CITY OF DE PERE
MEMO

To: Honorable Mayor Boyd
Members of the Board of Public Works
From: Eric Rakers, P.E., City Engineer
Date: January 13, 2025

RE: **Consideration and possible action on updates to 2025 General Conditions and Standard Specifications**

Listed in this memo are proposed updates to the City of De Pere's 2025 General Conditions and Standard Specifications. Specifications need to be updated on a regular basis to accommodate changes in the industry, as well as improving the clarity of the documents. The last update was completed in January 2024. There are several changes to the document. Listed below is a summary of the major changes to the specifications.

Section 32 16 13 – Concrete Curb and Gutter

1) Under Section 1.2, References, inserted C595 Standard Specifications for Blended Hydraulic Cements
2) Under Section 2.2, Cement, added the use of ASTM C595, Type 1L for cement in concrete.

Section 32 16 20 – Concrete Sidewalks and Driveways

1) Under Section 1.2, References, inserted C595 Standard Specifications for Blended Hydraulic Cements
2) Under Section 2.2, Cement, added the use of ASTM C595, Type 1L for cement in concrete.

Section 33 11 00 – Water Distribution Systems

1) Under Section 1.2, References, inserted C153 Ductile-Iron Compact Fittings.
2) Under 2.3, Valves, C., deleted Item 10. *Valves will be fitted with a three (3) foot long extension stem with bottom bolts for tightening to the valve at 90 degrees to each other.*
3) Under 2.7, Tracer Wire, A., updated the tracer wire specification to increase the wire coating, modify the wire for directional drilling/boring and added for pipe bursting.
4) Under 2.9, Couplings and Adapters, B., added the requirements for AWWA C153 for short body fittings.
5) Under 3.10 Field Quality Control, water main testing has been updated to require pressure and leakage testing on relay water main projects after the corporations are installed.

Section 33 31 00 – Sanitary Sewer Systems

1) Under Section 2.3, Manholes,
    a. A.4.b., added the use of Flex-O-Ring.
    b. A.7.d., added the use of Kor N-Seal.

2) Under Section 2.5 Tracer Wire, updated the tracer wire specification to increase the wire coating, modify the wire for directional drilling/boring and added for pipe bursting.
3) Under 3.1 Gravity Sewer Installation,
    a. C.1.d., eliminated the reference to lamping.
    b. C.1., added section h. to require clay dams be installed near manholes.

Section 33 41 00 – Storm Sewer Systems

1) Under Section 2.3, Manholes, A.4.b., added the use of Flex-O-Ring.
2) Under Section 2.7, Tracer Wire, updated the tracer wire specification to increase the wire coating.
3) Under Section 3.1, Gravity Sewer Installation,
    a. D.1.c., clarified that the 4'8" measurement is to the bottom of the structure.
    b. H.2., added polypropylene pipe to the listing for connecting storm sewer to endwalls.
4) Under Section 3.5, Tracer Wire, D.&E., clarified how tracer wire is brought to the surface for different types of installations.

Standard Detail Updates

1) Updated S-1 – Precast Concrete Manhole – Updated the detail from a 4" to 6" beyond the riser section to match the specifications.
2) Updated S-7 – Sanitary, Storm, and Water Services – Updated the length of the coiled water main from 50 feet to 60 feet.

Attachments

2024 Standard Specifications and Details with redlines
Changed 2024 Standard Specifications and Details with redlines

DEPARTMENT OF PUBLIC WORKS

2025 STANDARD SPECIFICATIONS

JANUARY 13, 2025

SECTION 32 16 13

CONCRETE CURB AND GUTTER

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes
1. Fine grading and compaction of subgrade.
2. Curb and gutter construction.
3. Backfilling and finish grading.
4. Landscaping.

1.2 REFERENCES

A. American Concrete Institute (ACI)

1.	ACI 305	Recommended Practice for Hot Weather Concreting
2.	ACI 306	Recommended Practice for Cold Weather Concreting

B. American Society for Testing and Materials (ASTM):

1.	A615	Spec. for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
2.	C31	Making and Curing Concrete Test Specimens in the Field
3.	C33	Spec. for Concrete Aggregate
4.	C39	Test for Compressive Strength of Cylindrical Concrete Specimens
5.	C94	Spec. for Ready-Mixed Concrete
6.	C143	Test for Slump of Portland Cement Concrete
7.	C150	Spec. for Portland Cement
8.	C172	Sampling Fresh Concrete
9.	C231	Test for Air Content of Freshly Mixed Concrete by the Pressure Method
10.	C309	Standard Specifications for Liquid Membrane – Forming Compounds for Curing Concrete
11.	C595	Standard Specifications for Blended Hydraulic Cements
12.	C1315	Spec. for Liquid Membrane-Forming Compounds Having Special properties for Curing and Sealing Concrete
13.	D1557	Test Methods for Moisture-Density Relations of Soils and Soils-Aggregate Mixtures Using 10-Lb. (4.54 Kg) Rammer and 18-In. (457 mm) Drop
14.	D1751	Spec. for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
15.	E329	Recommended Practice for Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials as Used in Construction

1. Tests to be taken for each 200 cubic yards of concrete placed or at least once each day.
2. Test one cylinder at 7 days.
3. Test two cylinders at 28 days.
4. Remaining cylinder shall be tested in the event prior tests fail.
5. 28 Day Test Requirements:
   a. Compressive strength is 4,000 psi.
   b. No individual test falls more than 500 psi below specified compressive strength.
   c. If differential strengths of the two specimens is 350 psi or greater, the low strength specimen shall be discarded and the strength of the remaining cylinder shall then be the test result.
   d. If the test result is below 3500 psi, the test is considered a failure. Also, if either of the two 28 day specimens falls below 3000 psi, the test result is considered a failure.
6. Failure of compressive strength tests shall result in following additional testing:
   a. Provide two core samples of each portion of work affected and perform compressive strength tests.
   b. Replace work if core samples do not equal or exceed specified compressive strength.
   c. Additional testing shall be completed at the Contractor's expense.

PART 2 – PRODUCTS

2.1 CONCRETE

A. Conform to ASTM C94, WisDOT State Specifications, and the following:
   1. Class II concrete
   2. Twenty-eight Day Compression Strength: 4000 psi.
   3. Aggregate shall conform to either of the following:
      a. Soil Class A-7 (3/4-Inch Crushed Rock) (WisDOT Size No. 1 Aggregate per 501.2.5.4.5)
      b. Soil Class A-6 (1 1/2-Inch Crushed Rock) (WisDOT Size No. 2 Aggregate per 501.2.5.4.5)
   4. Minimum Cement Content: 6 bags/c.y.
   5. Air entrainment:
      a. Slip-formed concrete – 7.0 percent, +/- 1.5 percent
      b. Other concrete – 6.0 percent, +/- 1.5 percent
   6. Maximum Water-Cement Ratio: .44
   7. Slump:
      a. 2.5 inch or less – Slip-formed
      b. 4.0 inch or less – Non slip-formed

B. Admixtures to lower freezing point of concrete are not permitted.

2.2 CEMENT

A. Conform to ASTM C150, Type 1 or ASTM C595, Type 1L.

2.3 AGGREGATES

SECTION 32 16 20

CONCRETE SIDEWALKS AND DRIVEWAYS

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes
1. Excavation.
2. Compaction aggregate base.
3. Sidewalk and driveway construction.

1.2 REFERENCES STANDARDS

A. American Society for Testing and Materials (ASTM)

1.	A185	Specification for Welded Steel Wire Fabric for Concrete Reinforcement.
2.	C31	Making and Curing Concrete Test Specimens in the Field.
3.	C33	Specification for Concrete Aggregates.
4.	C39	Test for Compressive Strength of Cylindrical Concrete Specimens.
5.	C94	Specification for Ready-Mixed Concrete.
6.	C143	Test for Slump of Portland Cement Concrete.
7.	C150	Specification for Portland Cement.
8.	C172	Sampling Fresh Concrete.
9.	C231	Test for Air Content of Freshly Mixed Concrete by the Pressure Method.
10.	C309	Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
11.	C595	Standard Specifications for Blended Hydraulic Cements
12.	C1315	Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete.
13.	D1557	Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-Lb (4.54 kg) Rammer and 18-in. (457 mm) Drop.
14.	D1751	Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Type).
15.	E329	Standard Recommended Practice for Inspection Testing Agencies for Concrete, Steel and Bituminous Materials Used in Construction.

B. American Concrete Institute (ACI)

1.	ACI 304	Measuring, Mixing, Transporting, and Placing Concrete.
2.	ACI 305	Recommended Practice for Hot Weather Concreting.
3.	ACI 306	Recommended Practice for Cold Weather Concreting.

1. Tests to be taken for each 200 cubic yards of concrete placed or at least once each day.
2. Test one cylinder at 7 days.
3. Test two cylinders at 28 days.
4. Remaining cylinder shall be tested in the event prior tests fail.
5. 28 Day Test Requirements:
   a. Compressive strength is 4,000 psi.
   b. No individual test falls more than 500 psi below specified compressive strength.
   c. If differential strengths of the two specimens is 350 psi or greater, the low strength specimen shall be discarded and the strength of the remaining cylinder shall then be the test result.
   d. If the test result is below 3500 psi, the test is considered a failure. Also, if either of the two 28 day specimens falls below 3000 psi, the test result is considered a failure.
6. Failure of compressive strength tests shall result in following additional testing:
   a. Provide two core samples of each portion of work affected and perform compressive strength tests.
   b. Replace work if core samples do not equal or exceed specified compressive strength.
   c. Additional testing shall be completed at the Contractor's expense.

PART 2 – PRODUCTS

2.1 CONCRETE

A. Concrete shall conform to ASTM C94, the WisDOT State Specification, and the following:
   1. Class II concrete
   2. Twenty-eight Day Compressive Strength: 4,000 psi.
   3. Aggregate shall conform to either of the following:
      a. Soil Class A-7 (3/4-Inch Crushed Rock) (WisDOT Size No. 1 Aggregate per 501.2.5.4.5)
      b. Soil Class A-6 (1 1/2-Inch Crushed Rock) (WisDOT Size No. 2 Aggregate per 501.2.5.4.5)
   4. Minimum Cement Content: 6 bags/c.y.
   5. Air entrainment:
      a. Slip-formed concrete – 7.0 percent, +/- 1.5 percent
      b. Other concrete – 6.0 percent, +/- 1.5 percent
   6. Maximum Water-Cement Ratio: .44
   7. Slump:
      a. 2.5 inch or less – Slipformed
      b. 4.0 inch or less – Non-Slipformed

2.2 CEMENT

A. Conform to ASTM C150, Type 1 or ASTM C595, Type 1L.

2.3 AGGREGATES

A. Conform to WisDOT State Specifications

SECTION 33 11 00

WATER DISTRIBUTION SYSTEMS

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes
1. Underground installation of pressure pipe, fittings and appurtenances.
2. Fire Hydrants
3. Valves
4. Polyethylene encasement for ductile iron pipe and fittings
5. Tracer wire
6. Insulation for pipe frost shield
7. Disinfection of water mains.

1.2 REFERENCES

A. American Water Works Association (AWWA):

1.	C105	Polyethylene Encasement of Ductile-Iron Pipe Systems
2.	C219	Bolted, Sleeve-Type Couplings for Plain-End Pipe
3.	C502	Dry-Barrel Fire Hydrants
4.	C504	Rubber-Seated Butterfly Valves
5.	C512	Air-Release, Air/Vacuum and Combination Air Valves for Waterworks Service
6.	C153	Ductile-Iron Compact Fittings
7.	C515	Reduced Wall, Resilient Seated Gate Valves for Water Supply Services
8.	C550	Protective Epoxy Interior Coatings for Valves and Hydrants
9.	C600	Installation of Ductile-Iron Water Mains and Their Appurtenances
10.	C605	Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water
11.	C651	Disinfecting Water Mains
12.	C800	Underground Service Line Valves and Fittings
13.	C901	Polyethylene (PE) Pressure Pipe and Tubing, ½ Inch through 3 Inch for Water Service
14.	C906	Polyethylene (PE) Pressure Pipe and Fittings, 4 in. through 63 in. for Distribution and Transmission

9. Operating Nut:
   a. The valve shall be equipped with a standard 2 inch square operating nut with cast-on directional arrow.
   b. Valve to open counter clockwise.
10. Acceptable Manufacturers:
    a. Mueller
    b. Kennedy
    c. American Flow Control/Waterous
    d. Clow

D. Valve Boxes
1. Cast iron, three-piece screw type, 5 ¼ inch shaft, round or oval base sized for valve.
2. Threads shall be cast into top and bottom sections.
3. Cover shall be anti-rattle type mark with the word “water” on top.
4. Acceptable Manufacturers:
   a. Tyler 6860DD
   b. Bingham Taylor
   c. Sigma

2.4 POLYETHYLENE ENCASEMENT FOR DUCTILE IRON PIPE AND FITTINGS

A. Conform to requirements of AWWA C105.

B. Type: I

C. Class: "A" (natural color) or "C" (black).

D. Grade: "E-1"

E. Thickness: 8 mils

2.5 WATER MAIN

A. Pipe material and size shall be stated in the Proposal and shown in the Drawings.

B. If the material is not stated, water main is to be Polyvinyl Chloride Pipe (PVC).

2.6 WATER SERVICES

A. Pipe and Tubing
1. Pipe and/or tubing material and size shall be as stated in the proposal and shown on the drawings.
2. Copper tubing shall conform to the requirements of ASTM B88, Type K for sizes up to 2 inches diameter.
3. Polyethylene (PE) tubing shall be blue and conform to the requirements of AWWA C901, PE

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<#>Extension stem manufacturer shall be Ess Brothers and Sons Inc. or approved equal. ¶

letters with nut for trace wire.
3. Upper section shall be a minimum 1 ¼" I.D. steel pipe.
4. Base section shall be a minimum 1 ¼" I.D. cast iron.
5. The casting shall be thoroughly coated with bituminous pitch varnish or pipe dip.
6. Provide a McDonald 5660SS 48 inch stationary Type 304 Stainless Steel curb box rod.
7. Length shall be 7 ½ foot bury with a 6 ½ to 7 ½ foot adjustment range.
8. Acceptable Manufacturers:
   a. Mueller H-10300
   b. Ford EM2-60-57
   c. McDonald 5614

2.7 TRACER WIRE

A. Wire for Water Main Construction.
1. Tracer wire shall be continuous, single-strand #12 AWG copper clad steel, high strength, with a minimum 30 mil HDPE thickness for open cut construction
2. Tracer wire shall be #12 AWG copper clad steel, extra high strength with a minimum 1150 lbs. break load with a minimum 30 mil HDPE insulation thickness for directional drilling/boring.
3. Tracer wire shall be 7x7 stranded copper clad steel, extreme strength with 4700 lb. break load, with minimum 50 mil HDPE coating for pipe bursting.

B. Tracer wire shall be color coated blue.

2.8 TRACER WIRE ACCESS BOX

A. Provide access box device in accordance with the following:
1. The covered access device (tracer wire access box) shall have:
   a. Two pieces to allow for telescoping action adjustment and for frost control.
   b. Top piece to extend below ground a minimum of 12 inches.
   c. 2 ½ inch minimum diameter extension from the top piece of the access box to the top of the sewer pipe.
   d. Lid to be heavy cast iron manufactured in accordance with ASTM A48 Class 25. The top of the lid to be permanently engraved with "WATER" by the manufacturer. The lid is to be furnished with a means of locking the lid such as a standard lockable pentagonal bolt head. Lid to be furnished with connection holes where the tracer wire is to be connected with stainless steel terminal bolts.
2. Acceptable access devices are:
   a. The Valvco Water Tracer Wire Access Box manufactured by C. P. Test Services-Valvco, Inc, reference: http://www.fischer-harris.com/ValvcoTracerWireAccessBox.htm
   b. The Cathodic Test Box P200 series manufactured by Bingham & Taylor, reference: http://www.binghamandtaylor.com/cathodic.htm
3. In lieu of the above access devices furnish materials required as shown on the drawing detail for Tracer Wire Access.

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4. In lieu of the above devices, a modified water valve box, approved by the Engineer will be considered, meeting the following requirements:
   a. Cast iron, two-piece screw type, 5 ¼ inch shaft, with extension to top of sewer pipe.
   b. Threads shall be cast into top section.
   c. Cover shall be anti-rattle type mark with the word “WATER” on top.

2.9 COUPLINGS AND ADAPTERS

A. Flanged Coupling Adapters
   1. Used for connecting plain end pipe to flanged equipment and fittings.
   2. Ductile iron body and follower completely epoxy coated.
   3. Plain rubber gasket.
   4. Provide with anchor studs.

B. Bolted Couplings
   1. Used for connecting plain end pipe to plain end pipe.
   2. Steel sleeve completely epoxy coated.
   3. Ductile iron follower.
   4. Plain rubber gaskets.
   5. Meet the requirements of AWWA C-219.
   6. Meet the requirements of AWWA C-153.

C. Tapping Sleeves
   1. Tapping sleeves shall be rated at 200 psi working pressure up to 12" diameter and 150 psi working pressure above 12" diameter.
   2. Sleeve and outlet flange shall be 304 stainless steel.
   3. Sleeve gasket shall be full length of the sleeve waffle style 360 degree around the pipe.
   4. Provide full face gasket between the outlet flange and the valve flange.
   5. Tapping sleeves shall be Mueller H-034, Smith Blair 665, Dresser Style 630, or Romac.

D. Couplings and adapters shall be Dresser, Smith-Blair, or Romac Industries.

2.10 INSULATION BOARD

A. Extruded polystyrene conforming to ASTM C578, Type IV.

B. Each board shall be 2 inches thick x 4 feet wide x 8 feet long.

2.11 PIPE EMBEDMENT MATERIAL

A. Soil Class A-7 - ¾" or A-8–3/8” crushed rock per section "Soils and Aggregates for Earthwork."

B. Soil Class G-2 - "Clean earth fill per section "Soils and Aggregates for Earthwork."

C. Sand or engineer approved material for steel casing void.

1. Perform water system pressure and leakage tests for pressurized pipelines following the procedure identified in Section 01 45 23.
    i. For water relay projects, perform tests on the water main with the installation of corporations but prior to connecting water services.
    ii. For new water installation projects, perform tests after all services and curb stops are installed.
2. a. Continuity testing for tracer wire installed.

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b. Test shall be performed at water system pressure following the procedure identified in Section 01 45 23. ¶
c. Close all curb stops in the section during the test.¶

3.11 DISINFECTION AND BACTERIOLOGICAL TESTING

A. Provide disinfection and bacteriological testing according to AWWA C651-14 and section NR 811.73, Wisconsin Administrative Code.

B. If piping was contaminated during storage, construction, or repair, the pipe shall be flushed to remove any foreign material that may have entered the pipe prior to disinfection.

C. Disinfect with Tablet Method.
1. Place the required number of tablets as follows:
    a. The inlet end of each pipe section, including branch lines. The number of tablets shall be per the following:

Pipe Diameter (Inches)	13 or less feet (Number of Tablets)	18 feet (Number of Tablets)	20 feet (Number of Tablets)
4	1	1	1
6	1	1	1
8	1	2	2
10	2	3	3
12	3	4	4
16	4	6	7

Refer to AWWA C651-14 for larger diameters

    b. Each hydrant, hydrant lead, and other appurtenances.
2. Attach tablets with food-grade adhesive to the top inside surface of the pipe.
    a. Use adhesive approved by USDA for contact with edible products.
    b. Adhesive shall be Permatex Form-A-Gasket No. 2, Permatex Clear RTV Silicone, or equal.
    c. Permatex Form-A-Gasket No. 1 is not acceptable.
3. Fill in a manner such that the water velocity within the main will not exceed 1 fps.
4. Water is to remain in the pipe for a minimum of 24 hours. If the water temperature is less than 41 degrees F, the water is to remain in the pipe a minimum of 48 hours.

D. Verify Chlorine Residual. Confirm the chlorine residual after 24 or 48 hours is greater than 0.2 ppm.

A. A manufacturer's certification for each product stating that the products were manufactured in accordance with the designated reference standards with test results and date of tests.

PART 2 – PRODUCTS

2.1 PIPE

A. Pipe Material
1. PVC Sewer Pipe shall be in accordance with Section 33 00 02 Polyvinyl Chloride (PVC) Pipe and Fittings.
2. Pipeline material shall be PVC Pipe unless stated elsewhere in the proposal schedule or as shown on drawings
3. Pipe diameters shall be as shown on drawings.

B. Wyes, Tees, Risers and Fittings
1. Wyes, tees and fittings shall be the same type of material and class as the mainline pipe.
2. Risers and fittings shall be the same material and class as the service connections.
3. Tees can only be used for connecting to existing sanitary sewers when approved by the Engineer.
4. Wye branches for a lined sewer shall be a saddle type connector compatible with the lined pipe. Acceptable manufacturers:
   a. Fernco Tap Saddle
   b. GPK gasketed sewer fittings,
   c. Approved equals (saddle wye gasket branch and gasket skirt with straps) will be considered.

2.2 TRANSITION COUPLINGS

A. Couplings for transition between dissimilar pipe diameters or dissimilar pipe materials
1. Fernco Inc., Mission Rubber Company, and Maxadapter are acceptable manufacturers.
2. Conform to ASTM C1173.
3. Provide stainless steel shear rings, bands, nuts and housings of marine grade stainless steel conforming to ASTM A240.

2.3 MANHOLES

A. Precast Reinforced Concrete Manholes
1. Components including base sections, riser sections, grade rings (adjustment rings), eccentric cone, flat slab top and manhole reducing bench shall meet ASTM C478.
2. Base section shall include base riser section with integral monolithic bottom extending minimum of 6 inches beyond riser section.
3. Tops for manholes shall be eccentric cone or, if required elsewhere, flat slab top.
4. Adjusting rings
   a. Precast concrete minimum of 2 inches thick.
   b. Rubber: Infra-Riser, Pro-Ring, Flex-O-Ring, or approved equal.

c. HDPE: Tadtech or approved equal.

5. Eccentric cones, flat slab tops and adjusting rings.
   a. Shall have a 24 inch diameter opening.
   b. Shall support AASHTO H-20 loadings.
6. Joints between components.
   a. Joint design shall be in accordance with ASTM C990.
   b. Gasket shall be the 1 ¼ inch thick butyl rubber material meeting requirements of AASHTO M-198 Type B flexible plastic gasket and ASTM C990 butyl rubber sealant.
7. Connector between Precast Reinforced Manhole Structures
   a. Resilient flexible connector shall meet ASTM C923.
   b. The seal between the flexible connector and the manhole shall be by casting the connector integrally with the manhole wall.
   c. The seal between the connector and the pipe shall be by compression of the resilient material against the outside of the pipe.
   d. Factory made manholes shall use A-Lok, Z-Lok, Kor N-Seal or equal.
   e. Where an existing manhole is core drilled in the field, the flexible connector shall be NPC Inc., Kor-N-Seal or Press-Seal Gasket Corporation PSX:Positive Seal.

B. Bituminous plastic cement shall meet Federal Specification SS-C-153C, Type I.

C. Manhole Steps
1. Steel reinforced copolymer polypropylene meeting ASTM C478.
2. Copolymer polypropylene shall meet ASTM D4101.
3. Steel reinforcement shall be ASTM A615, Grade 60, ½ inch minimum steel reinforcing rod.
4. Step shall be 12 inches wide and project from the wall between 5 inches and 7 inches.
5. Minimum design live load shall be a single concentrated load of 300 lbs. when in place.

D. Castings
1. Shall be ASTM A48, Class 35B, gray iron.
2. Manhole frame and covers shall be non-rocking.
3. Manhole covers for sanitary sewer shall be self-sealing with concealed pick hole.
4. Shall be of uniform quality free from blowholes, shrinkage, discoloration and other defects.
5. Shall be heavy duty designed for AASHTO H-20 loads.
6. Type 1 Frame and Cover: Neenah Foundry No. R1500 unless stated elsewhere in the proposal or as shown on the drawings.

2.4 PIPE EMBEDMENT MATERIAL

A. Soil Class A-7 or A-8 crushed rock per section “Soils and Aggregates”.

2.5 TRACER WIRE

A. Wire for sanitary sewer.
1. Tracer wire shall be continuous, single-strand #12 AWG copper clad steel, high strength, with a minimum 30 mil HDPE thickness for open cut construction

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2. Tracer wire shall be #12 AWG copper clad steel, extra high strength with a minimum 1150 lbs. break load with a minimum 30 mil HDPE insulation thickness for directional drilling/boring.
3. Tracer wire shall be 7x7 stranded copper clad steel, extreme strength with 4700 lb. break load, with minimum 50 mil HDPE coating for pipe bursting.

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B. Tracer wire on sanitary laterals will have green colored insulation.

PART 3 – EXECUTION

3.1 GRAVITY SEWER INSTALLATION

A. General
1. Vertical and Horizontal Alignment
   a. Install sewer pipe to maintain vertical and horizontal alignment as shown on the Drawings.
   b. Use laser equipment mounted in a manner to permit beam to shine through pipe.
   c. Use a target to check each pipe installed.
   d. Check laser beam alignment and grade a minimum of every 100 feet.
   e. Use a fan to control air temperature variations in pipe and reduce bending of laser beam.
2. Commence pipe installation only after the trench has been dewatered below the trench bottom and all necessary sheeting and bracing is in place.
3. Install pipe starting at the downstream end and proceed toward the upstream.
4. Install plastic pipe in accordance with ASTM D2321, as revised by these specifications.

B. Pipe Embedment
1. Plastic Pipe – Class "B" Embedment:
   a. Bedding, Haunching and Initial Backfill
      1) 4" below pipe to 12" above the pipe, place Soil Class A-7 or A-8 material work by hand to insure all excavated voids are filled.
      2) If in rock, place Soil Class A-7 or A-8 material 6" below pipe to 12" above the pipe and work by hand to insure all excavated voids are filled.

C. Pipe Installation
1. Open Cut Method:
   a. Trench requirements shall conform to Section "Trenching, Backfilling, and Compacting."
   b. Do not use support blocking.
   c. Proceed pipe laying upgrade with spigot pointing in direction of flow.
   d. Lay each pipe true to line and grade.
   e. When pipe installation is not in progress, provide the forward end of the pipe with a temporary plug to prevent foreign material from entering.
   f. Push "home" the spigot end of the pipe joint in the socket before proceeding to install the next pipe.
      When connecting to an existing sewer not terminating in a manhole, uncover the end of the existing sewer prior to laying sewer to allow horizontal and vertical adjustments.

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g. Install pipe such that pipe joints are located far enough from the manhole outside wall to permit future pipe repair without damaging the manhole and the joints shall not fall within manhole walls.

h. Construct a bentonite clay dam at the upstream end of each sanitary sewer run prior to the upstream manhole.

1) Clay dam is to be 12" thick.

2) Install in place of bedding stone and initial backfill.

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2. Trenchless Excavation Method
   a. Auger horizontal earth boring (boring and jacking)
      1) Bore and jack steel casing pipe at location and diameter or larger shown on the
      2) Drawings in accordance with Section "Trenchless Excavation Construction" at line and grade to accommodate the gravity carrier pipe.
      3) Install the gravity carrier pipe at line and grade through the casing pipe blocked to prevent contact with the casing pipe.
      4) Fill the annular space between casing pipe and gravity carrier pipe with sand or Engineer approved equal.
   b. Horizontal directional drilling
      1) Install gravity carrier pipe in accordance with Section "Trenchless Excavation Construction" at line and grade and location shown on the Drawings.
      2) Fill the annular space between the bore hole and the gravity carrier pipe with a bentonite slurry.

D. Manholes
   1. General Installation Requirements:
      a. Depths shown on Drawings shall be considered approximate.
      b. Establish flow lines and casting elevations from grade stakes and cut sheets.
      c. Provide 6 feet minimum height from top of casting to flowline.
      d. Place bases on a minimum of four (4) inches of bedding material:
         1) Soil Class A-7 or A-8.
         2) Place and work by hand to insure all excavated voids are filled.
         3) The maximum amount of adjusting rings is twelve inches.
      e. Seal exterior of lift holes with bituminous plastic cement.
      f. Fill the following with mortar and finished smooth.
         1) Interior lift holes.
         2) Annular space around pipes: interior bottom half only.
      g. Construct manholes in accordance with the appropriate detail drawings.
      h. Install structures plumb.
   2. Detailed Installation:
      a. Unless indicated otherwise, provide precast concrete manhole construction.
      b. Four foot diameter shall be considered standard.
      c. Pitch casting to match street crowns where applicable.
      d. Provide precast risers in a combination of lengths to minimize the number of joints.
      e. Install Butyl Rubber Joint Sealant at risers:
         1) Rope configuration.

2.3 MANHOLES AND INLETS

A. Precast Reinforced Concrete Manholes and Inlets
   1. Components including base sections, riser sections, grade rings (adjustment rings), eccentric cone, flat slab top and manhole reducing bench shall meet ASTM C478 and rectangular, inlets and catch basins shall meet ASTM C913.
   2. Base section shall include base riser section with integral monolithic bottom extending minimum of 6 inches beyond riser section.
   3. Tops for manholes shall be eccentric cone or, if required elsewhere, flat slab top.
   4. Adjusting rings
      a. Precast concrete: minimum of 2 inches thick.
      b. Rubber: Infra-Riser, Pro-Ring, Flex-O-Ring, or approved equal.
      c. HDPE: Tadtech or approved equal. Inlet rings shall be tapered longitudinally when the inlet is not at the low point.
   5. Eccentric cones, flat slab tops and adjusting rings.
      a. Shall have a 24 inch diameter opening.
      b. Shall support AASHTO H-20 loadings.
   6. Joints between components.
      a. Joint design shall be in accordance with ASTM C990.
      b. Gasket shall be the 1 ¼ inch thick butyl rubber material meeting requirements of AASHTO M-198 Type B flexible plastic gasket and ASTM C990 butyl rubber sealant.
   7. Connection between Manhole Structures and Storm Sewer Pipe.
      a. Provide a non-shrink grout.

B. Bituminous plastic cement shall meet Federal Specification SS-C-153C, Type I.

C. Manhole Steps
   1. Steel reinforced copolymer polypropylene meeting ASTM C478.
   2. Copolymer polypropylene shall meet ASTM D4101.
   3. Steel reinforcement shall be ASTM A615, Grade 60, ½ inch minimum steel reinforcing rod.
   4. Step shall be 12 inches wide and project from the wall between 5 inches and 7 inches.
   5. Minimum design live load shall be a single concentrated load of 300 lbs. when in place.

D. Castings
   1. Shall be ASTM A48, Class 35B, gray iron.
   2. Manhole frame and covers shall be non-rocking.
   3. Shall be of uniform quality free from blowholes, shrinkage, discoloration and other defects.
   4. Shall be heavy duty designed for AASHTO H-20 loads.
   5. Manhole Castings: Neenah Foundry No. R1500, unless stated elsewhere in the proposal or as shown on the drawings.
   6. Type A Field Inlet Casting: Neenah Foundry No. 1500 with R2100 Grate Type “A”.
   7. Type B Inlet Casting: Neenah Foundry No. 3067-L, 7007B curb box with language for dump no waste drains to freshwater.
   8. Beehive Grate and Casting: Neenah Foundry No. R-2560-D3.

2.7 TRACER WIRE

A. Tracer wire shall be continuous, single-strand #12 solid copper or copper clad steel, high strength, with a minimum 30 mil HDPE thickness for open cut construction.

B. Tracer wire on storm sewer laterals will have brown colored insulation.

2.8 ENDWALLS

A. Reinforced concrete apron endwalls shall be installed on the outlets of reinforced concrete storm sewer as called for on the plans. The concrete apron endwalls shall be constructed to conform to Section 33 00 01 Reinforced Concrete Pipe.

B. Corrugated metal apron endwalls shall be installed on outlets corrugated metal culverts as called for on the plans. The metal apron endwalls shall be constructed to conform to Section 33 00 04 Corrugated Metal Culvert Pipe.

PART 3 – EXECUTION

3.1 GRAVITY SEWER INSTALLATION

A. General
1. Vertical and Horizontal Alignment
   a. Install sewer pipe to maintain vertical and horizontal alignment as shown on the Drawings.
   b. Use laser equipment mounted in a manner to permit beam to shine through pipe.
   c. Use a target to check each pipe installed.
   d. Check laser beam alignment and grade a minimum of every 100 feet.
   e. Use a fan to control air temperature variations in pipe and reduce bending of laser beam.
2. Commence pipe installation only after the trench has been dewatered below the trench bottom and all necessary sheeting and bracing is in place.
3. Install pipe starting at the downstream end and proceed toward the upstream.
4. Install plastic pipe in accordance with ASTM D2321, as revised by these specifications.

B. Pipe Embedment
1. Circular Concrete Pipe – Class “C” Embedment:
   a. Bedding:
      1) 4” below pipe place Soil Class A-7 or A-8 material.
      2) 6” below pipe place Soil Class A-7 or A-8 material if trench bottom is rock.
      3) Place and work bedding material by hand to insure all excavated voids are filled.

   b. Haunching and Initial Backfill:
      1) From bedding material to one-sixth of pipe outside diameter, use Soil Class A-7 or A-8 material place and worked by hand to insure all excavated voids are filled.
      2) From one-sixth of pipe outside diameter to 12” above the pipe, use Soil Class G-2

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D. Manholes and Inlets
   1. General Installation Requirements:
      a. Depths shown on Drawings shall be considered approximate.
      b. Establish flow lines and casting elevations from grade stakes and cut sheets.
      c. Provide four feet eight inches (4'-8") minimum height from top of casting to the bottom of the base.
      d. Place bases on a minimum of four (4) inches of bedding material:
         1) Soil Class A-7 or A-8.
         2) Place and work by hand to insure all excavated voids are filled.
      e. Seal exterior of lift holes with bituminous plastic cement.
      f. Fill the following with mortar and finished smooth.
         1) Interior lift holes.
         2) Annular space around pipes
      g. Construct manholes and inlets in accordance with the appropriate detail drawings.
      h. Install structures plumb.
   2. Detailed Installation:
      a. Unless indicated otherwise, provide precast concrete manhole construction.
      b. Four foot diameter shall be considered standard.
      c. Pitch casting to match street crowns where applicable.
      d. Provide precast risers in a combination of lengths which minimize the number of joints.
      e. Install Butyl Rubber Joint Sealant at Risers:
         1) Rope configuration.
         2) Installed to be compressed by subsequent riser.
      f. Manhole and Inlet Adjusting.
         1) Manholes and inlets must have only ONE concrete ring (2", 4", or 6") on top of the cone section.
            a) Asphaltic Concrete Pavement – Secure ring to the pre-cast cone section with a 3 and ½ inch wide Kent Seal or equal.
            b) Concrete Pavement – Secure ring to pre-cast cone section with concrete vibrated in place during the paving operation.
         2) For manholes in pavement, above the concrete ring attach a ½ inch thru 3 inch thick tapered rubber ring using two (2) 5/16 inch bead above and below the ring, of sealant type as recommended by the rubber ring manufacturer. There shall be a minimum of 2" in depth of rubber rings.
         3) For inlets in pavement, above the concrete ring attach a ½ inch thru 3 inch thick rubber ring using two (2) 5/16 inch bead above and below the ring, of sealant type as recommended by the rubber ring manufacturer. The ring shall be tapered along the flow line for at all locations excluding inlets at low points. There shall be a minimum of 2" in depth of rubber rings.
         4) The maximum amount of adjusting rings is 12 inches.
      g. Do not enter manhole with pipe through cone section.
      h. Pipe connections to manholes
         1) Grout pipe in-place inside and outside the manhole with mortar or gasket providing a soil tight seal.
      i. Precast flat top may be used in lieu of a cone section when elevation is limited.

1. If pipe are of the same material and size, then use a coupling of the same pipe material designed for coupling of the same material and size.
2. If pipe are of dissimilar material or size or there is no coupling made of the same material, then provide a transition coupling with a stainless steel shear ring. Provide bushings or inserts to maintain the flow line through the connection.

G. Joints
1. Construct joints in compliance with manufacturer's recommendations.
2. Utilize full length pipe except at manholes or service branches.

H. Endwalls
1. Reinforced concrete endwalls shall be connected to concrete pipe with steel bolts conforming to WisDOT Standard Specifications for Highway Construction, Latest Edition.
2. Reinforced concrete endwalls shall be connected to PVC or PP Pipe with a band on the PVC or PP and steel bolt on the endwall.
3. Corrugated metal endwalls and pipe shall be banded.

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3.2 INSULATION FOR PIPE FROST SHIELD

A. Provide where shown on the Drawings.

B. Install insulation board in an inverted U around the pipe.

C. Install insulation board with the top insulation board the same width as the trench centered over the pipe.

D. Install the sides of the U-shape tow feet high with the bottom of the legs at least to the springline of the pipe.

E. Install the insulation board in layers to provide a minimum thickness of 4 inches or the thickness stated on the Drawings.

F. Install such that there are no voids under the insulation.

3.3 BULKHEADS

A. Bulkhead new construction to protect existing sewers from water, dirt, and debris.

B. Do not remove bulkheads until new construction is accepted for use.

C. Prior to removal of bulkhead, remove all material (liquid or solid) which accumulated behind bulkheads.

3.4 CLEANING AND REPAIRING SEWER LINES

A. Clean as follows:
   1. All new sewer lines installed under this contract.
   2. Any existing sewer lines which are affected by construction.

B. Furnish water and jetting equipment for cleaning operation.

C. Repair all visible leads and defects, whether or not the sewer lines have been subject to all required tests.

D. Remove any stuck cleaning, inspection or testing equipment from sewer lines.

3.5 TRACER WIRE

A. Provide for all non-metallic service laterals within public right-of-way.

B. Lateral or branch tracer wire splice connections will be typical Western Union-type solder splice made by stripping the coating off the main run tracer wire and then tightly wrapping the branch tracer wire around the main run tracer wire a minimum of eight (8) times. Both wire splices would then be soldered with a self-flux, 50-50 rosin core solder and tightly with a 1 1 /2 " wide 3.2 mm Scotchfill™ electrical insulation tape, or equivalent then coated with 3M Scotchkote™ electrical coating, or equivalent so that no copper wire is exposed. A Klein™ stripping tool shall be used to remove the plastic coating on the wire. The Contractor will be responsible to have all the correct types of tools necessary to install the tracer wire materials as specified above and to ensure that the tools are in good working order.

C. Tracer wire will be securely attached to the mainline sewer pipe, within (6) six inches of each end of the pipe, and at equally spaced locations with a minimum spacing of (6) six feet. Any exposed copper wire will be sealed and covered with materials approved by the Engineer.

D. Tracer wire at the end of laterals for new developed areas will be brought to the surface at the right-of-way perpendicular to the end of the lateral and will be inserted into a three (3) foot long piece of a one (1) inch PVC with a double slotted cap and securely attached to an eight (8) foot long, treated four by four ("4x4"). The top of the four x four will be placed such that thirty (30) inches extend above the finished grade. The one (1) inch PVC shall be placed such that eighteen (18) inches extend above the finished grade. The tracer wire at the top of the PVC will protrude out of one of the slots and back into the PVC pipe through the other slot with at least eighteen inches of slack.

E. Tracer wire at the end of laterals in existing developed areas shall be as follows:
   1. Wrapped around the curb stop if near the curb stop.
   2. Extended to the surface and installed in a tracer wire box if not near the curb stop, as directed by the engineer.

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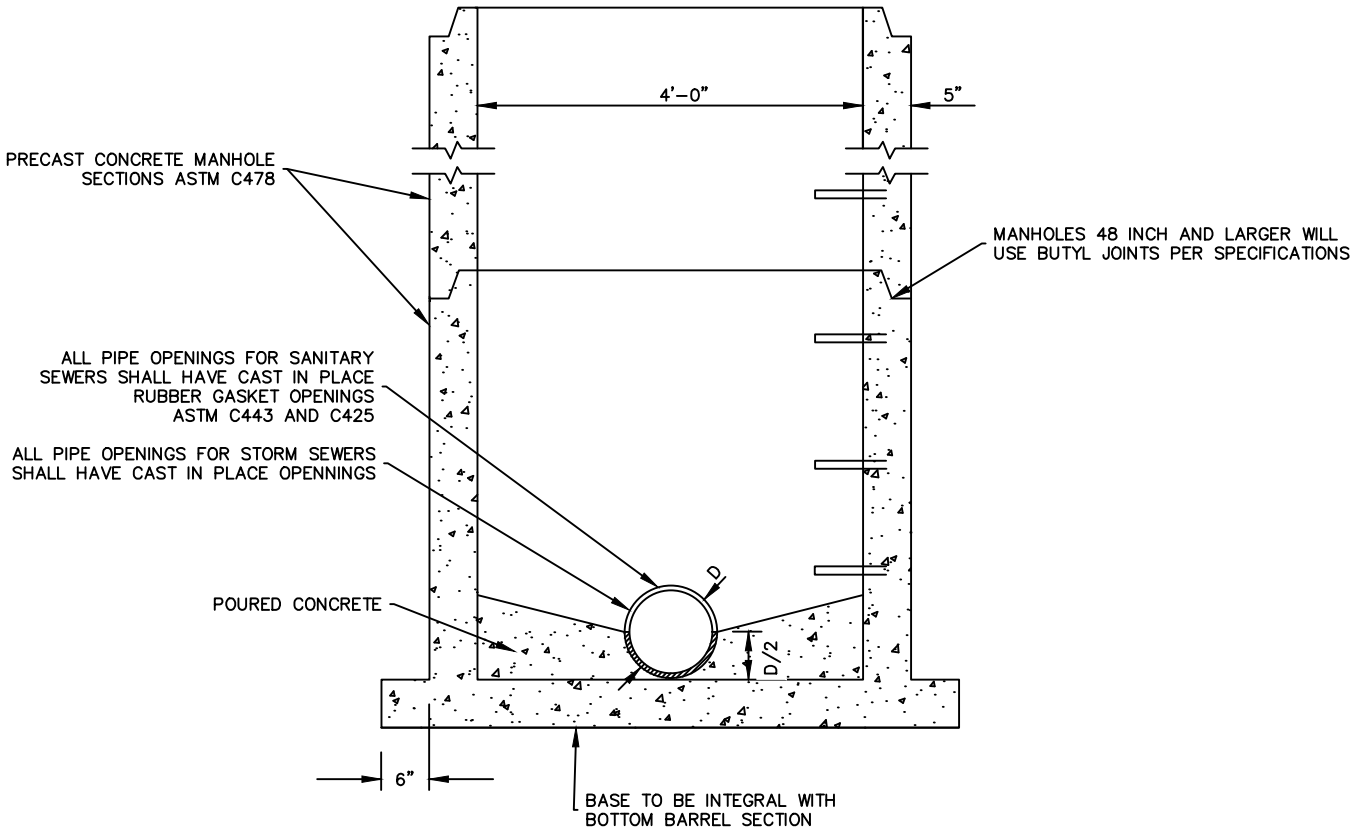
3.6 FIELD QUALITY CONTROL

DEPARTMENT OF PUBLIC WORKS

STANDARD DETAILS

JANUARY 13, 2025



DE PERE

ENGINEERING DIVISION
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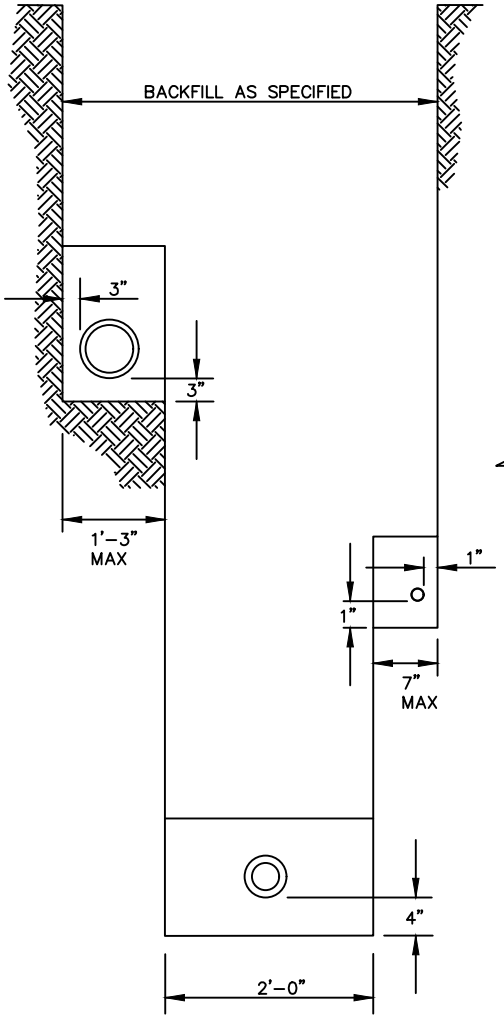
TITLE:
PRECAST CONCRETE MANHOLE

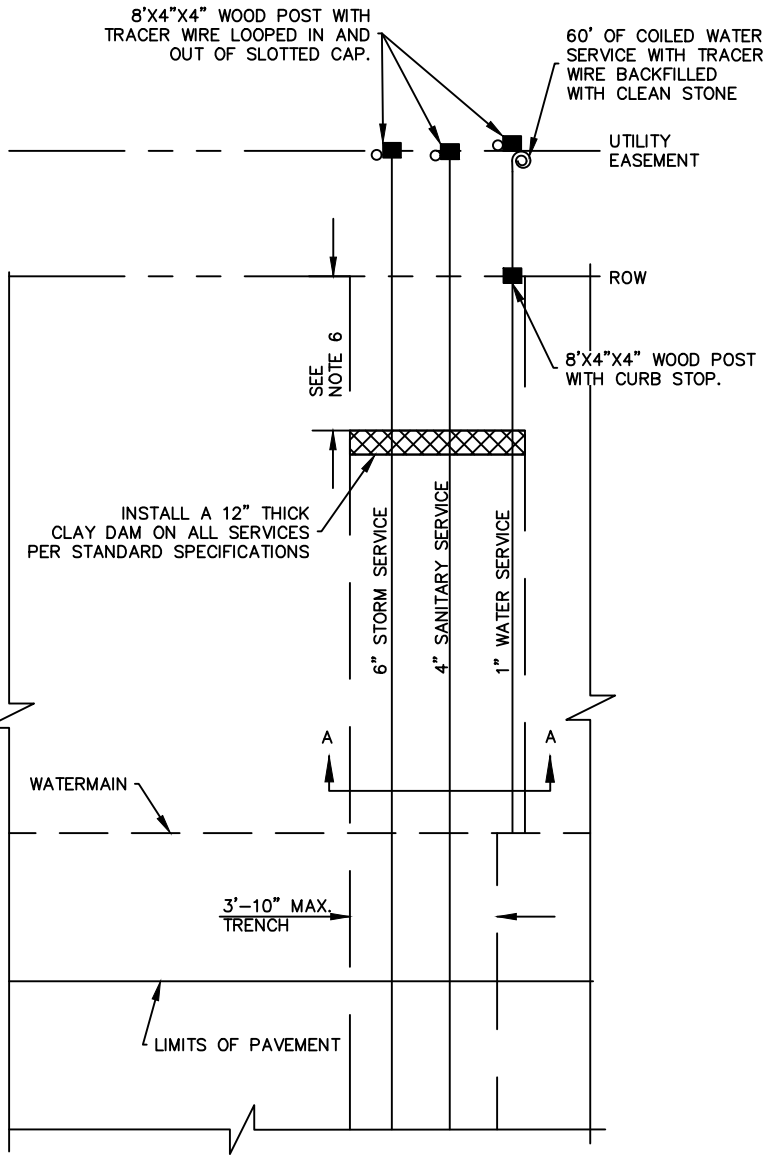
DIVISION: 33

DRAWING NO:
S-1

DATE: 01/2025
BY: KAD
CHECKED: EPR



SECTION VIEW A–A



PLAN VIEW

NOTES:

1. ON A NORTH–SOUTH STREET, STORM SERVICES SHALL BE PLACED ON THE NORTH SIDE OF TRENCH.
2. ON AN EAST–WEST STREET, STORM SERVICES SHALL BE PLACED ON THE WEST SIDE OF TRENCH.
3. STORM SERVICES SHALL BE PLACED TO A DEPTH OF 4 FEET AT THE PROPERTY LINE OR AS DIRECTED.
4. SANITARY SEWER SERVICES SHALL BE A MINIMUM OF 10 FEET OR A MAXIMUM OF 11 FEET OF DEPTH AT THE PROPERTY LINE.
5. GRANULAR BACKFILL SHALL BE PLACED A MINIMUM OF 6 INCHES OVER THE SERVICES.
6. LOCATION OF CLAY DAM TO BE DETERMINED BY ENGINEER BASED ON SIDEWALK AND OTHER PAVED SURFACES

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TITLE: SANITARY, STORM AND WATER SERVICES

DIVISION: 33

DRAWING NO: S–7

DATE: 01/2025
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CHECKED: EPR