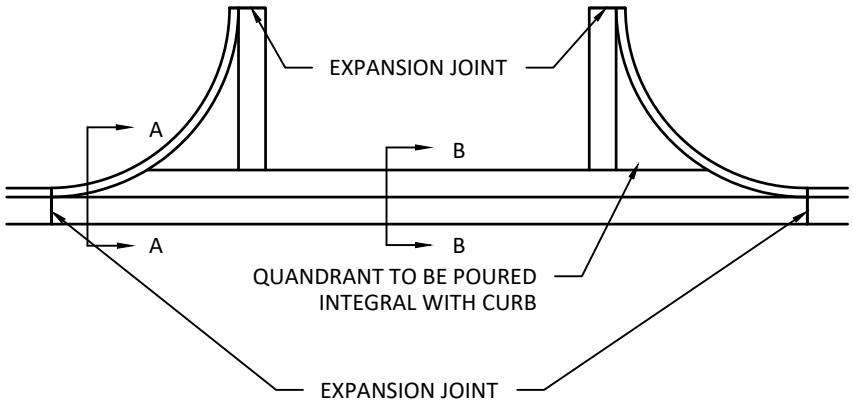
City of Shorewood

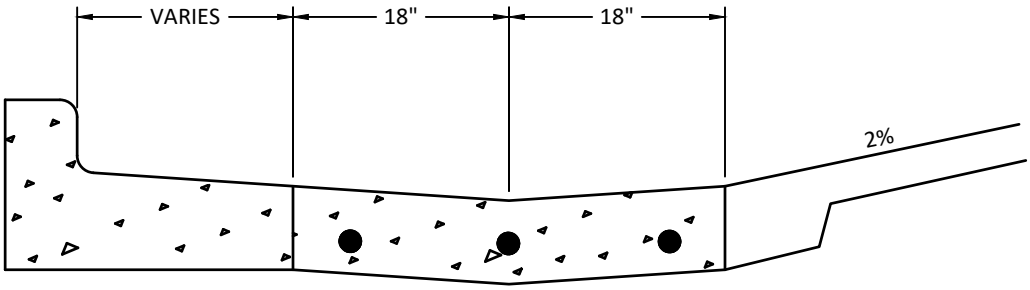
B618 CURB & GUTTER CONSTRUCTION AT CATCH BASIN

STANDARD DETAILS

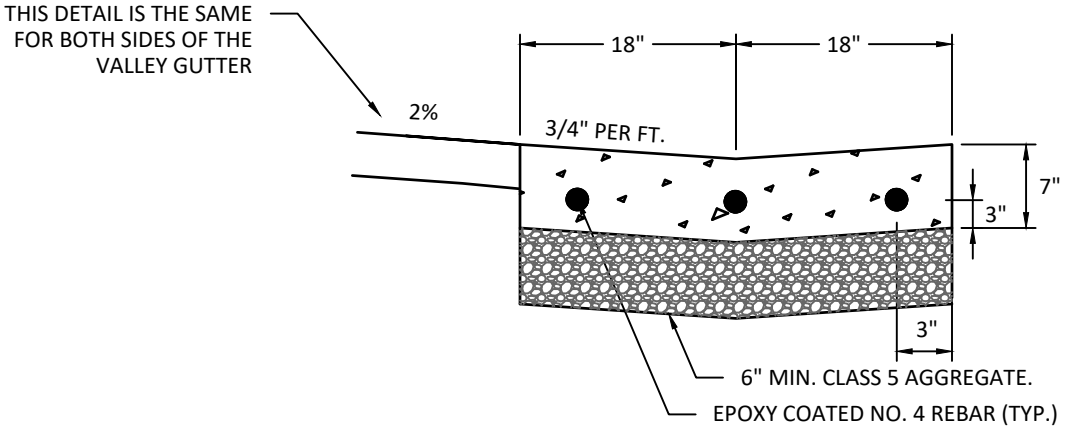
REVISED: NOV. 2025

RDW-06





SECTION A-A
THRU B618 C & G



SECTION B-B
THRU CONCRETE GUTTER

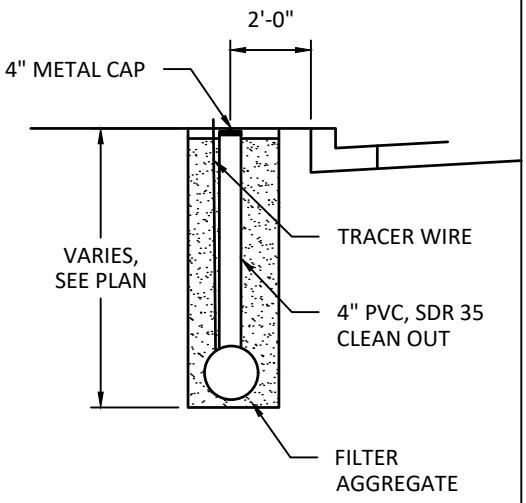
City of Shorewood

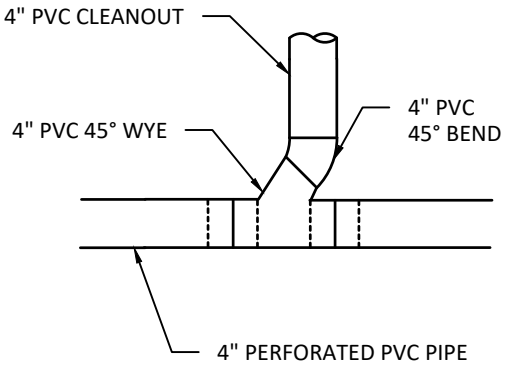
CONCRETE VALLEY GUTTER

STANDARD DETAILS

REVISED:
NOV. 2025

RDW-07



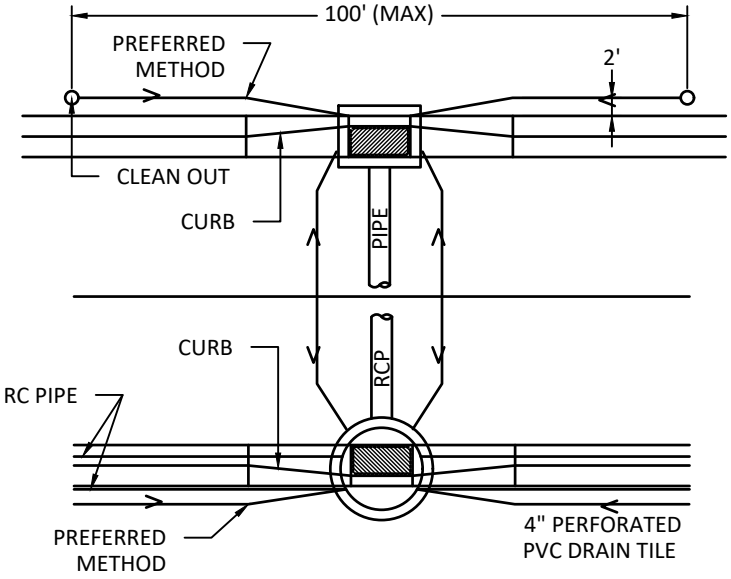


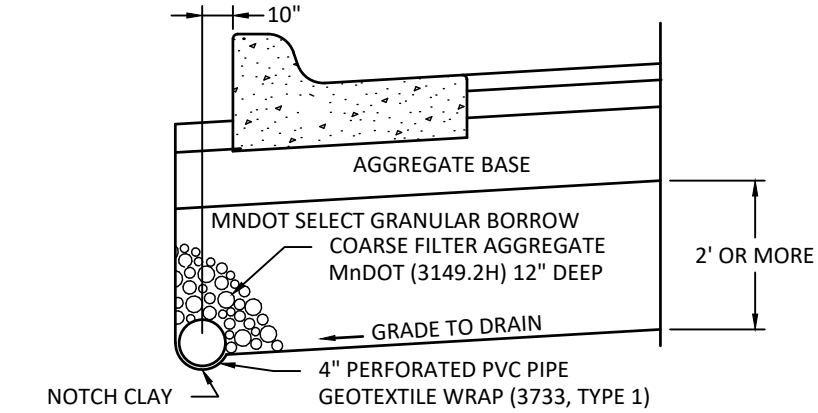
NOTE:
CONSTRUCT CLEAN OUTS AT THE END OF THE DRAIN TILE LINES OR EVERY 100 FEET.

4" PVC, SDR 35 DRAIN TILE CLEAN OUT

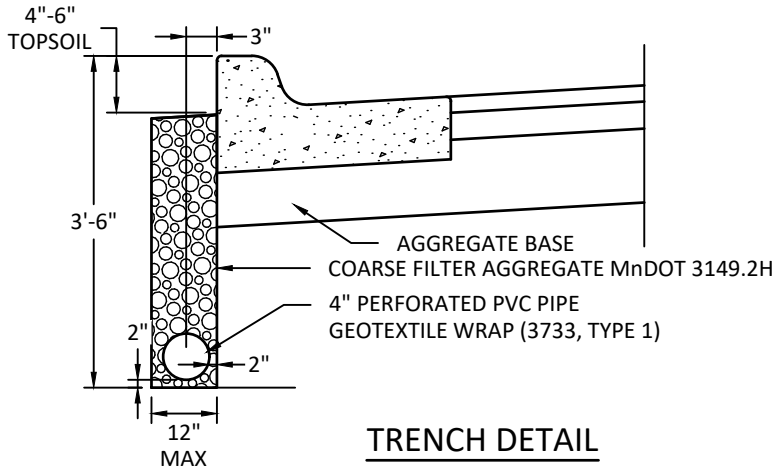
NOTE:
1. PERFORATED PVC DRAIN TILE AT LOW POINTS MINIMUM OF 50' EACH DIRECTION AND BOTH SIDES CROSSING BEHIND CURB.
2. PLACE NEENAH CASTING NO. R-1976 OR APPROVED EQUAL OVER CLEAN OUT IF LOCATION IN SIDEWALK OR TRAIL.

ALL CONNECTIONS TO EXISTING STRUCTURES SHALL BE CORE DRILLED





TRENCH DETAIL (STREET SUBCUT 2' OR MORE)



TRENCH DETAIL (STREET SUBCUT LESS THAN 2')

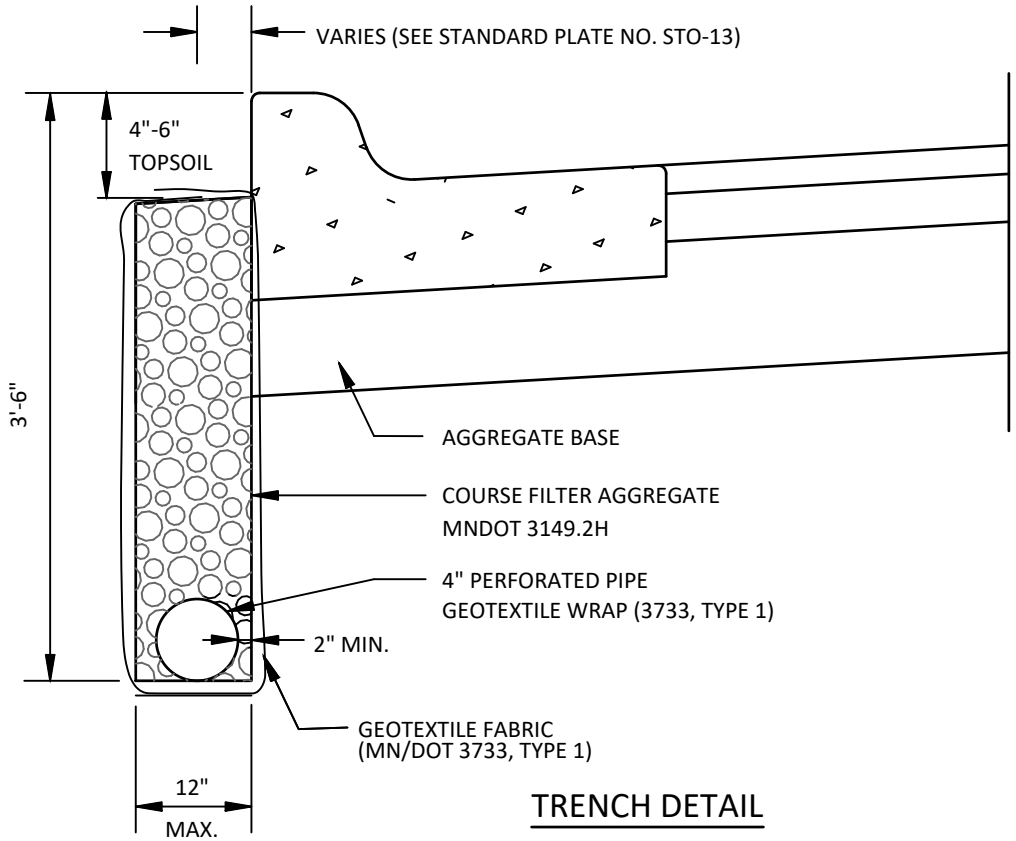
City of Shorewood

PVC PERFORATED PIPE INSTALLATION

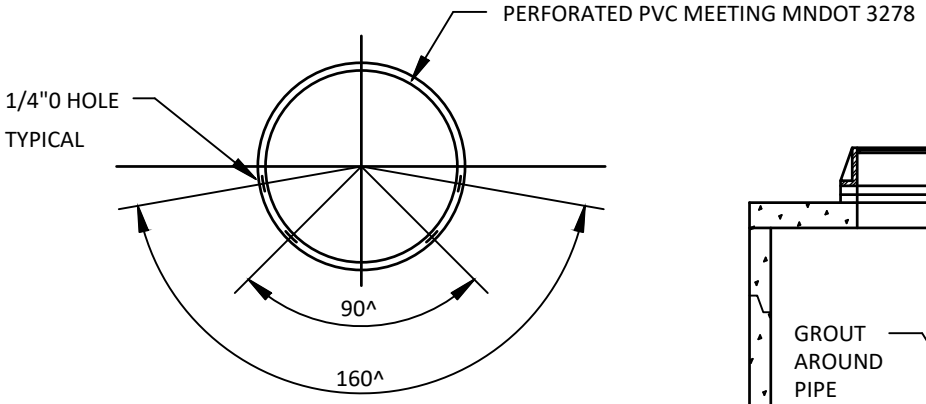
STANDARD DETAILS

REVISED: NOV. 2025

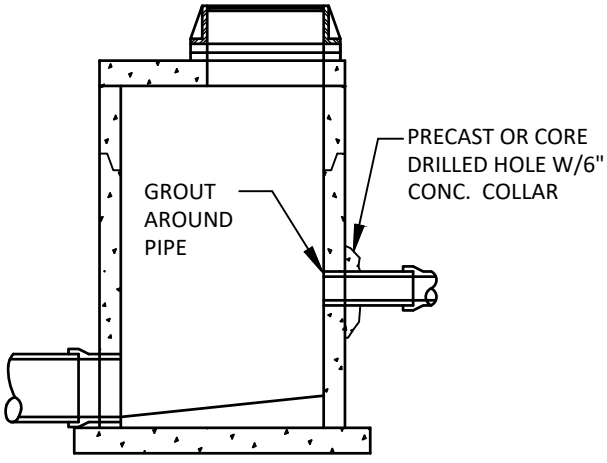
RDW-08



TRENCH DETAIL



PIPE DETAIL



NOTES:

1. CLEANOUTS REQUIRED AT 100' INTERVALS AND/OR ENDING POINTS AT DRAINTILE.
2. SWING TIES TO BE SHOWN ON AS-BUILTS FOR ALL CLEAN OUTS & ENDING POINTS ON ALL DRAINTILE.
3. OPENINGS IN STRUCTURE FOR DRAINTILE TO BE FABRICATED OR CORE DRILLED.

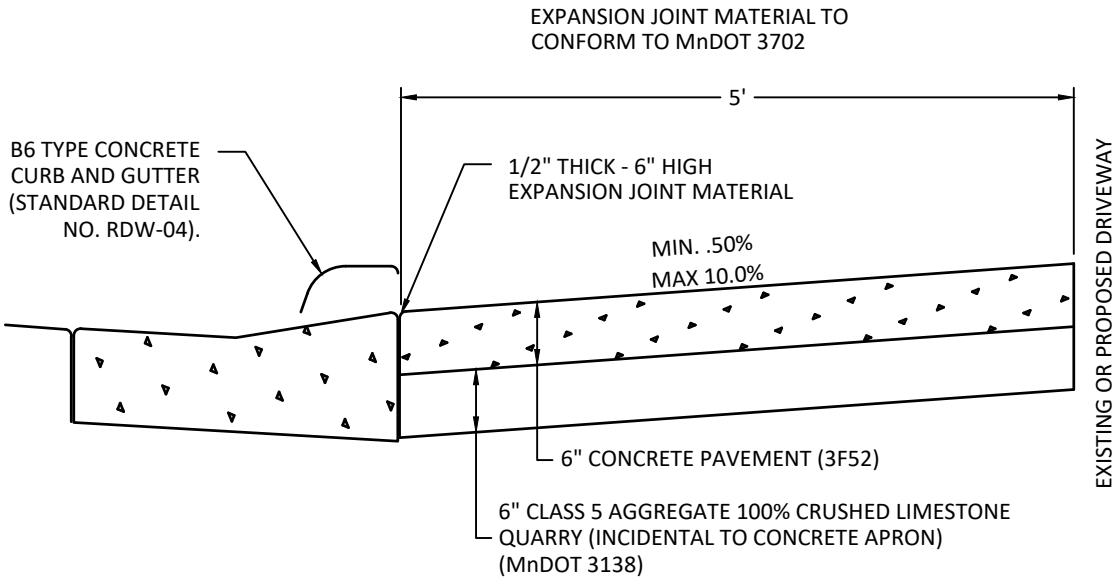
City of Shorewood

TYPICAL 4" DRAINAGE PIPE W/O GRANULAR SUBGRADE (STREET SUBCUT < 2')

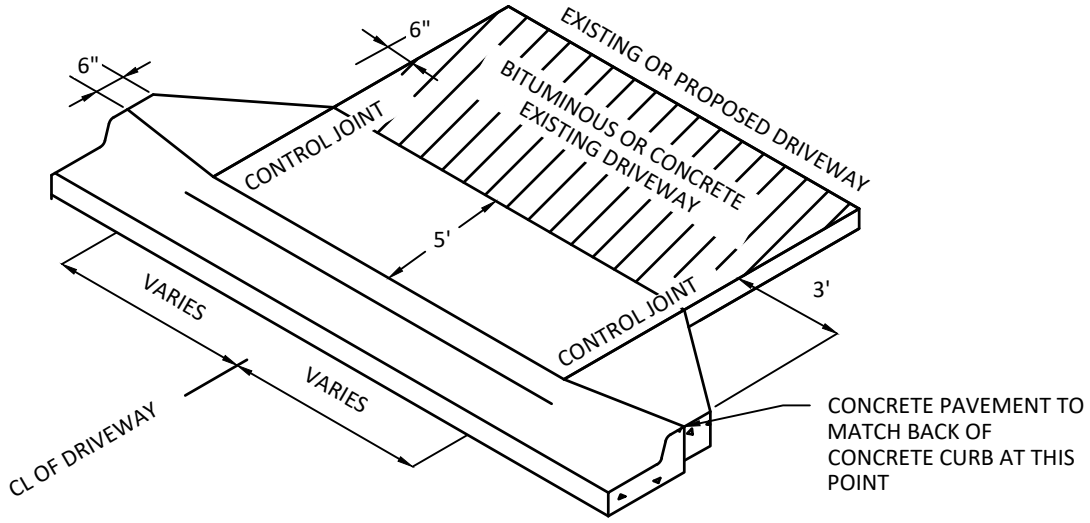
STANDARD DETAILS

REVISED: NOV. 2025

RDW-09



SECTION



ISOMETRIC

NOTE:

1. CONCRETE JOINTS IN CONCRETE CURB NOT TO EXCEED 10' SPACING THROUGH DRIVEWAY SECTION.
2. DRIVEWAY WINGS ARE REQUIRED WITH THE B6 STYLE CURBING. THE MAXIMUM DRIVEWAY WIDTH AT THE CURB AND AT THE PROPERTY LINE IS 24', PLUS THE 3' WINGS. THE MINIMUM WIDTH OF THE DRIVEWAY AT THE CURB AND PROPERTY LINE IS 12'.

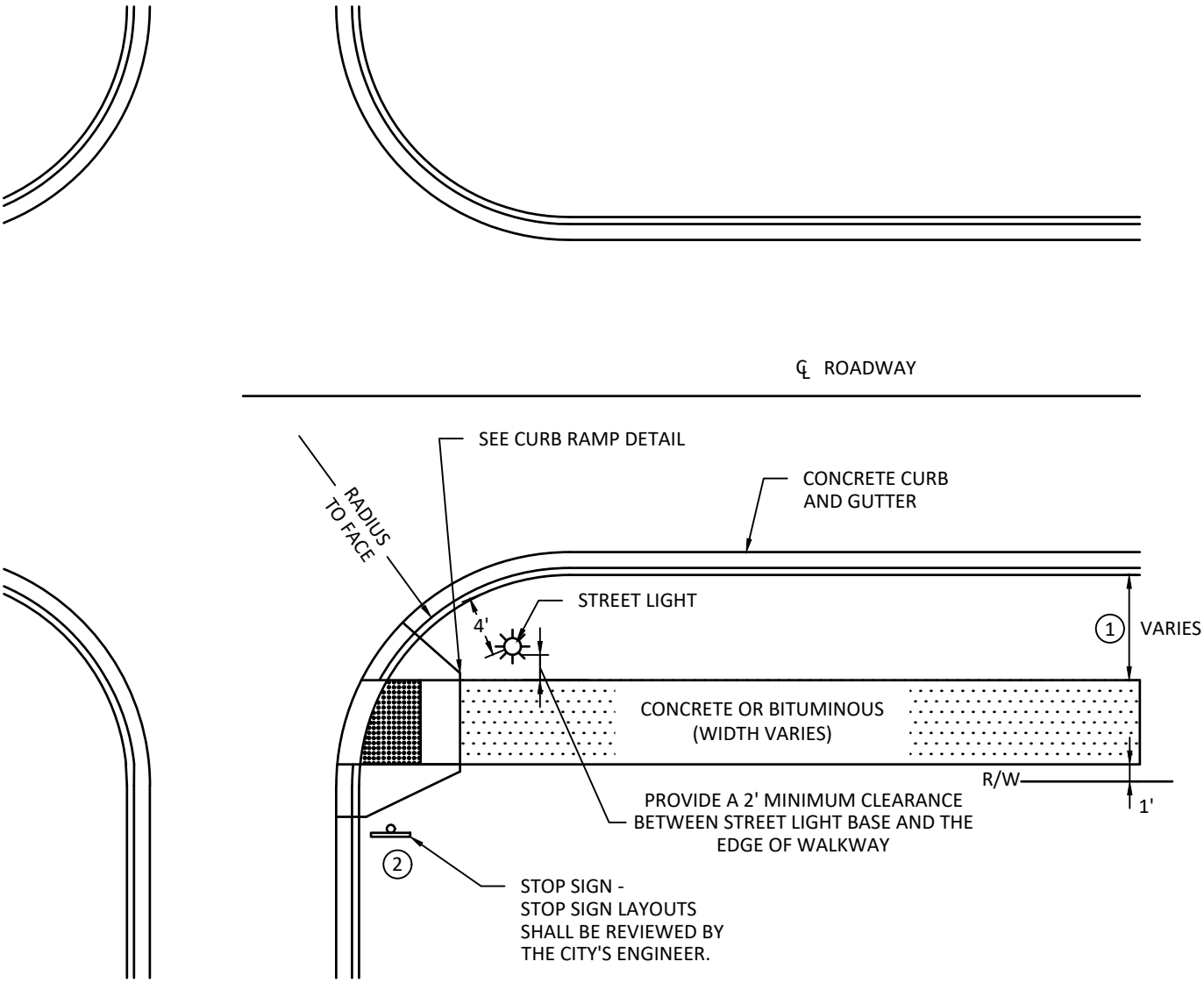
City of Shorewood

RESIDENTIAL CONCRETE DRIVEWAY APRON (B6 TYPE CURB)

STANDARD DETAILS

REVISED: NOV. 2025

RDW-10



PLAN

NOTE:

DIMENSIONS DEPEND ON TYPE OF PATHWAY OR SIDEWALK.

1. INCREASE BOULEVARD GRADE TO 4% AT LOW POINTS
2. STOP SIGN AND/OR STREET SIGN SHALL NOT BE OBSTRUCTED FROM VIEW BY ANY OBJECTS (TREES, STREET LIGHTS, ETC.)
3. PROVIDE 2' HORIZONTAL CLEARANCE BETWEEN SIGNS AND THE EDGE OF WALKWAY/PATH.

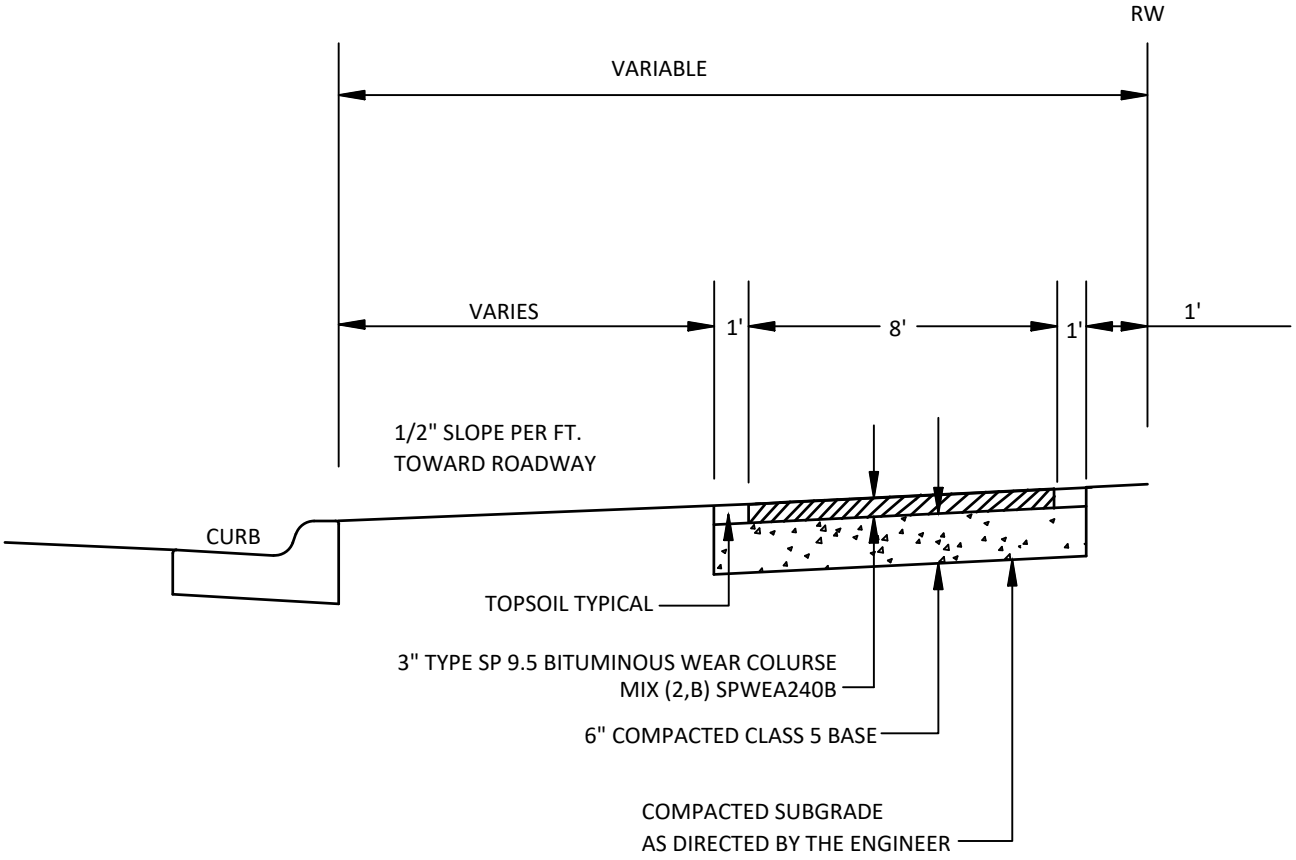
City of Shorewood

SIDEWALK/BIKE PATH CURB RAMP AND STREET LIGHT LOCATION PLAN

STANDARD DETAILS

REVISED: NOV. 2025

RDW-11



NOTES:

1. SHOULDERS TO BE RESTORED WITH 4" OF TOPSOIL AND RE-VEGETATED WITH SOD OR SEED / MULCH.
2. THIS DETAIL / SPECIFICATIONS ARE MINIMUMN REQUIREMENTS, ADDITIONAL DESIGN MAY BE REQUIRED DEPENDING ON EXISTING SUB-GRADE SOIL CONDITIONS.
3. BITUMINOUS TRAILS MAY NOT BE CONSTRUCTED ON UNSUITABLE SOILS. NO WASTE MATERIAL, BLACK DIRT, OR ORGANIC SOILS ALLOWED.
4. MAINTAIN A 2' CLEAR ZONE ON EACH SIDE OF THE PATH OR SIDEWALK.
5. TRAIL WIDTHS MAY VARY. SEE PLANS FOR SPECIFIC LOCATIONS.

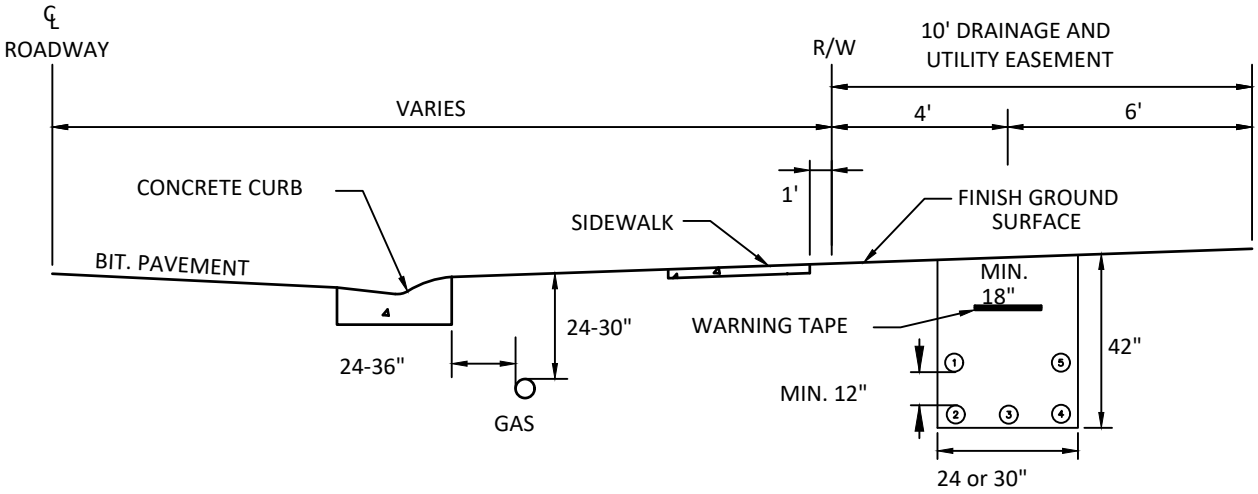
City of Shorewood

BITUMINOUS TRAIL

STANDARD DETAILS

REVISED: NOV. 2025

RDW-12



CROSS SECTION

① STREET LIGHTING
② ELECTRIC
③ CABLE TV
④ TELEPHONE
⑤ GAS OPTIONAL

NOTE:

1. ALL CONDUIT CROSSINGS UNDER ROADWAYS SHALL BE THE CONTRACTORS RESPONSIBILITY TO INSTALL THE CORRECT SIZE AND NUMBER FOR ALL UTILITIES. THE CONTRACTOR SHALL ALSO INSTALL ONE ADDITIONAL CONDUIT CROSSING FOR FUTURE USE.
2. THE CITY RECOMMENDS JOINT TRENCHING FOR INSTALLATION OF UTILITIES WITH CITY RIGHT OF WAY AND UTILITY EASEMENTS. GAS CAN BE PLACED IN A SEPARATE TRENCH LOCATED BEHIND THE CURB. ALL TRENCHES SHALL BE COMPACTED.
3. ALL CURB STOPS AND BOXES WILL BE LOCATED 3' FROM THE DRAINAGE & UTILITY EASEMENT.
4. ALL CURB STOPS AND BOXES SHALL BE PLACED 10' FROM BACK OF CURB ON PRIVATE STREETS THAT HAVE NO CITY RIGHT OF WAY BEYOND THE CURB.
5. ALL SEWER CLEAN OUTS SHALL BE PLACED ONE FOOT OUTSIDE OF THE RIGHT OF WAY.
6. STREET LIGHTS SHALL BE PLACED AS CLOSE TO 300' INTERVALS AS POSSIBLE IN RESIDENTIAL AREAS AND LOCATED ON PROPERTY CORNERS. ALL STREET LIGHT ELECTRICAL LINES SHALL BE RUGGEDIZED TYPE WIRING OR ENCASED IN CONDUIT AND PLACED WITHIN THE JOINT TRENCH.
7. CENTER OF UTILITY TRENCH IN PRIVATE STREETS SHALL BE 7' FROM BACK OF CURB. GAS CAN BE PLACED 2-3' FROM BACK OF CURB.
8. ALL UTILITY BOXES SHALL BE PLACED ON COMMON PROPERTY CORNERS.

City of Shorewood

UTILITY LAYOUT

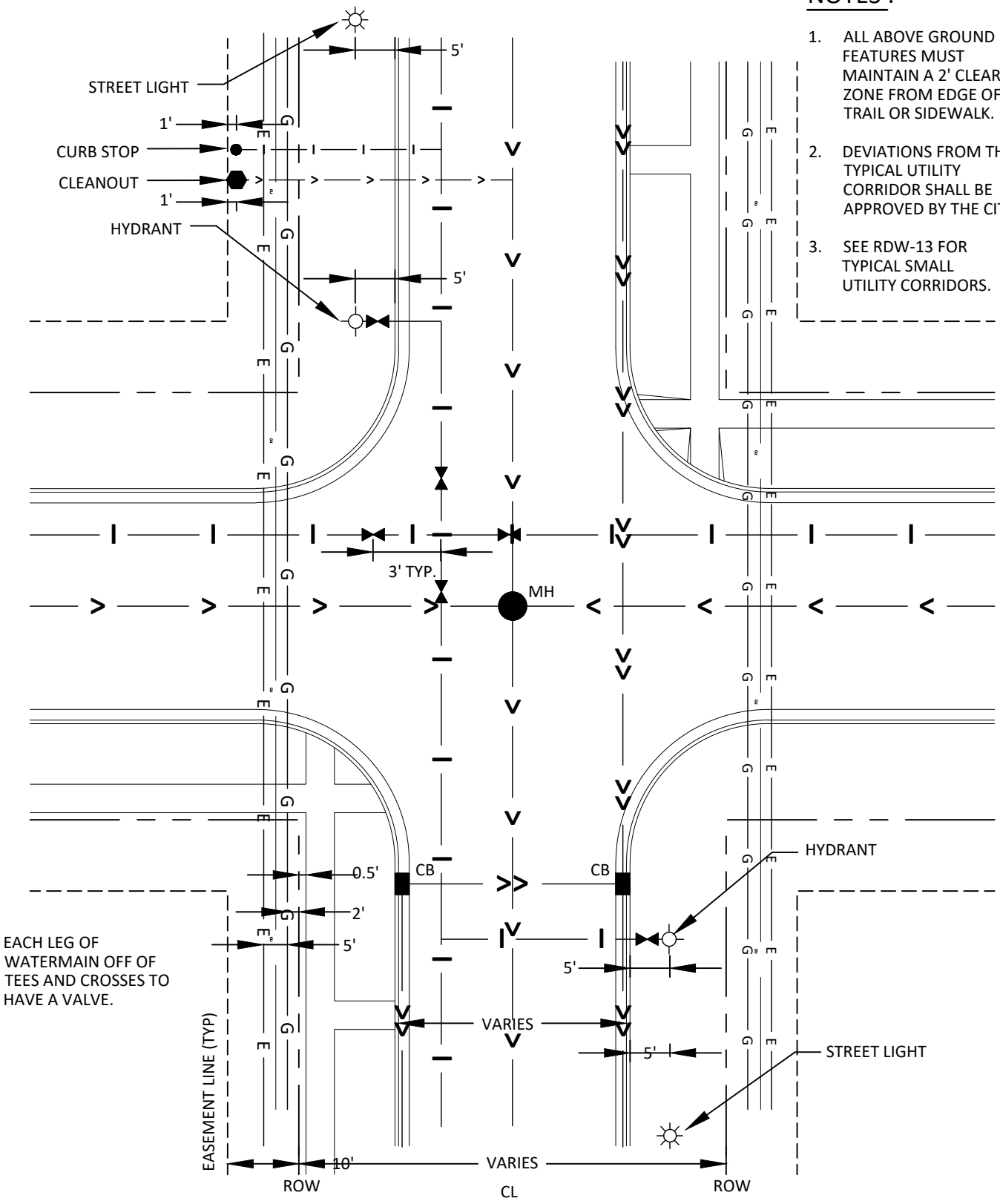
STANDARD DETAILS

REVISED: NOV. 2025

RDW-13

NOTES :

1. ALL ABOVE GROUND FEATURES MUST MAINTAIN A 2' CLEAR ZONE FROM EDGE OF TRAIL OR SIDEWALK.
2. DEVIATIONS FROM THE TYPICAL UTILITY CORRIDOR SHALL BE APPROVED BY THE CITY.
3. SEE RDW-13 FOR TYPICAL SMALL UTILITY CORRIDORS.



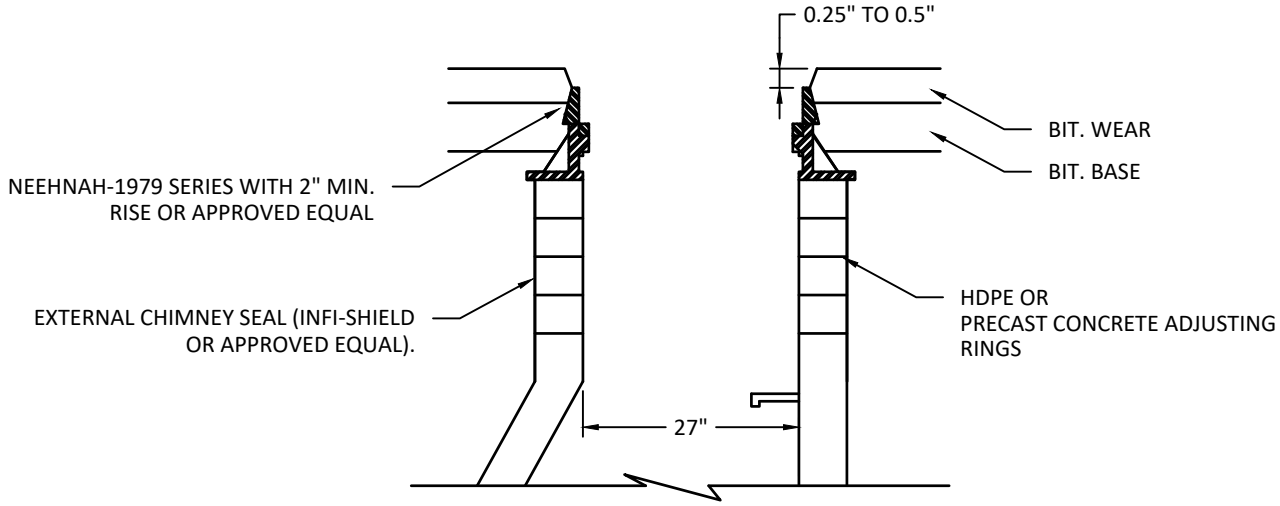
City of Shorewood

TYPICAL UTILITY CORRIDORS WITH AND WITHOUT SIDEWALK

STANDARD DETAILS

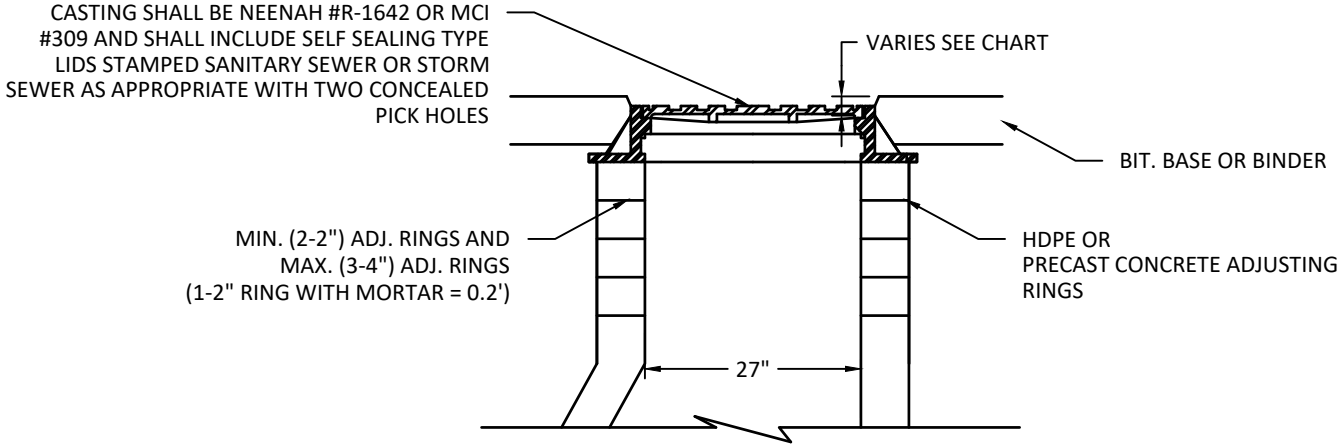
REVISED: NOV. 2025

RDW-14



NOTE: 2-PIECE COVER RISER RINGS ARE NOT ALLOWED.

BIT. WEAR COURSE ADJ. DETAIL



BIT. BASE OR BINDER COURSE ADJ. DETAIL

WEAR COURSE THICKNESS	COVER RISER SIZE	DEPTH OF CASTING SET BELOW BASE COURSE OR BINDER COURSE
1.5"	2" RISE	1.25"
2.0"	2" RISE	0.75"
2.5"	2" RISE	0.25"

NOTES:

1. PRECAST CONCRETE ADJUSTING RINGS SHALL BE BEDDED WITH 1/4" TO 1/2" MORTAR.
2. HDPE ADJUSTING RINGS SHALL BE BEDDED WITH SEALANT MANUFACTURED BY LADTECH, INC. OR APPROVED EQUAL.

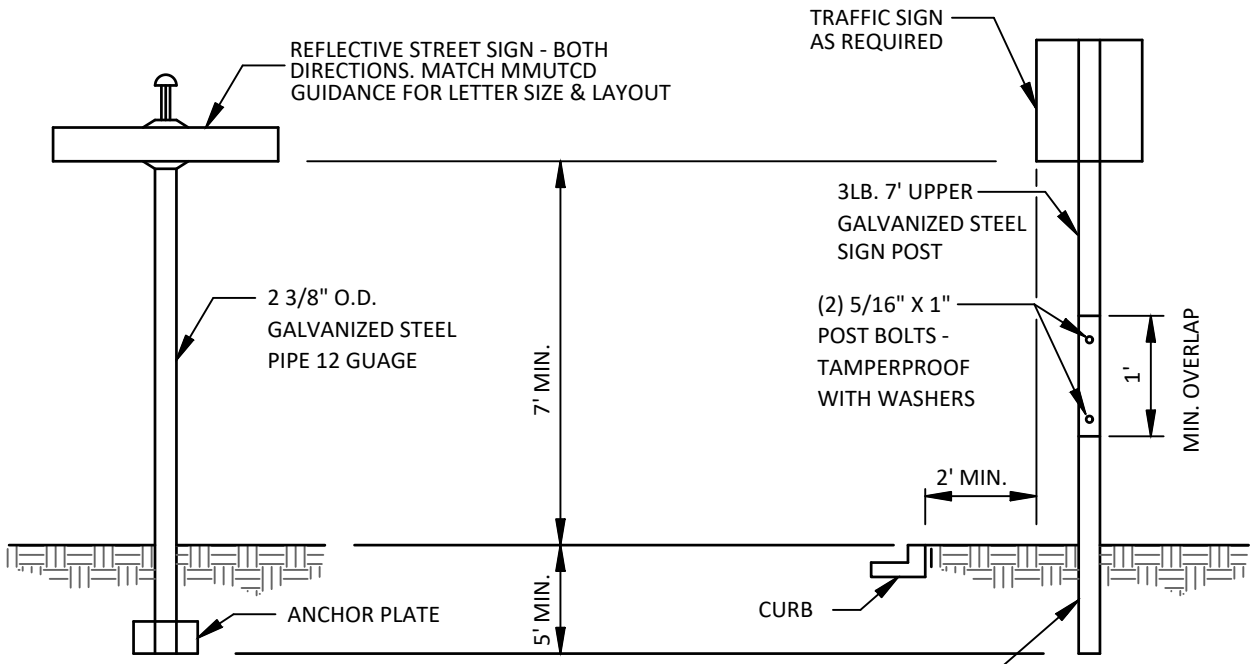
City of Shorewood

TYPICAL MANHOLE CASTING ADJUSTMENT

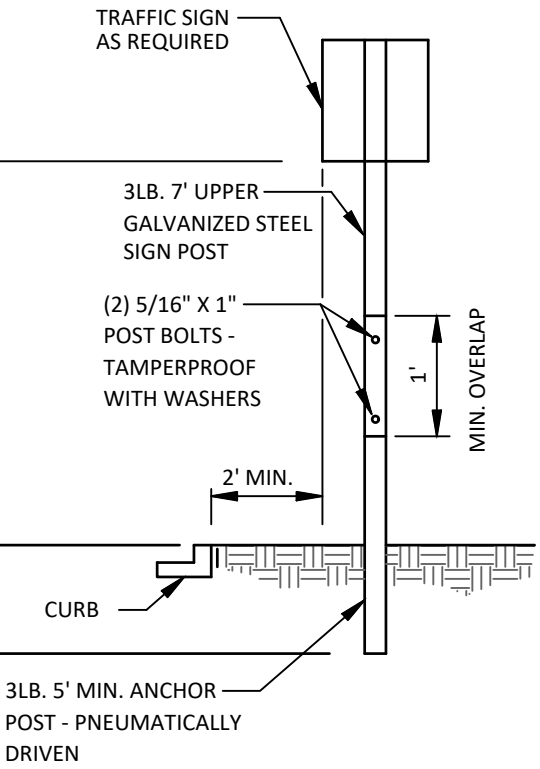
STANDARD DETAILS

REVISED: NOV. 2025

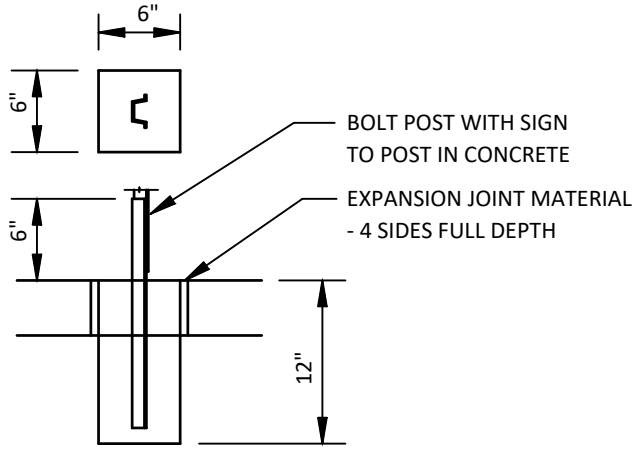
RDW-15



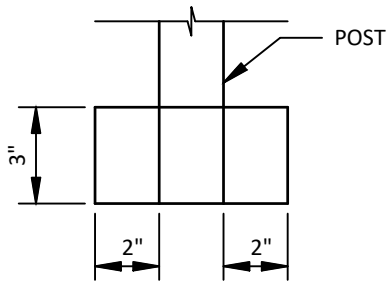
TYPICAL STREET SIGN INSTALLATION



TYPICAL TRAFFIC SIGN INSTALLATION



TYPICAL SIGN INSTALLATION IN CONCRETE MEDIAN



ANCHOR PLATE DETAIL

NOTES:

1. FOR MATERIAL SPECIFICATIONS SEE SECTION 4.11 OF STANDARD STREET SPECS.
2. TRAFFIC SIGNS WITH 9 SQ. FT. OR MORE OF SURFACE AREA AND 36" OR LARGER IN SIZE, MUST BE MOUNTED WITH TWO SEPARATE POSTS.
3. FOR PRIVATE STREETS, SIGNS SHALL BE THE SAME AS ABOVE, EXCEPT LETTERING TO BE WHITE ON BLUE BACKGROUND.
4. FOR BOULEVARD LOCATION OF STREET SIGNS AND FOR TRAFFIC SIGNS, CONTACT SHOREWOOD STREET SUPERINTENDENT.
5. STREET SIGNS SHALL BE STAMPED STEEL OR ALUMINUM 6" HIGH X 24" OR 30" OT 36" WIDE.

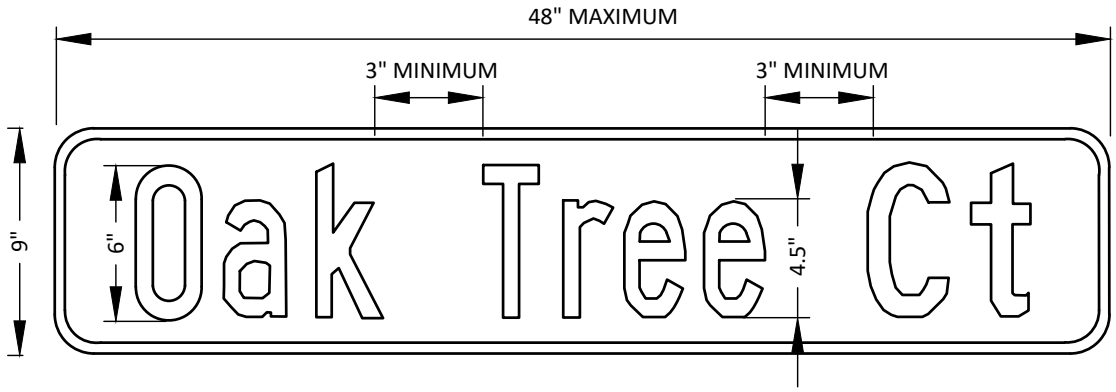
City of Shorewood

TYPICAL STREET & TRAFFIC SIGN INSTALLATION

STANDARD DETAILS

REVISED: NOV. 2025

RDW-16



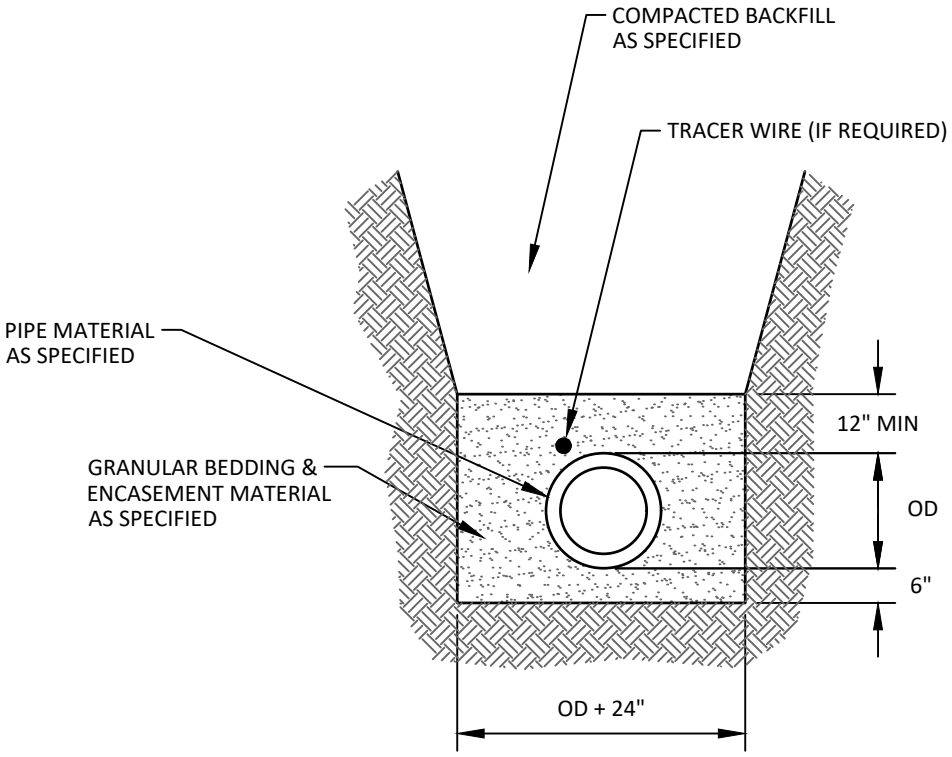
STREET BLADES TO HAVE
1.5" RADIUS ROUNDED EDGES

WHEN STREET NAMES HAVE DESCENDER LETTERS SHIFT ALL WORDING UP TO MAXIMIZE VISIBILITY OF THE TAIL, BUT ENSURE THE TAIL DOES NOT MEET THE SIGN BLADE BORDER.

NOTES:

1. PRIOR TO FABRICATION, SUBMIT SIGNCAD DETAILS FOR REVIEW AND APPROVAL BY CITY ENGINEER.
2. SIGN TEXT SHALL BE IN ACCORDANCE WITH MN MUTCD STANDARDS.
3. REFLECTIVE SHEETING ON SIGN FACE TO BE HIGH INTENSITY PRISMATIC & MEET MNDOT SPEC. 3352.2A.3F "SIGN SHEETING TYPE IX".
4. PUBLIC STREET SIGNS SHALL BE WHITE LETTERING ON GREEN BACKGROUND WITH WHITE BORDER. PRIVATE STREET SIGNS SHALL BE THE SAME AS ABOVE, EXCEPT LETTERING TO BE WHITE ON BROWN BACKGROUND WITH WHITE BORDER.

City of Shorewood	STREET BLADE SIGN DETAIL	STANDARD DETAILS	
		REVISED: NOV. 2025	RDW-17



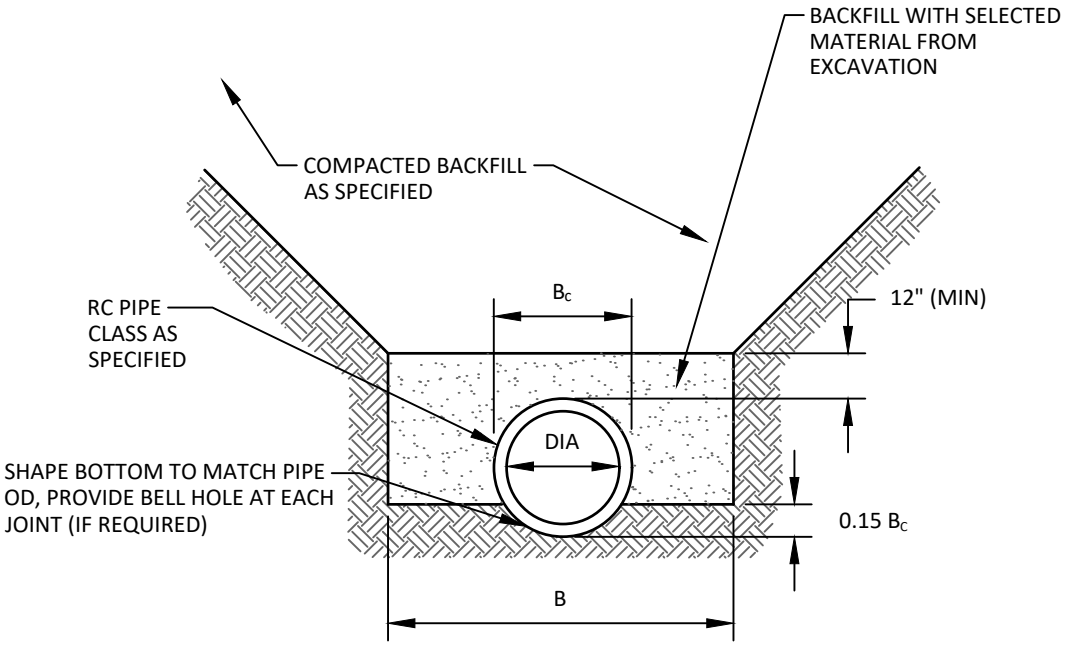
City of Shorewood

BEDDING METHODS FOR PLASTIC PIPE

STANDARD DETAILS

REVISED: NOV. 2025

BED-01



PIPE DIA	B
36" OR LESS	B_C + 24"
42" TO 54"	1.5 x B_C
60" OR OVER	B_C + 36"

NOTE:

1. THIS DETAIL MEETS CLASS "C" BEDDING REQUIREMENTS FOR RCP AT TYPE 1 FOR DIP.

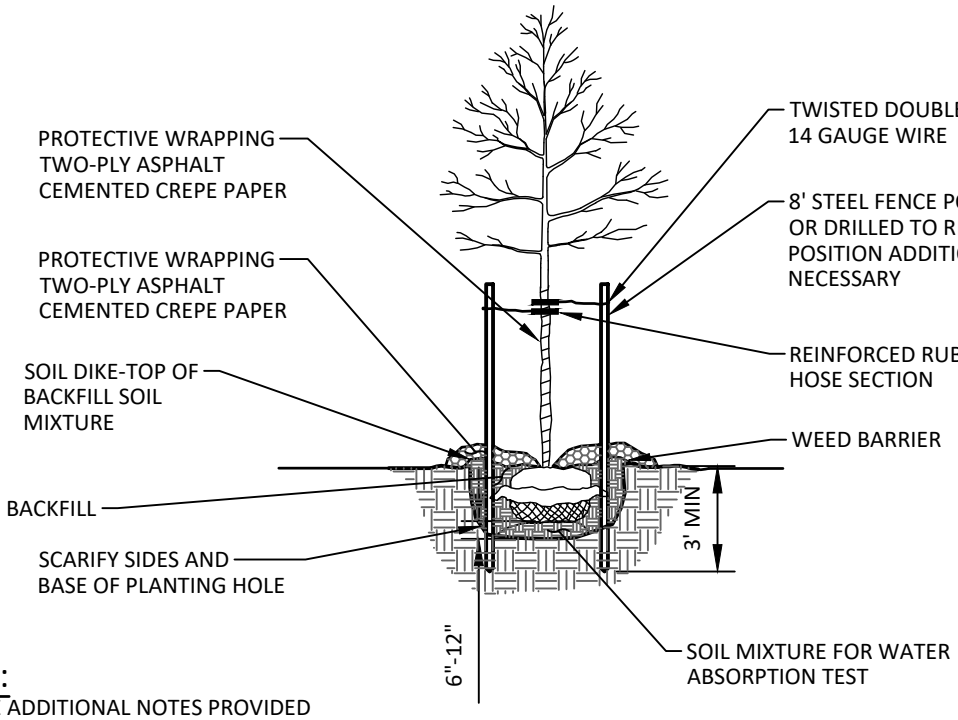
City of Shorewood

BEDDING METHODS FOR RCP & DIP

STANDARD DETAILS

REVISED: NOV. 2025

BED-02



NOTE:

INCLUDE ADDITIONAL NOTES PROVIDED THAT PERTAIN TO TYPE OF PLANTING CALLED OUT IN THE PLAN.

ENGINEER TO DETERMINE IF MULCH AND WEED BARRIER ARE INCIDENTAL TO PLANTING OR PAID AS SEPARATE ITEMS.

DECIDUOUS TREE PLANTING

BAG & BALL PLANTING NOTE:

1. REMOVE WRAPPING AND ALL TIES OR STRAPS. IF ROOT BALL IS WRAPPED IN BURLAP THE LOWER ½ PORTION OF THE FABRIC MAY BE LEFT AT THE BOTTOM OF THE HOLE. SYNTHETIC WRAP MUST BE REMOVED AND PROPERLY DISPOSED.
2. LOOSEN ROOTS TO ENSURE THEY ARE NOT GIRDLING THE ROOT BALL.
3. SALVAGE AND REUSE ALL SOIL THAT CAME WITH THE ROOT BALL.
4. IF ROOT BALL IS EXTREMELY DRY WATER IT PRIOR TO PLACING IT IN THE HOLE.
5. IF TREE IS CONTAINER GROWN, SALVAGE ALL SOIL AND MIX WITH SUPPLEMENTED SOIL FOR BACK FILL.

BARE ROOT PLANTING NOTE:

IF BARE ROOT MATERIAL IS SPECIFIED THESE ADDITIONAL REQUIREMENTS MUST BE MET:

1. ROOTS MUST BE SOAKED OVERNIGHT THE NIGHT BEFORE PLANTING.
2. ROOTS MUST BE PROTECTED FROM DRYING OUT DURING THE INSTALLATION PROCESS.
3. ALL DAMAGED, DISEASED OR DESIGNATED ROOTS AND ROOT ENDS MUST BE CLEANLY PRUNED. TREE SHALL NOT HAVE GIRDLING ROOTS.

1. PROVIDE AND INSTALL HEALTHY PLANT MATERIALS THAT MEET ALL SPECIFICATIONS AND ARE OF THE SIZE, TYPE AND SPECIES NAMED ON THE PLANT SCHEDULE AND SHOWN ON THE PLANS.
2. DIG PLANT HOLE 1'-0" MINIMUM LARGER ON ALL SIDES THAN ROOT BALL.
3. PRIOR TO PLACING TREE, SCARIFY BOTTOM AND SIDES OF THE PLANTING HOLE.
4. TEST SOIL ABSORPTION. FILL HOLE PARTIALLY WITH SUPPLEMENTED SOIL MIXTURE, ADD WATER AND ALLOW TO PUDDLE AND SETTLE PRIOR TO SETTING TREE.
5. AFTER PUDDLING HAS SETTLED, SET TREE AND BACK FILL WITH SUPPLEMENTED SOIL MIXTURE.
6. WATER THOROUGHLY AND ADD BACK FILL AS NEEDED AFTER MOISTURE IS ABSORBED.
7. BUILD SOIL DIKE AROUND PERIPHERY OF TREE TO HOLD WATER.
8. AFTER SETTLEMENT, MULCH WITH MINIMUM 4" LAYER SHREDDED BARK, WOOD CHIPS OR AS OTHERWISE SPECIFIED. DO NOT MULCH UP AGAINST THE TRUNK.
9. REMOVE DEAD OR DAMAGED BRANCHES. RETAIN THE NATURAL FORM OF THE TREE.

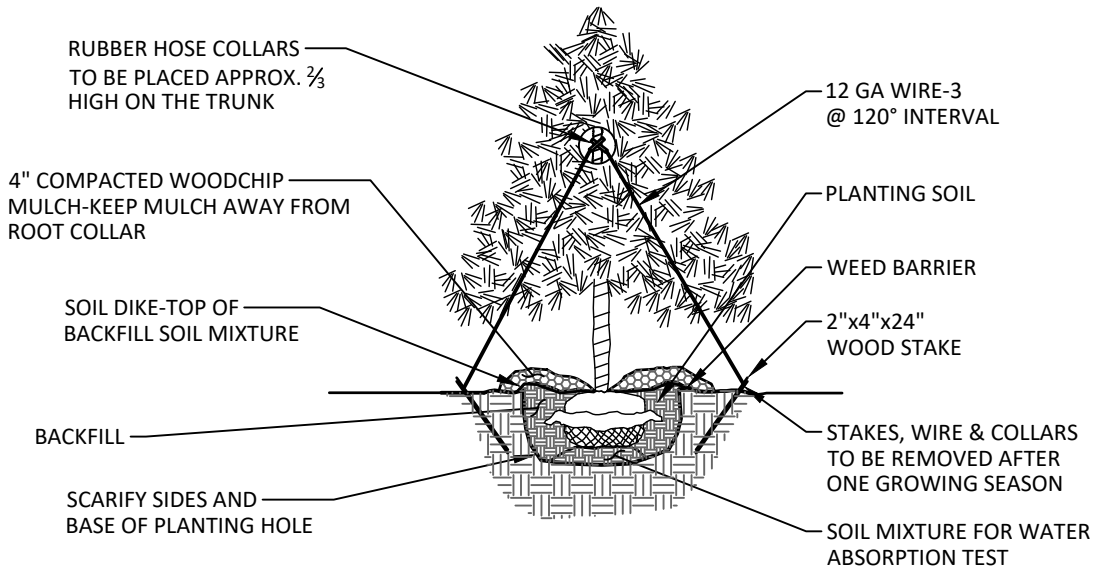
City of Shorewood

DECIDUOUS TREE PLANTING

STANDARD DETAILS

REVISED: NOV. 2025

MISC-01



CONIFEROUS TREE PLANTING

NOT TO SCALE

NOTE: INCLUDE ADDITIONAL NOTES PROVIDED THAT PERTAIN TO TYPE OF PLANTING CALLED OUT IN THE PLAN.

ENGINEER TO DETERMINE IF MULCH AND WEED BARRIER ARE INCIDENTAL TO PLANTING OR PAID AS SEPARATE ITEMS.

1. PROVIDE AND INSTALL HEALTHY PLANT MATERIALS THAT MEET ALL SPECIFICATIONS AND ARE OF THE SIZE, TYPE AND SPECIES NAMED ON THE PLANT SCHEDULE AND SHOWN ON THE PLANS.
2. DIG PLANT HOLE 1'-0" MINIMUM LARGER ON ALL SIDES THAN ROOT BALL.
3. PRIOR TO PLACING TREE, SCARIFY BOTTOM AND SIDES OF THE PLANTING HOLE.
4. TEST SOIL ABSORPTION.
5. FILL HOLE PARTIALLY WITH SUPPLEMENTED SOIL MIXTURE, ADD WATER AND ALLOW TO PUDDLE AND SETTLE PRIOR TO SETTING TREE.
6. AFTER PUDDLING HAS SETTLED, SET TREE AND BACK FILL WITH SUPPLEMENTED SOIL MIXTURE.
7. WATER THOROUGHLY AND ADD BACK FILL AS NEEDED AFTER MOISTURE IS ABSORBED.
8. BUILD SOIL DIKE AROUND PERIPHERY OF TREE TO HOLD WATER.
9. AFTER SETTLEMENT, MULCH WITH MINIMUM 4" LAYER SHREDDED BARK, WOOD CHIPS OR AS OTHERWISE SPECIFIED. DO NOT PLACE MULCH OVER THE ROOT COLLAR.
10. REMOVE DEAD OR DAMAGED BRANCHES RETAINING THE NATURAL FORM OF THE TREE.

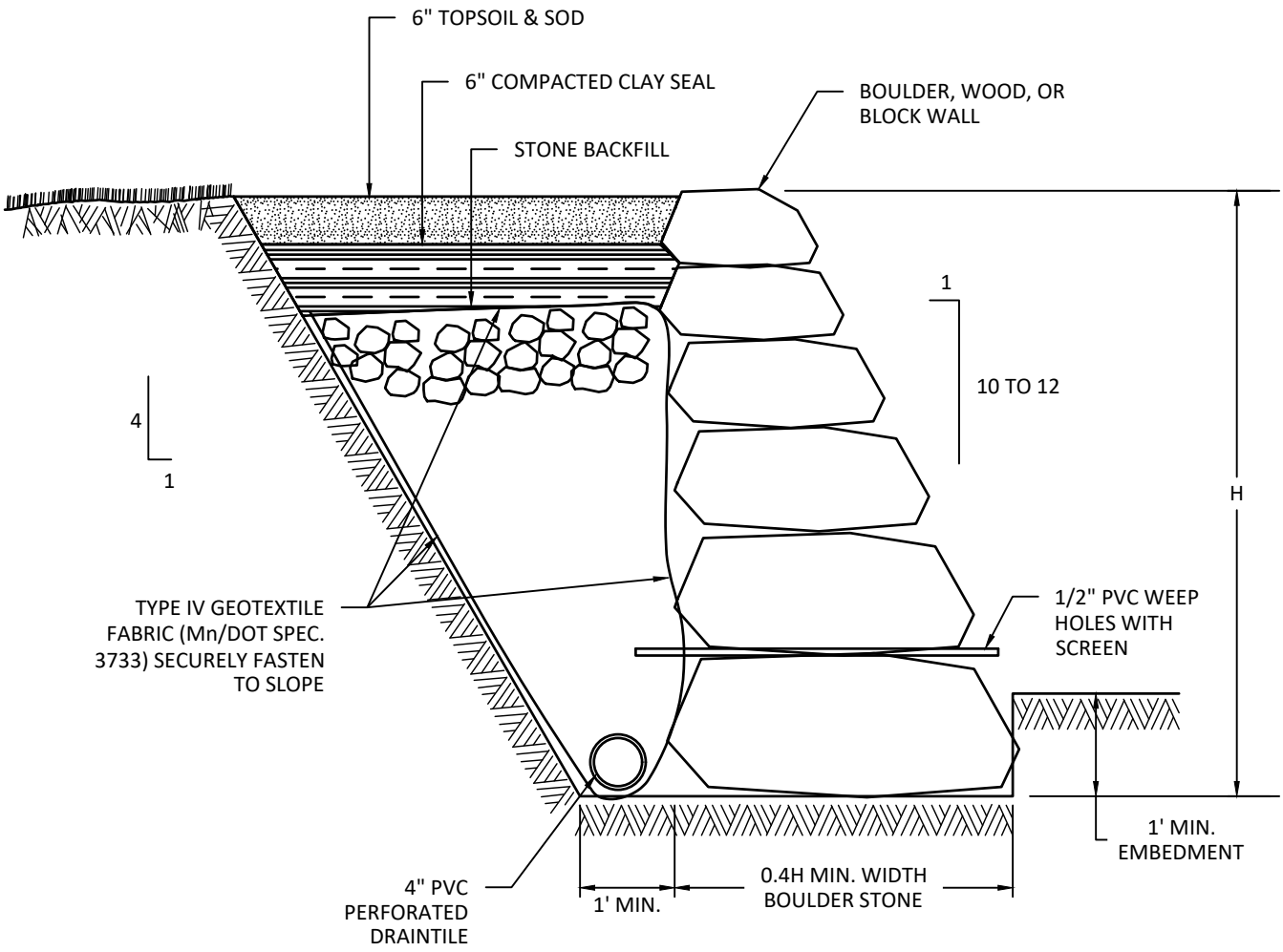
BAG & BALL PLANTING NOTE:

1. REMOVE WRAPPING AND ALL TIES OR STRAPS. IF ROOT BALL IS WRAPPED IN BURLAP THE LOWER PORTION OF THE FABRIC MAY BE LEFT AT THE BOTTOM OF THE HOLE. SYNTHETIC WRAP MUST BE REMOVED AND PROPERLY DISPOSED.
2. LOOSEN ROOTS TO ENSURE THEY ARE NOT GIRDLING THE ROOT BALL.
3. SALVAGE AND REUSE ALL SOIL THAT CAME WITH THE ROOT BALL.
4. WATER THE ROOT BALL PRIOR TO PLACING IT IN THE HOLE.
5. IF TREE IS CONTAINER GROWN, SALVAGE ALL SOIL AND MIX WITH SUPPLEMENTED SOIL FOR BACK FILL.

BARE ROOT PLANTING NOTE:

IF BARE ROOT MATERIAL IS SPECIFIED THESE ADDITIONAL REQUIREMENTS MUST BE MET:

1. ROOTS MUST BE SOAKED OVERNIGHT THE NIGHT BEFORE PLANTING.
2. ROOTS MUST BE PROTECTED FROM DRYING OUT DURING THE INSTALLATION PROCESS.
3. ALL DAMAGED, DISEASED OR DESIGNATED ROOTS AND ROOT ENDS MUST BE CLEANLY PRUNED. TREE SHALL NOT HAVE GIRDLING ROOTS.



NOTES:

1. CONTRACTOR SHALL VISIT SITE AND BECOME FAMILIARIZED WITH EXISTING STRUCTURES, TOPOGRAPHY, SURFACE DRAINAGE AND UTILITIES.
2. CONTRACTOR SHALL CHECK WITH CITY FOR APPROPRIATE PERMIT.
3. CONTACT GOPHER STATE ONE CALL AT 651-454-0002 FOR PRECISE ON SITE LOCATION OF UTILITIES PRIOR TO ANY EXCAVATION.
4. CONTRACTOR TO VERIFY PROPERTY LINE DIMENSIONS AND LOCATION WITH THE CITY OF SHOREWOOD.
5. ALL INFORMATION SHOWN IS APPROXIMATE, CONTRACTOR SHALL VERIFY LOCATIONS AND ELEVATION.

City of Shorewood

BOULDER RETAINING WALL

STANDARD DETAILS

REVISED: NOV. 2025

MISC-03

GENERAL NOTES:

1. CONTRACTOR SHALL VISIT SITE AND BECOME FAMILIARIZED WITH EXISTING STRUCTURES, TOPOGRAPHY, SURFACE DRAINAGE AND UTILITIES
2. CONTACT GOPHER STATE ONE CALL AT 651-454-0002 FOR PRECISE ON SITE LOCATION OF UTILITIES PRIOR TO ANY EXCAVATION.
3. CONTRACTOR TO VERIFY PROPERTY LINE DIMENSIONS AND LOCATION WITH THE CITY OF SHOREWOOD.
4. ALL INFORMATION SHOWN IS APPROXIMATE, CONTRACTOR SHALL VERIFY LOCATIONS AND ELEVATIONS.

STONES FOR BOULDER WALL

THE STONE SHALL BE DURABLE FIELD STONE OF APPROVED QUALITY, SOUND, HARD AND FREE OF SEAMS, CRACKS AND OTHER STRUCTURAL DEFECTS. TO DETERMINE SUITABLE QUALITY OF ANY STONE, THE ENGINEER MAY CONSIDER THE RESULTS OF LABORATORY TESTS, THE BEHAVIOR OF THE STONE UNDER NATURAL EXPOSURE CONDITIONS, THE BEHAVIOR OF THE STONE FROM THE SAME OR SIMILAR GEOLOGICAL FORMATIONS OR DEPOSITS OR SUCH OTHER TESTS OR CRITERIA AS MAY BE DEEMED APPROPRIATE.

STONES SHALL BE GENERALLY CUBIFORM IN SHAPE. THE RATIO OF HEIGHT TO LENGTH OR WIDTH OF STONE SHALL BE PREFERABLY BETWEEN 0.5 TO 0.75. MINIMUM STONE DIMENSION SHALL BE 2'X 2'X 1'. SLABBY OR ELONGATE STONE PIECES HAVING HEIGHT LESS THAN ONE THIRD THE LENGTH OR WIDTH SHALL NOT EXCEED 10 PERCENT OF THE TOTAL. STONE SHALL BE FREE OF CONTAMINATION BY SOIL OR OTHER DEBRIS PRIOR TO INCORPORATION INTO THE WORK.

STONE SHALL BE PLACED TO PROVIDE NESTING THAT MINIMIZE THE OPENINGS BETWEEN ADJACENT STONES (SIDES, TOP & BOTTOM).

EXISTING STONES THAT CONFORM TO THE ABOVE MAY BE SALVAGED AND REINSTALLED.

STONES FOR BACKFILL

STONES FOR BACKFILL SHALL BE THE KIND AND QUALITY AS REQUIRED FOR THE STONE FOR THE BOULDER WALL AND SHALL BE WELL GRADED AND RANGE IN SIZE FROM 3" MINIMUM TO 8" MAXIMUM.

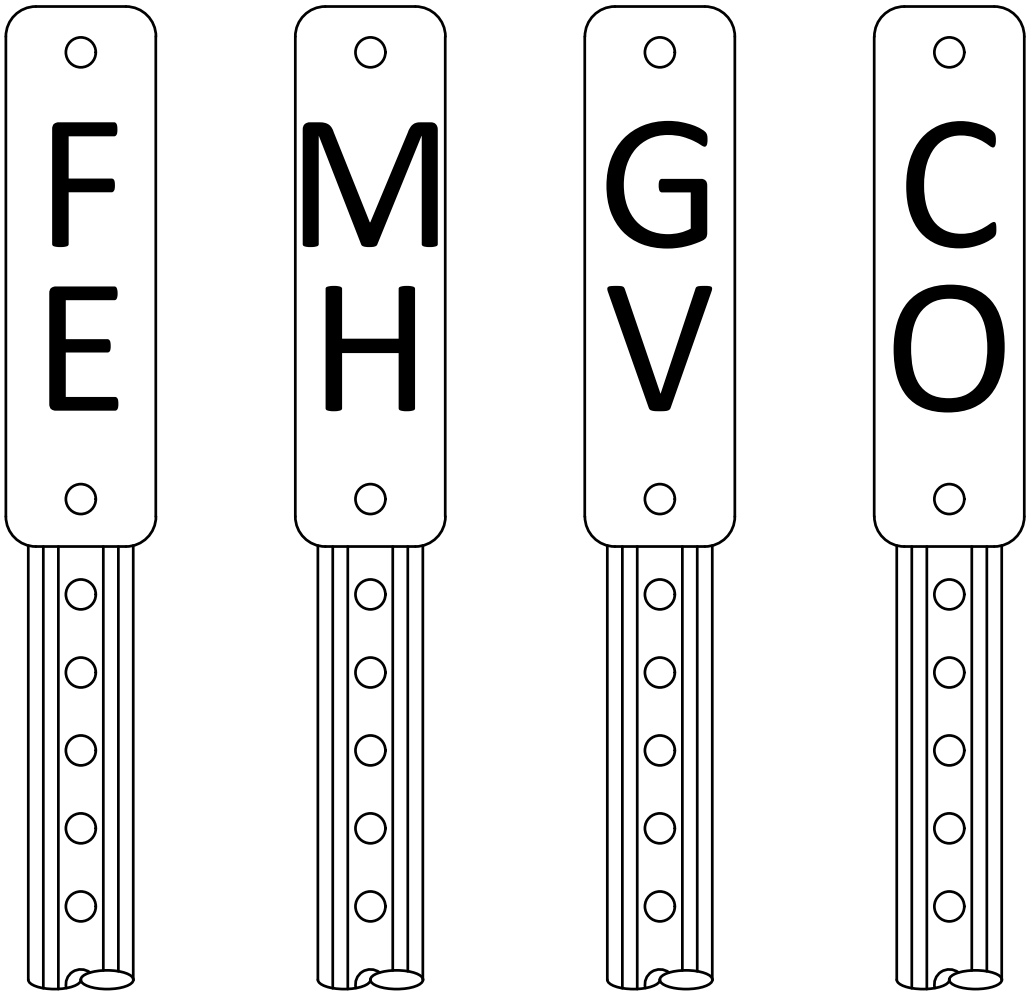
GEOTEXTILE FABRIC

GEOTEXTILE FABRIC SHALL CONFORM TO MN/DOT SPEC. 3733. WHEREVER GEOTEXTILE FABRIC IS PLACED, THE FOUNDATION SURFACE SHALL BE RELATIVELY SMOOTH AND FREE OF STONES, STICKS AND OTHER DEBRIS OR IRREGULARITIES THAT MIGHT PUNCTURE THE FABRIC. PLACEMENT OF BACKFILL AND OTHER CONSTRUCTION OPERATIONS SHALL NOT TEAR, PUNCTURE OR SHIFT THE FABRIC.

WHERE MULTIPLE FABRIC WIDTHS OR LENGTHS ARE REQUIRED, THEY SHALL BE PLACED WITH THE LONGEST DIMENSION PARALLEL TO THE DIRECTION OF WATER FLOW. IF NOT SEAMED, SPLICES AND JOINTS SHALL BE OVERLAPPED A MINIMUM OF 18". THE JOINT LAPS SHALL BE SHINGLED (BOTH IN THE FLOW DIRECTION AND FROM TOP OF SLOPE TO BOTTOM) SO AS TO DIRECT WATER FLOW OVER THE JOINT WITHOUT UNDERMINING. IN LIEU OF JOINT OVERLAPPING, MULTIPLE FABRIC PIECES MAY BE MECHANICALLY SEAMED (SEWED, GLUED, WELDED, ETC.) WITH SEAMS TO MEET APPROPRIATE SECTIONS OF 3733. UPGRADE EDGES OF THE FABRIC AREA SHALL BE BURIED SUFFICIENTLY TO DIRECT WATER FLOW OVER THE FABRIC WITHOUT UNDERMINING. IF NOT SEAMED, WASHERED STEEL PINS, EDGE STAKES, STONES, ETC. SHALL BE PLACED AT LOCATIONS AND IN QUANTITIES AS APPROVED BY THE ENGINEER, TO PREVENT MOVEMENT OF THE GEOTEXTILE FILTER DURING PLACEMENT OF THE STONE BACKFILL.

DUMPING OF STONE AT THE TOP OF THE SLOPE AND ROLLING OF STONE DOWN THE SLOPE WILL NOT BE PERMITTED.

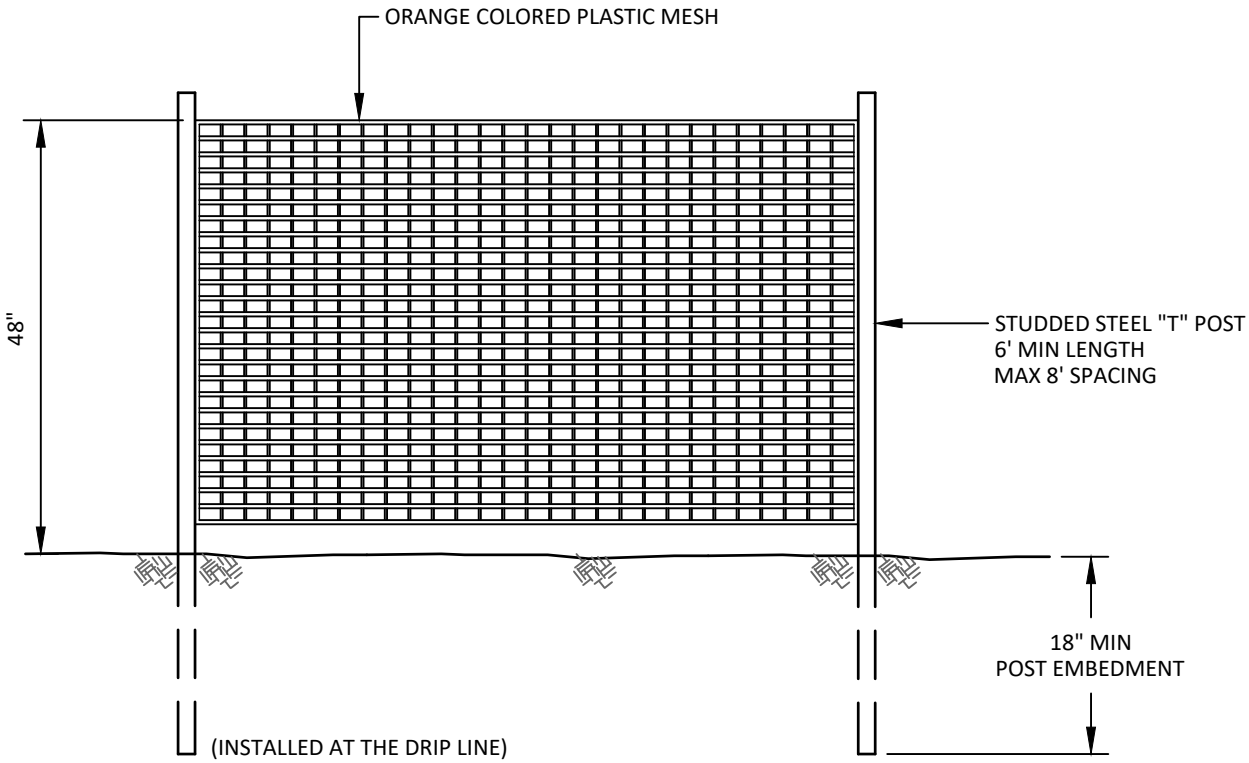
CONSTRUCTION EQUIPMENT SHALL NOT OPERATE DIRECTLY ON TOP OF THE GEOTEXTILE.



NOTES:

1. 0.063" THICK ALUMINUM SIGN. BLACK LETTERS ON WHITE HIGH INTENSITY REFLECTORIZED BACKGROUND.
2. U-CHANNEL POST, MINIMUM 3 LB/FT 6'-6" LONG, PAINTED GREEN.
3. PLACED AS DIRECTED BY ENGINEER.
4. SIGNS ARE NOT REQUIRED IN STRUCTURE IS LOCATED IN MAINTAINED SPACES.

City of Shorewood	STRUCTURE MARKING SIGNS	STANDARD DETAILS	
		REVISED: NOV. 2025	MISC-05



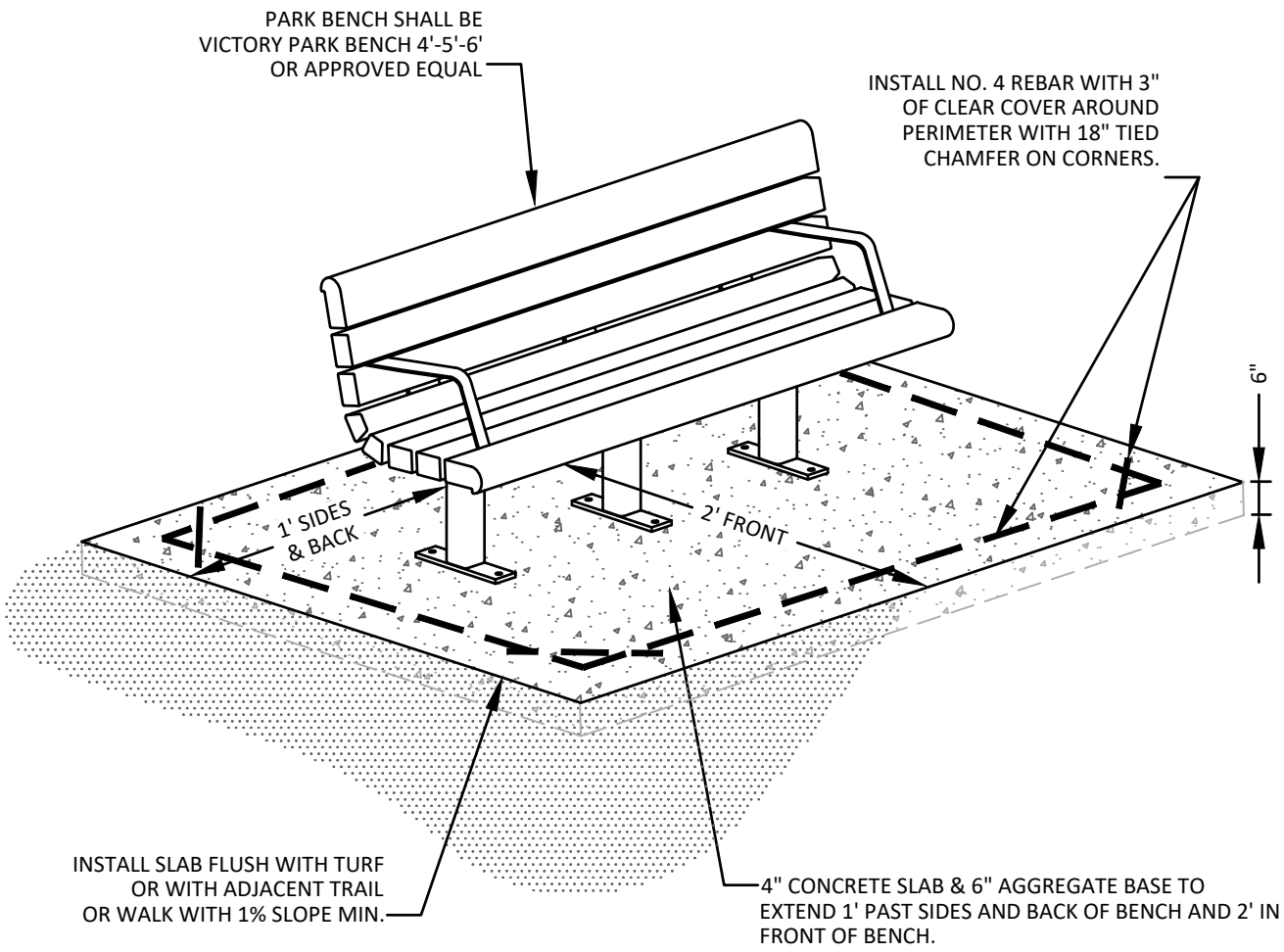
City of Shorewood

TREE PRESERVATION FENCE

STANDARD DETAILS

REVISED: NOV. 2025

MISC-06



City of Shorewood

VICTORY PARK BENCH

STANDARD DETAILS

REVISED: NOV. 2025

MISC-07