TOWN OF BREMEN

INDIANA

STANDARD SPECIFICATION AND DEVELOPMENT STANDARD

Prepared by:

JONES PETRIE RAFINSKI

TOWN OF BREMEN

TABLE OF CONTENTS

INTRODUCTION 1
SECTION 1: STANDARD DESIGN PRACTICE & CRITERIA 1
SECTION 2: STREET, SIDEWALK & CURB CONSTRUCTION 1
SECTION 3: SANITARY SEWER CONSTRUCTION 1
SECTION 4: SANITARY SEWER TESTING PROCEDURES 1
SECTION 5: WATER MAIN CONSTRUCTION 1
SECTION 6: WATER MAIN TESTING PROCEDURES & PRACTICES 1
SECTION 7: STORM SEWERS CONSTRUCTION 1
SECTION 8: MUNICIPAL POWER DEVELOPMENT STANDARDS 1
SECTION 9: MISCELLANEOUS REQUIREMENTS 1
APPENDIX A – FORMS 1
..... 1
APPENDIX B – BONDS 1

FIGURES

FIGURE 2.0 – TYPICAL ROADWAY CROSS SECTION – LINE 'A'
FIGURE 2.1 – ROLLED CURB & PAVEMENT SECTION
FIGURE 2.2 – SIDEWALK DETAILS
FIGURE 2.3 – SIDEWALK EXPANSION JOINT
FIGURE 2.4 – SIDEWALK TRANSITION APPROACH
FIGURE 2.5 – ADA CURB RAMP NOTES
FIGURE 2.6 – ADA CURB RAMP DETAILS
FIGURE 2.7 – DIRECTIONAL PERPENDICULAR CURB RAMP COMPONENT DETAILS
FIGURE 2.8 – DIRECTIONAL PERPENDICULAR CURB RAMP COMPONENT NOTES
FIGURE 2.9 – DETECTABLE WARNING SURFACE DETAILS
FIGURE 2.10 – TRUNCATED DOMES & DETECTABLE WARNING SURFACE NOTES
FIGURE 2.11 – PAVEMENT, CUTTING & RESTORATION DETAIL
FIGURE 2.12 - DRIVEWAY CONSTRUCTION

FIGURE 3.1 – TYPICAL TRENCH, STORM & SANITARY SEWER PIPE LAYING & BEDDING
FIGURE 3.2 – SERVICE CONNECTIONS TYPICAL CONSTRUCTION DETAIL
FIGURE 3.3 – STANDARD MANHOLE 3'-0" TO 4' TO 6" DEPTH DETAIL
FIGURE 3.4 – STANDARD PRE-CAST MANHOLE
FIGURE 3.5 – PRE-CAST DOG HOUSE STRUCTURE
FIGURE 3.6 – TYPICAL DETAIL FOR MANHOLE TOP FINISHING

FIGURE 3.7 – DROP ASSEMBLY MANHOLE
FIGURE 3.8 – STANDARD DROP MANHOLE
FIGURE 3.9 – HYBRID AIR RELEASE AND FLUSHING STATION

FIGURE 5.1 – BUTTERFLY VALVE AND BOX
FIGURE 5.2 – TYPICAL GATE VALVE & VALVE BOX
FIGURE 5.3 – TYPICAL WATER MAIN INSTALLATION TRENCH, PIPE LAYING & BEDDING DETAILS
FIGURE 5.4 – TYPICAL THRUST BLOCKING INSTALLATIONS
FIGURE 5.5 – WATER SERVICE CONNECTION
FIGURE 5.6 – TYPICAL HYDRANT ASSEMBLY
FIGURE 5.7 – DRY TAP METHOD
FIGURE 5.8 – WET TAP METHOD DETAIL

FIGURE 7.1 – STANDARD STORM CATCH BASIN & STORM INLET STRUCTURE
FIGURE 7.2 – STANDARD PRE-CAST STORM MANHOLE
FIGURE 7.3 – OVERFLOW STRUCTURE DETAIL
FIGURE 7.4 – PRECAST PERFORATED DRYWELL
FIGURE 7.5 – STORM SEWER OUTLET PROTECTION

INTRODUCTION

The streets, water, wastewater and storm infrastructure in the Town of Bremen represents a considerable investment of resources and is one of the major financial assets for the Town and its residents and businesses. The Town continuously strives to maintain these facilities so that the Town's residents and businesses can continue to use these facilities in a cost effective and safe manner.

Over the years, the Town has and continues to expend great amounts of financial resources and investments to maintain properly functioning infrastructure. The Town understands that the quality construction of these facilities results in reduced maintenance, increased longevity, and less financial burden to the residents and businesses of the Town.

The intent of this document is to serve as a guide to owners, developers, Town staff and other users by providing minimum standards for the design, construction and materials used for the Town's streets, water, wastewater and storm water infrastructure to maintain consistency with existing Town facilities.

The Town understands that each construction project is unique with its own set of challenges and circumstances. Therefore, the project owners are encouraged to enlist the aid of qualified consultants, engineers, contractors, etc. to analyze site conditions and to efficiently design each project within the minimum standards presented herein. On a similar note, alternate materials and methods of construction will be considered on a case by case basis if a unique situation warrants such.

The key to implementation of these construction and design standards is cooperation and communication between the Town and the project owner(s) and contractor(s). Therefore, the Town encourages project owner(s) and contractor(s) to engage the Town at the earliest possible date, preferably during preliminary design phase. Such notice and inquiries should be directed to:

Town of Bremen
Bremen Clerk-Treasurer
111 S. Center Street
Bremen, IN 46506

SECTION 1: STANDARD DESIGN PRACTICE & CRITERIA

1.1. Town Streets and Right-of-Way

Town streets and right-of-way improvements shall be designed, constructed and tested in accordance with the following documents:

a. The Bremen Standard Specification and Development Guide.
b. The Marshall County Subdivision Control Ordinance.
c. The Indiana Department of Transportation (INDOT) Standard Specifications.
d. Chapter V, “Local Roads and Streets”, as outlined in the American Association of State Highway and Transportation Officials (AASHTO) geometric design policy.

1.2. Sanitary Sewers

Sanitary sewers and appurtenances shall be designed, constructed and tested in accordance with the following documents:

a. Indiana State law and regulations as administered by the Indiana Department of Environmental Management (IDEM) under 327-IAC-3, as amended.
b. The Bremen Standard Specification and Development Guide.
c. The “Ten States Standards”.

1.3. Water Mains

Water mains and appurtenances shall be designed, constructed and tested in accordance with the following documents:

a. Indiana State law and regulations as administered by the IDEM under 327-IAC-8, as amended.
b. The Bremen Standard Specification and Development Guide.
c. The “Ten States Standards”.
d. American Water Works Association standards.

1.4. Storm Water Facilities

Storm water sewers, systems and storage facilities shall be designed, constructed and tested in accordance with the following documents:

a. The Bremen Standard Specification and Development Guide.
b. The INDOT Standard Specifications.

SECTION 2: STREET, SIDEWALK & CURB CONSTRUCTION

All streets, roadways, sidewalks or curbs shall be developed in accordance with the prevailing requirements of the INDOT Standard Specifications and the following provisions.

2.1. Procedures

All phases of construction including stripping, linear grading, subgrade construction and paving of street, roadway, curb and sidewalk shall be preceded by a pre-construction meeting scheduled with Town officials. Work begun prior to or without such pre-construction meeting will be considered unauthorized and may be subject to delay in acceptance of dedication or non-acceptance altogether.

2.2. Procedures – Testing and Records

All test results, pre-construction inspection and inspection records shall be promptly provided upon request by the Town. The lack of test records or other documentation may result in rejection of completed work or delay in acceptance of completed work until such requested records are provided.

All tests, inspections and otherwise documented quality control efforts will be as per the INDOT Standards Specifications.

2.3. Deviation from INDOT Street Standards

a. Street Specifications

The streets constructed within the corporate limits of the Town and under the jurisdiction of the Town shall conform to pavement thicknesses as presented in Bremen Standard Details Figures 2.0 and 2.1.

b. Sidewalks and Curb Ramps

Residential and commercial developments shall include sidewalks within street Rights-of-Way. Sidewalks shall be a minimum of 5’0” in width and shall be parallel with the right-of-way line and no closer than 2’0” from the curb or the edge of pavement. Sidewalks and curb ramps shall be 4” minimum thickness constructed in accordance with the INDOT Standard Specifications for Plain Concrete Sidewalk and Curb Ramps – Section 604 and Bremen Standard Details Figures 2.0 and 2.2.

Sidewalks and curb ramps shall be constructed in accordance with the INDOT standard details series 604 and Bremen Standard Details Figures 2.0, 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8, 2.9, and 2.10.

c. Acceleration-Deceleration Lanes for Residential Subdivisions

Acceleration-deceleration lanes shall be required for planned residential subdivisions with: (i) thirty (30) lots or more per road entrance by average; or (ii) an average daily traffic (ADT) count on the respective entrance roads of greater than one thousand (1,000).

d. Use or Non-use of Cul-de-sacs in any Type of Subdivision

Cul-de-sac arrangements shall be specifically reviewed for each subdivision of any type or character to ensure that a cul-de-sac arrangement is not established which would prohibit or interfere with future desirable development, beyond the area of the then being platted subdivision area. The cul-de-sacs will be routinely accepted only when there would appear to be little or no potential for future development of comparable facilities or uses in areas outside the area being platted, but adjacent thereto, or when adequate access to such outside areas exists or appears readily attainable.

e. Curb Cuts

The driveway cut or curb cut must meet the specifications established by these Street Standards with the curb being cut or ground down to the point, but no lower than the point, allowed by these Street Standards. Refer to Bremen Standard Details Figure 2.12 for Driveway Construction Standards. (1" of reveal shall remain at the face of the curb.)

f. Flowable Fill

All excavations made into, under, across or within two (2) feet of the finished edges of public roads, streets and alleys (paved or unpaved) gutters, or curbs shall be backfilled with "flowable fill", also known as "controlled density fill". All materials shall be in accordance with the current INDOT Standard Specifications.

The flowable fill shall have a compressive strength from 50 PSI to 150 PSI. The flowable fill shall have a flow test spread diameter greater than 8". The test for flow shall consist of filling a 3" diameter by 6" high open-ended cylinder placed on a smooth, level, non-porous surface to the top with flowable fill. The cylinder shall be pulled straight up within five (5) seconds. The spread of the fill shall be measured. The minimum spread shall be 8". This test may be performed by the Superintendent of the Town of Bremen Department of Public Works at the site prior to placement of the flowable fill.

g. Pavement Removal

On concrete streets and alleys, the following procedures are acceptable for pavement removal shown in Bremen Standard Details Figure 2.11:

1) All cuts shall be sawed the full depth of the pavement with a concrete saw.
2) Where possible, all cuts shall be made at pavement joints.

On asphalt streets and alleys, asphalt surface removal shall be as follows:

1) All cuts shall be made with a mechanical hammer equipped with a suitable chisel, starting from the center of the cut. Before final repairs are made, the cuts shall be "squared". The edges of all cuts are to be straight.

h. Right-of-Way Work Permits Required

1) All work planned or proposed to take place within the public right-of-way under the jurisdiction of the Town or within the Town limits including federal or state highways shall be submitted in writing to the Superintendent of the Town of Bremen Street Department for approval and compliance with the Street Standards prior to commencement of any

such work. The standard work permit application is provided in Appendix A herein (Form 8.6).

2) Work permits are required for any and all work within public Rights-of-Way as defined above regardless of scope except those activities undertaken by private property owners to maintain yards or landscaping, private irrigation systems, or existing private driveways.

3) Required minimum submittal includes:
   a) Detailed plans for all activities;
   b) Plans must include recoverable alignment data (i.e. dimensions from center line);
   c) Construction details conforming to Bremen standards;
   d) Restoration details of all disturbed areas. (Refer to Bremen Standard Details Figure 2.11).

4) Activities requiring work permits shall include but are not limited to the following:
   a) Installation, maintenance or repair of private utilities including sewer leads, water services, buried or overhead power, telephone, gas or communication services;
   b) Installation, maintenance or repair of semi-private/public utility plant facilities including power lines, telephone, gas mains, fiber optic or ducts appurtenant to communication equipment of any kind;
   c) Excavation of any kind to any depth;
   d) Temporary loading or unloading within public Rights-of-Way that will impede, block or close a street for more than 30 minutes;
   e) Any other activity that may affect Town streets, utilities or public improvements.

5) A permit fee is required in the amount of which is noted on the application (Form 8.6).

6) As-built/record drawings required. The permittee is required to provide detailed record drawings (hard copy and electronic format) of all new underground improvements constructed as part of the permitted activities. This will include:
   a) Installation, vertical and horizontal data;
   b) Location of any encountered town utilities;
   c) Description of any materials not conforming to submitted plans;
   d) Location of valves, fittings, manholes, access pits, etc.;
   e) All items noted on permit application (Form 8.6).

2.4. Guarantee and Maintenance Agreement, Acceptance of Dedication

Guarantee and maintenance agreement along with acceptance of completed roadways will be as required by Bremen Town Ordinance. An example of the standard form for such maintenance agreement is included in Appendix B.

SECTION 3: SANITARY SEWER CONSTRUCTION

3.1 General

a. Sewer pipe shall be the size shown on drawings prepared and certified by a registered professional engineer. Sanitary sewer installation shall meet all requirements of these specifications. Drawings and specifications shall be submitted to and approved by the Town's authorized representative prior to any construction.

b. The design of sanitary sewers shall be in accordance with the most recent edition of the "Recommended Standards for Sewage Work" as adopted by the Great Lakes-Upper Mississippi River Board of State Sanitary Engineers, commonly known as "Ten State Standards" and 327-IAC-Article 3.

c. All necessary permits shall be obtained by or on behalf of the developer.

d. These standards are to be used in conjunction with the other Town ordinances.

e. The plans shall also be submitted in electronic form compatible with the latest version of AutoCAD.

3.2 Length of Open Pipe

Except by permission of the Town's authorized representative, not more than 450 feet of trench shall be opened at any one time. Not more than 300 feet of trench may be opened in advance of the completed pipe laying operation, and not more than one street crossing may be obstructed by the same trench at any one time.

3.3 Relation to Water Mains

a. Sewers must be laid at least 10 feet horizontally from any existing or proposed water main. The distance is to be measured edge to edge. Should specific conditions prevent this separation, the contractor shall notify the Town's authorized representative for specific instructions regarding the treatment of the separation. Special conditions may allow installation of the sewer closer to a water main, provided that the water main is in a separate trench or on an undisturbed earth shelf located on one side of the sewer and at an elevation so the bottom of the water main is at least 18 inches above the top of the sewer. It may be necessary to install 150 psi water main pipe and joints as sewer pipe for the congested areas.

b. Whenever the sewer crosses a water main it should be laid at least 18 inches below the main or the water main should be re-laid with fittings to cross over the sewer. The crossing shall be arranged so that the sewer joints will be equidistant and as far as possible from the water main joints.

c. When it is not possible to obtain proper horizontal and vertical separation as stipulated above, the sewer shall be designed and constructed equal to waterworks grade pipe and shall be pressure tested to assure water tightness prior to backfilling.

3.4 Polyvinyl Chloride (PVC) Pipe

a. Pipe Material

The pipe shall conform to ASTM D3034 with a minimum Standard Dimension Ratio (SDR) rating of 35 for 4-inch through 15-inch diameter sewer and ASTM F679 for 18-inch diameter sewer and larger, or ASTM D2241, with a SDR rating of 26, each with bell and spigot joints. If no SDR rating is specifically shown on the project plans, SDR 35 pipe will be used. All polyvinyl chloride sewer joints shall be watertight and meet the requirements of ASTM D3212. Installation of the pipe shall conform to ASTM D2321. The pipe and fittings shall be homogeneous throughout and free from visible cracks, holes, foreign inclusions, or other injurious defects. The pipes shall be as uniform as commercially practical in color, opacity, density, and other physical properties.

b. Pipe Fittings

PVC fittings shall meet the requirements of ASTM D3034 and provide a watertight connection. Service connections shall be manufactured to accept a 6-inch PVC pipe or as specified on the plans. Location of the lateral service shall be connected to the sanitary sewer using a “TEE” connector. Location of “TEE” connections shall be determined in the field unless otherwise stipulated on the plans. Pipe fittings shall be homogeneous throughout and free from visible cracks, holes, foreign inclusions, and other injurious defects.

c. Backfilling

1) The Contractor shall not backfill sewers above the top of the pipe until the sewer elevations, gradient, alignment and the pipe joints have been installed correctly. The engineer, Town or Town’s authorized agent shall retain the capacity to check, inspect, and approve all sewer elevations, gradient, alignment, and pipe joints at any time during construction.
2) All sewer pipes shall have the space between the pipe and the bottom and sides of the trench backfilled fully by hand and thoroughly tamped and compacted, as fast as placed. Lifts shall not exceed 4-inches up to a depth of at least 12-inches above the top of the pipe. The backfill shall be carried up evenly on both sides. Backfill material to this point will be number eight (8) thru eleven (11) crushed stone or approved equal.
3) Backfilling from 12-inches above the top of the pipe to final grade shall be made in lifts not to exceed 2 feet in depth, and shall meet the compaction of 95% modified proctor density. The trench shall be backfilled using the material originally excavated from the trench unless the material is not Class B borrow or better. If the originally excavated material is of less quality than Class B borrow, the engineer or Town shall determine its reuse in the excavation.
4) Backfill shall be free from stones larger than 2-inches, frozen material, or other hard material. No rock having a diameter as previously described shall be placed within 3-feet of the installed pipe.
5) Backfilling shall not be left unfinished for more than 400 feet behind the completed pipe work.
6) Sanitary sewer trenching, pipe laying and bedding shall be in accordance with Bremen Standard Details Figure 3.1.

3.5 Manhole Structure

a. Manhole Requirements

Manholes shall be a minimum of 4-feet in diameter, unless larger diameter required otherwise, and shall be constructed of precast concrete in accordance with the ASTM C478 for "Precast Reinforced Concrete Manhole Risers and Tops". The minimum wall thickness shall be 5-inches, unless required otherwise due to larger diameter manhole(s).

Manhole tops shall be of the eccentric cone type with a minimum of 24-inch opening. Precast flat covers and flat bottoms shall be a minimum of 8 inches thick reinforced with two layers of steel with a minimum area of 0.39 square inches per linear foot in both directions in each layer. Each section joint shall contain a rubber mastic type sealer as approved by the Engineer. All manhole covers shall be Neenah 1772A or 1772B with Type B lid or approved equal. (Refer to Bremen Standard Details Figures 3.3, 3.4 and 3.5).

b. Rubber Pipe Gaskets

All manholes shall use high performance flexible rubber gaskets meeting ASTM C923 for pipe sizes of 18-inches or less. The gaskets shall be installed so that the sewer pipe can be inserted through the gasket and the gasket sealed to the sewer pipe through the use of a compression wedge or ring. The end result shall produce a watertight, flexible connection between the sewer pipe and the manhole wall.

c. Manhole Steps

Each manhole section shall contain standard steps constructed of ductile iron or plastic-coated steel meeting the loading requirements of ductile iron.

d. Frames and Covers

All manhole frames and covers shall be of gray iron free from any blowholes, etc., and shall conform to ASTM A48. Frames and covers shall be rated for H20 and H20S loading conditions (16,000 lbs.) as designated in AASHTO "Standard Specifications for Highway Bridges". (Refer to Bremen Standard Details Figures 3.6).

e. Manhole Drop Connection for Gravity Sewer

The manhole structure shall be a minimum of 5-feet in diameter, unless larger diameter required otherwise. The drop connection shall be constructed as detailed. All pipe material used for the gravity drop connection shall be of the size, type, and joint installed under the item titled "Polyvinyl Chloride Pipe." The designated drop connection shall extend the discharge to within a minimum of 2-feet of the floor of the structure. (Refer to Bremen Standard Details Figures 3.7 and 3.8).

3.6 Connection into Existing Manhole

All taps into existing manhole structures shall be cored. High performance flexible connectors meeting ASTM C923 shall be installed for all pipes 18 inches or smaller. Under no circumstances shall saw cutting or busting of the manhole wall be permitted. Pipes entering the existing structure shall protrude no more than 4 inches and have a watertight mortar collar placed on both the interior and exterior sides of the structure.

3.7 Six Inch Sanitary Service Lead, Tee and Fittings

a. Pipe Material

6-inch building connections shall be of the same material and material specification as the main line sanitary sewer. Tees and required fittings shall meet the requirements of the material specification of the main line sewer. The Contractor shall supply and install the necessary tees, bends, plugs and other fittings, which may be required for the installation of the sewer lateral.

b. Service Lead Installation

The Contractor shall install sanitary leads at locations shown on the project plans or as designed by the Engineer, the Town or the Town's authorized representative. The designated building connections shall extend from the sewer main to the adjacent property line (Right-of-Way). The connection shall be laid with a minimum rise of 1/8-inch per foot. A removable watertight plug shall be installed in the end of each connection. The terminus of the building connection shall be at a depth to provide satisfactory fall between the building and the installed pipe.

c. Marking Lateral Locations

The terminus of each building connection shall be marked by a 2-inch by 2-inch green treated wooden stake that shall extend vertically from the plugged end to within ½-inch of the surface. A ½-inch reinforcing rod, 18-inches long, shall be attached to the 2-inch by 2-inch stake so that later location can be determined using a metal detector. The reinforcing rod if saw cut, must be struck (by hammer) to establish a magnetic field on the top of the rod.

d. Recording Lateral Locations

The Contractor shall keep a record of the location of all building connections, tees, and the other openings in the sewer. Locations shall be recorded from the nearest downstream manhole to the center of the lateral. Lateral location information shall include the invert elevation, from grade, at the pipes terminus at the property line. All such locations shall be compiled in a neat readable manner and delivered to the Town with the completed record drawings of the project.

Sanitary service construction shall be in accordance with Bremen Standard Details Figure 3.2.

3.8 Bore and Jack

a. Casing Material

1) Steel casing shall be electric-fusion, arc-welded steel pipe in accordance with ASTM A139, grade B, or electric-resistance welded pipe in accordance with ASTM A53, Type E, Grade B, as applicable. Material furnished under this specification shall be covered by the type of certification specified in the Frequency Manual and in accordance with 916.
2) Casing pipe shall be smooth wall steel with a yield strength of 35,000 pound per square inch and shall be of the diameter and wall thickness as shown on the plans. The interior and exterior of the pipe shall be coated with a protective asphaltic barrier.

3) The inner diameter of the casing pipe has been selected to provide minimum tolerance for the installation of the carrier pipe. The contractor may, at his own expense, use a larger inner diameter casing pipe if he so desires.

b. Casing Thickness Requirements

The following schedule of pipe thickness shall govern unless otherwise specified on the plans.

Outside Diameter (inches)	Wall Thickness (inches)	
	Casing Contains Carrier	Casing used as Carrier
18 or less	1/4	1/4
19 to 20	1/4	5/16
21 to 26	1/4	3/8
27 to 30	3/8	1/2
31 to 42	3/8	1/2
43 to 48	1/2	9/16

c. Sheeting and Shoring

Sheeting and shoring shall be provided if the nature of the conditions of the soil or height of exposed face is such as to endanger either the traveling public or the integrity of the road surface.

d. Dewatering

When groundwater is known or anticipated, a dewatering system of sufficient capacity to handle the flow shall be maintained at the site until its operation can be safely halted. The dewatering system shall be equipped with screens or filter media sufficient to prevent the displacement of fines.

e. Jacking

1) This method shall consist of pushing steel pipe into the embankment.
2) Excavation shall be undertaken within the steel cutting edge or shield attached to the front section of the pipe to form and to cut the required opening for the pipe. Excavation shall be undertaken with the shield and shall not be carried ahead to the pipe far enough to cause loss of soil. When jacking in loose, granular, or running soils, the shield shall have means of inserting steel baffle plates and shelves for the purpose of preventing voids.
3) The thrust wall shall be adequate for installation of the jacked pipe. It shall be constructed normal to the proposed line of thrust.
4) The face of the excavation shall be adequately bulkheaded at the end of the day to prevent loss of soil at the heading.
5) A suitable lubricant, such as bentonite, may be applied to the outside surface of the jacked pipe to reduce frictional forces. This shall be accomplished by the use of pressure equipment which pumps the lubricant to the outside of the shield on the lead pipe or the lubricant may be pumped to the outside surfaces of the pipe through grout holes.

f. Boring

1) This method shall consist of pushing the pipe into the wall with a boring auger rotating within the pipe to remove the spoil.
2) Advancement of the cutting head ahead of the pipe will not be permitted except for that distance to permit the cutting head teeth to cut clearance for the pipe. If granular, loose, or unstable soil is encountered during the boring operation, the cutting head shall be retracted into the casing a distance that permits a balance between pushing pressure and the ratio of pipe advancement to quality of spoil to ensure no voiding is taking place. The excavation by the cutting head shall not exceed the outside diameter of the pipe by more than 1/2-inch. The face of the cutting head shall be arranged to provide reasonable obstruction to the free flow of soft or porous material.
3) The use of water or liquids to soften or wash the face will not be permitted. Water may be used in sticky clays to facilitate spoil removal providing water is introduced behind the cutting head. Lubricating agents, such as bentonite, may be used to lubricate the casing and reduce friction between casing and embankment jacking.
4) This method shall consist of pushing steel pipe into the embankment.

g. Obstruction in Installation

If an obstruction is encountered during installation which stops the forward progress of the pipe, and it becomes evident that it is impossible to advance the pipe, and if ordered, operations shall cease and the pipe shall be abandoned in place and filled completely with grout or other approved materials.

h. Carrier Pipe

Carrier pipe will not be measured separately for payment under any other item. Carrier pipe shall be attached to skids or other insulating device that removes the pipe load from the pipe bell and distributes the weight of the pipe to the pipe's body.

i. Casing End Caps and Fill

The casing shall be pneumatically filled with pea stone. Pea stone shall be placed in the casing pipe to a depth not to exceed three quarters (3/4) of the casing pipe. Sufficient pea stone shall be place to prevent movement of the carrier pipe within the casing pipe. Casing ends shall be brick and mortared to provide a seal from backfill material.

3.9 Force Main

a. Force Main Material

PVC pipe and fittings shall conform to ASTM D2241. Joints on PVC pipe shall be push-on type confirming to AWWA C900 with push-on or mechanical joints for 150 psi working pressure.

b. Restrained Joints

Force main pipe shall be joined using non-metallic couplings to form an integral system for maximum reliability and interchangeability. High-strength, flexible

thermoplastic splines shall be inserted into mating, precisions-machined grooves in the pipe and coupling to provide full 360º restraint with evenly distributed loading.

Couplings shall be designed for use at or above the rated pressure of the pipe with which they are utilized, and shall incorporate twin elastomeric sealing gaskets meeting the requirements of ASM F477. Joints shall be designed to meet the leakage test requirements of ASTM D3139.

c. Tracing Wire

All force main shall be provided with an electrically continuous Type TW insulated #10 tracing wire. Wire shall be attached to the pipe at 20-feet intervals using three wraps of duct tape (or more as needed to secure the wire to the pipe). Valve boxes, air release manholes, and lift stations shall serve as beginning and ending points for tracer wire runs. Wires shall be attached to the valve box to allow for reliable connection of tracing equipment. Wire runs ending at structures shall be easily accessible from the surface, and shall not require confined space entry. Wire in structures shall be tag labeled identifying purpose and service direction. Testing for conductivity shall be performed on each section of tracer wire immediately following installation and prior to Town acceptance of the force main.

d. Backfilling, shall be as represented in Section 3.4.c and Figure 3.1 for gravity sewer pipe.

e. Depth of Bury

Force main shall not be less than 5.0 feet deep to the top of the pipe or greater than 7 feet.

3.10 Wastewater Combination Air Manhole

a. Manufacturers:

- ARI Flow Control or Approved Equal.
- (Refer to Bremen Standard Details Figure 3.9).

b. Description:

- Automatic, Float Operated, Double Body, 2-Inch, for Sewage Service Test Rated to 145 DSIG.
- Body: Double.

c. Materials:

- Body and Cover: Reinforced Nylon.
- Float, Seat, and Trim: Type 316 Stainless Steel.
- Seats: Buna-N.
- Seals: Buna-N.

d. End Connections – Double Body:

- Size 3 Inches and smaller shall be flanged for 1-Inch valves with a 2-inch inlet.
- Furnish one additional NPT connection for backwash.

e. Valve Body Connections:

- Threaded NPT, clean out shall be 2 inches, drain shall be 1-inch.

f. Accessories:

- Backwash accessories, including inlet shutoff valve, blow-off valve, rubber supply hose, and quick-disconnect couplings.

g. Shop Drawings:

- Indicate materials, dimensions, weights, and end connections on assembly drawings. Provide operation and maintenance manual.

- Manufacturer's Certificate must certify that products meet or exceed specified requirements.

- Provide Manufacturer Instructions: Submit special procedures and setting dimensions.

- Manufacturer Reports: Certify that equipment has been installed according to manufacturer instructions.

3.11 Monitoring Manhole

a. For significant industrial or commercial dischargers or "Significant Industrial Users" as defined by Bremen Wastewater User Ordinance, the Town may require a monitoring device designed to document discharges to the Town's system. Such device shall include but may not be limited to ISCO Model 420 Flow Master, ISCO Model 914 Battery Back-up, TRACOM Palmer-Bowlus Flume (permanent) sized to accommodate the expected volume; TRACOM Built-in Sampler with stainless sensor bracket and TRACOM integral staff gauge.

b. Installation will be within an approved concrete vault/manhole in a location as approved by Town staff. The manhole shall be placed to allow access 24 hours a day and shall be in an area kept free of snow or other debris.

c. The vault shall not be placed in a parking or loading area that will be intermittently blocked by parked vehicles.

3.12 Municipal Lift Station

The Town discourages the installation of new municipal lift stations unless determined by the Town to be the only feasible alternative.

Development projects proposing new municipal lift stations must be reviewed in advance of detailed project planning to avoid delays.

Design and construction standards for lift/pump stations will be developed on a case by case once the need and other alternatives have been evaluated.

SECTION 4: SANITARY SEWER TESTING PROCEDURES

4.1 General

All tests shall be performed by the contractor and be witnessed by the Engineer or the Town's Wastewater Superintendent or another Town's authorized representative. Tests conducted otherwise shall not be accepted by the Town. Testing of sanitary sewer shall be scheduled with the Town 48 hours in advance of such test. Contact the Wastewater Department at 574-546-3829.

4.2 Testing

a. Low Pressure Air Test – Gravity Sewer

1) This test shall be performed according to ASTM C828. This practice shall be performed on lines after connection laterals, if any, have been plugged and braced adequately to withstand the test pressure, and after the trenches have been backfilled for a sufficient time to generate a significant portion of the ultimate trench load on the pipe line. The span of time between the completion of the backfill operation and the initiation of the air testing shall be determined by the Engineer or the Engineer's duly authorized agent.

2) To perform the low-pressure air test, all openings in the test section are to be securely plugged. Air is then to be added until the internal pressure of the line is raised to approximately 4.0 psi. After this pressure is reached, allow the pressure to stabilize. The pressure will normally drop as the air temperature stabilizes. This usually takes 2 to 5 minutes, depending on the pipe size. The pressure may be reduced to 3.5 psi before starting the test. Once the pressure has stabilized the test may begin. If the pressure drops more than 1.0 psi during the test time, the line is presumed to have failed the test. If a 1.0 psi drop does not occur within the test time, as shown in the following table, the line has passed the air test.

Pipe Diameter (in)	Time (min/100 ft.)
6-inch	0.7
8-inch	1.2
10-inch	1.5
12-inch	1.8

3) Groundwater above the pipe will reduce air loss. If the section of pipe under test shows significant infiltration, the Engineer or the Engineer's duly authorized agent may require an infiltration test.

b. Infiltration-Exfiltration

It shall be in the judgment of the Engineer or their authorized agent to require an infiltration-exfiltration test based upon field conditions that may warrant the additional testing. It is the intent of this requirement and specification to secure the collection system, including manholes, with a minimum amount of infiltration and exfiltration. The maximum allowable infiltration and exfiltration shall be 200 gallons per mile, per inch of diameter of sewer, per 24-hour day, at any time during the day. The joints shall be tight and the Contractor, at the Contractors own expense, shall repair visible leakage in the joints in excess of that specified above by any means found necessary. It shall be the Contractor's responsibility to conduct the necessary test, or to make arrangements (at no additional cost to the

Owner) for the tests to be made by other qualified parties, to determine if the newly constructed sewer system meets the requirements mentioned above. The infiltration and exfiltration tests shall be made in the presence of the Engineer or his duly authorized agents. (The results of the infiltration and exfiltration test on the newly completed sewer must be submitted to the Indiana Department of Environmental Management, within three (3) months of completion of the sewer construction).

In accordance with the above specifications, the maximum allowable quantity shall be as set forth in the following tabulations:

Pipe Diameter	Gallons per Day per Linear Foot
6-inch x 0.0378787	0.2273
8-inch	0.3030
10-inch	0.3788
12-inch	0.4545

c. Deflection Testing

Deflection measurements shall be made upon completion of the project providing the pipe has been installed for not less than 30 days and not more than 12 months prior to testing. No pipe shall exceed a vertical deflection of five percent (5%). The engineer may require either complete or random deflection testing.

Note: The period of 30 days to 12 months is deemed an adequate time for the soil to settle and stabilize. This phenomenon is dependent on geographical climatic conditions such as: heavy rains or snow, water tables, extended dry periods or freeze-thaw cycles. The engineer shall designate when the testing will be performed.

4.3 Manhole Vacuum Test

Installed manholes shall be air tested in accordance with ASTM C1244, Standard Test Method for Concrete Sewer Manholes by Negative Air Pressure (Vacuum) Test. This test shall demonstrate the integrity of the installed materials and the construction procedures. This test method is used for testing concrete manhole sections utilizing mortar, mastic, or gasketed joints. The test procedure shall be as follows, in accordance with ASTM C1244.

1) All lift holes and any pipes entering the manhole shall be plugged.
2) The test head shall be placed at the top of the manhole in accordance with the manufacturer's recommendations.
3) A vacuum of 10-inches of mercury shall be drawn on the manhole, the valve on the vacuum line of the test head closed, the vacuum pump shutoff. The time shall be measured for the vacuum to drop to 9-inch of mercury.
4) The manhole shall be deemed acceptable if the duration of time between the drop of 10-inches of mercury to 9-inches of mercury is less than the values indicated in Table 1.
5) If the manhole fails the initial test, necessary repairs shall be made by an approved method. The manhole shall be re-tested until a satisfactory test is obtained.

TABLE 1 Minimum Test Times for Various Manhole Diameters									
Depth	Diameter, in.								
(ft.)	30	33	36	42	48	54	60	66	72
	Time, s								
8	11	12	14	17	20	23	26	29	33
10	14	15	18	21	25	29	33	36	41
12	17	18	21	25	30	35	38	43	49
14	20	21	25	30	35	41	46	51	57
16	22	24	29	34	40	46	52	58	67
18	25	27	32	38	45	52	59	65	73
20	28	30	35	42	50	53	65	72	81
22	31	33	39	46	55	64	72	79	89
24	33	36	42	51	59	64	78	87	97
26	36	39	46	55	64	75	85	94	105
28	39	42	49	59	69	81	91	101	113
30	42	46	53	63	74	87	98	108	121

4.4 Shop Drawings

Drawings of the manholes must be submitted to the engineer, the Town or the Town's authorized representative for approval prior to construction.

4.5 Force main Pressure Test

Force main shall be installed and tested as per the manufacture's instruction and as per AWWA C600 "Installation of Ductile-Iron Water Mains and Their Appurtenances".

a. Leakage Test

1.) No pipe installation will be accepted if the leakage is greater than that determined by the formula. Allowable leakage in gallons per hour shall be less than:
(SxD)/12,084 = Gal./Hr.
L = Allowable Leakage, 6PH
S = Length of Pipe Tested
D = Nominal Diameter of Pipe (In Inches)

2.) Any leakage in excess of the above formula will be repaired by the Contractor at his own expense.

3.) Pumps, gauges, connections, measuring devices, or any other necessary apparatus will be furnished by the Contractor. Leakage testing will be considered an incidental cost of force main and any cost thereof should be included in the unit prices of other pay items.

SECTION 5: WATER MAIN CONSTRUCTION

5.1 General Requirements

a. All pipe, fittings, valves, hydrants, and appurtenances shall be shown on drawings and such drawings and specifications shall be submitted to the Town's authorized representative for approval prior to any construction. Water main installation shall meet all requirements of these specifications. All pipe, fittings, valves, hydrants, and appurtenances shall be new and unused.
b. The design of water mains shall be in accordance with the most recent edition of the "Recommended Standards for Water Mains" as adopted by the Great Lakes-Upper Mississippi River Board of State Sanitary Engineers, commonly known as "Ten State Standards" and 327-IAC-Article 8.
c. All necessary permits shall be obtained by or on behalf of the developer.
d. These standards are to be used in conjunction with other Town Ordinances.
e. Private wells shall be considered for approval only where municipal water main is not available.

5.2 Quality Assurance

a. The contractor shall test and disinfect water mains as specified in Section 6.
b. The contractor shall collect and submit samples of water from water mains constructed. Collect samples after the water mains have been disinfected. Submit the samples to the applicable regulatory agency for bacteriological analysis. Collection and submittal of these samples shall meet the requirements of the applicable regulatory agency. Copies of all test results shall be submitted to the Town (See Section 6).
c. Testing shall be at the direction and in the presence of authorized Town staff.

5.3 Ductile Iron Water Main Pipe and Fittings

a. Pipe

1) Ductile iron pipe shall meet the requirements of ANSI/AWWA C151/A21.51 and be a minimum 8" diameter. Pipe shall have a rated working pressure of 150 psi plus 100 psi surge and a safety factor of 2 and a minimum depth of 5 feet of cover top of the pipe. Except as otherwise noted in this specification, the pipe shall be Class 50 or 52.
2) Pipe joints shall be push-on type. Joints shall meet the requirements of ANSI/AWWA C111/A21.11. Restrained joints shall be Lok-Ring, Lok-Fast, Lok-Tyte or equal. Each joint shall have two bronze wedges securely installed to promote pipe connectivity.
3) Water main trenching, pipe laying and bedding shall be in accordance with Bremen Standard Details Figure 5.3.

b. Fittings

1) Fittings shall be ductile iron. Fittings for standard size fittings shall meet the requirements of ANSI/AWWA C110/A21.10. Compact or short body fittings 3 inch through 12 inch shall meet the requirements of ANSI/AWWA/C110/A21.53. Fitting shall have a pressure rating of at least 150 psi.
2) Fitting joints shall be mechanical joints or restrained push-on joints. Joints shall meet the requirements of ANSI/AWWA C111/A21.11. Thrust block

mechanical joints as indicated on the drawings and specified in the Section. Restrained joints may be used instead of mechanical joints and thrust blocking. Restrained joints shall be Meg-A-Lug or equal. Pipe connecting to restrained joint fittings shall also have restrained joints as indicated on the drawings and specifications. (Refer to Bremen Standard Details Figure 5.4).

3) Mark each fitting. Marking shall meet the requirements of ANSI/AWWA C110.

c. Adapters

1) Adapters from ductile iron water mains to Victaulic or flange joint valves or fittings shall be cast iron or ductile iron. Adapters shall meet the requirements of ANSI/AWWA C110. Adapters shall have a pressure rating of at least 150 psi.
2) Adapter ends connecting to ductile iron water mains shall have plain ends, push-on joints, mechanical joints or restrained push-on joints. Adapters with plain ends, push-on joints or mechanical joints may be used where restrained joints are not required. Adapters shall have restrained push-on joints where restrained joint piping is required as indicated on the drawings and specified. Mechanical joints and push-on joints shall meet the requirements of ANSI/AWWA C111/A21.11. Restrained joints shall be Meg-A-Lug or equal.
3) Adapter ends connecting to Victaulic or flange joint valves or fittings shall have joints complying with the specifications for the applicable valves or fittings.

d. Lining and Coating

Line the inside surfaces of all pipe, fittings, and adapters with cement mortar lining and bituminous seal coat. Cement mortar lining and bituminous seal coat shall meet the requirements of ANSI/AWWA C104/A21.4. Coat the outside surfaces of all pipe, fittings and adapters with bituminous coating. Outside coating shall meet the requirements of ANSI Specifications A21.51. (AWWA Standard C151.)

e. Gaskets

Gaskets for mechanical joints and push-on joints shall meet the requirements of ANSI/AWWA C111/A21.11.

f. Nuts and Bolts

1) Nuts and bolts for mechanical joints shall be high strength, heat treated, cast iron. Nuts shall be hexagon. Bolts shall be tee head. Nuts and bolts shall meet the requirements of ANSI/AWWA C111/A21.11.
2) Nuts and bolts for restrained push-on joints shall meet the requirements of the joint manufacturer.

5.4 Valves

a. Butterfly Valves

1) Butterfly valves and operators shall meet the requirements of AWWA Standard C504, except buried valves shall have shouldered type ends. Valves and operators shall be Class 150B.

2) Buried butterfly valves shall have shouldered type joints. Shouldered type joints shall meet the requirements of AWWA Standard C606. Butterfly valves installed above ground or in structures shall have flange joints as specified in AWWA Standard C504. Nuts, bolts and gaskets for flange joints shall meet the requirements of ANSI/AWWA C110. Nuts and bolts shall be cadmium plated. Gaskets shall be full face and shall be red rubber or equal.
3) Each buried butterfly valve shall have a manual operator and a 2" operating nut. Valve opening direction shall be consistent with operation of existing valves in the waterworks in which the valves are installed, unless otherwise directed by the Town's authorized representative.
4) Each butterfly valve installed above ground or in a structure shall have a manual operator and handwheel as close to adjoining fittings as possible or as recommended by the manufacturer.
5) (Refer to Bremen Standard Details Figure 5.1).

b. Gate Valves

1) Buried gate valves 4" and larger shall be full ductile iron body, non-rising stem, fusion bond epoxy coated and resilient seat gate valves. Valves shall meet the requirements of ANSI/AWWA C509 and shall have mechanical joint ends. Mechanical joints and joint accessories shall meet the requirements of ANSI/AWWA/C111/A21.11. Valve opening direction shall be consistent with operation of existing valves in the waterworks in which the valves are installed, unless otherwise directed by the Town's authorized representative, valves shall open counter clockwise.
2) Three-inch buried gate valves shall be iron body, non-rising stem gate valves. Valves shall meet the requirements of ANSI/AWWA C509 except ends shall be screwed. Screwed ends shall meet the requirements of ANSI B16.3. Valve opening direction shall be consistent with operation of existing valves in the waterworks in which the valves are installed, unless otherwise directed by the Town's authorized representative.
3) Gate valves 4" and larger installed above ground or in structures shall be resilient seat, iron body, outside screw, and yoke gate valves. Valves shall meet the requirements of ANSI/AWWA C509, except those parts of ANSI/AWWA C509 only applicable to non-rising stem gate valves and wrench nuts. Outside screw and yoke gate valves shall have flange joint ends and malleable iron handwheels. Flange joints and accessories shall meet the requirements of ANSI/AWWA C110. Nuts and bolts shall be cadmium plated. Gaskets shall be full face and shall be red rubber or equal.
4) Gate valves smaller than 4" installed above ground or in structures shall be resilient seat bronze, 125 lb. S.W. P. double disc, screwed-in bonnet, rising stem, inside screw gate valves with screwed ends and malleable iron handwheels. Valves shall meet the requirements of Federal Specification WW-V-54d for Class A, Type III valves.
5) The following requirements apply to all gate valves: Wedge shall be ductile iron, fully encapsulated in synthetic rubber except of guide and wedge nut areas. Synthetic rubber shall be molded in place and bonded to the wedge; mechanical fasteners are not allowed. Stem shall be sealed by at least two O-rings; contained within the stuffing box (grooving of stem O-rings is not allowed). All stem seals shall be replaceable with the valve wide open and while subjected to full rated pressure. Valve body and bonnet shall be coated, inside and out; with fusion-bonded epoxy. Bonnet and stuffing box bolts and nuts shall be type 18-8 stainless steel and must be installed by the manufacturer.

6) Gate valves shall be manufactured by Mueller, Clow or American Flow Control.
7) Gate valves shall be configured for installation within 3 feet of adjoining fittings.
8) Valves shall include a valve box adapter as manufactured by Adapter, Inc., 2033 S. 54th Street, West Allis, Wisconsin. (Refer to Bremen Standard Details Figure 5.2).

c. Curb Stops

Buried valves 2" and smaller shall be curb stops. Curb stops shall meet the requirements of AWWA C800, ASTM B-62 for 85-5-5-5 composition bronze, and USAS B2.1. Curb stops shall be Mueller, A.Y. McDonald within utility easement or Right-of-Way, and no more than 5' from curb line. (Refer to Bremen Standard Details Figure 5.5).

5.5 Valve Boxes

a. Valve boxes for butterfly valves and gate valves shall be cast iron. Valve boxes shall be two piece or three piece type. Each two piece type box shall be complete with bottom section, top section, and cover. Each three piece box shall be complete with base, center section, top section and cover. Valve boxes shall be extension type with slide or screw type adjustment. Each base and bottom section shall be the proper size for the valve served. Each valve box assembly shall be the proper length for the valve served. The minimum thickness of metal shall be 3/16-inch. Cast the word "WATER" in each valve box cover.
b. Valve boxes for curb stops shall be cast iron. Curb boxes shall be extension type. Each curb box shall be complete with foot pieces, curb box and lid. Curb box shall be Ford EAI 5040-42R or equal.
c. Valves shall include a valve box adapter as manufactured by Adapter, Inc., 2033 S. 54th Street, West Allis, Wisconsin.

5.6 Fire Hydrants

a. Fire hydrants shall be Model No. K81 as manufactured by Kennedy, painted red.
b. Fire hydrants shall meet or exceed AWWA C502. Hydrants shall comply with Factory Mutual Research Corporation and Underwriter's Laboratories UL 246 Standard; proof of compliance shall be cast on the ductile iron hydrant barrel. Rated water working pressure shall be 175 psi; test pressure shall be 350 psi; and hydrants shall include the following specific design and performance criteria.
c. The main valve closure shall be of the compression type, opening against system pressure and closing with the pressure (counter clockwise open – clockwise closed). The traffic feature shall be designed so the nozzle section of the hydrant can be rotated by degree a full 360 degrees during field installation if necessary.
d. The main valve opening shall not be less than 5-1/4 inches and shall be designed so that removal of the seat, drain valve mechanism, internal rod and all working parts can be removed through the of the hydrant without disturbing the ground line joint or the nozzle section of the hydrant. The bronze seat shall be threaded into mating threads of bronze for easy field removal.
e. The drain system shall be bronze and activated by the main stem without use of auxiliary rods, toggles, pins, etc. The drain mechanism shall be completely closed after no more than three turns of the operating nut in the opening direction. There shall be a minimum of two inside ports and four outlets to the exterior of the hydrant. Drain closure is to be by direct compression; sliding seals are not permitted.

f. The operating nut, stem, coupling and main valve assembly shall be capable of withstanding input torque of 200 foot-pounds in both opening and closing directions. There shall be an internal top housing with three O-rings to seal the operating threads from the waterway. The reservoir created by the O-rings shall be filled with lubricant and designed such that the operating threads are coated each time the hydrant is operated. A stop nut in this housing shall preclude over-torqueing of the stem.
g. Friction loss through the hydrant shall not exceed 3.0 psi at 1,000 gpm through the 4-1/2 inch pumper nozzle. Flow testing and certification of the feature shall be conducted by an independent testing laboratory and be in accordance with AWWA C502.
h. They hydrant nozzle shall be field replaceable without special tools, excavation or disturbing the ground line joint. Nozzles shall be of a breech-lock design and be sealed by heavy duty O-rings.
i. Shoe and lower valve washer shall be coated, inside and out, with fusion bonded epoxy.
j. Shoe shall be attached to lower barrel with stainless steel bolts and nuts.
k. An Affidavit of Compliance must be submitted by the manufacturer certifying compliance with these specifications.
l. Fire department connections shall be coordinated with Town Water and Fire Departments.
m. Fire department connections shall be located a minimum 24” above finished grade.
n. Interval spacing shall not exceed 500 feet.
o. (Refer to Bremen Standard Details Figure 5.6).

5.7 Tapping Sleeves

a. Tapping sleeves shall be cast iron or ductile iron split sleeves. Each sleeve shall have a branch connection with a flange end. The inside diameter of each branch shall be oversized to permit entry and exit of tapping machine cutters. Each flange shall have a recess to center a tapping valve. Recesses shall meet the requirements of MSS SP-60. Flange dimensions and drilling shall meet the requirements of ANSI B16.1. The sleeve dimensions shall be such that the sleeve will not leak when installed on cast iron, ductile iron, or polyvinyl chloride pipe with outside diameters shown in AWWA Standards.
b. Tapping sleeves for 4” through 16” pipe shall be mechanical joint type. Tapping sleeves shall have a working pressure rating of 200 psi.
c. Tapping sleeves for 18” and larger pipe shall be mechanical joint type. Tapping sleeves shall have a working pressure rating of 150 psi. Fit sleeves with combined lead and rubber gaskets. Each gasket shall cover the entire surface area of each sleeve assembly flange. The bolts used to assemble the two halves of each sleeve shall pass directly through the assembly flanges and through each lead gasket. The bolts shall not be outside the flange area.
d. (Refer to Bremen Standard Details Figure 5.7 for dry tap details and Figure 5.8 for wet tap details).

5.8 Tapping Assemblies

Tapping assemblies for steel cylinder type pre-stressed concrete pressure pipe shall be specifically designed and manufactured for the tapped pipe. Tapping assemblies shall have a working pressure rating of 150 psi. The inside diameter of the outlet branch shall be oversized to permit entry and exit of tapping machine cutters. Each outlet branch shall have a flange end with a recess to center a tapping valve. Recesses shall meet the requirements of MSS SP-60. Flange dimensions and drilling shall meet the requirements of ANSI B16.1.

5.9 Tapping Saddles

a. Tapping saddles shall have a working pressure rating of 250 psi. Saddle bodies shall be ductile iron. Saddle straps shall be corrosion resistant steel alloy. Saddle gaskets shall be positively confined O-ring gasket. The sleeve dimensions shall such that the sleeves will not leak when installed on cast iron, ductile iron or polyvinyl chloride pipe with outside diameter shown in AWWA Standards.

b. Each saddle used for making a wet connection shall have a branch connection with a flange end. The inside diameter of each branch shall be oversized to permit entry and exit of tapping machine cutters. Each flange shall have a recess to center a tapping valve. Recesses shall meet the requirements of MSS SP-60. Flange dimensions and drill shall meet the requirements of ANSI B16.1.

c. Each saddle used for making a dry connection shall have a branch connection with a flange or mechanical joint end. Flange dimensions and drilling shall meet the requirements of ANSI B16.1. Nuts, bolts and gaskets for flange joints shall meet the requirements of ANSI/AWWA C110. Nuts and bolts shall be cadmium plated. Gaskets shall be full face and shall be red rubber or equal. Mechanical joints and accessories shall meet the requirements of ANSI/AWWA C111/A21.11.

d. Gaskets used to seal joints between saddle bodies and tapped pipes shall be O-ring type, circular in cross section, and made of natural or synthetic rubber with a Durometer Hardness of 70±5.

5.10 Flange-Mechanical Joint Adapters

Flange-mechanical joint adapters shall be Dresser Style 126, Smith-Blair Type 912 or equal.

5.11 Residential Water Service Connection

a. Residential corporation stop shall be compression. A.Y. McDonald 7470IQ.
b. Residential curb stops shall be round ball curb stops. Mueller 300.
c. Curb stop box shall be Ford EA1 5040-42R.
d. Curb box key shall be compatible to the above. Supply two for every 50 services.
e. Service connection requirements:

1) Service connections shall be in accordance with AWWA C-800.
2) Taps to the water main shall be made so that the corporation cock is installed 45 degrees from the vertical axis of the main. The residential corporation stops shall be 1”.
3) Residential service lines shall be 1” type ‘K’ copper pipe unless otherwise approved. Installation depth shall be a minimum of 60” and/or 72” maximum cover.
4) Service pipe shall be laid 90 degrees to the main.
5) Service assembly shall extend from the main to the Right-of-Way limits.

f. Service locations:

The location of the service connection shall be located in the field by the Town Representative or as shown on the plans. Generally, the location should be near a property line appropriate for the most direct or shortest route from the service shutoff to the home. The route shall be selected to avoid plantings, landscaping, driveways, sidewalks, and other exterior appurtenances wherever possible. In no case shall a water service be placed closer than 10 feet from a sewer utility or any part of a septic system.

g. Services crossing pavement:

Service leads, when crossing undisturbed pavement, shall be installed by boring, molding or other acceptable methods, which does not disturb the pavement or its support.

h. Marking service connection locations

Each service connection location shall be marked at the Right-of-Way line by a 2" by 2" blue painted treated wood stake 24" long driven exactly above the terminal end of the connection. The service shall also be permanently marked in the top of the concrete curb along the street exactly above the service line with the letter "W" imprinted thereon.

i. Water service connections shall be in accordance with Bremen Standard Details Figure 5.5.

5.12 Water Meter Standards

SIZE	MANUFACTURER
1-1/2" Meter Setting	
Service clamp tapping valve	A.Y. McDonald 74701Q
Line material	Rigid copper
Meter	Neptune
2" Meter Setting	
Service clamp tapping valve	2" A.Y. McDonald 74701Q
Line material	Rigid copper
Meter	Neptune
5/8" x 3/4" Single Setting	
3/4" service tap	A.Y. McDonald 74701Q
Line material	K Copper 3/4"
Meter	Neptune
5/8" x 3/4" Double Setting	
1" service tap	A.Y. McDonald 74701Q
1" pack joint Y 3/4" outlets	Y44-243
Line material	3/4" K and 1" K Copper
Meter	Neptune
1" Meter Setting	
1" service tap	A.Y. McDonald 74701Q
Line material	K Copper 1"
Meter	Neptune

Notes:
1. All fittings must be compression.
2. The Bremen Water Utility will determine the location of meter settings.
3. For any areas where municipal water is not available and a private well is installed, such private well or wells shall be metered if the improvement is connected to the Town's wastewater system.

SECTION 6: WATER MAIN TESTING PROCEDURES & PRACTICES

6.1 Standards

a. All water mains and their accessories shall be installed and pressure and leak tested in accordance with the applicable provisions of AWWA Standard C600 “Installation of Ductile Iron Water Drains and their Appurtenances”, C602 “”Cement –Mortar Lining of Water Pipelines in Place – 4-inch and Larger”, C603 “Installation of Asbestos Cement Pressure Pipe”, C605 “Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water” or C606 “Grooved and Shouldered Joints”.
b. All water mains and their accessories shall be disinfected and tested in accordance with the applicable provisions of AWWA Standard C651, AWWA Manual M12, and the *Standard Methods for the Examination of Water and Wastewater*.
c. The persons working with the distribution system are required to be familiar with the standard construction and testing requirements. The identified standards are available at the office of the water utility for review or online at www.townofbremen.com.
d. Unless otherwise specified, all procedures apply to new mains, cleaned mains, cleaned and relined mains, repaired mains, and mains that have been out of service.

6.2 Procedures

Water main construction shall be immediately followed by pressure and leakage testing followed by disinfection and bacteria sampling.

6.3 Procedure Records

During the testing and disinfection procedure of a facility to be connected to the existing water system, the Contractor (i.e. person controlling the construction activity) shall maintain a record of activity. The record of activity shall include:

a. Flushing of the main- how long the line is flushed (start and end time), the rate of flow from the flowing hydrant or blow off connection including flushing-flow velocity (2.5-4.0 fps), and calculated volume of water wasted.
b. Pressure & Leakage Test- record diameter of the main, length of the main, starting pressure (150 psi) and time, ending pressure and time, volume of recovery water required.
c. For testing of private systems connected to the Town’s system that have operating pressures above 100 psi, test pressures shall be double the operating pressure. Such tests and systems shall be completely buffered from the Town’s system by adequate backflow and pressure reducing devices. Required test data shall be the same as above.
d. Disinfection- including volume of the treated line in gallons, type and amount of chlorine reagent used, concentration of available chlorine applied, residual chlorine value in the new main, date and time of the 24-hr retention period, date and time of the second flushing of line, and the date and time when line is finally refilled with system water.
e. Bacterial Analyses- including date and time of samples, receipt of instructions of laboratory or supervisor to release line or repeat disinfection, and time the line is opened for use in system.

f. Forms are available for procedure documentation.

g. The person in responsible charge shall obtain a signature of approval from the Water Superintendent prior to the Town's acceptance of the water mains permanent connection to the existing water system.

6.4 Water Utility Supervision

No water valve shall be operated for filling, flushing or testing of a main without the direct supervision of a town employee familiar with the operations requiring the valves operation. The Town will provide the necessary personnel upon request.

6.5 Pressure and Leakage Test

a. Under the direction of the town, the new water mains shall be slowly filled to ensure that all air has been expelled from the main, hydrants, air valves and service leads. Once all air is expelled, the new main shall be flushed at a minimum velocity of 2.5 feet per second for a minimum of 1 hour. The required "scour" flow rate shall be calculated as shown in Table 6-A, and shall be verified in the field using a pitot gage, flow meter or trajectory measurement. The Contractor shall be responsible for all dechlorination and disposal of all flushing water and providing any necessary hoses or equipment for flushing and prevent unnecessary erosion.

Flow Rate for 2.5 ft/s Line Velocity

Main Size(in.)	Gallons per Minute
6	200
8	400
12	900
16	1600

b. The tap for the pressure and leak testing and chlorination shall be installed within ten feet of the source if practical. Otherwise, the tap shall be installed immediately outside of existing pavement. The Contractor is responsible for all work associated with the excavation, including proper trench protection, barricades, traffic control and proper backfilling and compaction upon successful completion of the test.

c. The Contractor shall conduct the pressure and leak test and provide the required testing equipment after the new main has been properly filled and flushed. The pressure and leak test shall be conducted as follows:

1) Purge all air from the line.
2) Decrease pressure in the main to be tested to approximately 20 psi. Observe test gauge to ensure the pressure doesn't rise due an existing valve or tapping valve leaking by. This is done to ensure that water that is not disinfected does not enter the existing main from installed main while performing the actual test.
3) A pressure test pump, sanitized for connection to a municipal water main, will be connected to the main at the testing point. The pressure will be slowly increased to 150 psi and allowed to stabilize (+/- 2.5 psi) for a minimum of 15 minutes.
4) A reservoir of potable water, capable of being calibrated to fractions of a gallon, shall be connected to the test pump and the initial level of water recorded.
5) The pump pressure shall be maintained at 150 psi for two hours with all makeup water withdrawn from the reservoir.

6) After two hours, the water level in the reservoir will be measured and the volume of water drawn from the reservoir calculated and compared with the following allowable leakage:

$$\textbf{\textit{Allowable leakage}} = \frac{\textbf{\textit{Pipe length (ft) x Nominal diameter (in)}}}{\textbf{\textit{10,875}}}$$

(Based upon an allowable leakage of 11.65 gpd/mi/in. and a 150 psi test pressure)

Allowable leakage per 1,000 feet of DIP at 150 psi Test Pressure

Test pressure	Nominal Pipe Diameter, inches										
	4	6	8	10	12	14	16	18	20	24	30
	Allowable Leakage, gallons										
150	0.37	0.55	0.74	0.92	1.10	1.29	1.47	1.66	1.84	2.21	2.76

7) If any test discloses leakage greater than that specified above, the Contractor shall, at his own expense, locate and make repairs as necessary until the leakage is within the specified allowance. No repair clamps of any kind will be allowed. Repair shall consist of removing leaking section and replacing with couplings and pipe.

6.6 Pre-Flushing

The Town shall flush the source water, as near the shutoff as possible prior to tying-in to ensure that contaminants or debris are not introduced into the new pipe.

6.7 Flushing

The main shall be flushed through a hydrant at the end of the main at a velocity not less than 2.5 ft./sec. If no hydrant is installed at the end of the main, the Contractor shall provide a tap large enough to develop a velocity in the main of at least 2.5 ft./sec, unless the water utility determines that conditions do not permit the required flow to be discharged to waste. The gallons per minute to achieve 2.5 ft./sec velocities for different diameter pipes are provided in Table 6.B.

NOTE - Flushing is no substitute for preventive measures during construction.

a. The Town shall supply water for use in disinfecting and flushing mains. However, all such supply is at the Contractor's expense. Discharge to Town sewers of flushing volumes is prohibited unless approved by the Town. If approved, expenses for such discharge will be the Contractor's obligation.
b. The person in responsible charge shall furnish all necessary pipe and hose connections. The person in responsible charge shall exercise care in the use of the water to prevent contamination of the existing water supply.
c. Measures shall be taken prior to flushing to provide adequate drainage during flushing.
d. Drainage shall be directed away from the main, and flooding of the trench shall be prevented.
e. Coordinate activities with the Town 72 hours in advance to allow for meter placement and authorization.

6.8 Methods of Disinfection

Disinfection of water main shall be in accordance with AWWA C651 “Disinfecting Water Mains”.
All portions of the water main that was worked on as well as any portion(s) of the network that was taken out-of-service to allow completion of the contract shall be chlorinated. The chlorine solution to be used may be made from Calcium or Sodium Hypochlorite.

The use of Calcium Hypochlorite granules left in the main to be dissolved on filling of the main is not an approved method.

a. Continuous Feed Method

1) The continuous feed method consists of completely filling the main to remove all air pockets, flushing the completed main to remove particulates, and filling the main with chlorinated potable water so that after a 24±4-hour holding period in the main there will be a free chlorine residual of not less than 10 mg/L at all locations of the main.
2) At a point not more than 10 ft. downstream from the beginning of a new main, water entering the new main shall receive a dose of chlorine pumped at a constant rate such that the water at any location will have not less than 25 mg/L of chlorine. To assure that this concentration is provided, a water department representative shall measure the chlorine concentration at regular intervals at available blow-offs or hydrants in accordance with procedures described in the current editions of "Standard Methods for the Examination of Water and Wastewater" or using an appropriate chlorine test kit.
3) The table below gives the amount of chlorine required for each 100 ft. of pipe of various diameters. Solutions of 1% chlorine may be prepared with Sodium Hypochlorite or Calcium Hypochlorite. During the application of chlorine, valves shall be closed so that the strong chlorine solution in the main being treated will not flow into water mains in active service. Chlorine application shall not cease until the entire main is filled with heavily chlorinated water. The chlorinated water shall be retained in the main for at least 24±4 hours, during which time all valves and hydrants in the section treated shall be operated in order to disinfect the appurtenances. At the end of this 24±4-hour period, the treated water in all the portions of the main shall have a residual of not less than 10 mg/L of free chlorine.

Chlorine Required to Produce 25 mg/L Concentration in 100 feet of Pipe by diameter

Pipe size (in.)	Volume (gals in 100 feet of Pipe)	15% Chlorine solution gals per 100 feet of Pipe	1% Chlorine solution gals per 100 feet of Pipe
4	65	2 oz.	0.2 (1 1/2 pts)
6	150	3 oz.	0.4(1 1/2 qts)
8	260	5 oz.	0.6 (2 1/2 qts)
10	410	1 cup	1.0 Gal
12	590	1 Pint	1.4
16	920	1Quart	2.3
24	2350	1 1/2 Quarts	5.8
30	3680	2 1/2 Quarts	9.1
36	5290	0.9	13.0
42	7200	1.2	18.0
48	9400	1.5	23.0
54	11900	2.0	30.0
60	14690	2.5	36.0

NOTE: To make 1% chlorine solution using HTH granular Calcium Hypochlorite add 1 pound of Calcium Hypochlorite to 8 gallons of water. Using Sodium Hypochlorite, dilute the hypochlorite according to the percent available chlorine on the container. For example, if you have 5% household bleach, place 1 gallon in 4 gallons of water. You then have 5 gallons of 1% solution.

b. Slug Method (Emergency Use Only)

1) At a point not more than 10 ft. downstream from the beginning of the new main, water entering the new main shall receive a dose of chlorine fed at a constant rate such that the water will have not less than 100 mg/L of free chlorine. To assure that this concentration is provided, a water department representative shall measure the chlorine concentration at regular intervals along the main where taps and/or hydrants have been provided. The chlorine shall be applied continuously and for sufficient period to develop a solid column or 'slug' of chlorinated water that will, as it moves through the main, expose all interior surfaces to a concentration of approximately 100 mg/L for at least 3 hours.
2) The free chlorine residual shall be measured in the slug as it moves through the main. If at any time it drops below 50 mg/L, the Contractor shall stop the flow, chlorination equipment shall be relocated at the head of the slug, and as flow is resumed, chlorine shall be applied to restore the free chlorine in the slug to not less than 100 mg/L.
3) As the chlorinated water flows past fittings and valves, related valves and hydrants shall be operated so as to disinfect appurtenances and pipe branches.

6.9 Flushing after Disinfection

After the applicable retention period, the heavily chlorinated water shall be flushed from the main into the sewer until chlorine measurements show that the concentration in the water leaving the main is no higher than that generally prevailing in the system. Where domestic sewers are not available, the heavily chlorinate shall be dechlorinated. The replacement water shall be allowed to remain in the pipeline for 24 hrs.(+/- 4 hrs.) prior to sampling for physical, bacteriological, and chemical testing.

6.10 Analytical Tests

After the appropriate retention time (24±4 hours or 3 hours for the slug method), after flushing and before the water main is placed into service, two consecutive sets of acceptable samples, taken at least 24 hours apart, shall be collected for sanitary analysis. Suitable sample piping shall be furnished by the Contractor to allow sample collection. The sampling point or points shall provide samples, which are representative of the water in all sections of the main for which sanitary approval is requested. All samples shall be collected in a manner as to avoid contamination from the environment surrounding the main. Rubber or synthetic hose shall not be connected to the main to collect a representative sample. The area around the sampling point of the main shall not be filled with water. At least one sample shall be taken from each main, and in the case where a main is greater than 1000 feet, one sample from each 500 feet of line. The samples shall be submitted to a certified laboratory for bacteriological, chemical, and physical analysis. The following analyses shall be completed and reported on the appropriate form. Total chlorine residual, Total Coliform (Membrane Filtration method), pH, and turbidity.

6.11 Final Flushing

Disinfected water mains shall be flushed within 4 hours of being placed into service. Flushing shall be designed to restore water quality to that of the source water, immediately prior to being placed into service. The length of time of flushing shall depend on the size and length of the water main, however at least three volumes of water should flow through the entire length of the main.

6.12 Redisinfection

If the initial disinfection and flushing fail to produce satisfactory analytical results, the main may be re-flushed and shall be resampled. If check samples show the presence of coliform organisms, then the main shall be re-chlorinated by the Contractor, using the continuous feed method of chlorination, until satisfactory results are obtained.

6.13 Final Connection

Water mains and appurtenances must be completely installed, flushed, tested for leakage, disinfected, and satisfactory bacteriological sample results received prior to permanent connections being made to the active distribution system where the new main was isolated from the existing system. Sanitary construction practices must be followed during installation of the final connection to insure that there is no contamination of the new or existing water main with foreign material or groundwater. The new pipe, fittings, and valve(s) required for the connection will be spray-disinfected or swabbed with a minimum 1 - 5% solution of chlorine just prior to being installed.

6.14 Dechlorination

Contact the wastewater superintendent before discharging the highly chlorinated water to the sewer. The discharge of water to the environment with chlorine concentrations greater than the ambient distribution system chlorine residual is prohibited. The highly chlorinated water must be dechlorinated before being discharged to the environment. The method of dechlorination is at the discretion of the contractor as long as the procedure does not cause harm to the environment.

SECTION 7: STORM SEWER CONSTRUCTION

7.1 General

a. Under this specification non-watertight joints will be allowed and hydrostatic or air testing will not be required for storm sewers unless because of suspected excessive leakage or other problems the Town's authorized representative deems such to be necessary.
b. This specification covers the following types of materials for storm sewers, culverts, underdrains, inlet drains, conduits and miscellaneous applications.
    1) Reinforced concrete pipe and fittings
    2) Polyvinyl chloride pipe (PVC)
    3) PVC composite pipe
c. Sewer pipe shall be of the size shown on the drawings prepared and certified by a registered professional engineer. Storm sewer installation shall meet all requirements of these specifications.
d. This specification requires project plans and construction specifications to be submitted to and approved by the Town and all appropriate regulatory agencies prior to beginning any work.
e. These standards are to be used in conjunction with other Town ordinances.
f. All necessary permits shall be obtained by or on behalf of the developer.

7.2 Pipe Marking

Each length of pipe shall bear the name or trademark of the manufacturer, the location of the plant and the date of manufacture. Each length shall likewise be marked to designate the class or strength of the pipe. The marking shall be made on the exterior or interior of the pipe barrel near the bell or groove end and shall be plainly visible.

7.3 Reinforced Concrete Pipe and Fittings

a. Reinforcing concrete pipe and fittings shall conform to ASTM C76 for circular pipe and ASTM C507 for elliptical pipe.
b. Reinforced concrete pipe and fittings for normal conditions shall be reinforced in accordance with ASTM C76, Class III, Wall B (minimum). Acceptance shall be on the basis of Subsection 4.1.1 of ASTM C76.
c. Circumferential reinforcing in circular pipe shall be required. No elliptical reinforcing or combination of elliptical and circumferential reinforcing or part circular reinforcing shall be permitted in circular pipe.
d. Concrete pipe shall be stem cured and shall not be shipped from point of manufacture for at least five days after having been cast.
e. Joints shall conform to the requirements of ASTM C443. Gaskets shall be of an oil resistant type having a maximum swell of 90% when tested in accordance with ASTM D471. Lubricant for jointing shall be approved by gasket manufacturer.

    1) All rubber gasket similar to and equal to "Press-Seal" or "Tylox" conforming to ASTM Designation C443. The gasket shall be attached to the spigot of the pipe and shall be the sole element depended upon to make the joint flexible and practically watertight.
    2) Butyl mastic joint sealer in rope or trowel applied form specifically made for permanently sealing joints in tongue and groove concrete sewer pipe. The material shall adhere tightly to the pipe surface and form a tight, flexible joint. The material shall have been in use for at least five years. Test results and material specifications shall be submitted to the Town's

authorized representative and shall have been approved prior to use on the project.

7.4 Polyvinyl Chloride Pipe and Fittings

Polyvinyl chloride (PVC) pipe and fittings shall comply with ASTM D 3034.

7.5 PVC Composite Pipe and Fittings

ABS and PVC composite pipe and fittings shall conform to ASTM D 3350.

7.6 Manholes and Other Structures

a. Manholes shall be constructed of monolithic concrete or precast manhole sections. Precast manhole sections shall conform to requirements of ASTM Specification C478.
b. Materials for manholes, junction chambers, diversion chambers and miscellaneous concrete structures shall comply with the following:

1) Cement shall be Portland cement and shall meet the requirements of ASTM Specification C150, ACI 301, and ACI 318. Concrete for precast manhole sections shall be 3000 psi concrete. Monolithic manholes shall use 400 psi concrete. Ready mix concrete shall conform to ASTM C94, Alternate 2. Maximum size of aggregate shall be ¾ inch. Slump shall be between 2 and 5 inches.
2) Forms for chamber and structures shall be plywood or other approved material. Steel forms shall be used for the inside face on monolithic concrete manholes.
3) Reinforcing steel shall conform to ASTM A614, Grade 60 deformed bars, or ASTM A616 Grade 60 deformed bars.
4) Mortar materials
5) Manhole bases for both monolithic and precast circular manhole shall extend beyond the outside diameter of the manhole barrel a minimum of 6” and be reinforced.
6) The manufacturer shall provide openings for sewers entering and leaving the manhole. Any additional openings needed to be made in the field shall be made by drilling holes at least ½ inch in diameter with a maximum spacing of 3 inches.
7) Manhole castings shall be of good quality cast iron and/or ductile iron, conforming to ASTM Designation A48.
8) Storm manhole construction shall be in accordance with Bremen Standard Details Figure 7.2.

7.7 Catch Basins and Drain Inlets

a. The Town has a specific catch basin to be used.
b. Cast iron or ductile iron frames and gratings for catch basins and drain inlets shall be as shown on Figure 7.1. Bearing surfaces shall be clean and shall provide uniform contact. Castings shall be tough, close-grained gray iron, sound, smooth, clean, free from blisters, blow holes, shrinkage, cold shuts and all defects and shall conform to ASTM A48 Class No. 30-B.
c. Catch basin and inlet structures shall be precast and as specified in the INDOT Standard Specifications.

7.8 Inspection and Rejection of Pipe

a. The quality of all materials, the process of manufacture, and the finished pipe shall be subject to inspection and approval by the Town. Such inspection may be made at the place of manufacture or on the work after delivery or at both places; and the pipe shall be subject to rejection at any time on account of failure to meet any of the specifications' requirements even though sample pipes may have been accepted as satisfactory at the place of manufacture.
b. Prior to being lowered into the trench, each pipe shall be carefully inspected and those not meeting the specifications shall be rejected and at once removed from the work.
c. The Town's authorized representative shall have the right to cut cores from such pieces of the concrete pipe as desired for such inspection and tests as they may wish to apply.
d. Holes left by the removal of cores shall be filled in an approved manner by and at the expense of the manufacturer of the pipe.
e. The Town's authorized representative shall also have the right to take samples of concrete after it has been mixed, or as it is being placed in the forms or molds, and to make such inspection and tests thereof as he may wish.
f. Any pipe which has been damaged after delivery will be rejected.

7.9 Handling Pipe

Each pipe section shall be handled into its position in the trench only in such manner and by such means as the Town's authorized representative approves as satisfactory. As far as practicable, the contractor will be required to furnish slings, straps, and other approved devices to permit satisfactory support of all parts of the pipe when it is lifted.

7.10 Notice of Town's Authorized Representative

The Town's authorized representative shall be notified when the pipes are to be laid in the trench. At least 15 feet of the pipe shall, under ordinary circumstances, be laid before covering begins.

7.11 Laying Pipe

a. All pipe shall be reinspected for soundness and damage due to handling immediately before being lowered into the trench. Any pipe found to be unsound or damaged will be rejected and shall be removed immediately from the site of the work.
b. All pipe shall be laid accurately to the required line and grade as shown on the drawings, and in the manner prescribed by the pipe manufacturer and appropriate ASTM Specifications, to form a close, concentric joint with the adjoining pipe and to bring the invert of each section to the required grade. The supporting of pipe on block will not be permitted.
c. Pipe laying shall proceed upgrade, beginning at the lower end of the sewer.
d. Practically watertight work is required and the contractor shall construct the sewers with the type of joint specified.
e. All pipe shall be laid to the line and grade as shown on the drawings. Variations from a uniform line and grade as shown the drawings shall be cause for the line to be rejected.
f. The ends of the pipe shall be satisfactorily cleaned just before laying, and the joint shall be made in a satisfactory manner in accordance with the recommendations of the manufacturer on particular type of joint and the directions of the Town's authorized representative. All joint work shall be done by experienced workmen.

g. Storm sewer trenching, pipe laying and bedding shall be in accordance with Bremen Standard Details Figure 3.1.

7.12 Pipe Bedding and Haunching

a. Each pipe section shall be laid in a firm foundation of bedding material and haunched and backfilled with care.

b. Prior to pipe installation, carefully bring bedding material to grade along the entire length of pipe to be installed. To provide adequate support for the pipe, the following bedding procedures are recommended:

1. When angular 60 to 12 mm (1/4- to 1/2-inc) clean graded stone, slag or crushed stone material is used for bedding, little or no compaction is necessary due to the nature of the angular particles. A depth of 4" to 6" is generally sufficient to provide uniform bedding. If Class I material is used for bedding, it must also be utilized for haunching up to or higher than the spring line of the pipe to avoid loss of side support through migration of Class II haunching material into the bedding.
2. Take care with coarse sands and gravels and maximum size 20 mm (3/4-inch) material to provide a uniformly compacted bedding. Excavate the bedding material or place it to a point above the pipe bottom, determining such point by the depth of loose material resulting in the preparation of the bedding and the amount of compaction that will be required to bring the material to grade. Use hand or mechanical tamping to compact the bedding material to a minimum 85% Standard Proctor Density.
3. Slightly damp material will generally result in maximum compaction with a minimum of effort. If water is added to improve compaction or if water exists in the trench, take care to avoid saturation of Class II material, which could result in additional stability problems. Check grade of bedding after compaction.

c. Bedding material shall have a minimum thickness beneath the pipe of 4" (100 mm) or one-eighth of the outside diameter of the pipe, whichever is greater, and shall extend up the sides of the pipe one-sixth of the outside or granular backfill if required.

d. For rigid pipe, such as concrete or ductile iron, backfill between the bedding material and a plane 12" (300 mm) over the top of the pipe shall be hand placed finely divided earth, free from debris and stones or granular backfill if required.

e. For flexible pipe and corrugated metal pipe, the placement of embedment material or haunching around the pipe must be done with care. The ability of the pipe to withstand loading in a trench depends a large part on the method employed in its installation. If crushed stone, pea gravel or graded gravel or sand is used to backfill between the bedding material and a plane 12" (300 mm) over the top of the pipe, it shall be hand placed. Care should be taken so not to compact directly over the pipe.

f. In yielding subsoils, the trench bottom shall be undercut to the depth necessary and backfilled with graded, crushed stone to form a firm foundation. No additional payment shall be made for stabilizing yielding subsoils.

g. Where excavation occurs in rock or hard shale, the trench bottom shall be undercut and a minimum of 6" (150 mm) crushed stone bedding placed prior to pipe installation. Additional payment for rock excavation shall be made on "unit cost" projects only, and as prescribed under basis for payment.

7.13 Manholes and Other Structures

a. Manholes and other structures may be precast or cast-in-place concrete structures. Cast-in-place structures will require approval from the Town's authorized representative before placement.
b. Precast concrete manhole sections shall conform to requirements of ASTM Designation C478, except as noted herein:
    1. The joint design of the precast sections shall consist of a bell or groove on one end of the unit of pipe and a spigot or tongue on the adjacent end of the joining section.
    2. The joint shall consist of a flat rubber gasket attached to the spigot end of the precise manhole section and shall conform to Sections 6.1.6, 6.1.7 and 9 of ASTM Designation 443.
c. Openings in manhole sections for sewer connections shall be cut at the point of manufacture and shall be circular or horseshoe shaped with grooved or roughened surfaces to improve mortar bond. Any additional holes cut in the field shall be accomplished in a manner approved by the Town's authorized representative.
d. Manhole bases shall be cast-in-place concrete, properly reinforced and shall be case on a minimum of 6" of compacted crushed stone.
e. Manhole channels or inverts shall be performed and poured with Class "B" concrete to the spring line of the connecting pipe. The finished invert shall be a semi-circular shaped smooth channel directing the flow to the downstream sewer.
f. Manhole frames and lids shall weigh not less than 355 pounds and be of good quality cast iron, conforming to ASTM Designation A48 and as shown in Figure 7.2. Unless specifically designated otherwise, manhole castings shall be the non-locking type. All manhole frames shall be cast or drilled with three holes equally spaced around base of frame and shall be securely anchored to cone sections with three 3/8-inch bolts, nuts and washers. The joint between the casting frame and cone section shall be fully mortared or gasketed and coated with a coal tar epoxy coating upon reaching its final set to become a watertight joint.
g. Manhole steps shall be made from a steel reinforcing rod encapsulated in a copolymer polypropylene resin. Steps shall be placed as shown on the drawings.

7.14 Final Sewer Cleaning

Prior to final acceptance and final manhole-to-manhole inspection of the sewer system by the Town's authorized representative, flush and clean all parts of the system. Remove all accumulated construction debris, rocks, gravel, sand, silt and other foreign material from the sewer system at or near the closest downstream manhole. If necessary, use mechanical rodding or bucketing equipment.

SECTION 8: MUNICIPAL POWER DEVELOPMENT STANDARDS

8.1 Utility Corridors

a. All new residential or commercial industrial developments shall include corridors for the location of Bremen Power utility lines.
b. Corridors shall be located outside of proposed or existing street Rights-of-Way.
c. Preferred locations shall be in mid, block or rear yard areas. Intermediate corridors shall be included so as to allow for line feed redundancy.
d. Development pre-planning shall include a sketch level plan submittal to the town power utility Superintendent. Such submittal shall be routed through the technical review process and the Town Coordinator.

8.2 Rights-of-Way/Easements

a. All residential and commercial industrial developments shall include platted utility easements, or utility easements by grant that cover each utility corridor set aside for power lines and other town utilities.
b. A minimum exclusive width of 20-feet may be required for the Town's power utility lines above or below ground.
c. Easements for pad mounted transformers are required to be provided outside of the linear easements and required to be 10 feet by 10 feet.
d. If the easement(s) are to be provided by grant, then the grant shall be in the form approved by the Town's legal counsel. Examples can be provided by the Town.

8.3 Utility Corridors; Occupancy Restricted

a. All residential and commercial developments shall include language on the face of the recorded plat or within grants of easements from un-platted land, as to the use and development of utility corridors. This language shall summarize or stipulate:

1. That private improvements such as sheds, fences, trees, shrubs, or other permanent structures shall not be placed or constructed over or within the easement. Such improvements will be subject to permanent removal without notice by the Town.
2. That hard surface drives, landscaping, trees, irrigation components, or play equipment may be disturbed or removed without notice by the power utility. Restoration of such improvements shall be at the land owner's expense.
3. That parking of vehicles, boats or recreational vehicles is prohibited within utility corridors or easements at any time. Such items are subject to removal without notice by the town power utility. Removal or relocation will be at the owner's expense.
4. That occasional trimming of trees or removal of trees will be at the discretion of the Town power utility. Such will be performed without notice in the case of an outage or hazard resulting from interference with a town power line. Trimming or removal of trees as a part of routine maintenance will be proceeded by notice in writing to subject land owners prior to the work beginning.
5. The suggested summarized statement is:

> "Together with and subject to the Town of Bremen utility corridors or utility easements of record as shown or described. The location of permanent structures within which are prohibited. Removal of permanent or semi-permanent improvements may be without notice and are at the owner's expense".

8.4 Electric Service Planning or Distribution

a. Landowners or developers requesting service or new distribution should contact the power utility through the Town Coordinator. A site plan or preliminary plat or plan in accordance with the Marshall County Standards is required.

8.5 Town Code/Ordinances

a. Additional information and requirements related to the Town's electric system are presented in Chapter 105 of the Town's Code/Ordinance.

SECTION 9: MISCELLANEOUS REQUIREMENTS

9.1. Project Review & Approvals

a. All projects except those involving single family individual home sites will require review and approval by the Town.
b. Initiation of project approval will require completion of a Project Review Application as provided herein in Appendix A.
c. The completed form shall be filed with the Bremen Town Manager who will then schedule and coordinate project review.
d. Detailed site plans are required.

9.2. Approval Process

a. Depending upon the project scope, the Town Manager will schedule a staff technical review session. The Town Manager will advise as to the date and time of such session. For projects located outside of the Town's boundaries, costs incurred by the Town for engineering review will be invoiced to and shall be the responsibility of the developer.
b. If no session is scheduled, written comments will be forwarded to the applicant generally within two weeks. Revised plans should be submitted as soon as possible to avoid delay.
c. For development projects such as subdivisions or planned unit developments the request will be scheduled for review by the Town Council only after all technical comments have been addressed to the satisfaction of the Town Staff, Town Engineer and Town Manager. The Town Manager will notify the applicant of the date and time of the Council's review. The Council session will normally be the next available agenda after the project reaches technical compliance. If project approval requires rezoning, the Council session will be scheduled to allow appropriate public notice. Such notice will be coordinated with the Marshall County Planning Department.
d. For projects that include request for annexation, the Town legal counsel shall schedule ordinance review, hearing and approval by the Town Council. The Town Manager will inform the applicant as to date and time of such.

9.3. As-built Record Documents

a. General

The contractor or owner/developer is to maintain an accurate set of record drawings reflecting modifications to the approved plan documents. These documents are to be kept separately from the field set of documents. If the record documents become lost or destroyed, it is the contractor's responsibility to recreate to the same quality as the originals. The contractor shall submit to the Town Manager two (2) neatly prepared and reproducible sets of record drawings, as well as an electronic copy of the record drawings (in current AutoCAD format) with the Final Request for Acceptance.

Roadway and street as-builts will include information sufficient to determine that the alignment (vertical and horizontal) are in compliance with the approved plans. If not, provide the as-built geometry. Generally, utility installation documentation shall include the following, but the Town may require additional documentation:

1) Location and depth of the constructed storm sewers, sanitary sewers, water mains and force mains.
2) Location and depth of all constructed structures.
3) Location of all valves and fittings.
4) Location of any service taps, wyes, service leads or laterals.
5) Identify and locate all buried utilities that cross the installed utility (i.e. sewer, water, gas, telephone, electric, etc.)
6) Locations shall be dimensioned off of the existing structures and property irons or fixed objects within 50 feet of any located item.

b. Sanitary Sewer

As-builts shall include pipe alignment, pipe invert elevations, laterals and service leads measured from the next downstream manhole to the center of the service wye or tee, along with accurate vertical location of the service lateral at the terminus. (See Sections 3 and 4 for other details related to as-built requirements.) The as-built record will also include a manhole as-built form for each structure and a service wye data sheet for each lateral. (See Appendix A.)

c. Water Supply

As-builts shall include accurate pipe alignment both vertically and horizontally and will accurately depict the exact location of all fittings, bends, vertical alignment changes, valves, plug ends and thrust blocks. Valves shall be located with a minimum two measurement ties accurate to within one tenth of one foot taken at approximately 90 degrees to each other. Services including curb boxes shall be measured from the nearest fixed objects within 50 feet and shall include a minimum of two ties taken at approximately 90 degrees to each other. Valves, hydrants, services leads, and curb boxes shall be further recorded on forms provided for that specific purpose included in Appendix A.

9.4. Uniform Traffic Control

Traffic maintenance devices shall be in accordance with Indiana Manual on Uniform Traffic Control Devices for streets and highways and the INDOT Standard Specifications.

a. Contractor's Responsibility

1) The Contractor shall be responsible for coordination of traffic control with co-existing construction projects, with respect to detours, signage, etc.
2) The work shall be done as per INDOT Specifications Sections 801 and 104.04, and as per plan details. Road Construction Ahead signs shall be installed prior to the beginning of all other work operations, and shall be removed only after notification from the Engineer. The Contractor shall be responsible for the maintaining of the signs and required warning lights on a periodic basis, (minimum once per week) and additional prompt maintenance when alerted to problems by the Town.

b. Signage

1) Signs shall be as per INDOT standard detail drawings. Signs shall be subject to rejection due to wear and tear. All type III barricades shall have reflective material on both sides of the planks, and shall be incidental to the item "Maintaining Traffic," regardless of being relocated within the project. Construction signage and any incidental detour route marker assemblies shall be placed for optimum visibility to the motorists, (i.e. with

the avoiding of obstructions), and growth of vegetation over signage shall be eliminated as part of normal maintenance. When sand bagged, temporary sign standards are acceptable, the contractor shall provide a sufficient number of sandbags to keep signs erect in windy conditions.

2) Additional work under the lump sum item shall include the placement of additional reflective barrels, and yellow plastic “Caution" tape at potential hazard areas as needed. Also, additional work, incidental to the lump sum, shall include the placement and maintaining of temporary aggregate pavement at approaches as directed. Maintaining traffic shall otherwise be performed as per INDOT Standard Specifications.

c. Flagmen

The Contractor shall provide flagmen as needed for safe operation of traffic during short term traffic interruptions. The Prime Contractor shall be responsible for the daily use of personal safety equipment, (i.e. reflective vests, hard hats, etc.) and for safe operation of equipment and haul trucks on the project, for all crews and subcontractors.

d. 2-Way Traffic and Road Closure

Twenty-four hour per day, safe, 2-way traffic shall be maintained on all streets during construction, except where road closure and detours are allowed by the Town of Bremen. Access at approaches within the project limits shall be maintained at all times.

9.5. Erosion Control

a. Temporary Seeding

1) Temporary seeding shall be required as necessary and/or as directed by the Town for the effective control of erosion as various areas of the project are rough graded.

2) Temporary seeding shall include the following options of species and rates:

Wheat or Rye	@	150#/acre
Spring Oats	@	100#/acre
Annual Rye Grass	@	40#/acre

3) A fertilizer application of 400#/acre of 12-12-12 analysis material shall accompany the seeding application. Mulching of temporary seeding is not required. Temporary seeding is encouraged for use for the time period between final grading and the completion of exterior construction at building sites, to allow for grass stabilization prior to the expense of permanent seeding.

b. Erosion Control Handbook

A copy of the "Indiana Handbook for Erosion Control in Developing Areas" (or "IHFECIDA") shall be kept onsite by the Contractor during the construction of the project for use as a reference for the proper implementation of erosion control measures as planned. Stockpile locations for earth materials shall be at the discretion of the contractor, but shall be located in such a way as to strategically avoid erosion problems.

c. Permanent Seeding

1) All permanent seeding shall involve the mixture of 170#/acre (including 95#/acre of low endophyte Kentucky 31 Fescue or approved equal, 65#/acre of perennial rye grass, and 10#/acre of Jasper Red Fescue or approved equal). The Contractor shall provide Proof of Compliance with the above prior to seeding.
2) Permanent seeding shall be done promptly and progressively as final grading is completed at the various project areas, in order to allow for the earliest possible achievement of fully established and stabilized grass for erosion control purposes (i.e. multiple mobilizations for seeding shall be made as areas are final-graded, rather than one mobilization after all grading is complete).
3) The Contractor shall schedule the construction work so as to take best advantage as possible of the allowable seeding season. This season shall be as described in the "IHFECIDA", and repeated here as follows:
4) Optimum Seeding Dates - 3/1 thru 5/10 and 8/10 thru 9/30 with the period of 5/10 thru 8/10 being the time in which extensive irrigation may be required.
5) The Contractor shall be responsible for irrigation as necessary or as directed by the Owner until 90 days, minimum, beyond the completion and acceptance by the Owner of all project work.
6) Site preparation for seeding shall include "IHFECIDA" practices. This includes disking of the top 3-4 inches of subsoil prior to the placing of an even-depth topsoil application of 4 inches minimum. The topsoil shall then be compacted slightly to improve contact with the subsoil.
7) Fertilizer for the seeding shall include 400-600#/acre of 12-12-12 analysis material, followed by tilling to obtain a uniform seed bed, working the fertilizer into the soil 2-4 inches deep with a disk or rake operating across the slope.
8) Seeding shall be applied uniformly with a drill or cultipacker seeder, or by broadcasting, and then covered to a depth of 1/4 to 1/2 inch.
9) Mulch shall be applied to cover at least 75% of the soil surface, and shall consist of straw, hay, wood fiber, cellulose, excelsior, etc. as given in the "IHFECIDA".
10) The mulching rate shall be 2 tons per acre, and if straw or hay is used, it shall be anchored immediately by crimping, hydro mulching w/short cellulose fibers, applied liquid tackifier, or covered with netting secured by metal staples.
11) Following the initial application of fertilizer as mentioned above, additional fertilizer shall be added to bring the total rate to 1,000#/acre. The supplemental application shall be made according to the timing which will enhance the establishment and stabilization of the grass.
12) The scheduling of work operations shall be the responsibility of the contractor, subject to potential changes by weather, etc. In general, however, operations involving control of stormwater runoff, erosion control protection, etc., shall be given priority within the schedule. In regards to erosion control, this involves the optimum use of the available seeding season as previously given.

d. Erosion Control Maintenance

The Contractor shall promptly re-seed at disturbed or washed-out areas, and erosion control features shall be inspected weekly by the contractor, and

immediately following storm events for prompt and proper resetting or replacement. Inlet protection erosion control shall be inspected on a daily basis when work is being performed in the vicinity of these features. If disturbed, these erosion control features shall be promptly reset and properly in place at the end of each workday in question.

e. Contamination Precaution

The contractor is herein advised of the well-draining quality of the existing sandy soils within Town areas and in order to protect the groundwater resource from contamination, the contractor must take all precautions to avoid the release of construction related liquids during the project.

9.6. Special Notes and Requirements

a. Utility Locations

For protection of underground utilities, contractor shall call Indiana's Utility Location Service at (800) 382-5544 or "811" a minimum of three working days prior to excavating in the vicinity of utility lines. All "Indiana 811" participating members will thus be routinely notified. The contractor shall be responsible for notifying utility Owners who may not be part of the alert system. Notify the Town (48 hours in advance) at 574-546-2471 or 574-546-2044 prior to any excavation anywhere within Town Rights-of-Way. No work will begin prior to the contractor obtaining confirmation that the Town has visited the site and marked Town utilities.

b. Preconstruction Meeting

Prior to the start of construction, the contractor shall request a pre-construction meeting with the Town of Bremen to review project issues. At that time, the contractor shall provide the Town with an updated work plan for review and discussion.

c. Preconstruction Video

The Contractor shall be responsible for providing a pre-construction videotape of the construction corridor. The videotape shall provide good color frames and have sound capabilities used to point out existing surface conditions. A date and time stamp shall be visible during the extent of the production. The pre-construction video(s) shall be delivered to the Town of Bremen prior to the start of construction. It is suggested that if possible the preconstruction video be made after a rain event to show any existing drainage problems.

d. Compaction Requirement

Compaction testing shall be required during restoration of any excavation within Town Rights-of-Way. It shall be the responsibility of the contractor to order these tests and provide the necessary documentation, verifying passing tests, to the Supervisor of Public Works or Town Manager. Failed tests shall be followed by documentation of corrective measures and passing test results obtained in the same immediate locations.

e. Soil Erosion Permit

All construction methods shall be done in compliance with the Indiana Administrative Code 327 IAC 15-5 for "Storm Water Runoff Associated with

Construction Activities." The Owner will acquire the necessary erosion control permit for projects affecting 1 acre or larger prior to the start of construction.

f. Protection and Restoration of Property

The Contractor shall not enter upon private or Town property for any purpose without obtaining proper permission. He shall be responsible for the preservation from injury or damage resulting directly or indirectly from the execution or nonexecution of the work of all public and private property adjacent to the work. He shall take all necessary precautions to prevent damage to trees, pipes, conduits, and other underground structures, public utilities, etc., and shall protect carefully from disturbance or damage all property marks or markers. The contractor shall contact all utilities in the area of the proposed construction and have them locate their utility lines prior to the start of work.

g. Opening of Section of Work

Whenever, in the opinion of the Town, all of the work or any portion thereof is in suitable condition for opening or use, it shall be opened as may be directed, but such opening shall not be construed as an acceptance of the work or any part thereof, or as a waiver of any of the provisions of these specifications.

h. Limitations of Operations

Whenever, in the judgment of the Town, the contractor has obstructed or closed a greater portion of any street, sidewalk or alley than is necessary for the proper prosecution of the work, or is carrying on operations to the prejudice of work already started, the Town may require the contractor to finish the part on which work is in progress before any additional portions are started. Work shall be conducted so as to create a minimum amount of inconvenience to the public.

i. Final Cleaning Up

Before acceptance or approval of any work, adjacent property, the Right-of-Way or streets, and all grounds occupied by the contractor in connection with the work, shall be cleaned of all rubbish, excess materials, temporary buildings, etc., and the contractor shall restore in an acceptable manner all property, both public and private, which may have been damaged during the prosecution of the work, and all parts of the work shall be left in a neat and presentable condition, as good as or better than it was at the beginning of construction.

j. Removal and Replacement of Unclassified Road Surfacing, Sidewalks, Curb and Gutter, Driveways, etc.

The contractor shall restore and/or repair all sidewalks, crosswalks, curbs, gutters, driveways, shoulders of roads and paved streets, parking areas, mailbox turn-outs, parkways, lawns, mailboxes, street signs, miscellaneous structures, etc. The replacement and/or repair work shall be done without delay, as soon as the work immediately adjacent is completed. In any event, the removed or damaged facilities, etc. shall be restored to a condition equal to or better than that, which existed prior to the start of the work.

Where lawn sod is removed, either on public or private property, it shall be carefully preserved and later replaced, or the area where sod has been removed shall be covered with a 4-inch thick layer of good black dirt and seeded with an approved

grass mixture in an amount of at least 200 pounds of pure, live seed per acre of surface.

k. Limitations on Open Trench

The contractor shall not open, nor leave open, any more trench than is absolutely necessary, and as approved by the Town, to carry out construction work in an efficient manner.

l. Contractor's Performance Bond

The Contractor's performance bond shall remain in force throughout the period of construction and shall continue in force for a period of one (1) year following the final inspection and acceptance of the project by the Owner.

m. Work Performed by Town Employees

If the Town in its sole judgment determines that the Town's employees must be used to perform work that is the contractor's responsibility, the Town may charge the contractor using the following rates:

Professionals	$150.00/hr.
Non-Professionals	$100.00/hr.

The Town, through the Director of Public Works, reserves the right to implement this option after the problem is called to the attention of the Contractor's representative on the project and a satisfactory response, in his sole judgment, is not received. Notice to the Contractor and the required time for response will be dependent upon the circumstances involved. Matters of public safety or imminent hazard to Town property may require immediate response and, therefore, reaction by the Contractor or Town employees.

Examples of Contractor's responsibilities most frequently neglected to a degree that the Town feels compelled to intervene, include, but are not limited to:

Traffic Control
Clean-up and Restoration

The Town will bill the contractor after performing the work. Remittance shall be required within 30 days. Billings may include materials, equipment, vendor services, and subcontractor services. Costs will be billed plus 10%.

9.7. Signs - Private

Refer to Chapter 153 Article II of the Town of Bremen Code/Ordinances.

APPENDIX A – FORMS

Town of Bremen

Copies of this information Issued
Date:_____ By:_____

Date installed:_____

HOUSE SANITARY SERVICE LEAD AND WYE DATA

Name:_____

Address:_____

Lot:_____ Plat:_____

Parcel:_____ Section:_____

Lead Size:_____ Main Size:_____

Down Stream MH#:_____ To MH#_____

Distance to Downtown MH: _____

Depth of Main:_____ Elevation:_____

Lead Invert (Depth/Elevation):_____
(At end or R.O.W.)

Ties to lead location:_____

_____

_____

Service Length:_____

Riser at Right-of-Way:_____

Total Length:_____

Note: The plumber shall take it upon himself to physically locate the end of the sewer lead and determine the grade necessary to make the connection.
If the grade is less than that allowed by the plumbing code or the lead cannot be located, contact the Town's Wastewater Department at 574-546-3829.

This data sheet provided by:_____

Town of Bremen

PIPE MANDREL TEST

PROJECT _____ JOB # _____

CONTRACTOR _____ FOREMAN _____

MAXIMUM DEFLECTION _____ SIZE _____

TYPE OF PIPE _____

Date	**From: MH = STA**	**To: MH = STA**	Length	Deflection	P/F

COMMENTS: _____

_____

_____

_____

Signed _____
Project Inspector

Town of Bremen

PIPE AIR PRESSURE TEST

PROJECT _____ JOB # _____

CONTRACTOR _____ FOREMAN _____

PRESSURE OF PIPE _____ psi SIZE _____

TYPE OF PIPE _____

Date	**From: MH = STA**	**To: MH = STA**	Length	Time	Pressure Drop	P/F

COMMENTS: _____

_____

_____

_____

Signed _____
Project Inspector

Town of Bremen

PIPE PROBE RESULTS

PROJECT _____ JOB # _____

CONTRACTOR _____ FOREMAN _____

SIZE _____

TYPE OF PIPE _____

Date	From: MH = STA	DIRECTION	Length	Point #	Depth	

COMMENTS: _____

_____

_____

_____

Signed _____
Project Inspector

Town of Bremen

MANHOLE AS-BUILTS

			SHEET _____ OF _____		
JOB #:			DATE:		
JOB NAME:			CREW:		
CLIENT:			WEATHER:		
LOCATION:					
MANHOLE #	PIPE		PIPE		
	SIZE & TYPE	DEPTH	SIZE & TYPE	DEPTH	

Town of Bremen

MANHOLE VACUUM TEST DOCUMENTATION

Project Number: _____ Date: _____

Contractor Name: _____ Job Number: _____

Manhole Number	Manhole Manufacturer	Diameter	Manhole Height	Spec Test Time	Actual Drop	Pass/Fail	Manhole Clean		Steps	
							Yes	No	Yes	No

NOTES: _____

_____

City Representative: _____ Title: _____ Date: _____

Contractor Representative: _____ Title: _____ Date: _____

*Calculated from ASTM C 1244-02. The Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test.

Town of Bremen

Copies of this information Issued
Date:_____ By:_____

Date installed:_____

HOUSE WATER SERVICE DATA

Name:_____

Address:_____

Lot:_____ Plat:_____

Parcel:_____ Section:_____

Lead Size:_____ Main Size:_____

Depth of Main:_____ Elevation:_____

Lead (Depth):_____(At end or R.O.W.)

Lead Material:_____

Main Material:_____

Ties to service location:_____

_____

_____

Service Length:_____

Riser at Right-of-Way: _____

Total Length:_____

Note: The plumber shall take it upon himself to physically locate the end of the water service and determine materials to make the connection.

If cover (min. 60") cannot be maintained contact Town representatives.

This data sheet provided by:_____

Town of Bremen

WATER SYSTEM TESTING PROCEDURE RECORD

Contractor's Name: _____

Contractor's Address: _____

Project Name: _____

Project Location: _____

Pipe Data:
Existing Pipe Connection Point (Describe-General Location, Size, Connection Method)

Connection Point No. 1:_____

_____

Connection Point No. 2:_____

_____

Connection Point No. 3:_____

_____

New Pipe Description:
Length:_____/_____

Diameter:_____/_____

Type: _____DI _____ PVC _____RCP

Pipe Filling Data:
Town Representative Present:_____

Fill Date:_____

Chlorination Method: ☐ Granular ☐ Liquid

Free Chlorine Residual (>25 mg/l) _____
Location No. 1: _____

Free Chlorine Residual (>25 mg/l) _____
Location No. 2: _____

Calculated Volume of Water Used: _____

Special Note: All testing shall be performed in the presence of a town-authorized representative.

Pressure & Leakage Test:
Date:_____

Start Time:_____ (a.m./p.m.)

End Time: _____ (a.m./p.m.)

Test Duration:_____2 hours_____(required)

Test Pressure:_____150 psi_____(required)

Pressure Drop During Test:_____psi
(Maximum Pressure Drop Allowed – 5psi)

Allowable Leakage shall be calculated as follows:

$$\text{Allowable Leakage} = \frac{\text{PipeLength(ft)} \times \text{NominalDia.(in)}}{10{,}875}$$

Calculated Allowable Leakage:_____ oz/gal

Volume of Water Required to Return the System Pressure to 150 psi:_____ oz/gal

Water Main: ☐ Passed / ☐ Failed Tests

Test Witnessed By:_____

Bacteria & Chlorine Residual Sample 1:
Town Representative Present:_____

First Sample Date:_____

Testing Laboratory:_____

Sample Results: ☐ Positive ☐ Negative

Chlorine Residual in System:_____

Bacteria & Chlorine Residual Sample 2:
Town Representative Present:_____

First Sample Date:_____

Testing Laboratory:_____

Sample Results: ☐ Positive ☐ Negative

Chlorine Residual in System:_____

Initial Flushing Record:

Required Flushing Velocity:_____

Min. Flow Volume Required:_____

Date:_____

Start Time of Flush:_____(a.m./p.m.)

End Time of Flush:_____ (a.m./p.m.)

Duration of Flush:_____ min.

Flush Rate:_____ gpm

Volume of Water Used:_____ gal

Final Flush Record:

Required Flushing Velocity:_____

Min. Flow Volume Required:_____

Date:_____

Start Time of Flush:_____(a.m./p.m.)

End Time of Flush:_____ (a.m./p.m.)

Duration of Flush:_____ min.

Flush Rate:_____ gpm

Volume of Water Used:_____ gal

Additional Comments:

Town of Bremen

DEVELOPMENT INTRODUCTION/REVIEW REQUEST

Development Project/Site Improvement Planning

New projects require review prior to initiation of construction. Coordination/Pre-planning activities require early contact with the Town Manager/Coordinator. Completing the following form will help town officials expedite review and approval of project plans. Note: Project and Development Standard requirements are provided in Title 153 Article 1 of the Town of Bremen Code/Ordinance.

Project Name:
_____

Owner/ Developer

_____
Corporate Name

_____
Developer's Name

_____
Address

_____

_____

_____
Phone No. Fax No.

Design Engineer

_____
Corporate Name

_____
Engineer's Name

_____
Address

_____

_____

_____
Phone No. Fax No.

Type of Development:

☐ Single Family Residential ☐ Multi- Family Residential ☐ Commercial ☐ Industrial

Number of Development Parcels_____ Development Acreage: _____

Additional Site Information:_____

_____

_____

_____

Development Location:

_____ Qtr. Section:_____ Township:_____ Range:_____

Descriptive Location: _____

_____

_____

Nearest Cross Streets:_____

_____

DEVELOPMENT INTRODUCTION/REVIEW REQUEST

Development Access:

The development is to gain public access from what town or county road(s): _____

_____

_____

Wastewater Service:

Proposed Number of EDU's: _____ Estimated Wastewater Flow: _____

For Town Use

Proposed Municipal Wastewater Connection Point: _____

_____

_____

If a lift station is required, provide the station's service area as an attachment. What is the station's proposed pumping capacity: _____

Calculated Wastewater Connection Fee: _____

Water Service:

Proposed Number of Equivalent Dwelling Units: _____

Estimated Water Demand: _____

For Town Use

Proposed Municipal Water Main Connection Points (two connection points will generally be required): _____

_____

_____

Calculated Water Connection Fee: _____

☐ Upper Pressure Zone ☐ Lower Pressure Zone

Stormwater:

Developments plans for stormwater maintenance: _____

_____

_____

Town of Bremen

Town Manager/Coordinator
Trend Weldy
Office: Town Hall
Ph: 546-2044 Fax: 546-5487

Clerk Treasurer
Janet Anglemyer
Office: Town Hall
Ph: 546-2471 Fax: 546-5487
bremenclerk@mchsi.com

Street Superintendent
Alex Mikel
Office: Central Garage
Ph: 546-4324 Fax: 546-5487

Wastewater Department Superintendent
Matt Cunningham
Office: Wastewater Treatment Plant
Ph: 546-3829

Water Department Superintendent
Alex Mikel
Office: Water Utility Garage
Ph: 546-4324 Fax: 546-5487
After Hours Emergency #546-3456
bremenwater@gmail.com

Park Superintendent
Brian Main
Office: Town Hall
Ph: 546-3390 Fax: 546-5487

Electric Department
Jay Stoneburner
Office: Bremen Electric Department
Ph: 574-546-4324. Fax: 574-546-5487

Town Council

Michael Leman, President

Jim Leeper, Vice President

Bill Daily, Member

Rick Graverson, Member

Trend Weldy, Town Manager

Town Council Meeting Schedule
Second and Fourth Monday of every month at 4:30 p.m.

Town Hall Address
Bremen Town Hall
111 South Center Street
Bremen, IN 46506

Town Attorney
Anthony Wagner, Esq.
Wagner & Wagner, LLP
1406 W. Plymouth St., PO Box 158
Bremen, IN 46506
Ph: 546-2626 Fax: 546-2608

Town Engineer
Ken Jones – Jones Petrie Rafinski
Attn: Brett Konarski, P.E.
325 S. Lafayette Blvd
South Bend, IN 46601
Ph: 232-4388

Town of Bremen

INDUSTRIAL USER WASTEWATER QUESTIONNAIRE

(enabling Town Ordinance – Ord. No. 383)

SECTION A: GENERAL INFORMATION (PLEASE TYPE OR PRINT)

Company Name: _____

Mailing Address: _____

Facility Address: _____

Wastewater Discharges to:

☐ Town Sewer System ☐ Private Septic System

☐ Natural Outlet (pond, etc.) ☐ Other: _____I

Contact Official:

Name: _____ Title: _____

Phone:_____ E-mail:_____

Certification Statement: (to be signed by the property owner or an official of the company identified)

I certify that I am familiar with the facility in question and that to the best of my knowledge and belief, the information contained in this questionnaire is true and accurate.

Signature: _____ Title: _____ Phone: _____

FOR PRETREATMENT USE ONLY

1. Your facility will be required to install the following:

: ☐ Control monitoring manhole ☐ Grease interceptor

☐ Sediment and/or oil interceptor ☐ Other: _____

☐ Additional information is necessary. You will be required to complete an Industrial Wastewater Discharge Application.

2. ☐ Your facility will require an Industrial Wastewater Discharge Permit. PLEASE CONTACT OUR OFFICE FOR FURTHER INFORMATION AT 574-825-1499.

3. DISPOSITION:

☐ APPROVED ☐ NOT APPROVED

Pretreatment Approval: _____ Date: _____

Comments: _____

_____

INDUSTRIAL USER WASTEWATER QUESTIONNAIRE

SECTION B: PRODUCT OR SERVICE INFORMATION

Give a brief description of the manufacturing or service activity on the premises. Use additional sheets if necessary:

Provide the following information on chemicals and compounds used:

CHEMICAL NAME	SIZE OF LARGEST CONTAINER (GALLONS)	RATE OF HANDLING/USAGE (PER MONTH OR YEAR)	MAXIMUM QUANTITY ON SITE AT ANY ONE TIME

Water Service

Proposed Number of Equivalent Dwelling Units: _____

Estimated Water Demand: _____

For Town Use

Proposed Municipal Water Main Connection Points (two connection points will generally be required): _____

_____

_____

Calculated Water Connection Fee: _____

☐ Upper Pressure Zone ☐ Lower Pressure Zone

Stormwater

Developments plans for stormwater maintenance: _____

_____

_____

Town of Bremen

APPLICATION FOR RIGHT-OF-WAY PERMIT

Allow two weeks minimum for review and approval process.

Project name: _____

Owner or contractor name, address and phone number: _____

_____

Property address (nearest or at worksite): _____

_____

Work will occur within the R-O-W of _____ between _____

and _____.

Describe the work proposed: _____

Contractor's name, address and phone number: _____

_____

Provide minimum of two 24-hour emergency contacts:

_____ _____

APPLICANT MUST PROVIDE AN ACCURATE ENGINEERING PLAN (TO SCALE) SHOWING RIGHT-OF-WAY LINES AND DIMENSIONS, GRADING, UTILITIES, EXISTING STORM WATER FEATURES AND DISTANCES TO ADJOINING BUILDINGS. THE PLAN SHOWING WORK AREAS AND COMPONENTS MUST INCLUDE EXISTING SURFACE IMPROVEMENTS INCLUDING LANDSCAPING, AND WALKWAYS.

Duration of work: From _____ to: _____

Will the work require excavation? _____ To what depth: _____

Will the work connect to Town utilities? _____

Will the work disrupt power to Town facilities? _____

Will the work require a street closure? _____

Have you completed a waste water questionnaire? ☐ Yes ☐ No (If yes, please attach.)

Have you completed a development introduction form? ☐ Yes ☐ No (If yes, please attach.)

Have you met with Town officials? ☐ Yes ☐ No

If yes, who? _____

Permit Fee ($100.00) Paid? ☐ Yes ☐ No

Please see Section 2.3 h. 1-6 & 2.4 for detail requirements.

Submitted by: _____

Address: _____

Phone: _____

APPENDIX B – BONDS

Town of Bremen, Indiana PERFORMANCE BOND

The undersigned certifies that he/she is the Secretary/Custodian of the company named as Principal in the within Bond; that _____ who signed the said Bond on behalf of the Principal was then the _____ of the Company, that I know his/her signature, and his/her signature thereto is genuine; and that said Bond was duly signed, sealed, and attested to, for and on behalf of said Company by authority of its governing body.

_____ (Seal)
Signature

_____
Printed Name

Title: Secretary/Custodian

KNOW ALL MEN BY THESE PRESENTS, that _____ as Principal and _____ as Surety, are firmly bound unto the Town of Bremen, Indiana acting through the Town Council of the Town of Bremen, Indiana (Owner) in the penal sum of an amount equal to _____ Dollars ($_____), the amount of the construction or contract price, for the payment of which, well and truly to be made, we bind ourselves, jointly and severally, and our joint and several heirs, representatives, successors, and assigns, firmly by these presents, this _____ day of _____, 20____.

THE CONDITIONS OF THE ABOVE OBLIGATION ARE SUCH that, Whereas, the Principal is herewith performing a construction project for _____ in accordance with the plans and specifications approved and adopted by said Owner, which are made a part of this Bond: _____.

NOW, THEREFORE, if the said Principal shall promptly perform the construction project and shall well and faithfully do and perform the same in all respects according to the plans and specifications provided and as approved by the OWNER, and according to the time, terms, and conditions, specified in the contract entered into, and in accordance with all requirements of law, and shall promptly pay all debts incurred by him or any subcontractor in the construction of said work, including labor, service, and materials furnished, then this obligation shall be void; otherwise to remain in full force, and effect.

IT IS AGREED that no modifications, omissions, or additions in or to the terms and conditions of the contract or in or to the plans, specifications, drawings, or profile therefore shall in any wise affect the obligations of such Principal and Surety on this Bond.

The Principal and Surety on this Bond shall not be released until one (1) year after final completion and acceptance of the work by the Owner.

IN WITNESS WHEREOF, we hereunto set our hands and seal this _____ day of _____, 20_____.

NAME OF PRINCIPAL

By:_____

_____
Printed Name

_____
Title

NAME OF SURETY

By:_____

_____
Printed Name

_____
Title

STATE OF INDIANA)
)SS:
COUNTY OF _____)

Before me, a Notary Public in and for said County and State, this _____ day of _____, 20_____, personally appeared _____, of _____, as Principal and acknowledged that as said officer he executed the foregoing Performance Bond for and on behalf and in the name of said Principal, for the uses and purposes therein mentioned, and that he was authorized so to do.

WITNESS my hand and notarial seal.

_____
Notary Public

_____
(printed or typed name)
Residing in Marshall County, Indiana

My Commission Expires:
_____

STATE OF INDIANA)
)SS:
COUNTY OF _____)

Before me, a Notary Public in and for said County and State, this _____ day of _____, 20_____, personally appeared _____, of _____, as Surety and acknowledged that as said officer he executed the foregoing Performance Bond for and on behalf and in the name of said Surety, for the uses and purposes therein mentioned, and that he was authorized so to do.

WITNESS my hand and notarial seal.

_____
Notary Public

_____
(printed or typed name)
Residing in Marshall County, Indiana

My Commission Expires:
_____

Accepted and approved this _____ day of _____, 20_____.

TOWN COUNCIL OF THE TOWN OF
BREMEN, INDIANA

By:_____

Title:_____

ATTEST:

By:_____

Title:_____

Town of Bremen, Indiana MAINTENANCE BOND

The undersigned certifies that he/she is the Secretary/Custodian of the Company named as Principal in the within Bond; that _____ who signed the said Bond on behalf of the Principal was then the _____ of the Company, that I know his/her signature, and his/her signature thereto is genuine; and that said Bond was duly signed, sealed, and attested to, for and on behalf of said Company by authority of its governing body.

_____ (Seal)
Signature

_____
Printed Name

Title: Secretary/Custodian

KNOW ALL MEN BY THESE PRESENTS, that _____ as Principal and _____ as Surety, are held and firmly bound to the Town of Bremen, Indiana acting by and through the Town Council of the Town of Bremen, Indiana ("Owner") in the sum of _____ Dollars ($_____), for the payment of which sum well and truly to be made, we jointly and severally bind ourselves, our heirs, representatives, successors, and assigns firmly by these presents this _____ day of _____, 20_____.

THE CONDITIONS OF THE ABOVE OBLIGATION ARE SUCH that, Whereas, the Principal, entered into a construction contract on the _____ day of _____, 20_____ to construct and install _____ according to the plans and specifications; it is hereby warranted and guaranteed that the work and materials as provided in the work and the plans and specifications as completed are free of defect, and such warranty shall extend for a period of three (3) years from the date of final acceptance of the work by the Owner.

NOW, THEREFORE, if the said Principal shall faithfully perform and fulfill all of the requirements of said Warranty and Guaranty, and make all repairs required under said Warranty and Guaranty, and in the manner provided for, then this Bond to be null and void; otherwise to remain in full force and effect.

IN WITNESS WHEREOF, this Maintenance Bond is executed on the _____ day of _____, 20____ by the Principal and Surety.

NAME OF PRINCIPAL

By:_____

_____
Printed Name

_____
Title

NAME OF SURETY

By:_____

_____
Printed Name

_____
Title

STATE OF INDIANA)
)SS:
COUNTY OF _____)

Before me, a Notary Public in and for said County and State, this _____ day of _____, 20_____, personally appeared _____, of _____, as Principal and acknowledged that as said officer he executed the foregoing Maintenance Bond for and on behalf and in the name of said Principal, for the uses and purposes therein mentioned, and that he was authorized so to do.

WITNESS my hand and notarial seal.

_____
Notary Public

_____
(printed or typed name)
Residing in Marshall County, Indiana

My Commission Expires:
_____

STATE OF INDIANA)
)SS:
COUNTY OF _____)

Before me, a Notary Public in and for said County and State, this _____ day of _____, 20_____, personally appeared _____, of _____, as Surety and acknowledged that as said officer he executed the foregoing Maintenance Bond for and on behalf and in the name of said Surety, for the uses and purposes therein mentioned, and that he was authorized so to do.

WITNESS my hand and notarial seal.

_____
Notary Public

_____
(printed or typed name)
Residing in Marshall County, Indiana

My Commission Expires:
_____

Accepted and approved this _____ day of _____, 20_____.

TOWN COUNCIL OF THE TOWN OF
BREMEN, INDIANA

By:_____
_

Title:_____

ATTEST:

By:_____

Title:_____

TOWN OF BREMEN, INDIANA MAINTENANCE GUARANTEE

WHEREAS the undersigned individual, individuals, partnership, corporation, limited liability company, limited liability partnership, or other entity, as "Principal," is the owner and/or developer of _____ located in the Town of Bremen, Marshall County, State of Indiana; and

WHEREAS the final plat/plans showing the location, construction, and installation of a _____ ("Improvements") have been filed with the _____ for approval and recording, and with the Town Council of the Town of Bremen, Indiana for acceptance of the Improvements, which is incorporated herein and made a part of this instrument by reference;

WHEREAS the Town Council of the Town of Bremen, Indiana is unwilling to accept the Improvements described until certain promises and guarantees of Principal for such maintenance have been made;

WHEREAS Principal desires to make such promises and guarantees as required by the Town Council of the Town of Bremen, Indiana as hereinafter more particularly described;

NOW, THEREFORE, in consideration of the agreement by the Town Council of the Town of Bremen, Indiana to accept the Improvements described, Principal does hereby unconditionally warrant the work and materials of the Improvements to be free from defect and to meet the specifications, standards, and requirements of the Town of Bremen, Indiana for a period of three (3) years from the date of this guarantee. Further, Principal does hereby promise and agree to remedy any such defect or shortcoming within sixty (60) days of discovery. Provided Principal fulfills the requirements of this Guarantee, the commitments, promises, and guarantees of Principal herein stated shall terminate and be of no further force or effect three (3) years from the date of this guarantee.

If Principal fails to fulfill the requirements and obligations of this Guarantee, the Town Council of the Town of Bremen, Indiana shall be entitled to perform or cause to have performed the necessary remedy for the Improvements specified herein to the then standards of the Town of Bremen, and Principal shall pay or cause to be paid to the Town Council of the Town of Bremen, Indiana all costs and expenses, direct and indirect, including proper allowance for administrative time, expenses and effort, and professional services, encountered or incurred by the Town Council of the Town of Bremen, Indiana as a result of the failure of Principal to fulfill the requirements and obligations of this Guarantee, together with all costs of collection of such sums including reasonable attorney fees.

As security for all commitments, promises, agreements, and guarantees of Principal herein made, Principal does hereby pledge, transfer, assign, and set over unto the Town Council of the Town of Bremen a Maintenance Bond in the amount of _____ Dollars ($_____) from a surety company authorized to do business in the State of Indiana, which Maintenance Bond shall be fully payable to the Town Council of the Town of Bremen, Indiana and shall be conditioned upon the full and complete satisfaction by Principal of all commitments and obligations of Principal under this Guaranty.

All provisions hereof to the contrary notwithstanding, Principal shall be responsible and legally obligated to the Town Council of the Town of Bremen, Indiana for any and all costs and expenses, direct and indirect, including proper allowance for administrative time, expenses and effort, and professional services, encountered or incurred by the Town Council of the Town of Bremen, Indiana as a result of the failure of Principal to fulfill this Guarantee, not otherwise satisfied or covered by the Maintenance Bond described above. Additionally, the Town Council of the Town of Bremen, Indiana shall be entitled to payment by Principal of all costs of collection of such sums, including reasonable attorney fees.

All persons executing this Maintenance Guarantee are both individually and jointly responsible for all commitments, promises, representations, and guarantees herein stated. Further,

this Maintenance Guarantee shall be binding upon and shall inure to the benefit of the heirs, representatives, successors and assigns of Principal and the Town Council of the Town of Bremen, Indiana.

Dated this _____ day of _____, 20____.

PRINCIPAL: _____
Signature

_____
Printed Name

Approved and accepted by the Town Council of the Town of Bremen, Indiana this _____ day of _____, 20_____.

By_____

Title_____

ATTEST:

By:_____

Title:_____

CLASSIFICATION	R.O.W.	TRAVEL LANES	CURB	TREE LAWN	SIDE WALK
COLLECTOR	60'	18'	2'	6'	5'
MINOR	50'	12'	2"	6'	5'
ALLEY	16'	12'	2'	–	–

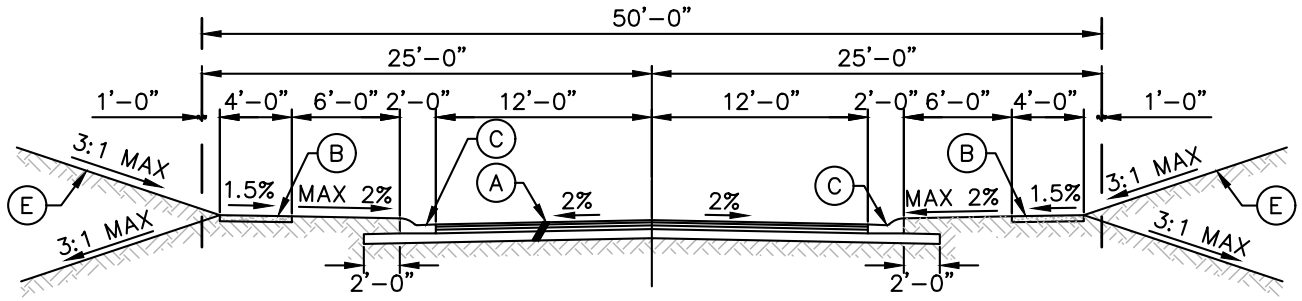
(NOTE – DIMENSIONS ARE MINIMUM)

(A) MAINLINE HMA PAVEMENT
165#/SYD (1 1/2") HMA SURFACE, 9.5mm, TYPE B, ON TACK COAT OVER
220#/SYD (2") HMA INTERMEDIATE, 19.5mm, TYPE B, OVER
330#/SYD (3") HMA BASE, 25.0mm, TYPE B, OVER
6" COMPACTED AGGREGATE, NO. 53 BASE OVER
COMPACTED SUBGRADE

(B) CONCRETE SIDEWALK, 4" THICK, 3,500 PSI CONCRETE

(C) COMBINED CONCRETE CURB & GUTTER, "ROLLED CURB"

(E) MULCHED SEEDING, TYPE 'U' ON TOPSOIL

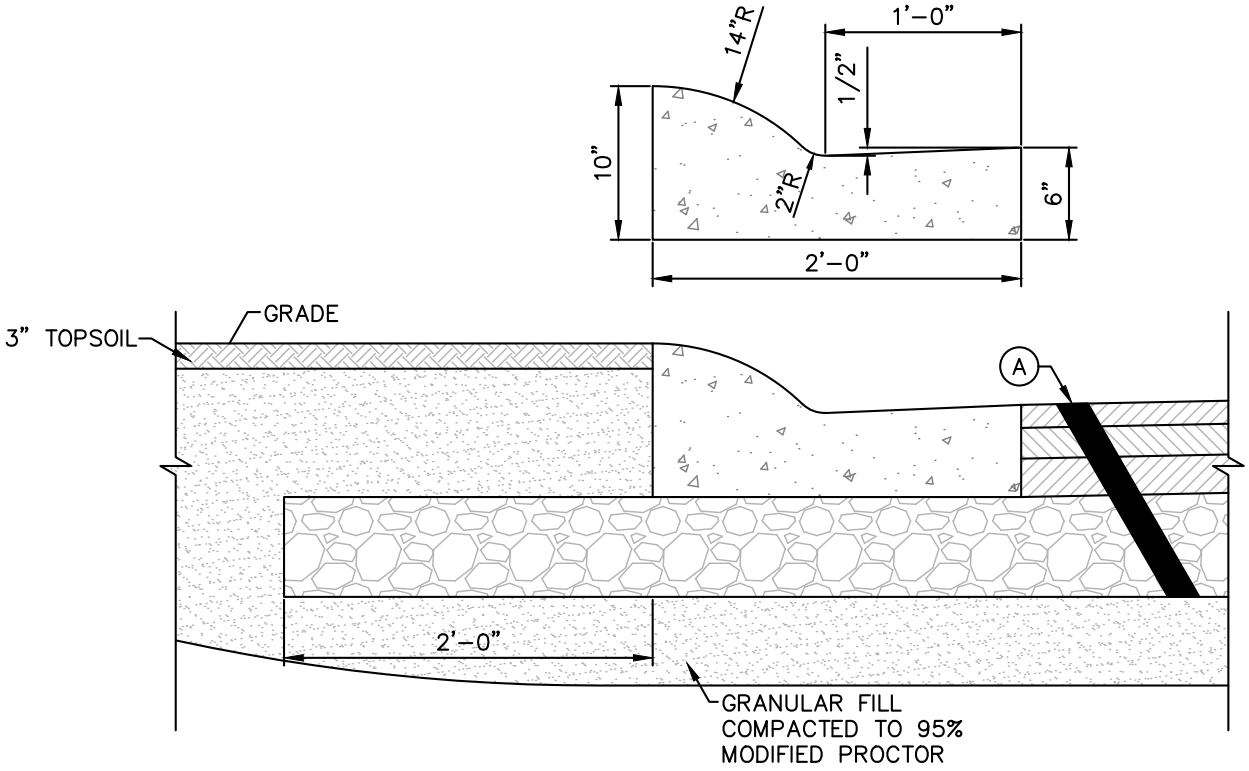


TYPICAL ROADWAY CROSS SECTION – LINE 'A'

SCALE: 3/8" = 1'–0"

NOTES:
SIDEWALK WIDTH SHOWN AS MINIMUM.

FIGURE 2.0



Ⓐ MAINLINE HMA PAVEMENT
165#/SYD (1 1/2") HMA SURFACE, 9.5mm, TYPE B, ON
TACK COAT OVER
220#/SYD (2") HMA INTERMEDIATE, 19.5mm, TYPE B, OVER
330#/SYD (3") HMA BASE, 25.0mm, TYPE B, OVER
6" COMPACTED AGGREGATE, NO. 53 BASE OVER
COMPACTED SUBGRADE

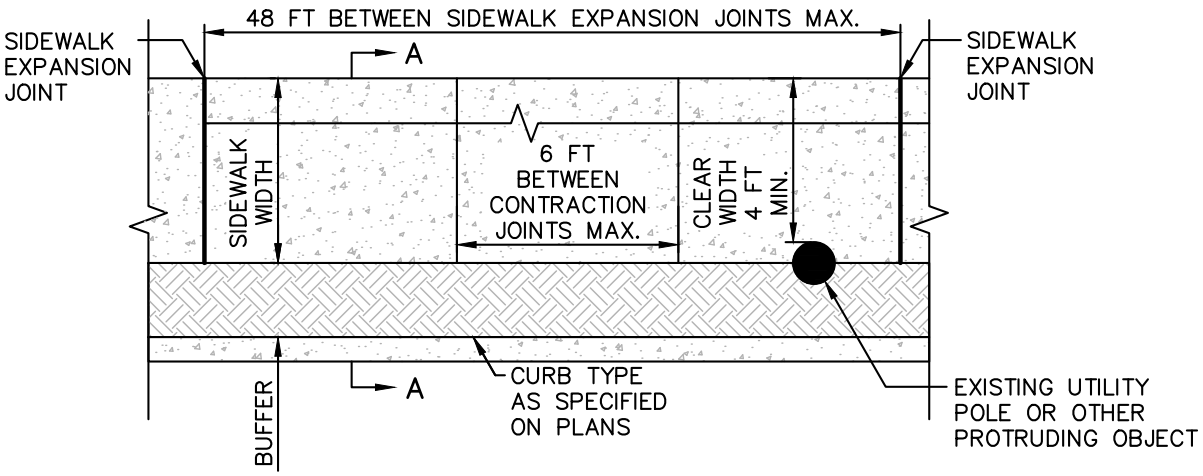
NOTES:
1. ALL CURBS SHALL HAVE EXPANSION JOINTS CONSTRUCTED AT THE BEGINNING AND END OF ALL CURB RETURNS, AT ALL CASTINGS AND AT 100' INTERVALS ALONG STRAIGHT OF WAYS AND AT 20' INTERVALS ALONG RADII. SAWED JOINTS SHALL BE LOCATED AT REGULAR INTERVALS OF 10'

2. CURB AND GUTTER SHALL HAVE A TEXTURED (BROOM) FINISH.

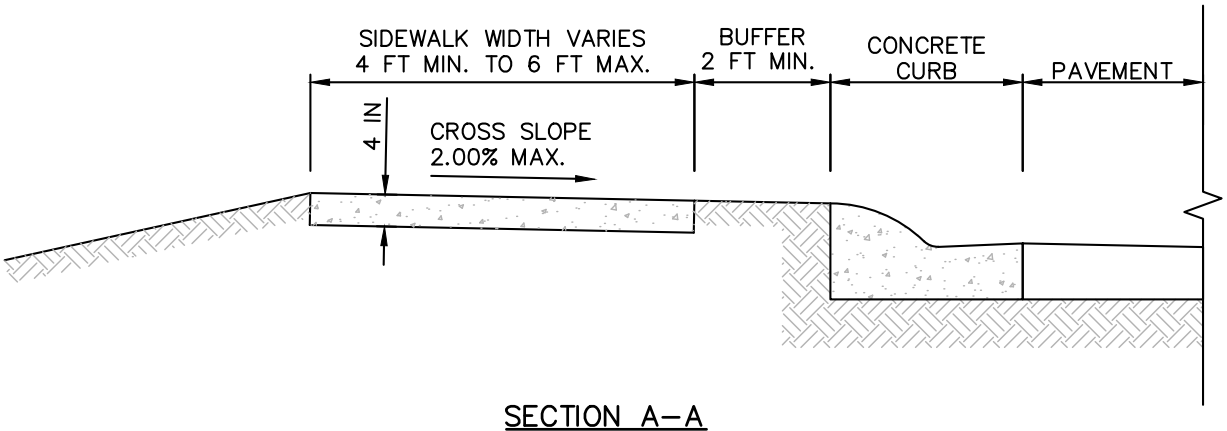
3. CONCRETE SHALL BE CAPABLE OF REACHING 4,000 PSI IN 28 DAYS.

ROLLED CURB & PAVEMENT SECTION

NOT TO SCALE



SIDEWALK PLAN



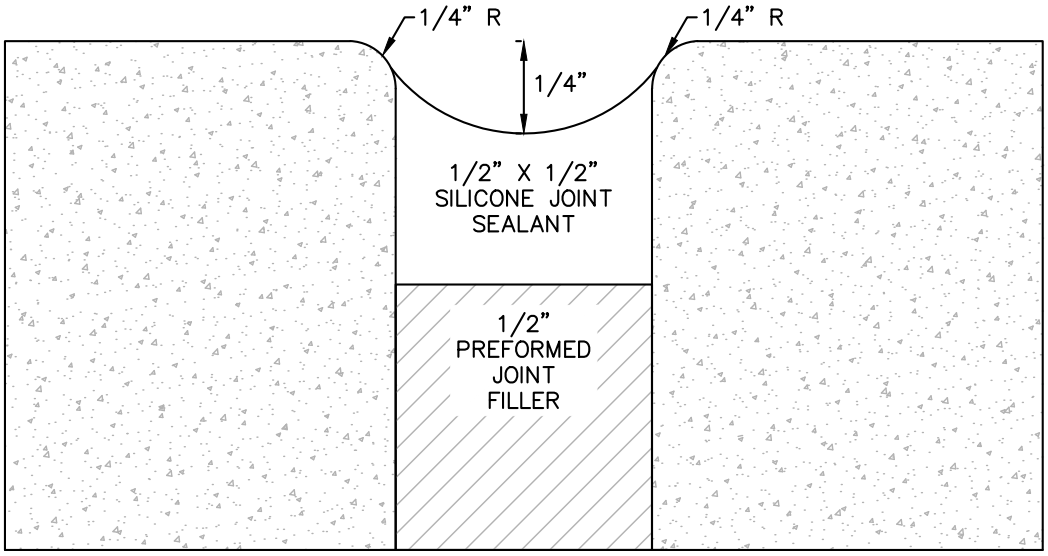
SECTION A–A

SIDEWALK DETAILS

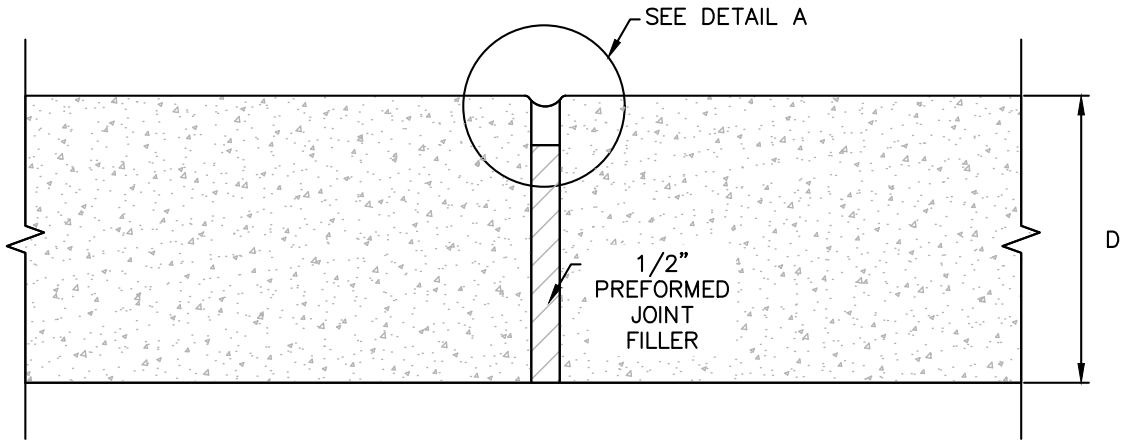
NOT TO SCALE

NOTES:

1. ALL SLOPES ARE ABSOLUTE RATHER THAN RELATIVE TO THE SIDEWALK OR ROADWAY GRADE. SLOPES AT 2.00% TO 1.50% ARE PREFERRED.
2. THE GRADE OF THE SIDEWALK IS MEASURED IN THE DIRECTION OF PEDESTRIAN TRAVEL. THE GRADE OF THE SIDEWALK SHALL NOT EXCEED THE GRADE OF THE ADJACENT ROADWAY. THE CROSS SLOPE IS MEASURED PERPENDICULAR TO THE DIRECTION OF PEDESTRIAN TRAVEL. THE CROSS SLOPE OF THE SIDEWALK SHALL NOT EXCEED 2.00%.
3. WHERE THERE IS A 2 FT MINIMUM BUFFER BETWEEN THE SIDEWALK AND CURB, THE PREFERRED MINIMUM SIDEWALK CLEAR WIDTH IS 5 FT.
4. WHERE THERE IS NO BUFFER BETWEEN THE SIDEWALK AND CURB, THE PREFERRED MINIMUM SIDEWALK WIDTH IS 6 FT.
5. A 4 FT MINIMUM CLEAR WIDTH SHALL BE PROVIDED ADJACENT TO STREET FURNITURE, MAILBOX, UTILITY POLE, OR OTHER PROTRUDING OBJECT. WHERE THE SIDEWALK CLEAR WIDTH IS LESS THAN 5 FT, A PASSING SPACE 5 FT X 5 FT SHALL BE PROVIDED AT 200 FT INTERVALS.
6. BUFFER MATERIAL SHALL MATCH EXISTING OR PROPOSED MATERIAL AS DIRECTED BY THE TOWN.
7. SEE TOWN STANDARD FIGURE 2.3 FOR SIDEWALK EXPANSION JOINT DETAILS.



DETAIL A

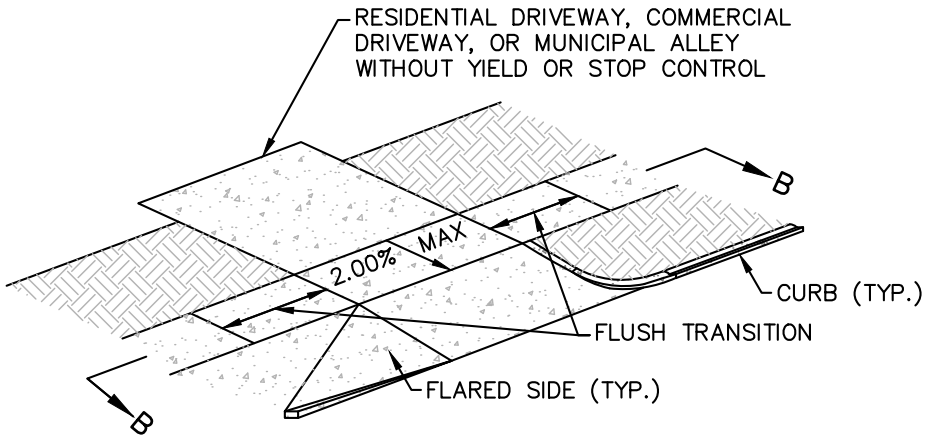


SIDEWALK EXPANSION JOINT

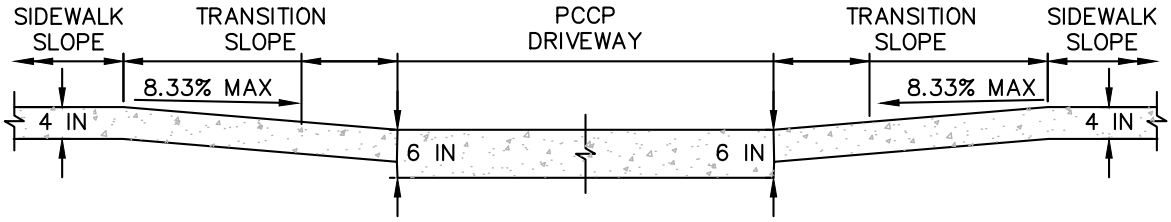
NOT TO SCALE

NOTES:

1. DIMENSION D IS EQUAL TO THE FULL DEPTH OF THE SIDEWALK OR CURB RAMP.



SIDEWALK CROSSING



SECTION B–B SIDEWALK
ELEVATION TRANSITION

SIDEWALK TRANSITION APPROACH

NOT TO SCALE

NOTES:

1. ALL SLOPES ARE ABSOLUTE RATHER THAN RELATIVE TO THE SIDEWALK OR ROADWAY GRADE. SLOPES AT 2.00% TO 1.50% ARE PREFERRED.
2. THE SIDEWALK TRANSITION AT APPROACH SHALL ONLY BE USED ON A SIDEWALK AT A RESIDENTIAL DRIVEWAY, COMMERCIAL DRIVEWAY, OR MUNICIPAL ALLEY WITHOUT YIELD OR STOP CONTROL. A CURB RAMP SHALL BE USED AT ALL OTHER CROSSINGS.
3. WHERE A SIDEWALK TRANSITION IS USED TO LOWER OR RAISE THE SIDEWALK TO CONNECT WITH A RESIDENTIAL DRIVEWAY, COMMERCIAL DRIVEWAY, OR MUNICIPAL ALLEY WITHOUT YIELD OR STOP CONTROL, THE RUNNING SLOPE OF THE TRANSITION SHALL BE 8.33% MAXIMUM.
4. THE GRADE OF THE SIDEWALK ACROSS THE DRIVEWAY SHALL NOT EXCEED THE GRADE OF THE ADJACENT ROADWAY.
5. THE AREA BETWEEN THE DRIVEWAY AND A FLARED SIDE OF SIDEWALK TRANSITION SHALL MATCH THE DRIVEWAY PROFILE AND TRANSVERSE SLOPE.
6. A TURNING SPACE IS NOT REQUIRED AT THE TOP OF A SIDEWALK TRANSITION.
7. OBJECTS SUCH AS A UTILITY CASTING, VAULT FRAME, AND GRATING SHALL BE PLACED OUTSIDE A SIDEWALK TRANSITION.
8. A DETECTABLE WARNING SURFACE SHALL NOT BE PLACED AT THE CROSSINGS OF A RESIDENTIAL DRIVEWAY. A DETECTABLE WARNING SURFACE MAY BE PLACED AT THE CROSSING OF A COMMERCIAL DRIVEWAY OR MUNICIPAL ALLEY WITHOUT YIELD OR STOP CONTROL. REFER TO PLAN.
9. SIDEWALK WITHIN DRIVEWAY LIMITS SHALL BE 6–IN PCCP 4000 PSI FIBER REINFORCED OVER 6–IN COMPACTED AGGREGATE OVER COMPACTED SUBGRADE.

ADA CURB RAMP NOTES:

1. ALL SLOPES ARE ABSOLUTE RATHER THAN RELATIVE TO THE SIDEWALK OR ROADWAY GRADE. SLOPES AT 2.00% TO 1.50% ARE PREFERRED.

2. A RAMP OR BLENDED TRANSITION SHALL BE USED TO LOWER OR RAISE THE SIDEWALK TO CONNECT WITH THE STREET OR HIGHWAY.

3. A TURNING SPACE SHALL BE PROVIDED AT THE TOP OF A PERPENDICULAR RAMP, BOTTOM OF A PARALLEL RAMP, OR WHERE THE PEDESTRIAN TRAVEL REQUIRES A CHANGE IN DIRECTION. A COMMON TURNING SPACE MAY BE SHARED BY ADJACENT RAMPS. THE TURNING SPACE SHALL HAVE A MINIMUM CLEAR DIMENSION OF 4 FT X 4 FT. WHERE THE TURNING SPACE IS CONSTRAINED AT THE BACK OF THE SIDEWALK BY A CURB, RETAINING WALL, BUILDING, OR FEATURE OVER 2 INCHES IN HEIGHT, THE MINIMUM CLEAR DIMENSION SHALL BE 4 FT X 5 FT, WITH THE 5–FT DIMENSION IN THE DIRECTION OF THE RAMP RUNNING SLOPE.

4. A FLARED SIDE SHALL BE USED ADJACENT TO A WALKABLE SURFACE. A FLARED SIDE MAY BE USED ADJACENT TO A NON–WALKABLE SURFACE. A FLARED SIDE SHALL HAVE A MAXIMUM SLOPE OF 10.00% MEASURED PARALLEL TO THE BACK OF THE CURB.

5. A RETURN CURB IS PLACED PERPENDICULAR TO THE ROADWAY CURB. A RETURN CURB MAY BE USED ADJACENT TO A NON–WALKABLE SURFACE. A RETURN CURB SHALL NOT BE USED ADJACENT TO A WALKABLE SURFACE.

6. A CLEAR SPACE SHALL BE PROVIDED BEYOND THE BOTTOM GRADE BREAK OF A CURB RAMP WHOLLY CONTAINED WITHIN THE CROSSWALK AND WHOLLY OUTSIDE THE PARALLEL VEHICULAR TRAVEL PATH. THE CLEAR SPACE SHALL HAVE A MINIMUM CLEAR DIMENSION OF 4 FT X 4 FT.

7. A DETECTABLE WARNING SURFACE SHALL CONSIST OF TRUNCATED DOMES AND BE PLACED AT EACH STREET, HIGHWAY, OR RAILROAD CROSSING. THE DETECTABLE WARNING SURFACE SHALL EXTEND A MINIMUM OF 2 FT IN THE DIRECTION OF PEDESTRIAN TRAVEL AND BE PLACED THE ENTIRE WIDTH OF A RAMP, BLENDED TRANSITION, OR TURNING SPACE.

8. THE RUNNING SLOPE OF A RAMP, BLENDED TRANSITION, OR TURNING SPACE SHALL BE MEASURED PARALLEL TO THE DIRECTION OF PEDESTRIAN TRAVEL.
   A. RUNNING SLOPE OF 2.00% TO 1.00% IS CONSIDERED LEVEL.
   B. A RUNNING SLOPE AT LEAST 1.00% IS REQUIRED TO MAINTAIN ADEQUATE DRAINAGE.
   C. A RAMP SHALL HAVE A MAXIMUM RUNNING SLOPE OF 8.33% BUT SHALL NOT REQUIRE A RAMP LENGTH TO EXCEED 15 FT.
   D. A BLENDED TRANSITION SHALL HAVE A MAXIMUM RUNNING SLOPE OF 5.00%.
   E. A TURNING SPACE SHALL HAVE A MAXIMUM RUNNING SLOPE OF 2.00%.

9. UNLESS OTHERWISE NOTED, MINIMUM WIDTH OF A RAMP, BLENDED TRANSITION, OR TURNING SPACE, EXCLUDING FLARED SIDES OR RETURN CURB, SHALL BE 4 FT.

10. A GRADE BREAK AT THE TOP AND BOTTOM OF A RAMP, BLENDED TRANSITION, OR TURNING SPACE SHALL BE PERPENDICULAR TO THE RUNNING SLOPE. GRADE BREAKS SHALL NOT BE WITHIN THE RAMP, BLENDED TRANSITION, TURNING SPACE, OR DETECTABLE WARNING SURFACE. GRADE BREAKS SHALL BE FLUSH. VERTICAL DISCONTINUITIES SHALL NOT BE GREATER THAN 1/2 IN. WHERE A DISCONTINUITY IS GREATER THAN 1/4 IN. THE SURFACE SHALL BE BEVELED WITH A SLOPE NOT STEEPER THAN 1V:2H.

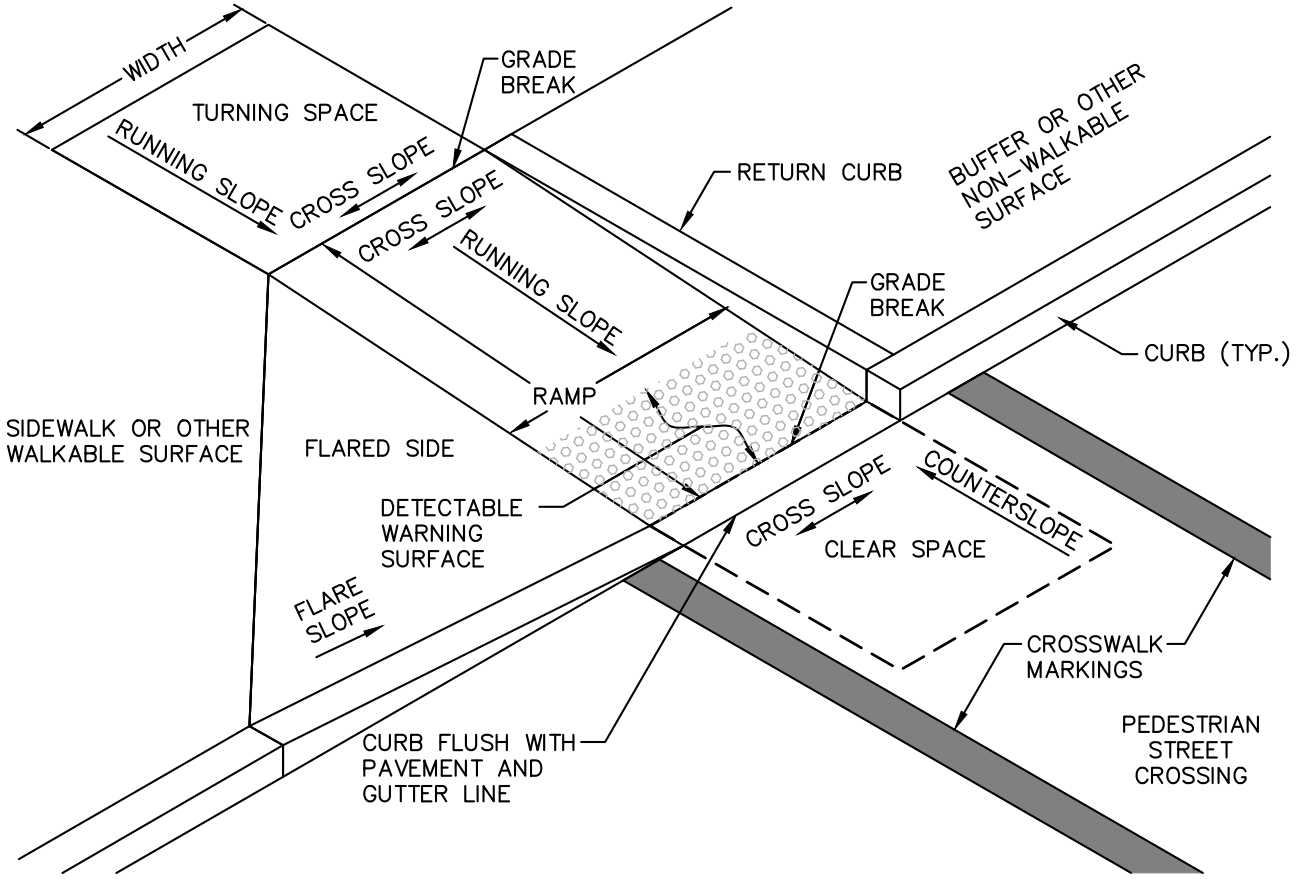
11. CROSS SLOPE EXCEPTIONS. THE CROSS SLOPE OF A RAMP, BLENDED TRANSITION, OR TURNING SPACE SHALL BE MEASURED PERPENDICULAR TO THE DIRECTION OF PEDESTRIAN TRAVEL.
   A. THE MAXIMUM CROSS SLOPE AT A PEDESTRIAN STREET CROSSING WITHOUT YIELD OR STOP CONTROL SHALL BE 5.00%.
   B. THE MAXIMUM CROSS SLOPE AT A PEDESTRIAN STREET CROSSING WITH YIELD OR STOP CONTROL SHALL BE 2.00%.
   C. THE MAXIMUM CROSS SLOPE AT A MIDBLOCK CROSSING SHALL BE THE ESTABLISHED GRADE OF THE ADJACENT ROADWAY.

12. A COUNTERSLOPE IS THE CROSS SLOPE OF THE GUTTER OR STREET ADJACENT THE RUNNING SLOPE OF THE RAMP, BLENDED TRANSITION, OR TURNING SPACE.

13. OBJECTS SUCH AS A UTILITY CASTING, VAULT FRAME, AND GRATING SHALL BE PLACED OUTSIDE THE CURB RAMP.

14. CURB RAMPS SHALL BE PLACED WITHIN THE MARKED CROSSWALK AREA.

15. DRAINAGE INLETS SHOULD BE LOCATED UPHILL FROM A CURB RAMP TO PREVENT PONDING IN THE PATH OF PEDESTRIAN TRAVEL.



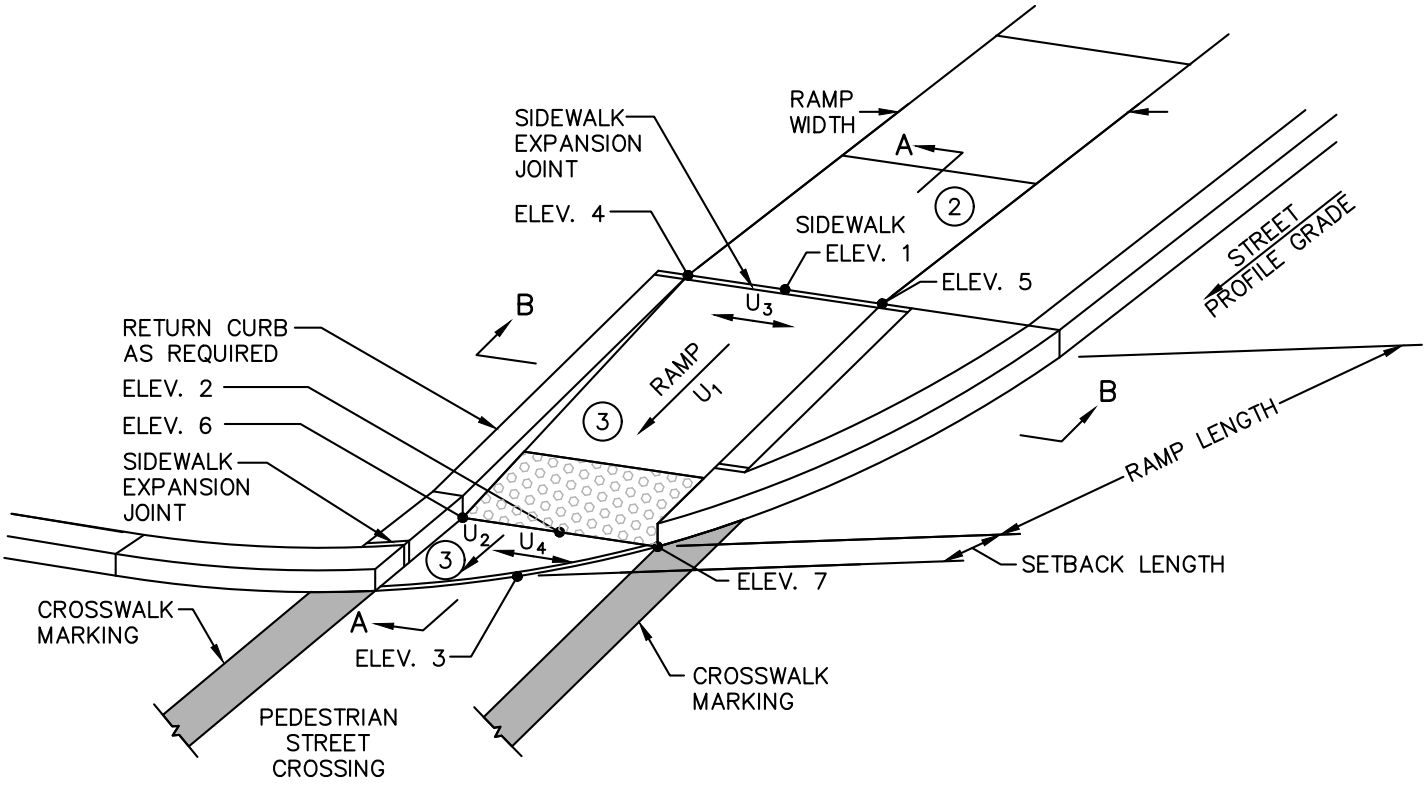
ADA CURB RAMP DETAILS

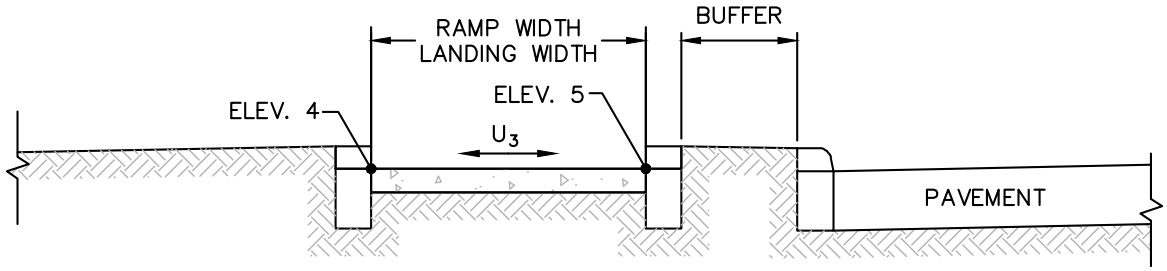
NOT TO SCALE

NOTES:

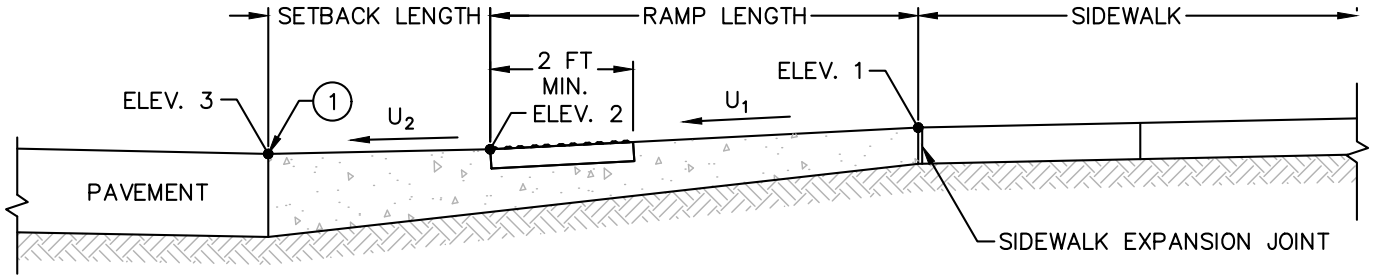
1. SEE FIGURE 2.5 FOR ADA CURB RAMP NOTES.

FIGURE 2.6





SECTION B–B



SECTION A–A

DIRECTIONAL PERPENDICULAR CURB RAMP COMPONENT DETAILS

NOT TO SCALE

NOTES:

1. SEE FIGURE 2.8 FOR DIRECTIONAL PERPENDICULAR CURB RAMP COMPONENT NOTES.

FIGURE 2.7

COMPONENT SLOPE EQUATIONS:

RAMP U_1 RUNNING SLOPE	=	$\frac{\lvert \text{ELEV. 1} - \text{ELEV. 2} \rvert}{\text{RAMP LENGTH}}$	≤	8.33%
SETBACK U_2 RUNNING SLOPE	=	$\frac{\lvert \text{ELEV. 2} - \text{ELEV. 3} \rvert}{\text{SETBACK LENGTH}}$	≤	PROFILE GRADE OF ADJACENT STREET
RAMP U_3 CROSS SLOPE	=	$\frac{\lvert \text{ELEV. 4} - \text{ELEV. 5} \rvert}{\text{RAMP WIDTH}}$	≤	2.00% (4)
SETBACK U_4 CROSS SLOPE	=	$\frac{\lvert \text{ELEV. 6} - \text{ELEV. 7} \rvert}{\text{RAMP WIDTH}}$	≤	2.00% (4)

DIRECTIONAL PERPENDICULAR CURB RAMP COMPONENT NOTES

NOTES:

(1) THE BOTTOM EDGE OF THE RAMP OR SETBACK AND TOP OF CURB SHALL BE FLUSH WITH THE EDGE OF ADJACENT PAVEMENT AND GUTTER LINE.

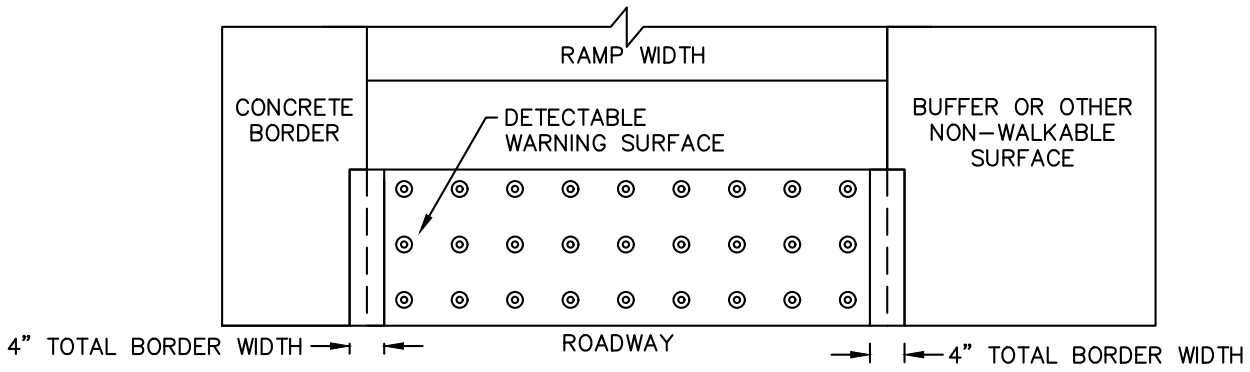
(2) A TURNING SPACE IS NOT REQUIRED AT THE TOP OF THE RAMP FOR A ONE-WAY DIRECTIONAL PERPENDICULAR CURB RAMP.

(3) CURB RAMP SURFACE SHALL BE COARSE BROOMED TRANSVERSE TO THE RUNNING SLOPE.

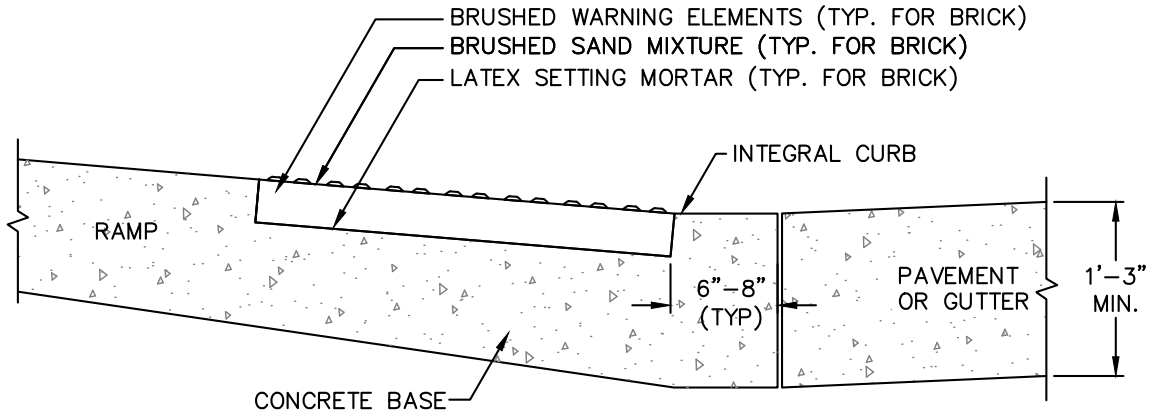
(4) SEE FIGURE 2.5 FOR CROSS SLOPE EXCEPTIONS.

5. SEE FIGURES 2.9 AND 2.10 FOR DETECTABLE WARNING SURFACE PLACEMENT, CONFIGURATION, AND DETAILS.

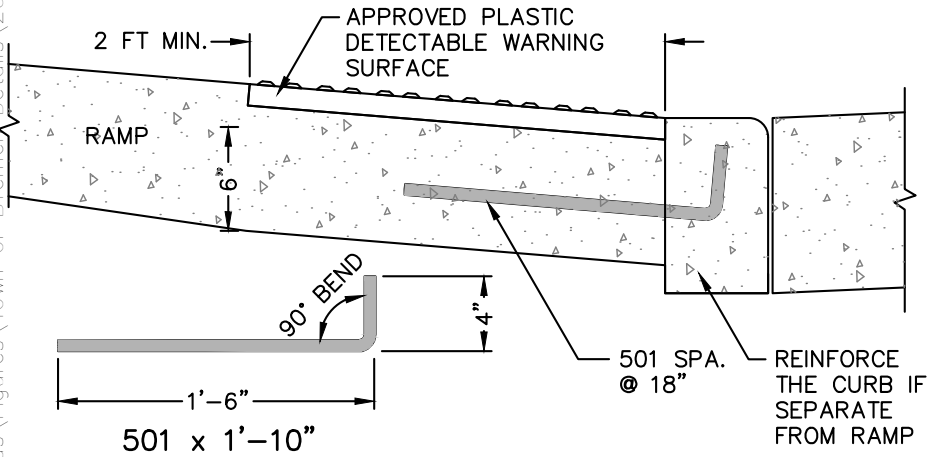
6. SEE FIGURE 2.3 FOR SIDEWALK EXPANSION JOINT DETAILS.



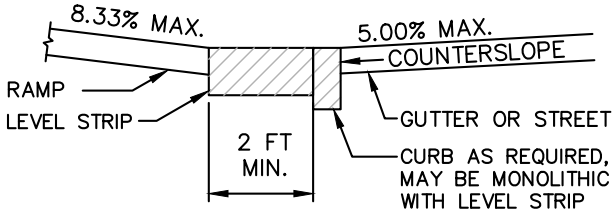
DETECTABLE WARNING SURFACE WITH CONCRETE BORDER



TYPICAL RAMP AND SURFACE CONSTRUCTION DETAIL



ALTERNATE CURB CONSTRUCTION



CHANGE OF GRADE > 11%

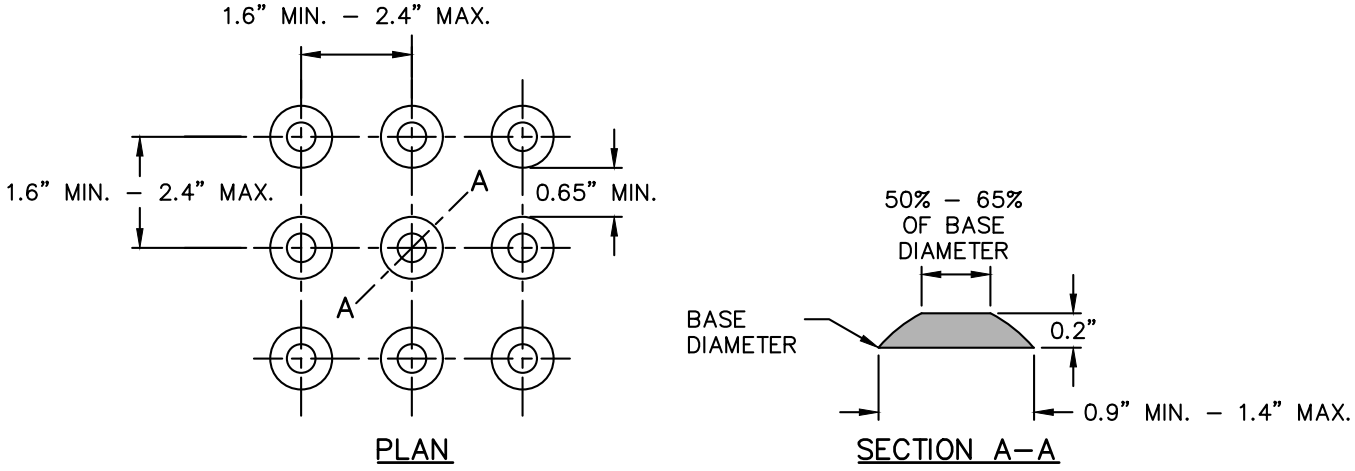
DETECTABLE WARNING SURFACE DETAILS

NOT TO SCALE

NOTES:

1. SEE FIGURE 2.10 FOR DETECTABLE WARNING SURFACE NOTES.

FIGURE 2.9



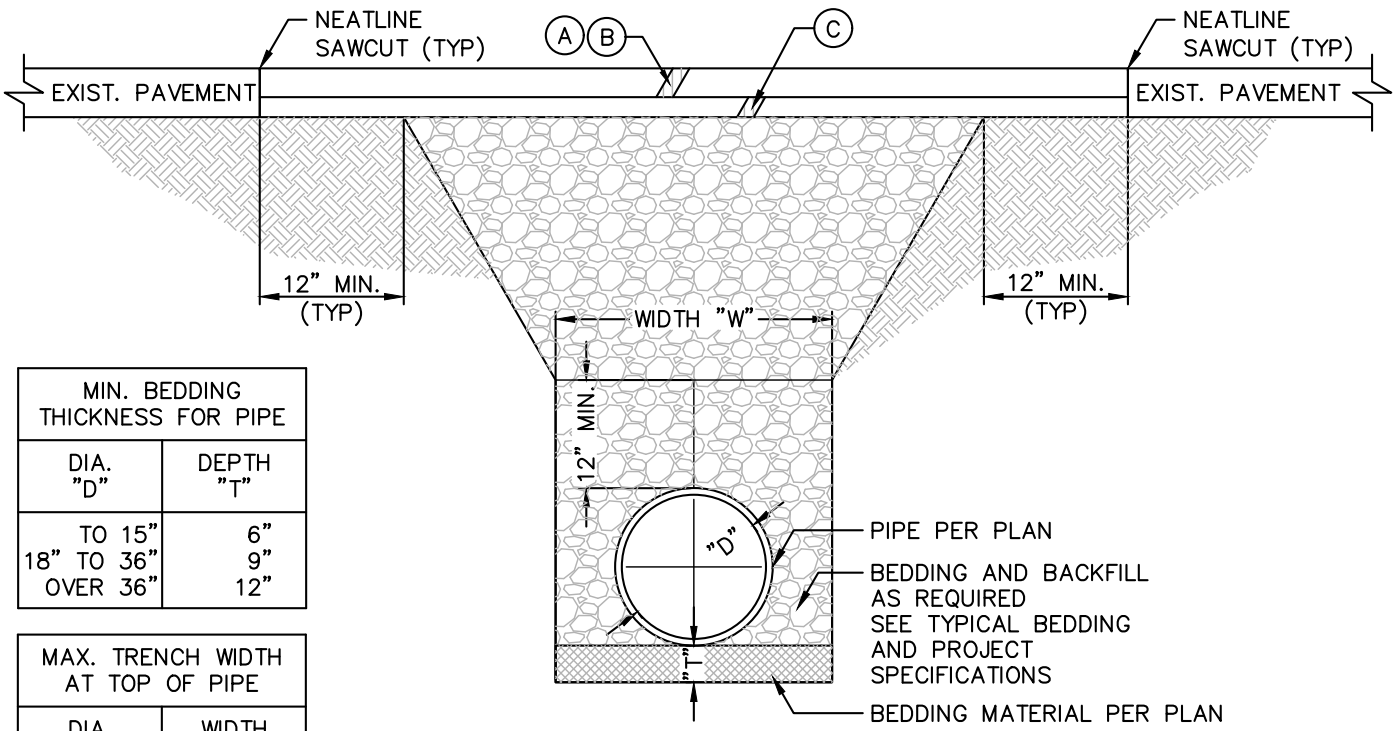
TRUNCATED DOMES

NOT TO SCALE

DETECTABLE WARNING SURFACE NOTES

NOTES:

1. SEE FIGURE DETECTABLE WARNING SURFACE MATERIAL SHALL BE MADE OF TOWN APPROVED PLASTIC AS AN ACCEPTABLE ALTERNATIVE TO BRICK.
2. DETECTABLE WARNING SURFACE SHALL CONSIST OF TRUNCATED DOMES. DOMES SHALL BE ALIGNED IN A SQUARE OR RADIAL GRID PATTERN. WHERE TRUNCATED DOMES ARE ARRAYED RADIALLY, THEY MAY DIFFER IN DIAMETER AND CENTER–TO–CENTER SPACING WITHIN THE RANGES SPECIFIED.
3. THE DETECTABLE WARNING SURFACE SHALL BE MANUFACTURED TO FIT THE RADII. FIELD CUTTING SHALL NOT ALTER THE TRUNCATED DOME SPACING BETWEEN THE ADJACENT PANELS OUTSIDE OF THE ALLOWABLE RANGE.
4. THE DETECTABLE WARNING SURFACE SHALL CONTRAST VISUALLY WITH ADJACENT SURFACES, EITHER LIGHT–ON–DARK OR DARK–ON–LIGHT.
5. THE DETECTABLE WARNING SURFACE SHALL EXTEND A MINIMUM OF 2 FT IN THE DIRECTION OF PEDESTRIAN TRAVEL AND EXTEND THE FULL WIDTH AS SHOWN. THE DETECTABLE WARNING SURFACE SHALL NOT BE PLACED ACROSS A GRADE BREAK.
6. THE MAXIMUM COUNTERSLOPE OF THE GUTTER OR STREET AT THE BOTTOM OF THE RAMP SHALL BE 5.00%. WHERE THE ALGEBRAIC DIFFERENCE BETWEEN THE RUNNING SLOPE AND THE COUNTERSLOPE EXCEEDS 11%, A 2 FT MINIMUM LEVEL STRIP SHOULD BE PROVIDED AT THE BOTTOM OF THE RAMP.
7. WHERE CONCRETE BORDER IS USED FOR FORMING, THE BORDER SHALL BE CAST MONOLITHICALLY WITH THE CURB RAMP CONCRETE. THE CONCRETE BORDER SHALL NOT EXCEED 2 IN WITHIN THE RAMP WIDTH.
8. WHERE FORMING OTHER THAN A CONCRETE BORDER IS USED, THE EDGE RESTRAINT SHALL NOT ENCROACH UPON THE RAMP WIDTH.



MIN. BEDDING THICKNESS FOR PIPE	
DIA. "D"	DEPTH "T"
TO 15"	6"
18" TO 36"	9"
OVER 36"	12"

MAX. TRENCH WIDTH AT TOP OF PIPE	
DIA. "D"	WIDTH "W"
6"	18"
8"	24"
10"	24"
12"	30"
15"	36"
18"	39"
21"	42"
24"	45"
27"	48"
30"	53"
36"	66"
42"	75"
48"	82"

LEGEND

(A)(B)(C) REFER TO PLANS FOR ASPHALT ROADWAY AND DRIVEWAY RESTORATION REQUIREMENTS

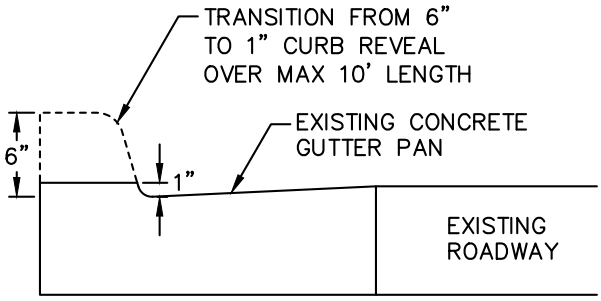
PAVEMENT, CUTTING & RESTORATION DETAIL

NOT TO SCALE

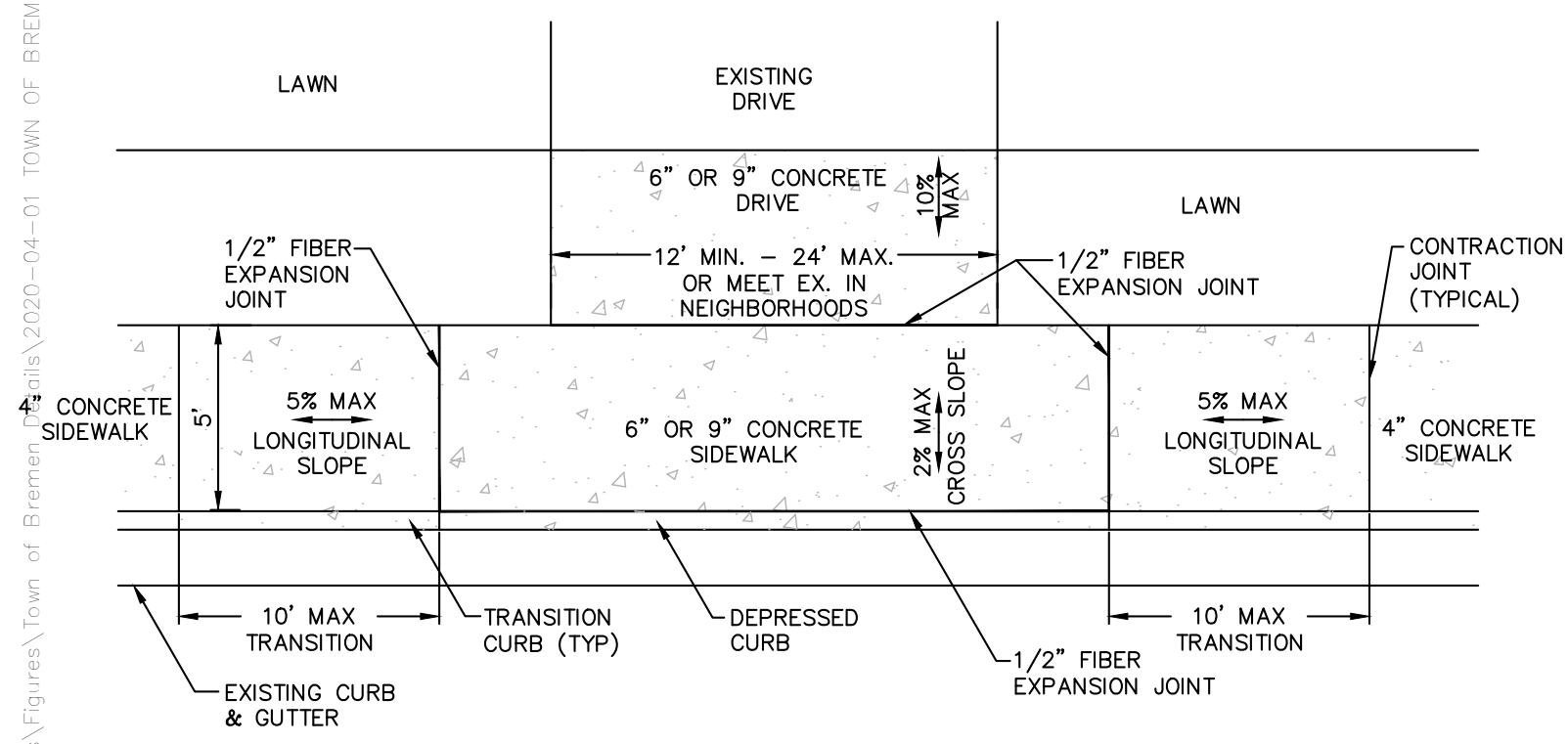
NOTES:

1. PAVEMENT CUTS FOR PIPE INSTALLATION SHALL BE PERPENDICULAR TO THE ROAD SURFACE.
2. PAVEMENT CUTS FOR PIPE INSTALLATION SHALL EXTEND TO THE CENTERLINE OF ROADWAY.
3. PAVEMENT SECTION SHALL BE AS SPECIFIED.

FIGURE 2.11



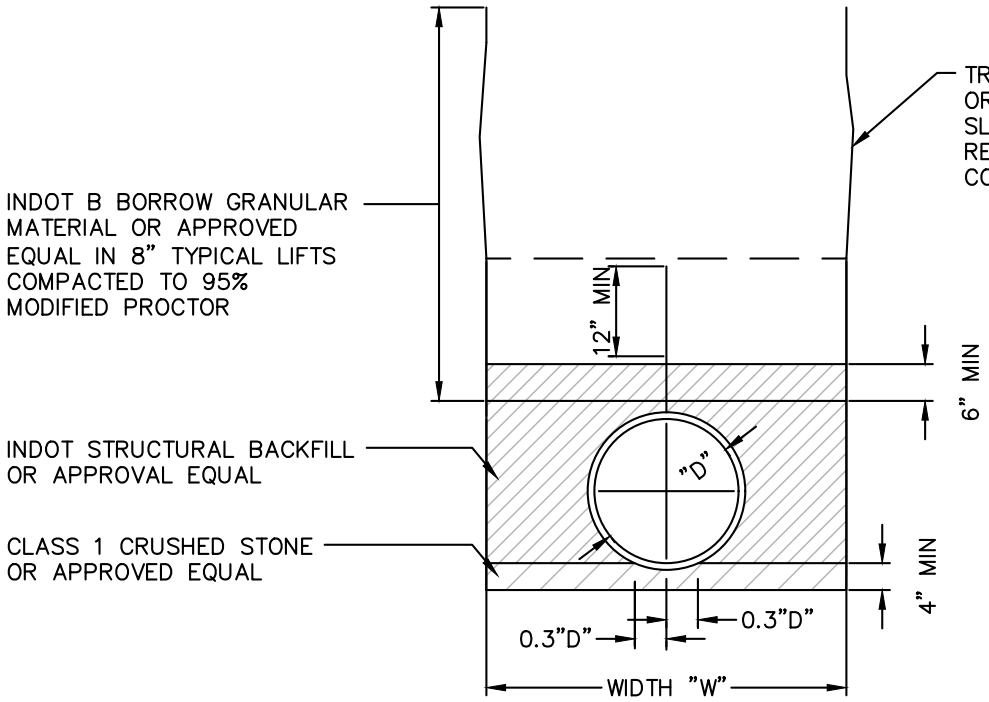
CURB CROSS SECTION



DRIVEWAY CONSTRUCTION

FIGURE 2.12

NOTE:
ALL PVC PIPE SHALL BE INSTALLED FOLLOWING THE ASTM STANDARD PRACTICE D 2321-89.



HDPE OR PVC PIPE

MIN THICKNESS "T"	
TO 15"	6"
18" TO 36"	9"
OVER 36"	12"

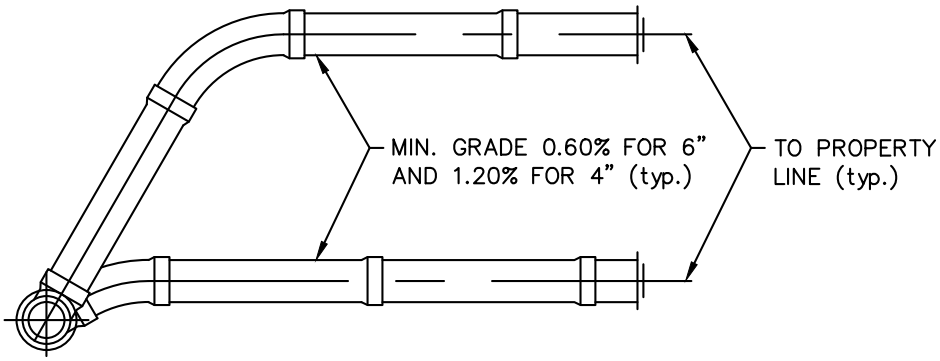
MAX TRENCH WIDTH AT TOP OF PIPE	
DIA "D"	WIDTH "W"
6"	18"
8"	24"
10"	24"
12"	30"
15"	36"
18"	39"
21"	42"
24"	45"
27"	48"
30"	53"
36"	66"
42"	75"
48"	82"

NOTE:
PIPE SHALL BE FIRMLY BEDDED ON UNDISTURBED SOIL AS SHOWN IN SECTION. IN THE EVENT THE SOIL CANNOT BE SHAPED, OR THE CONTRACTOR PREFERS, THE TRENCH SHALL BE EXCAVATED TO A GREATER DEPTH AND BACK FILLED WITH SELECTED FILL AND COMPACTED AS SHOWN IN RIGHT SECTION. IN ALL CASES, BELL HOLES SHALL BE PROVIDED SO THAT THE BELL SUPPORTS NO WEIGHT.

TYPICAL TRENCH, STORM & SANITARY SEWER PIPE LAYING & BEDDING

NOT TO SCALE

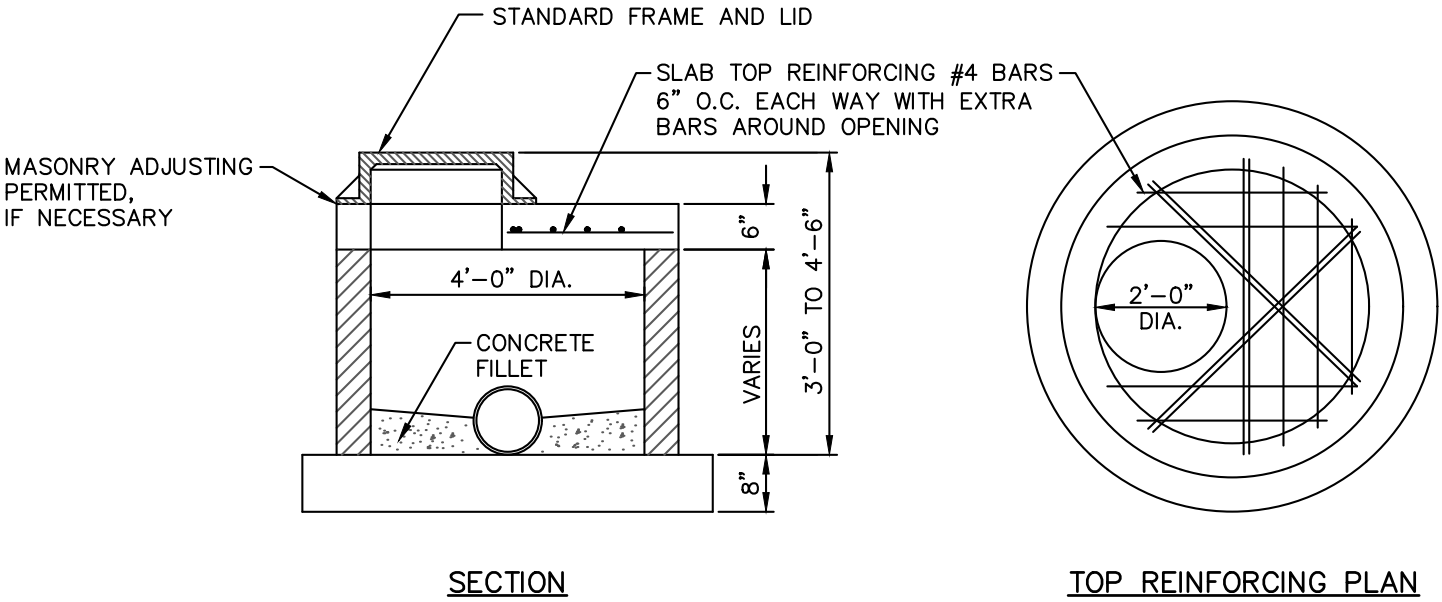
FIGURE 3.1



SERVICE CONNECTIONS TYPICAL CONSTRUCTION DETAIL

NOT TO SCALE

FIGURE 3.2

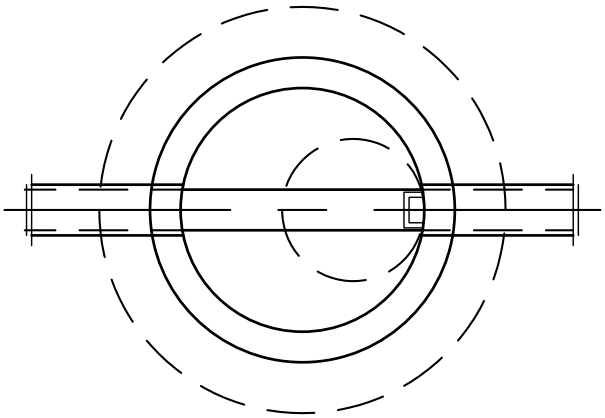


STANDARD MANHOLE 3'-0" TO 4'-6" DEPTH DETAIL

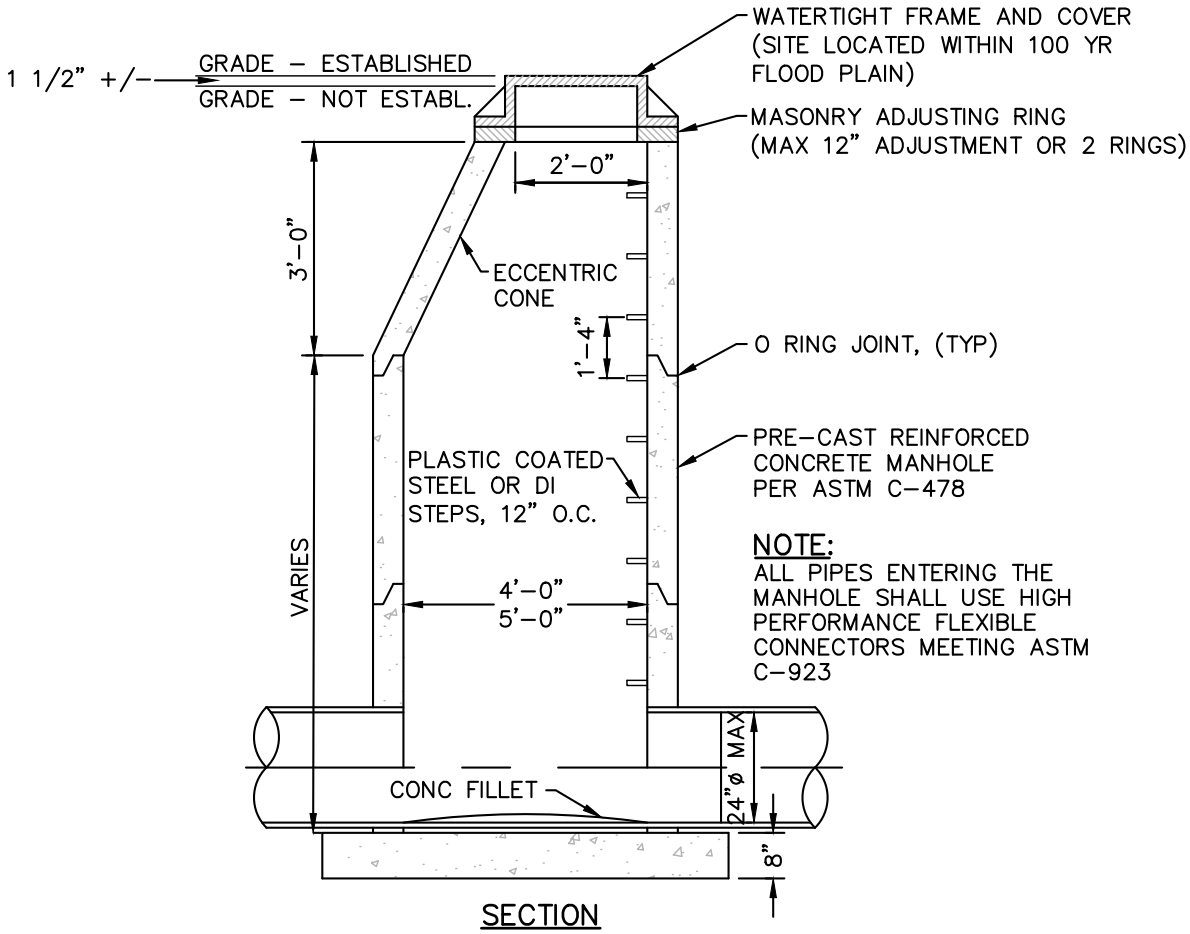
NOT TO SCALE

FIGURE 3.3

TOWN OF BREMEN DETAILS



PLAN



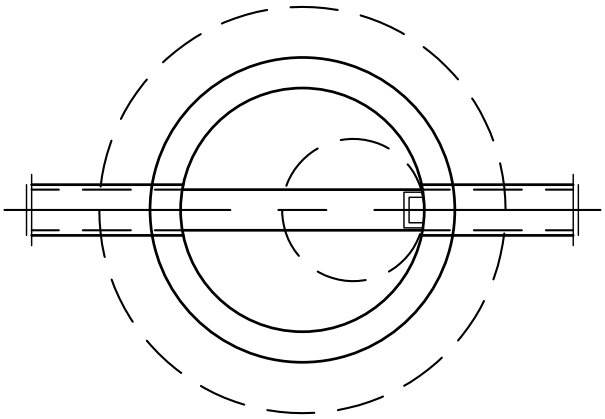
SECTION

STANDARD PRE-CAST MANHOLE

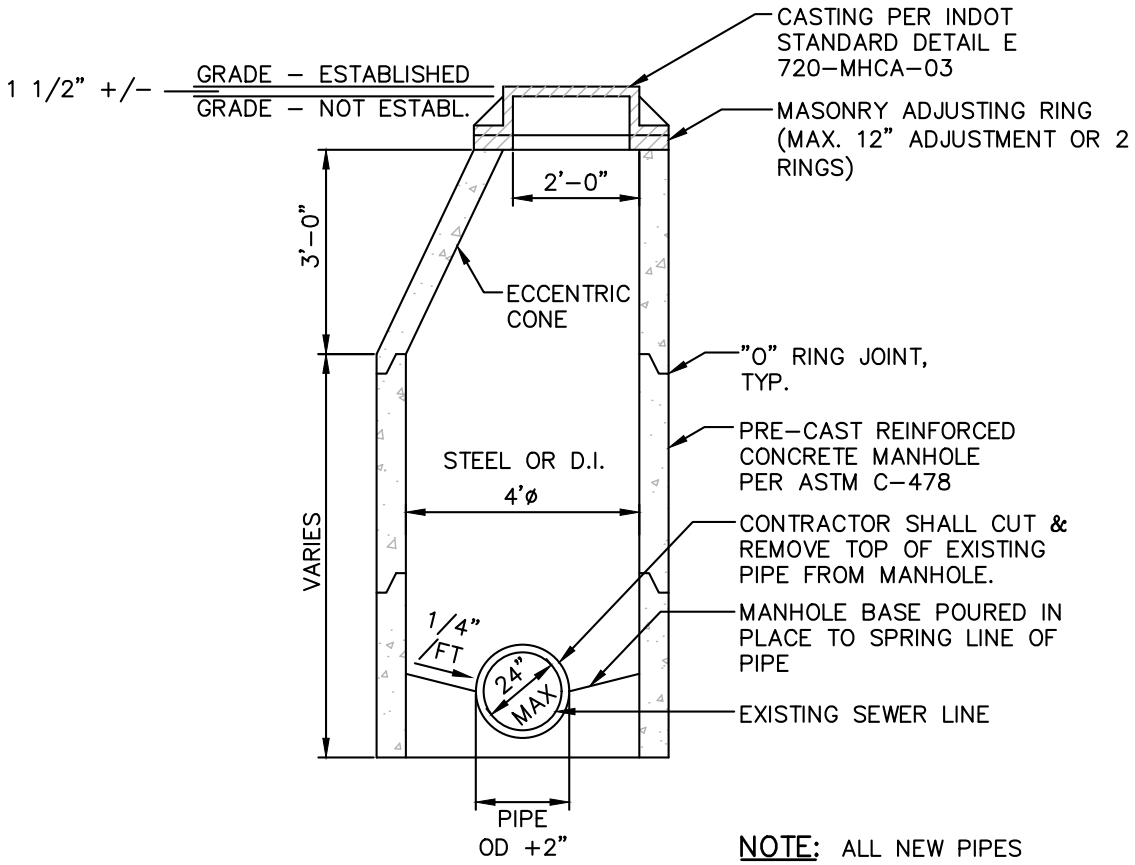
NOT TO SCALE

FIGURE 3.4

TOWN OF BREMEN DETAILS



PLAN



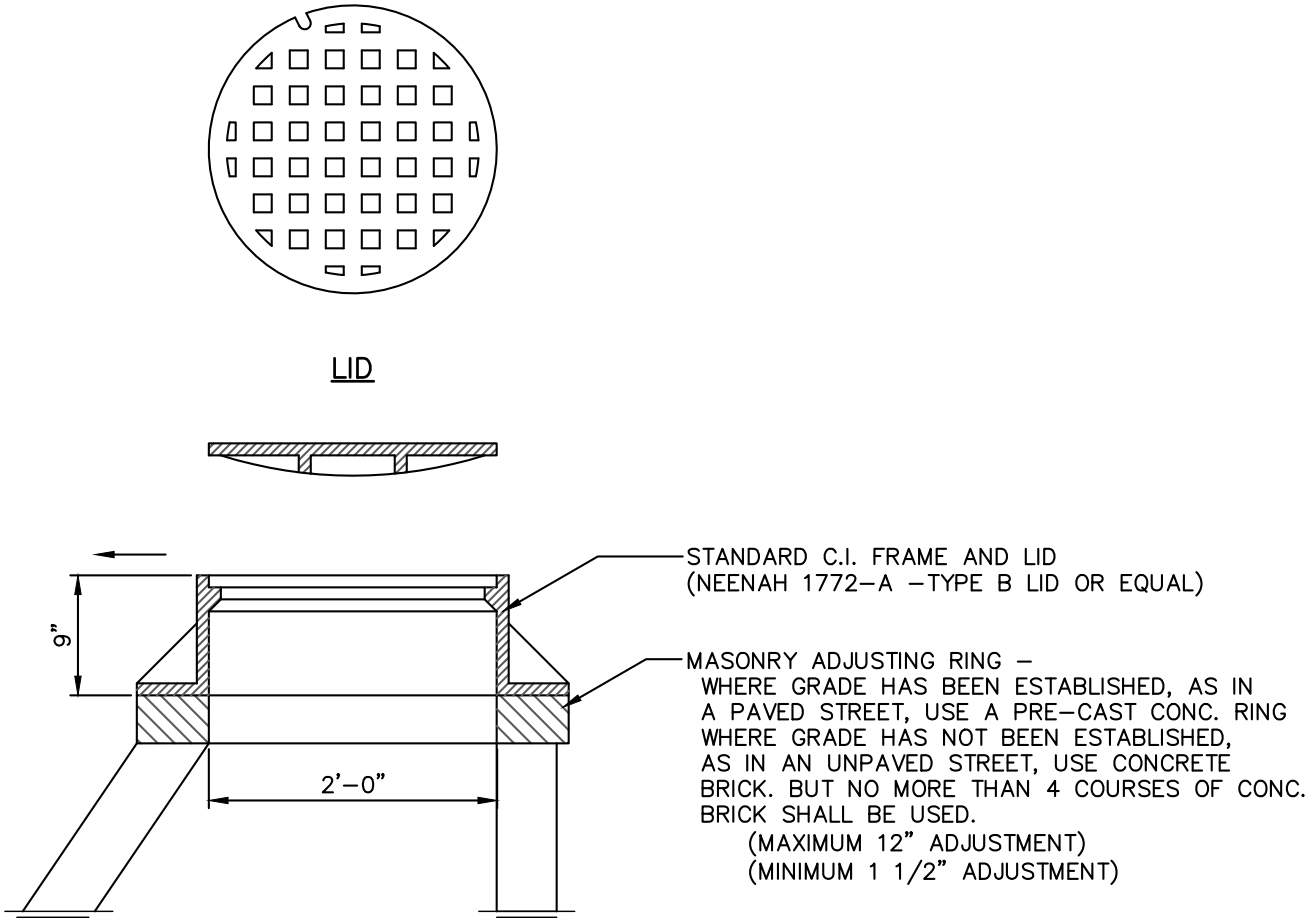
SECTION

NOTE: ALL NEW PIPES ENTERING THE MANHOLE SHALL USE HIGH PERFORMANCE FLEXIBLE CONNECTORS MEETING ASTM C–923

PRE–CAST DOG HOUSE STRUCTURE

NOT TO SCALE

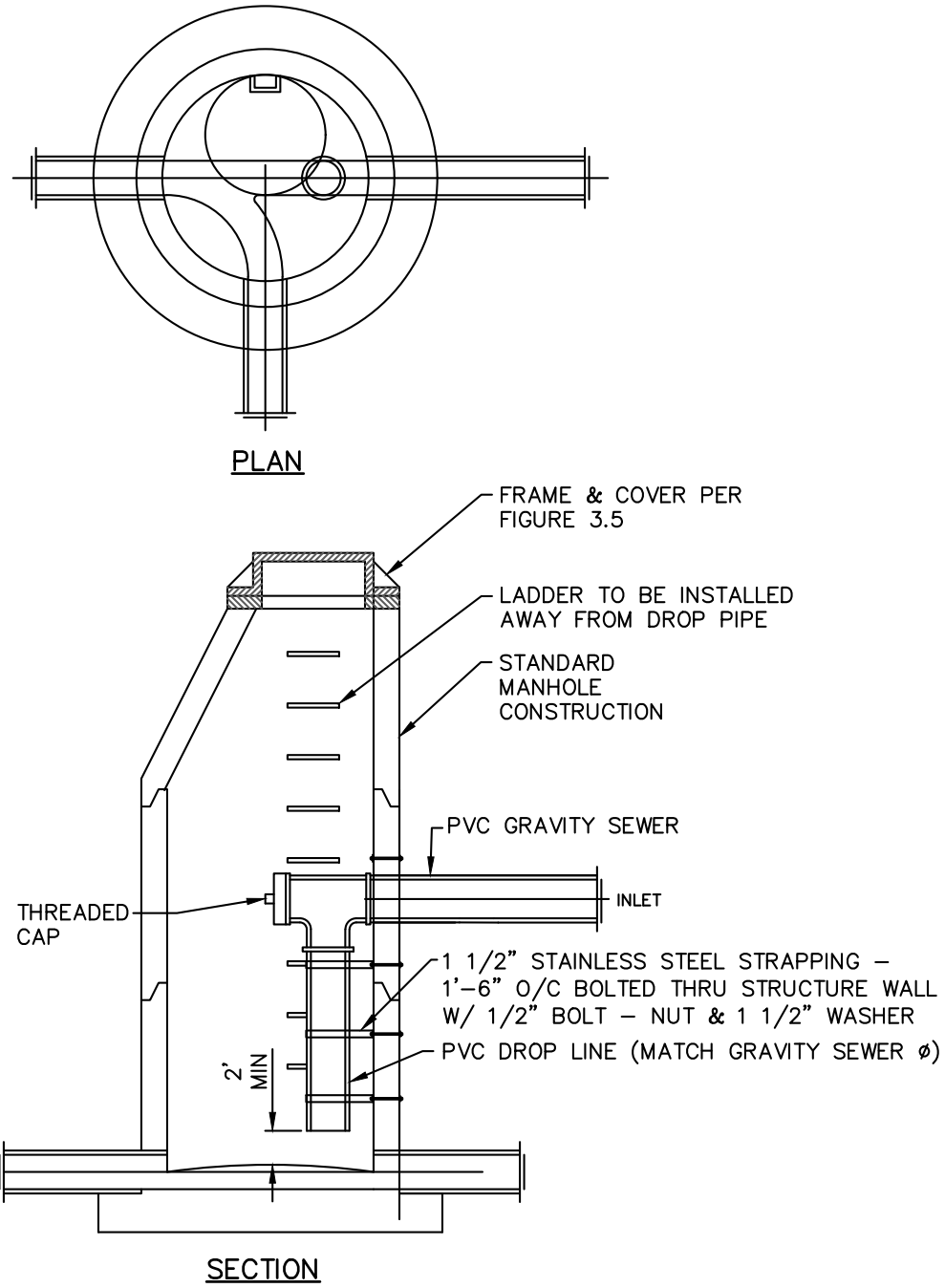
FIGURE 3.5



TYPICAL DETAIL FOR MANHOLE TOP FINISHING

NOT TO SCALE

FIGURE 3.6



DROP ASSEMBLY MANHOLE

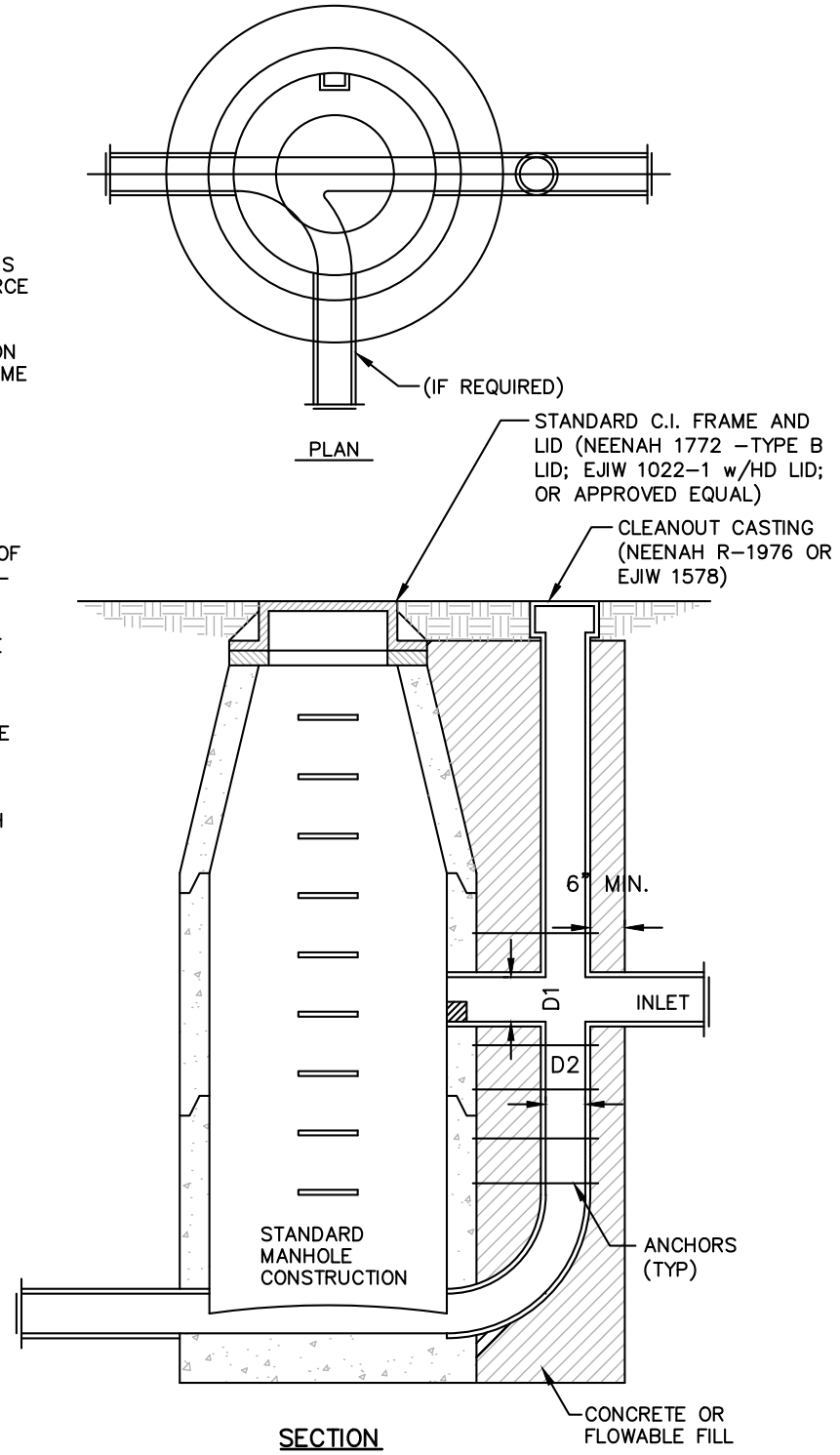
NOT TO SCALE

FIGURE 3.7

TOWN OF BREMEN DETAILS

NOTES:

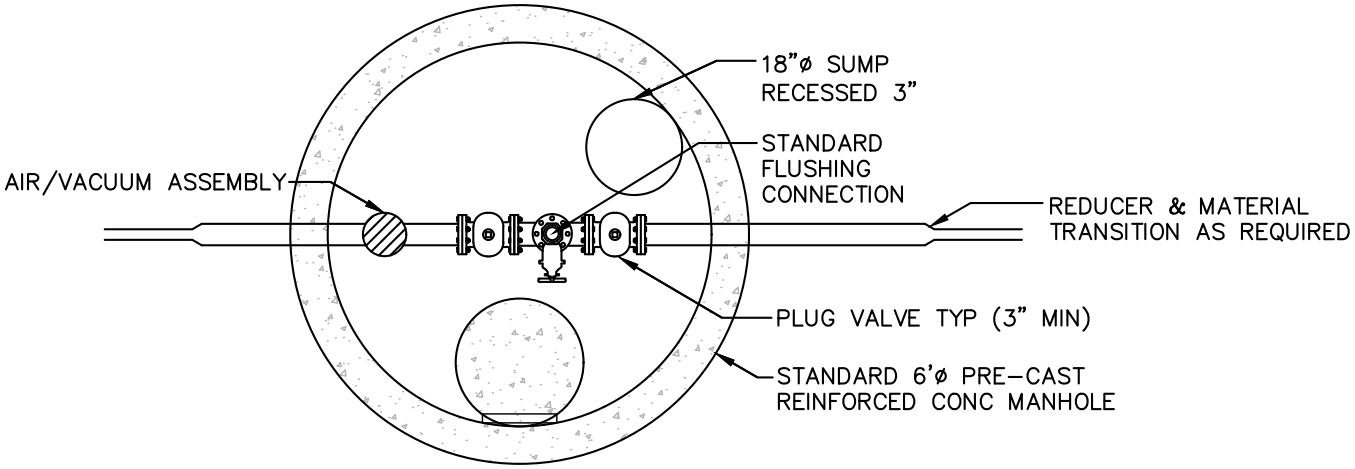
1. AN OUTSIDE DROP IS REQUIRED WHEN INVERT DIFFERENTIAL IS 24 INCHES OR GREATER AND IS ONLY ALLOWED FOR GRAVITY SEWERS, NOT FORCE MAINS.
2. HEIGHT OF DROP PIPE IS TO BE AS SHOWN ON THE PLANS OR WILL BE DETERMINED AT THE TIME OF CONSTRUCTION.
3. MATERIALS FOR THE CROSS, DROP PIPE AND BEND SHALL BE OF THE SAME MATERIAL TYPE.
4. OUTSIDE DROP PIPES REQUIRE A 6" THICK(MINIMUM) CLASS "C" CONCRETE OR FLOWABLE FILL ENCASEMENT ON THREE SIDES OF PIPE AND TIED TO MANHOLE WALL WITH 5/8" – "U" RODS X 6" LONG @ 12".
5. ALL PIPES ENTERING THE MANHOLE SHALL USE HIGH PERFORMANCE FLEXIBLE CONNECTORS MEETING ASTM C 923.
6. DIAMETER OF THE DROP PIPE, D2, MAY BE ONE SIZE SMALLER THAN THE DIAMETER OF THE HORIZONTAL PIPE, D1.
7. MANHOLE STAIRS DO NOT NEED TO ALIGN WITH MANHOLE COVER/OPENING.

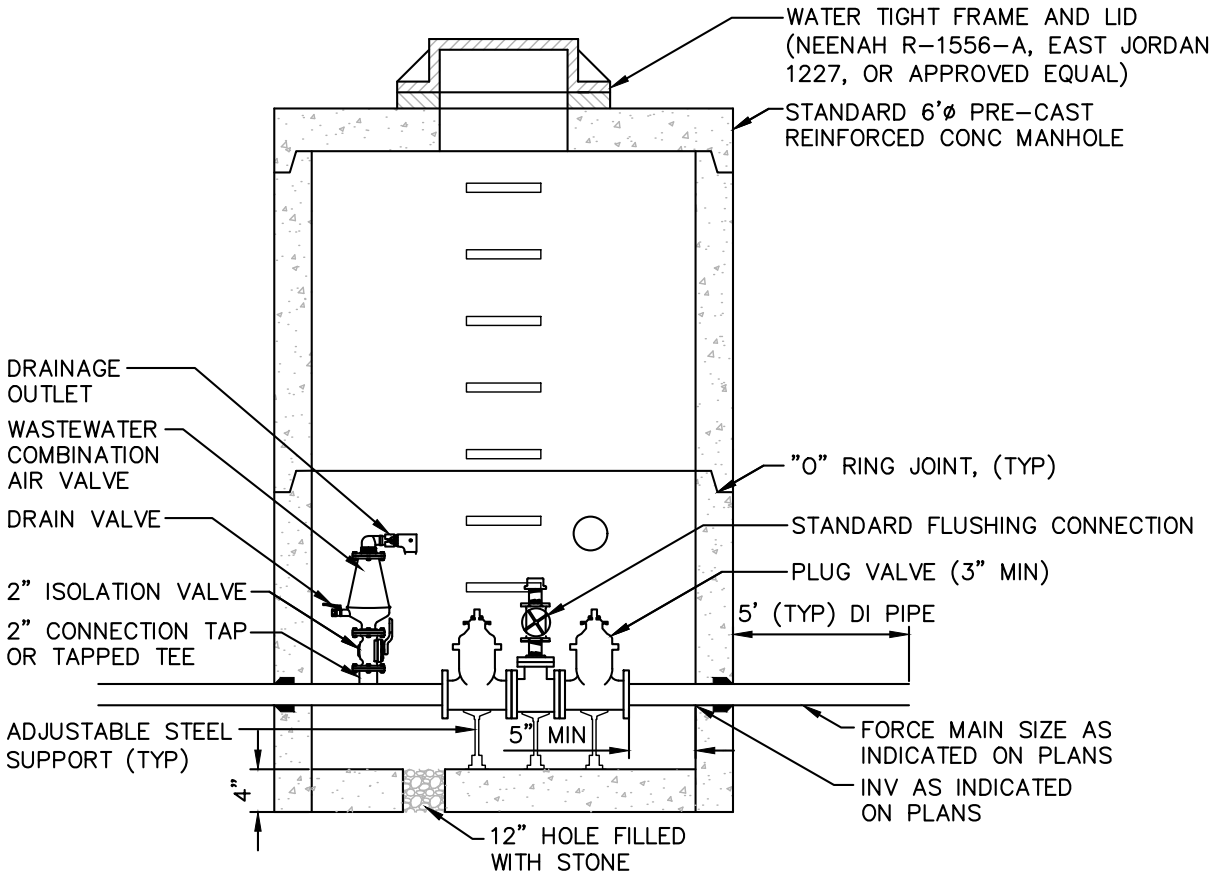


STANDARD DROP MANHOLE

NOT TO SCALE

FIGURE 3.8



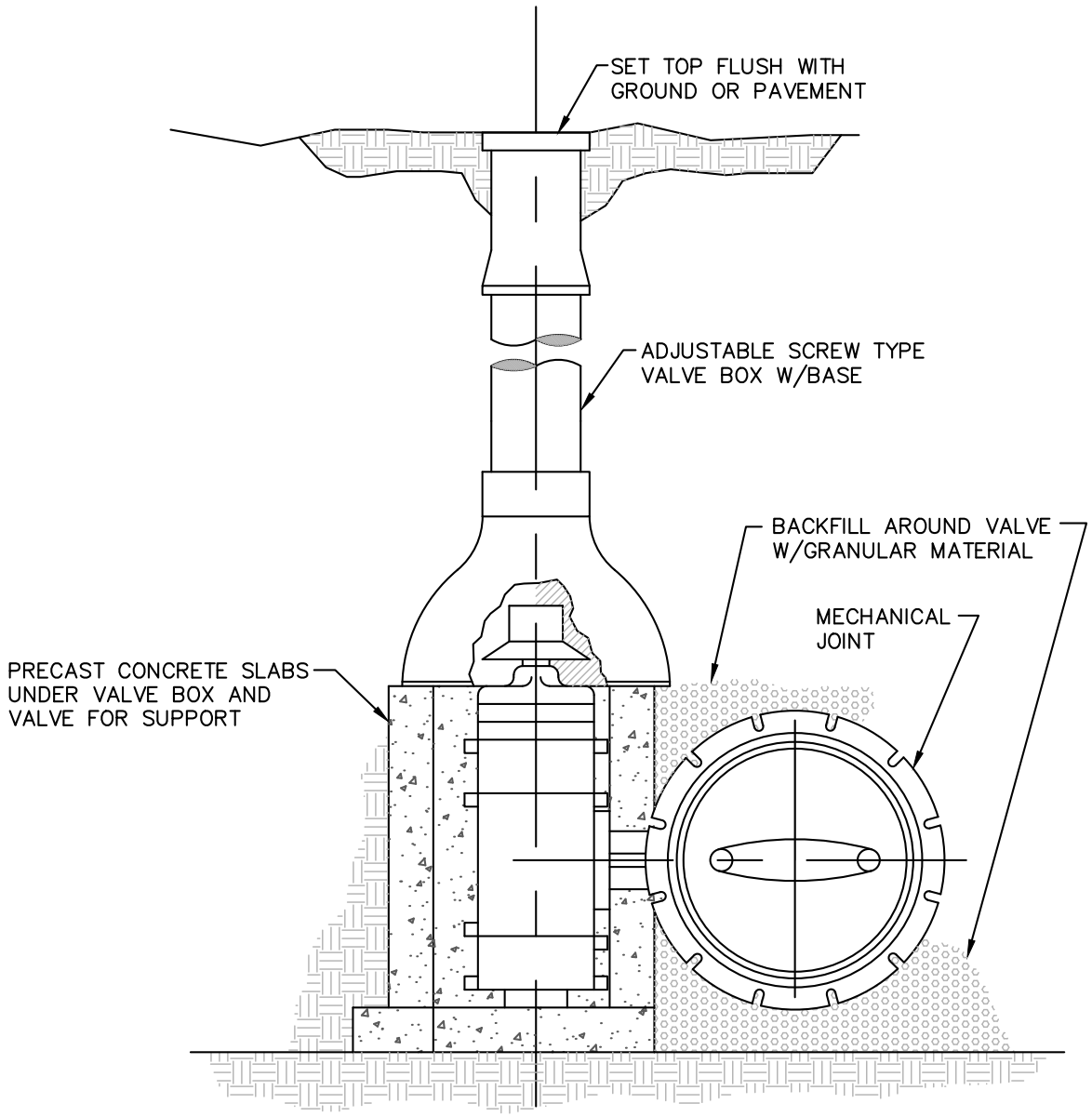


HYBRID AIR RELEASE AND FLUSHING STATION

NOT TO SCALE

FIGURE 3.9

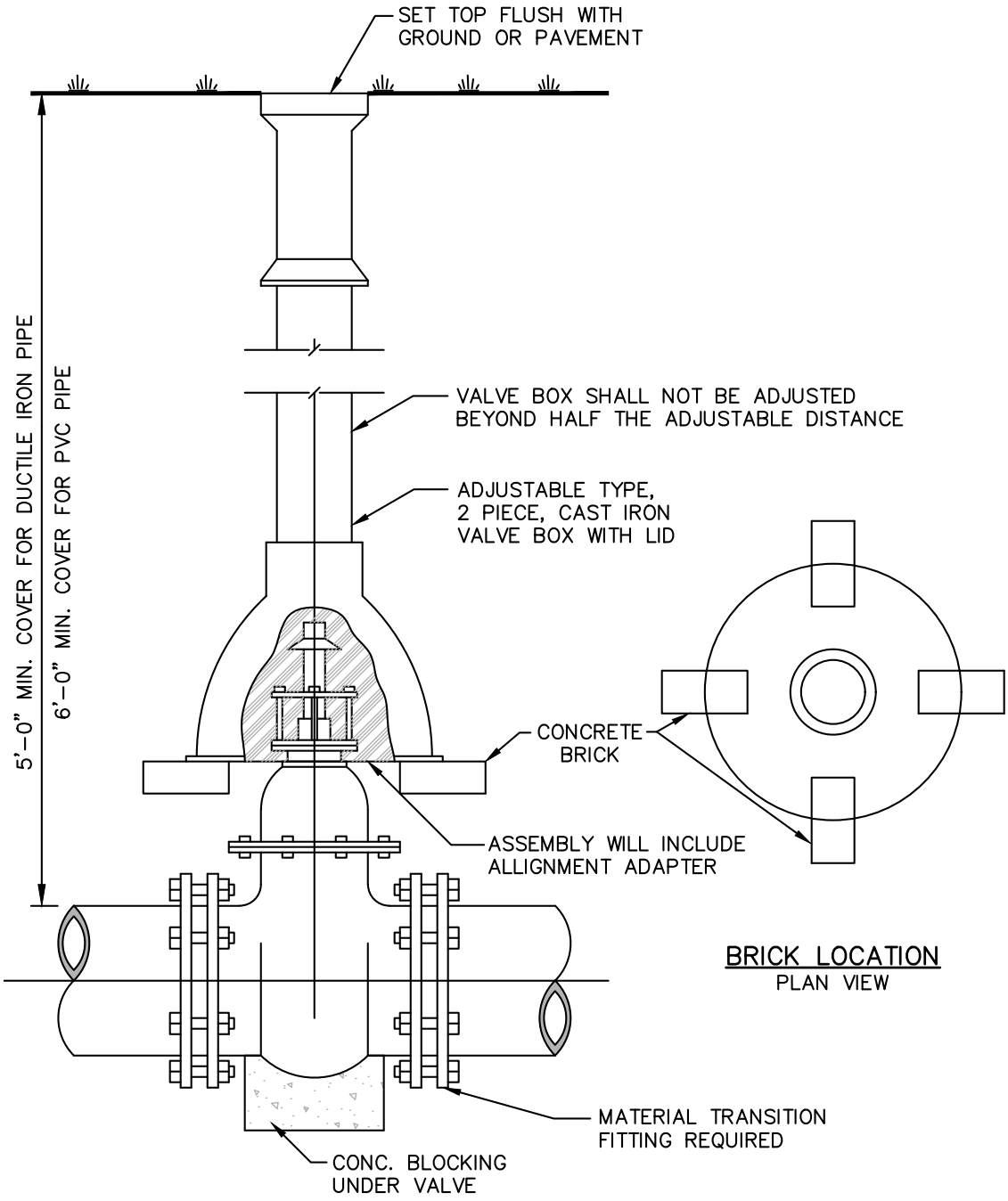
TOWN OF BREMEN DETAILS



BUTTERFLY VALVE AND BOX

USE BUTTERFLY VALVES FOR MAINS 12" AND LARGER
NOT TO SCALE

FIGURE 5.1



TYPICAL GATE VALVE & VALVE BOX

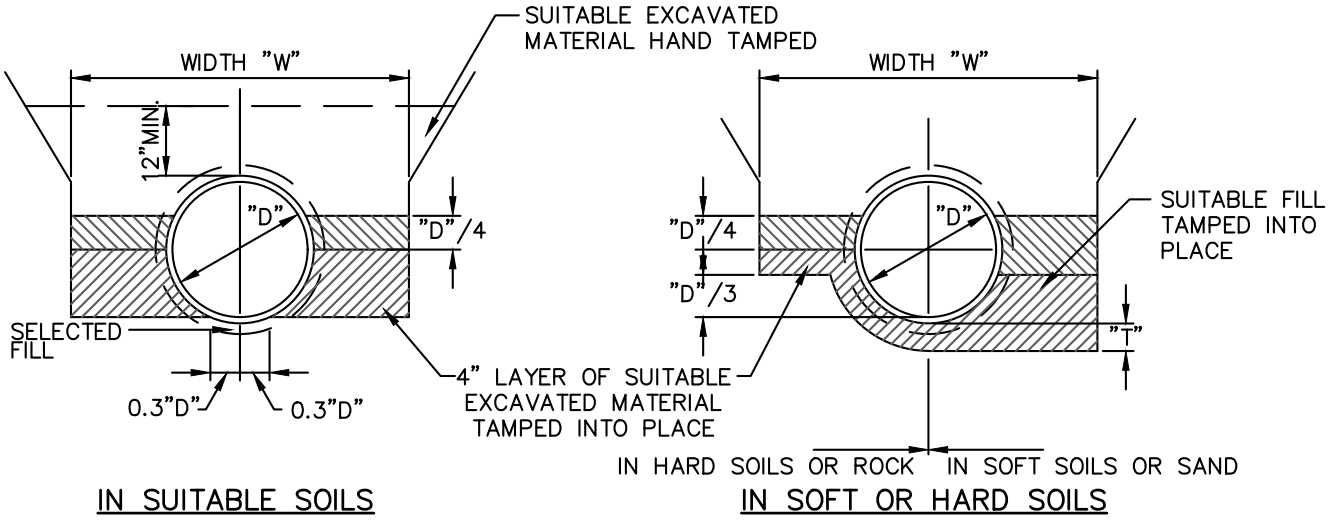
NOT TO SCALE

FIGURE 5.2

MAX. TRENCH WIDTH AT TOP OF PIPE	
DIA. "D"	WIDTH "W"
6"	18"
8"	24"
10"	24"
12"	30"
15"	36"
18"	39"
21"	42"
24"	45"
27"	48"
30"	53"
36"	66"
42"	75"
48"	82"

MIN. THICKNESS "T"	
TO 15"	6"
18" TO 36"	9"
OVER 36"	12"

NOTE: PIPE SHALL BE FIRMLY BEDDED ON UN-DISTURBED SOIL AS SHOWN IN LEFT SECTION. IN THE EVENT THE SOIL CAN NOT BE SHAPED, OR THE CONTRACTOR PREFERS, THE TRENCH SHALL BE EXCAVATED TO A GREATER DEPTH AND BACKFILLED WITH SELECTED FILL AND COMPACTED AS SHOWN IN THE RIGHT SECTION. IN ALL CASES BELL HOLES SHALL BE PROVIDED SO THAT BELL SUPPORTS NO WEIGHT.



IN SUITABLE SOILS

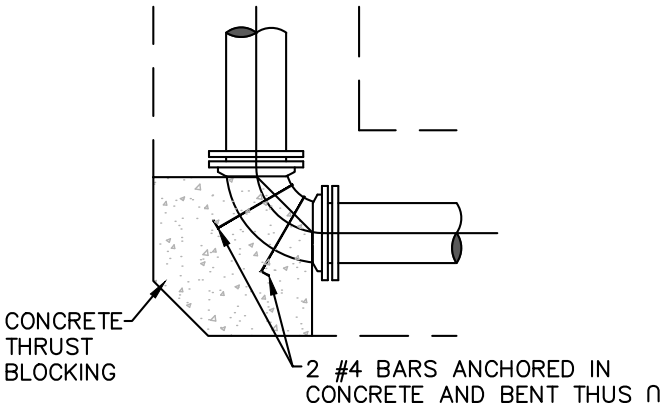
IN SOFT OR HARD SOILS

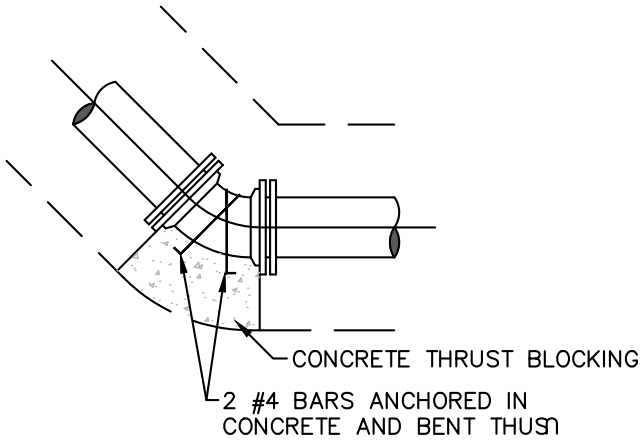
TYPICAL WATER MAIN INSTALLATION TRENCH, PIPE LAYING AND BEDDING DETAILS

NOT TO SCALE

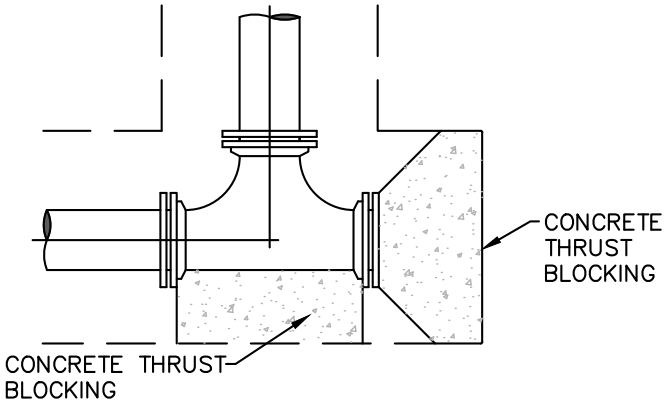
FIGURE 5.3

BLOCKING FOR TEES & WYES	
SIZE OF BRANCH	OUTSIDE FACE AREA (SQ. FT)
6" OR LESS	2
8"	3
10"	6
12"	9
16"	15





BLOCKING FOR PLUGS & ENDS					
PIPE SIZE	OUTSIDE FACE AREA (SQ.FT.)				
	PLUG	90	45	22 1/2°	11 1/2°
4"	2	3	2	1	1
6"	2	3	2	1	1
8"	3	5	3	2	2
10"	6	8	5	3	2
12"	9	13	7	4	3
16"	15	21	11	6	3

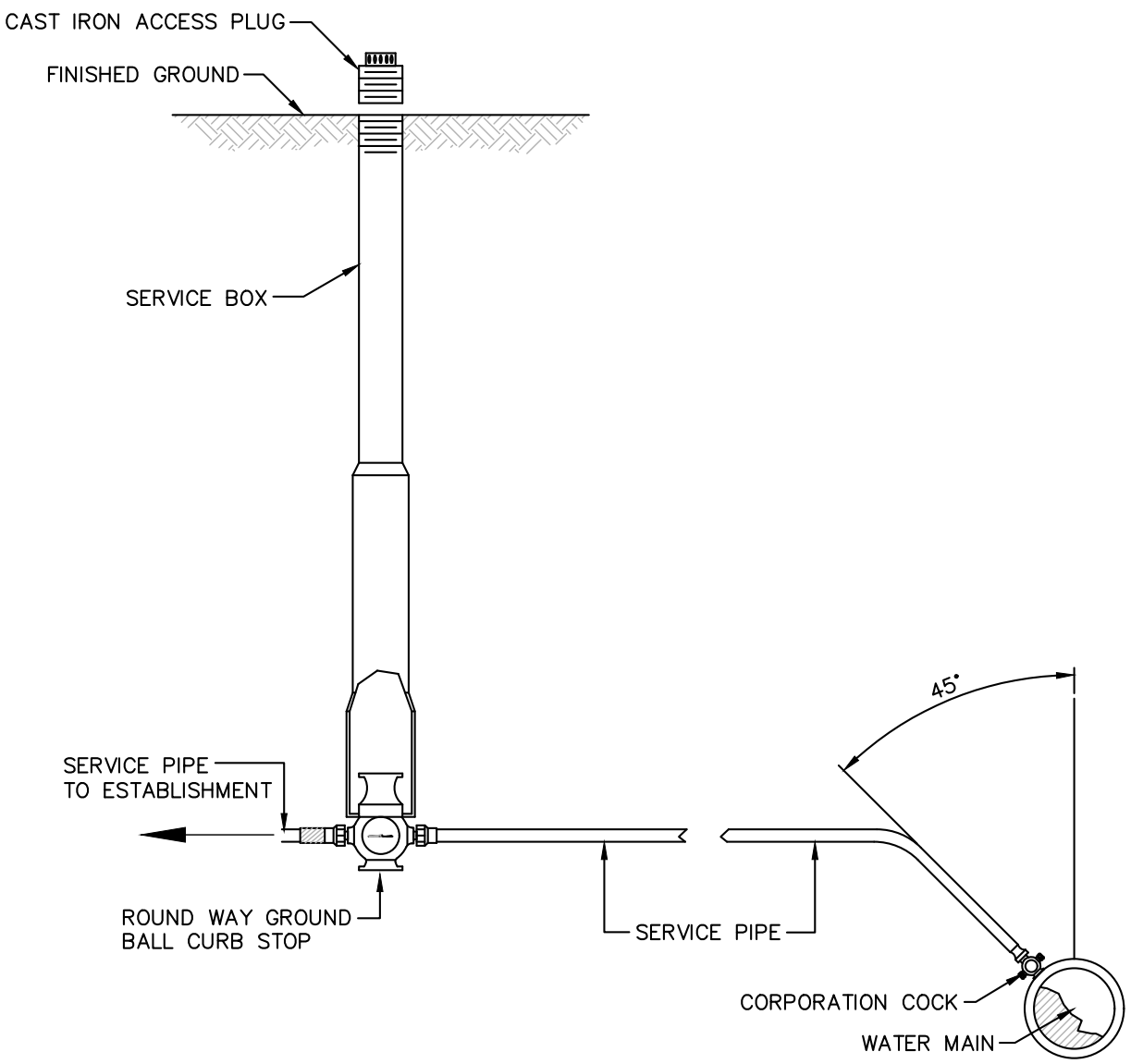


NOTE: CONCRETE TO BE PLACED BETWEEN FIRM EARTH OF TRENCH AND PIPE AT ALL TEES AND BENDS.

TYPICAL THRUST BLOCKING INSTALLATIONS

NOT TO SCALE

FIGURE 5.4

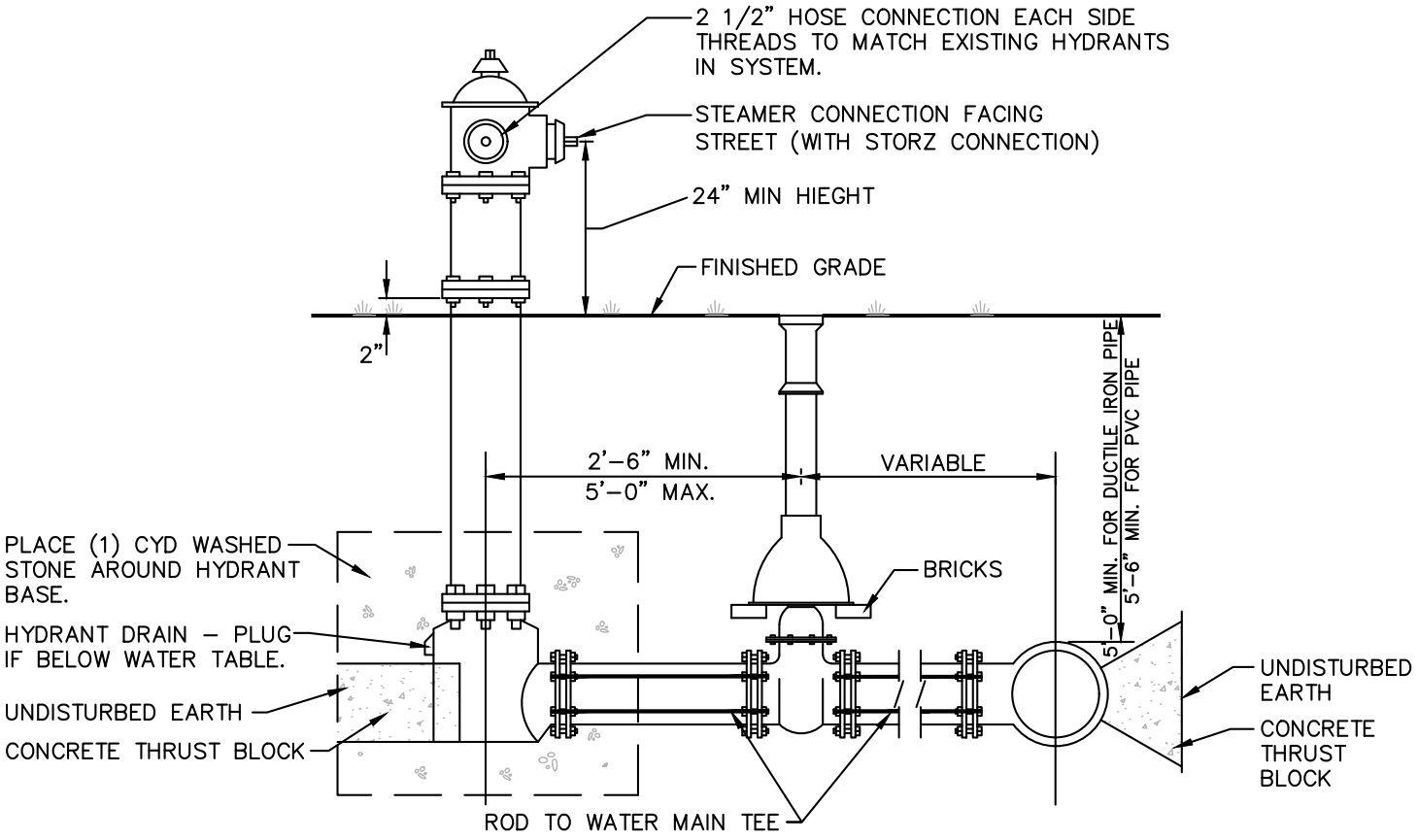


PLAN VIEW

WATER SERVICE CONNECTION

NOT TO SCALE

1. WHEN CONNECTING EXISTING SERVICE TO NEW MAIN. EXISTING SERVICE BOX & ACCESSORIES ARE TO BE USED & ADAPTER FITTINGS INSTALLED.
2. SERVICE SHUT-OFF BOX: FORD EA1 50 40-42R
3. ROUND WAY GROUND BALL CURB STOP: MUELLER 300
4. CORPORATION COCK: AY MCDONALD 74701Q
5. PROVIDE ONE KEY ROD & CLAM FOR EACH 20 BOXES OR LESS: POLLAND P-537.

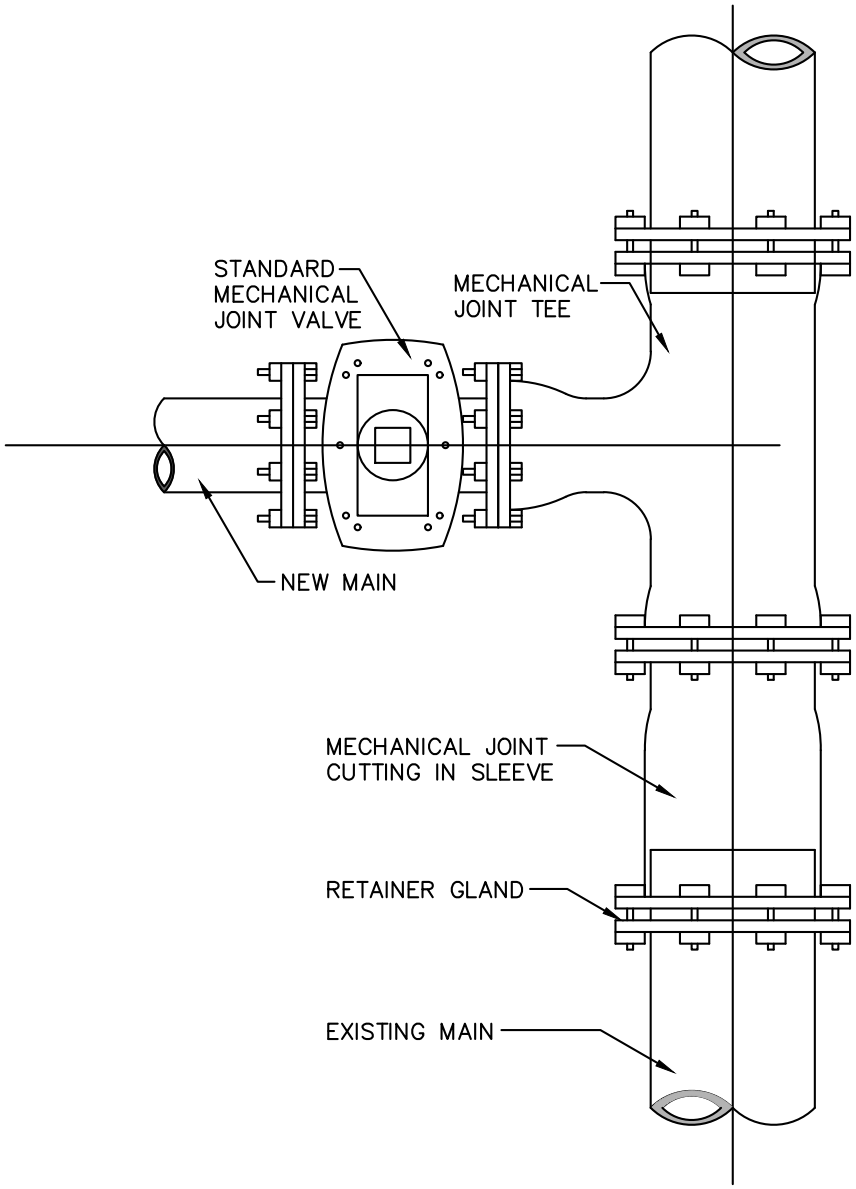


HYDRANT TO BE KENNEDY K81 - PAINTED RED
W/ COUNTER - CLOCKWISE TO OPEN

TYPICAL HYDRANT ASSEMBLY

NOT TO SCALE

FIGURE 5.6

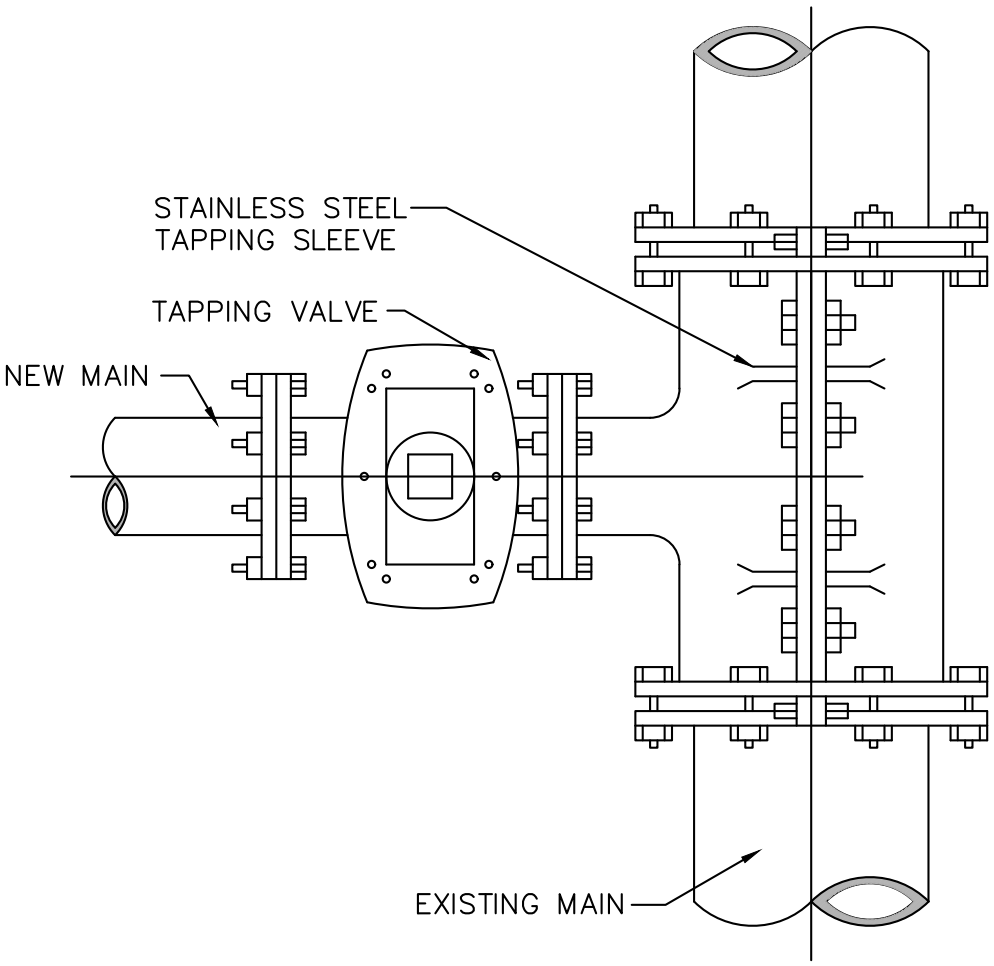


DRY TAP METHOD

CONNECTING NEW MAIN TO EXISTING MAIN

NOT TO SCALE

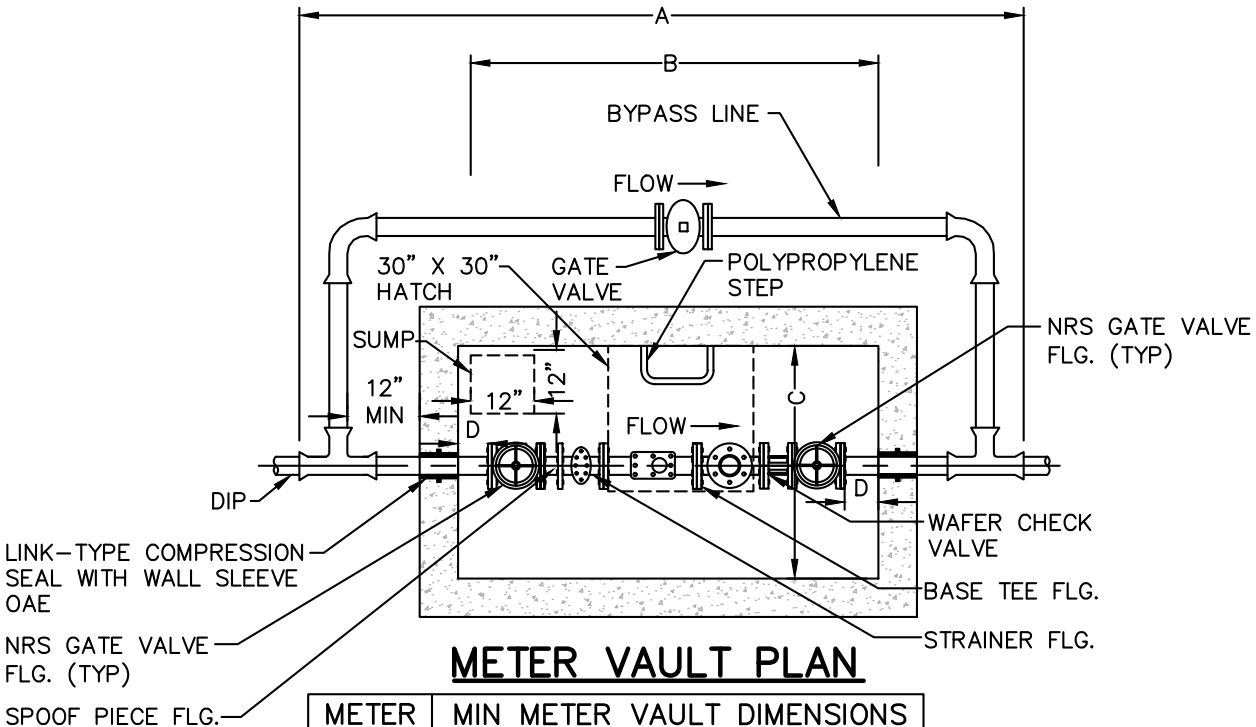
FIGURE 5.7



WET TAP METHOD DETAIL

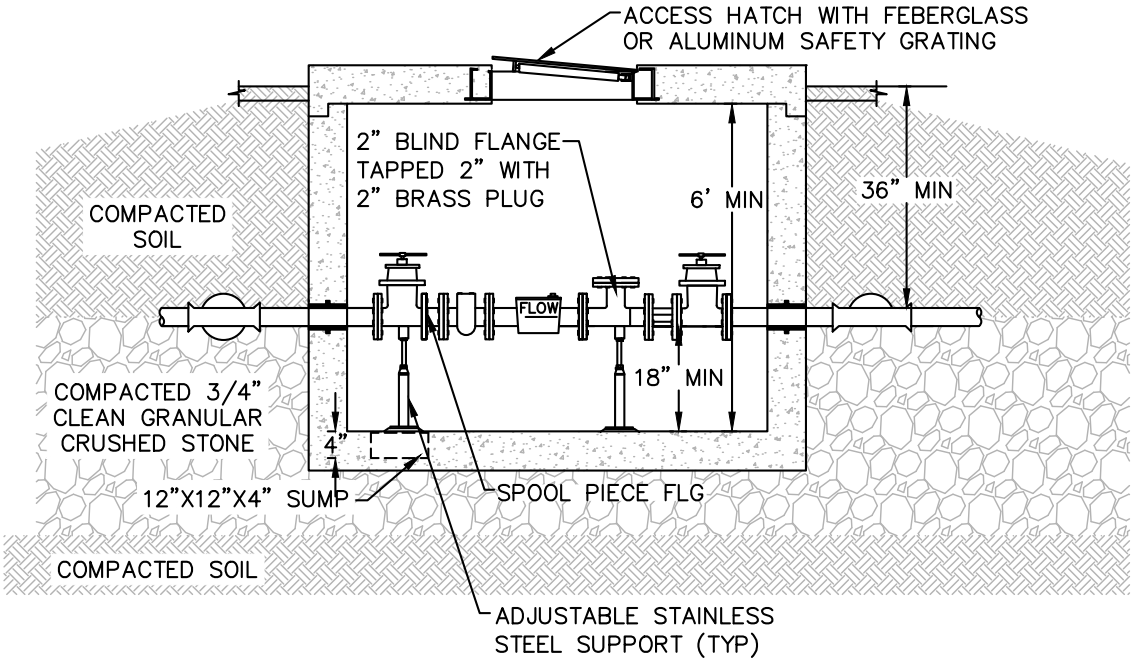
(UNDER PRESSURE)
CONNECTING NEW MAIN TO EXISTING MAIN
NOT TO SCALE

FIGURE 5.8



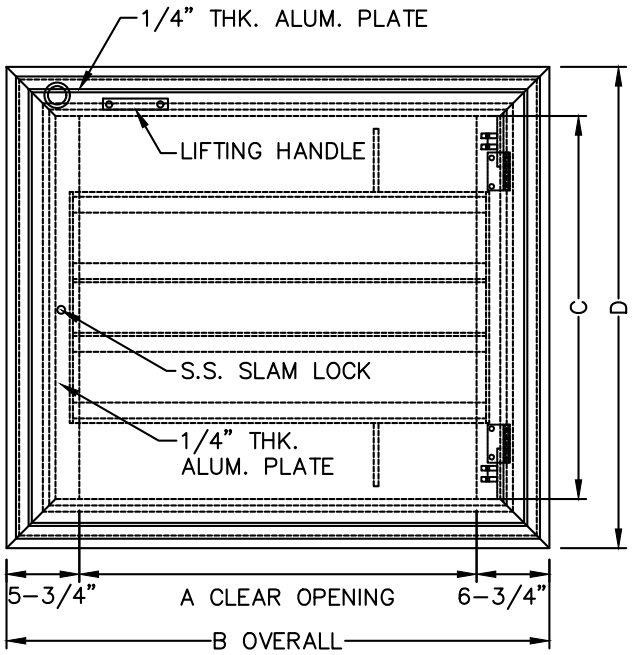
METER VAULT PLAN

METER SIZE	MIN METER VAULT DIMENSIONS			
	A	B	C	D
3"	10'-6"	6'-0"	4'-0"	8"
4"	12'-0"	6'-6"	4'-0"	8"
6"	14'-0"	8'-0"	4'-0"	8"
8"	14'-6"	8'-6"	4'-0"	8"
10"	17'-0"	10'-6"	4'-0"	8"

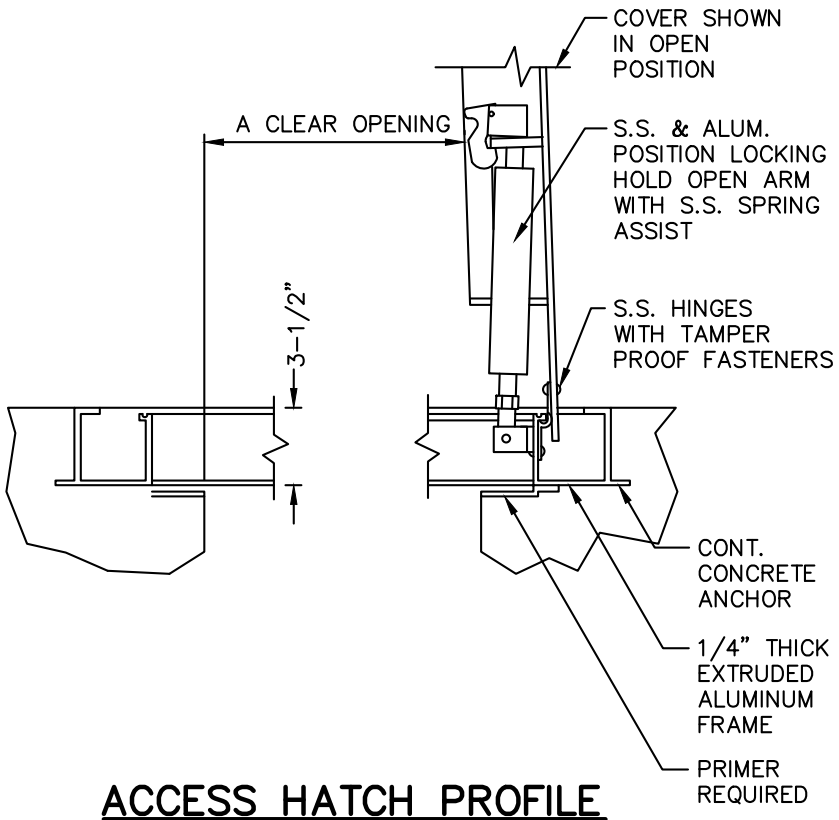


METER VAULT ELEVATION

FIGURE 5.9



ACCESS HATCH PLAN



ACCESS HATCH PROFILE

MODEL NO.	ACCESS HATCH DIMENSIONS				UNIT WT.
	A	B	C	D	
H1W3030	30"	42-1/2"	30"	37-1/2"	104 LBS

ACCESS HATCH NOTES:

1. PROVIDE AN H1W SERIES (SINGLE LEAF) ACCESS FRAME AND COVER, AS MANUFACTURED BY HALLIDAY PRODUCTS, OR APPROVED EQUAL.
2. FRAME AND COVER SHALL HAVE A 1/4" THICK, ONE-PIECE, MILL FINISH, EXTRUDED ALUMINUM CHANNEL FRAME, INCORPORATING A CONTINUOUS CONCRETE ANCHOR. A1-1/2" DRAINAGE COUPLING SHALL BE LOCATED IN THE FRONT LEFT CORNER OF THE CHANNEL FRAME. THE INSIDE OF THE FRAME SHALL HAVE A DOOR-SUPPORT LEDGE ON TWO SIDES.
3. FRAME, SUPPORT ANGLES AND LEDGE SHALL BE SUPPORTED BY A FULL BED OF 4,000 PSI CONCRETE.
4. THE DOOR PANEL SHALL BE 1/4" ALUMINUM DIAMOND PLATE, REINFORCED TO WITHSTAND A LIVE LOAD OF 300 PSF.
5. DOOR SHALL OPEN TO 90° AND AUTOMATICALLY LOCK WITH A STAINLESS STEEL HOLD OPEN ARM WITH ALUMINUM RELEASE HANDLE.
6. FOR EASE OF OPERATION, DOOR SHALL INCORPORATE ENCLOSED STAINLESS STEEL COMPRESSION SPRING ASSISTS. DOOR SHALL CLOSE FLUSH WITH THE FRAME.
7. HINGES AND ALL FASTENING HARDWARE SHALL BE STAINLESS STEEL.
8. UNIT SHALL LOCK WITH STAINLESS STEEL SLAM LOCK WITH REMOVABLE KEY AND HAVE A NON-CORROSIVE HANDLE.
9. UNIT SHALL BE GUARANTEED AGAINST DEFECTS IN MATERIAL AND/OR WORKMANSHIP FOR A PERIOD OF 10 YEARS.

FIGURE 5.10

VAULT DRAINAGE NOTES:

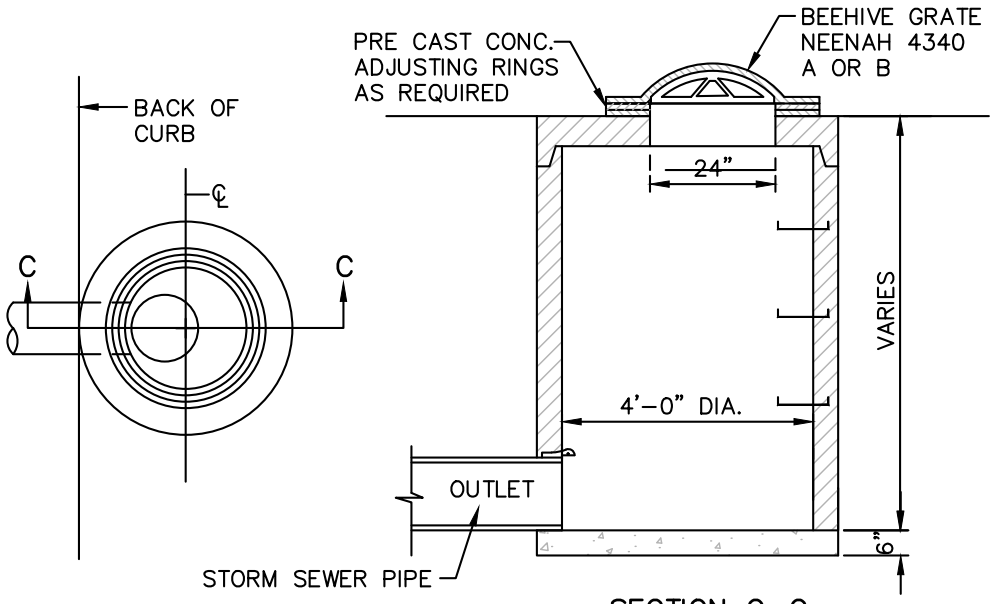
1. VAULTS CONTAINING VALVES, BLOWOFFS, METERS, OR OTHER SIMILAR APPURTENANCES TO WATER DISTRIBUTION SYSTEM SHALL NOT BE CONNECTED DIRECTLY TO ANY STORM DRAIN OR SANITARY SEWER, NOR SHALL BLOWOFFS, OR AIR RELEASE VALVES BE CONNECTED DIRECTLY TO ANY SEWER.
2. METER VAULT SHALL BE DRAINED TO THE SURFACE OF THE GROUND WHERE THEY ARE NOT SUBJECT TO FLOODING BY SURFACE WATER OR TO ABSORPTION PITS LOCATED ABOVE THE SEASONAL GROUNDWATER TABLE ELEVATION. SUMP PUMPS WITH AUTOMATIC OPERATION AND ALL NECESSARY APPURTENANCES ARE ALLOWED WHERE OTHER MEANS OF VAULT DRAINAGE ARE NOT PRACTICABLE.

WATER METER NOTES

1. ALL PIPE AND FITTINGS TO BE THE SAME SIZE AS THE METER. REDUCERS ARE PERMITTED ONLY WITH PRIOR AUTHORIZATION FROM TOWN OF BREMEN.
2. ADJUST SPOOL PIECE TO PROVIDE MANUFACTURER RECOMMENDED STRAIGHT RUN OF PIPE UPSTREAM AND DOWNSTREAM OF THE METER, OR AS DIRECTED BY TOWN OF BREMEN.
3. ALL PIPING BETWEEN THE TEES UPSTREAM AND DOWNSTREAM OF THE METER SHALL BE DUCTILE IRON PIPE FOR SERVICE LINES 3" AND GREATER.
4. NEWLY CONSTRUCTED WATER LINES SHALL BE DISINFECTED IN ACCORDANCE WITH CURRENT TOWN OF BREMEN STANDARDS.
5. TRACER WIRE REQUIRED FROM EXISTING WATER MAIN TO METER VAULT.
6. ROUND METER VAULTS MAY BE SUBSTITUTED AS AN ALTERNATE TO THE DEPICTED RECTANGULAR BOX. MINIMUM CLEARANCES SHALL STILL BE PROVIDED.
7. PROVIDE BYPASS LINE WITH THRUST BLOCKS REQUIRED ON ALL BYPASS LINE FITTINGS.
8. PROVIDE ADDITIONAL PIPE SUPPORTS AS REQUIRED.
9. INSTALL A FLANGED COUPLING ADAPTER IN THE VAULT.

CONCRETE STRUCTURE NOTES

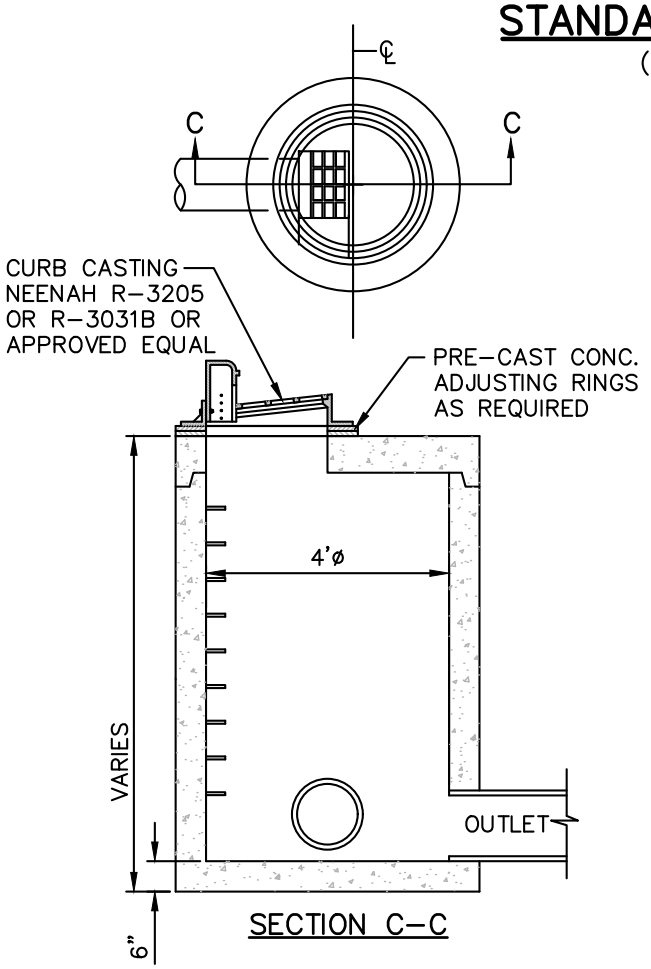
1. PRECAST CONCRETE METER VAULT SHALL BE DESIGNED FOR THE FOLLOWING CONDITIONS STATED BELOW (1.1 THROUGH SUBMIT CALCULATIONS TO TOWN OF BREMEN FOR REVIEW. ALL CALCULATIONS SHALL BE SIGNED AND SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF INDIANA.
   - 1.1 STRUCTURE FILLED TO TOP WITH NO EXTERNAL SOIL PRESSURE
   - 1.2 STRUCTURE EMPTY WITH SOIL BACKFILL TO FINISHED GRADE. ASSUME SOIL DRY DENSITY AT 95 LBS/C.F. ASSUME SOIL SATURATED TO FINISHED GRADE.
   - 1.3 STRUCTURE SHALL NOT FLOAT WITH SATURATED SOIL TO FINISHED GRADE. ASSUME SOIL LOAD ON CONCRETE LIP AT 32 LBS/C.F. A SAFETY FACTOR OF 1.5 SHALL BE PROVIDED IN THE FLOATATION CALCULATIONS.
   - 1.4 SOIL BEARING PRESSURE OF 2,500 PSF.
   - 1.5 EFFECTS OF ALL VERTICAL LOADS ANTICIPATED ON THE FINISHED STRUCTURE SHALL BE INCLUDED IN THE ANALYSIS AND DESIGN. LOADING FROM PIPING AND EQUIPMENT, HOIST, SUPERSTRUCTURES, SNOW, H-20 LIVE LOAD, AND ACTUAL DEPTH OF SOIL COVER SHALL BE INCLUDED.
2. PRECAST VAULT STEPS SHALL BE MADE OF POLYPROPYLENE ENCASED STEEL AS MANUFACTURED BY M.A. INDUSTRIES, OR APPROVED EQUAL, AND SHALL CONFORM TO ASTM C478.
3. THE EXTERIOR OF ALL PRECAST PRODUCTS SHALL BE COATED WITH TWO COATS OF BITUMASTIC PAINT, 16, TO 20 MIL DFT, TO FINISHED GRADE. USE PROMASTIC 900 COAL TAR WATERPROOFING MANUFACTURED BY PROGUARD COATING, INC., OR APPROVED EQUAL.
4. ALL ALUMINUM IN CONTACT WITH CONCRETE SHALL BE PAINTED WITH 2 COATS OF COAL TAR EPOXY OR ISOLATED FROM THE CONCRETE WITH 1/8" THICK NEOPRENE PADDING. ALL STEEL THRUST RESTRAINT ANGLES SHALL BE WIRE BRUSHED AND PAINTED WITH 2 COATS OF COAL TAR EPOXY.
5. ALL PIPE COUPLINGS IN CONTACT WITH SOIL SHALL BE WIRE BRUSHED AND PAINTED WITH 2 COATS OF COAL TAR EPOXY.
6. ALL CONCRETE ANCHORS AND HARDWARE SHALL BE STAINLESS STEEL.
7. PROVIDE COMMON KEYED LOCKS FOR ALL HATCHES, PANELS, DOORS AND QUICK DISCONNECT CAPS ASSOCIATED WITH THIS PROJECT.
8. ALL STRUCTURES SHALL BE WATERTIGHT AND SHALL BE TESTED FOR WATER TIGHTNESS BY FILLING PRECAST STRUCTURE WITH WATER PRIOR TO BACK FILLING. AN ACCEPTABLE LEAKAGE IS DEFINED AS A LOSS OF LESS THAN 1/2" IN 24 HOURS AND NO VISIBLE LEAKS. REPAIR OF LEAKS IS REQUIRED USING METHODS APPROVED BY THE TOWN OF BREMEN.
9. DUAL SEAL II GASKETS DISTRIBUTED BY DUAL SEAL CORP, OR APPROVED EQUAL, SHALL MEET ASTM C923 REQUIREMENTS.
10. JOINTS IN STRUCTURE SHALL BE SEALED WITH BITUMEN CONSEAL CS-102-B JOINT SEALANT MATERIAL MANUFACTURED BY CONCRETE SEALANTS, INC AND MEET FEDERAL SPECIFICATION SS-S-00210 (210-A).
11. CONCRETE STRUCTURES SHALL MEET THE REQUIREMENTS OF ASTM C478. DESIGN SHALL FOLLOW ACI 318-95 USING LOAD FACTOR DESIGN.
12. CONCRETE: fc = 4,000 PSI AT 28 DAYS. TYPE III CEMENT. AIR ENTRAINMENT 7% ± 2%, ASTM C33 NO. 57 OR NO. 67 COARSE AGGREGATE.
13. REINFORCEMENT: WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185. BAR REINFORCEMENT SHALL BE GRADE 60, CONFORMING TO ASTM A615.
14. VERTICAL BAR REINFORCEMENT REQUIRED BETWEEN BASE SLAB AND FIRST VERTICAL SECTION OF STRUCTURE.



SECTION C–C

STANDARD CATCH BASIN

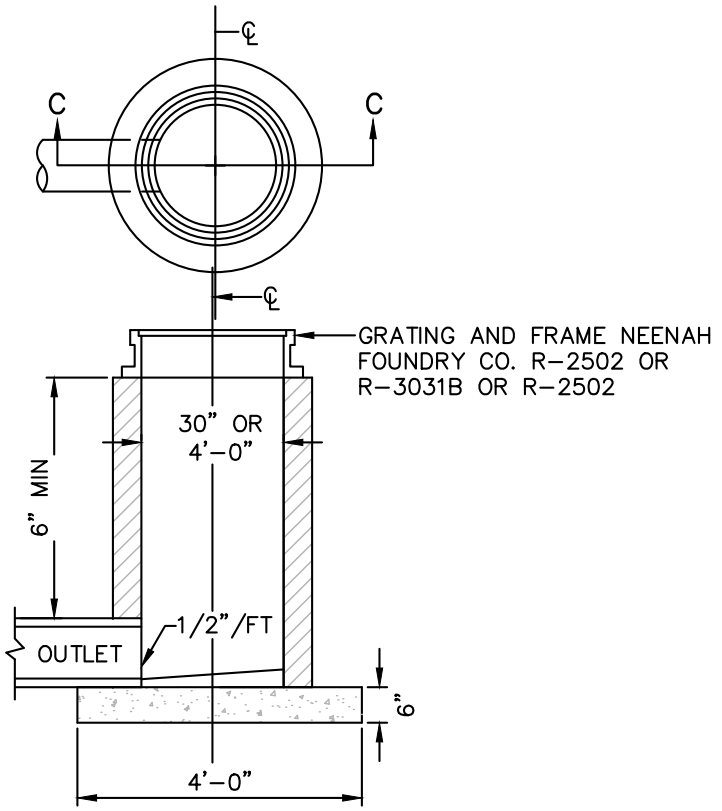
(IN YARD OR DITCH)
NOT TO SCALE



SECTION C–C

STANDARD STORM CATCH BASIN

NOT TO SCALE



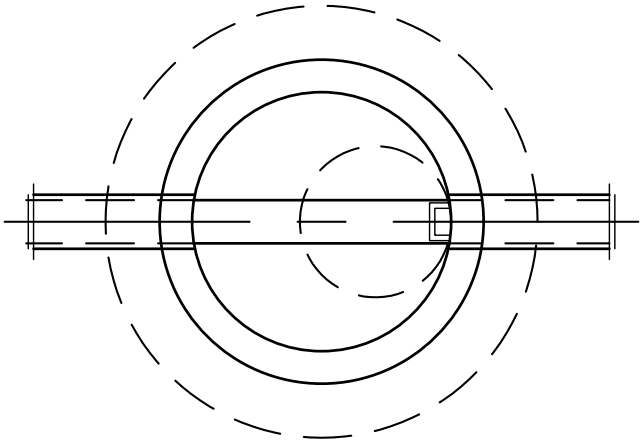
SECTION C–C

STORM INLET STRUCTURE

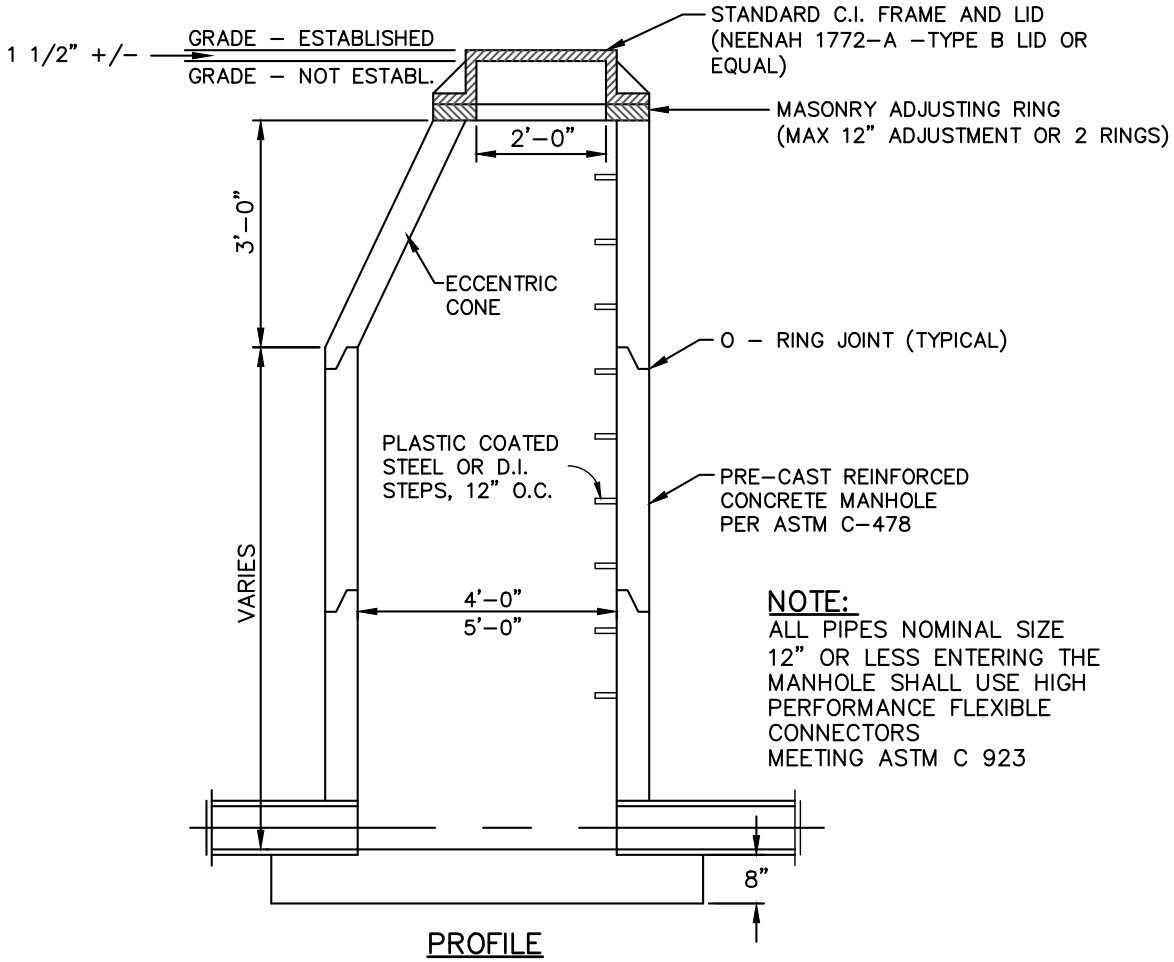
NOT TO SCALE

FIGURE 7.1

TOWN OF BREMEN DETAILS



PLAN



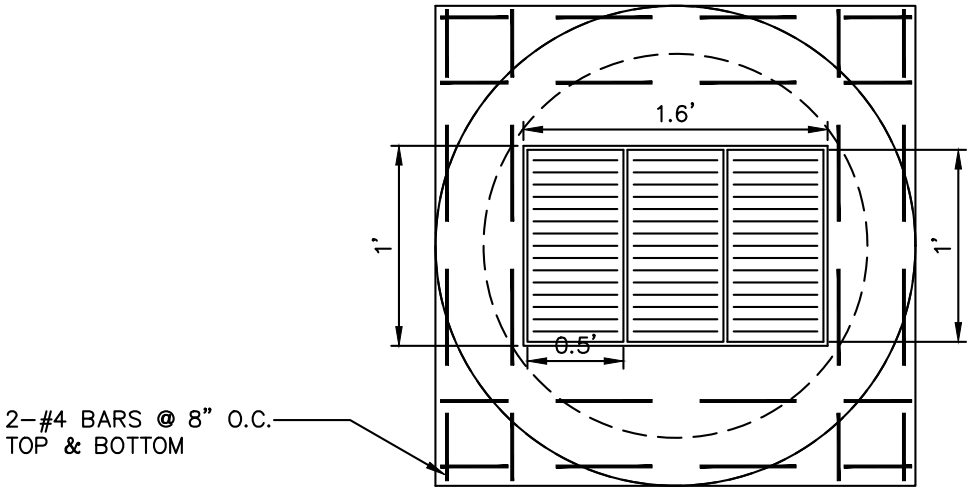
PROFILE

STANDARD PRE–CAST STORM MANHOLE

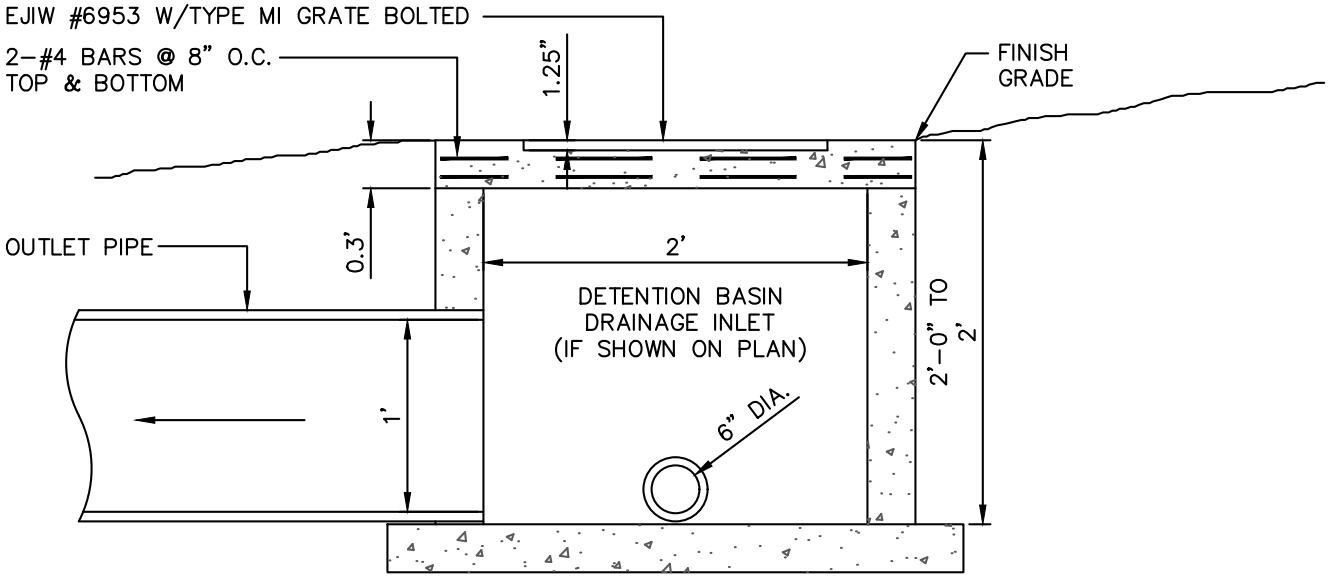
NOT TO SCALE

FIGURE 7.2

TOWN OF BREMEN DETAILS



TOP VIEW



PRE-CAST MANHOLE SECTION
BASE & CAP PER ASTM C-478

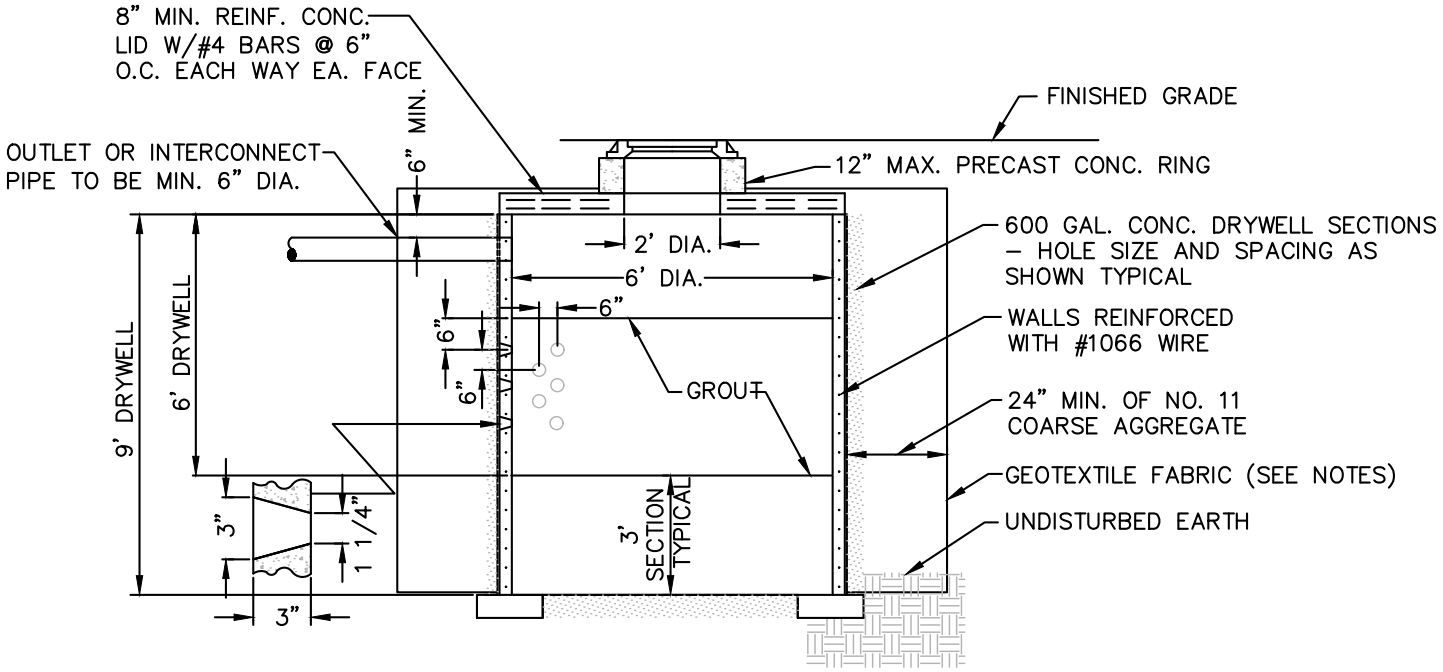
OVERFLOW STRUCTURE DETAIL

NOT TO SCALE

FIGURE 7.3

TOWN OF BREMEN DETAILS

NOTES:
1. IN GRASS, AN OPEN GRATE CASTING SHALL BE NEENAH R-2561-A WITH A 6" BEEHIVE GRATE.
2. IN PAVEMENT, AN OPEN GRATE CASTING SHALL BE NEENAH R-2502-A WITH A TYPE "D" GRATE.
3. ALL OTHER CASTINGS SHALL BE NEENAH R-1772-A WITH A TYPE "B" LID.

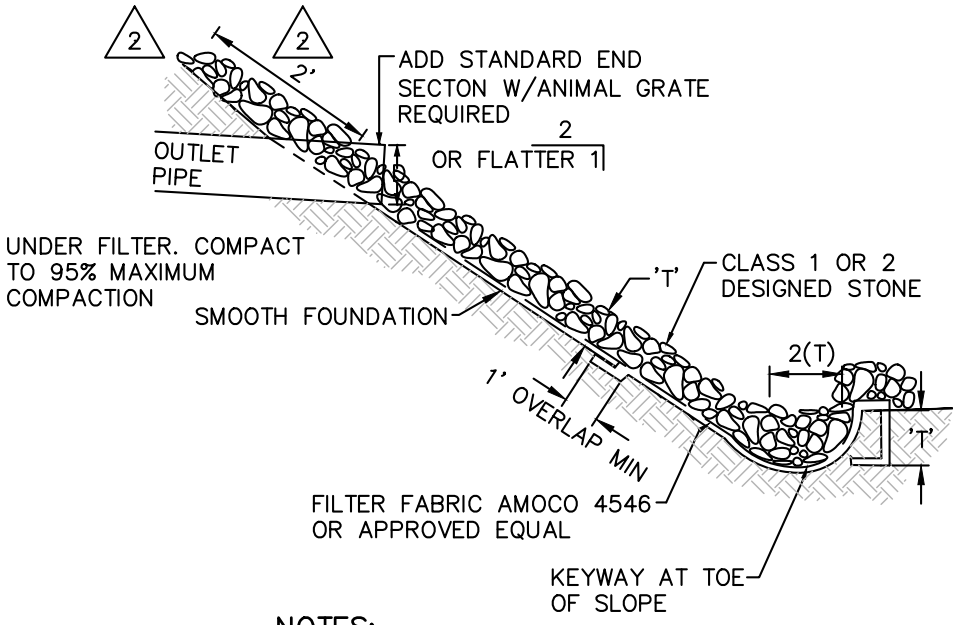


PRECAST PERFORATED DRYWELL

1800 GALLON CAPACITY

FIGURE 7.4

TOWN OF BREMEN DETAILS



NOTES:

RIPRAP AGGREGATE SIZE: d50 OF 6"
MAXIMUM SIZE: 1.5 x d50
RIPRAP WIDTH SHALL BE 4.0 x 'D' MINIMUM
'T' = THICKNESS: MINIMUM THICKNESS SHALL BE 1.5x
THE MAXIMUM STONE DIAMETER
NEVER LESS THAN 6"

STORM SEWER OUTLET PROTECTION

NOT TO SCALE

FIGURE 7.5