

ORDINANCE NO. 14
AN ORDINANCE TO ESTABLISH:
A MANUAL OF PRACTICE FOR THE DESIGN OF PUBLIC IMPROVEMENTS
BLOOMINGTON TOWNSHIP PUBLIC WATER DISTRICT (BTPWD)
Enacted March 2004

SECTION 14 Design and Construction Standards for Sanitary Sewers

- 14.01 Introduction
- 14.02 General Requirements
- 14.03 Design Standards
- 14.04 Right-of-Way Dedication
- 14.05 District's Participation in Cost
- 14.06 Approval and Acceptance Assignment
- 14.07 Specifications and special Provisions
- 14.08 Standard Details
- 14.09 Exhibit Q
- 14.10 Validity
- 14.11 Ordinance in Force

14.01 INTRODUCTION

All subdivision construction, watermain or sewer line extensions and connections or other public improvements within Water District Boundaries, which will be accepted by the District for operation and maintenance, shall be in accordance with this Ordinance, other Ordinances of the Water District, including Ordinance 12 as revised, the latest edition of the McLean County Land Subdivision Ordinance, and engineering, procedural and administrative requirements of the Water District Engineer.

The failure to coordinate the Planning, Design, Construction, Inspection and Approval of Public Improvements with the Water District and its engineer may lead to delays in approval and acceptance, and higher fees.

14.02 GENERAL REQUIREMENTS

All subdivisions shall be designed so the proposed sanitary sewer system does and accomplishes the following:

- A. Conforms to the District's Sanitary Sewer Service Area Map for Sanitary Sewers, and is within the District's Sanitary Sewer Service Area;
- B. Extends interceptor sanitary sewers through the proposed subdivision to serve upstream properties in the natural drainage area, or if applicable , allows access to downstream properties at appropriate locations;
- C. Provides sanitary sewer services with separate service connections terminating not less than two feet inside the property or easement line of each proposed lot of record, or at/near the property or easement line of each existing lot of record;
- D. Has adequate capacity to drain the portions of the subdivision proposed to be served by the sewer and any property upstream thereof which drains into or may drain into that sewer, based on the effluent discharge reasonably expected from development of the type and to the maximum density permitted by the then-existing zoning ordinances of the County for property within the District limits and the land use element of the District's Sanitary Sewer Service Area Map;
- E. Maintains separation from public water supply systems, and other potable water supply systems.
- F. Discourages the use of sewage pumping facilities.
- G. Designed to prevent installation of sanitary sewers in rear yard easements and to permit only when necessary, installation in side yard easements.
- H. Meet requirements for Pump Station (if required).

- I. Private sewage disposal systems, including but not limited to septic tanks, holding tanks, distribution boxes, subsurface seepage systems, sand filters, and waste stabilization ponds, which are no longer in active use shall be emptied and abandoned in accordance with all State, County, and District regulations. The owner of the property shall provide documentation to the District that the system has been properly abandoned.

14.03 DESIGN STANDARDS

- A. Design Formula. Sanitary sewers shall be designed to provide adequate capacity without surcharge, using Manning's Formula.

Metric

$$V = \frac{1}{n} R^{2/3} S^{1/2}$$

Where:

V = Velocity of flow in meters per second

n = Roughness Factor

R = Hydraulic Radius (meters)
 $\frac{\text{Area}}{\text{Perimeter}} = \frac{\text{Sq.m}}{\text{m}}$

S = slope of energy grade line for conduit running full (meter per meter)

English

$$V = 1.486 R^{2/3} S^{1/2}$$

V – Velocity of flow in Feet per second

n = Roughness Factor

R – Hydraulic Radius (feet)
 $\frac{\text{Area}}{\text{Perimeter}} = \frac{\text{Sq.ft.}}{\text{ft.}}$

S = slope of energy grade line for conduit running full (feet per foot)

For new smooth walled sewer pipe n = 0.013

Sanitary sewers shall flow with a desired minimum velocity of 0.8 meters per second (2.5 feet per second). Proposed sanitary sewage flow shall be based on the population after full development of the area. For undeveloped areas where the details of future development are not known, design population will be estimated based on the zoning classification and expected use conforming to the McLean County Comprehensive Plan, and the District's Sanitary Sewer Service Area Map.

FLOW CRITERIA:

Sanitary sewers shall be sized to accept the following peak design flows:

Domestic: 1500 liters (400 gallons) per day per capita for lateral sewers. Average flow of 375 liters (100 gallons) per capita peaked by a factor per Exhibit Q attached herewith plus 110- liter/mm dia/Hectare (300 gal/inch/dia/acre) for infiltration.

Commercial and/or 95000 liters/hectare (10000 gallons/acre) per day for lateral sewers. 66000 liters/hectare (7000 gallons/acre) per day for

Industrial: trunk sewers.

or such specific flows known for the type of facilities served.

- B. Materials. All sanitary sewer pipe shall be Vitrified Clay Pipe ASTM Designation C-700 (extra Strength) or Ductile Iron Pipe Class 150 conforming to ANSI A 21.51. Vitrified Clay pipe joints shall conform to ASTM C-425. Ductile iron pipe joints shall be mechanical or rubber ring (slip seal or push-on) joints. Use of other materials for sanitary sewers must be approved in writing by the Water District prior to their installation.
- C. Minimum Size. All public sanitary sewers shall be a minimum of 200 mm (8 inches) in diameter. All service sewer lines shall be a minimum of 150 mm (6 inches) diameter.
- D. Alignment. All sewers shall be laid straight in both horizontal and vertical planes between manholes unless otherwise approved by the Water District.
- E. Sewer Size Changes. When sanitary sewers of different diameters join in a manhole, the invert elevations shall be adjusted to maintain a uniform energy gradient. Alignment of the 0.9 depth points of the sewers shall be implemented to meet this requirement.
- F. High Velocity Protection. Where velocities greater than 3.0 m per second (10 feet per second) will occur, in a sanitary sewer when flowing full, special precautions shall be taken to prevent scouring or displacement of the pipe.
- G. Manholes.
1. Provide public manholes at the end of each line, at all changes in grade, size or alignment, at all intersections and at distances not greater than 120 m (400 feet). Greater spacing may be permitted by the Water District in large sewers and in those carrying a settled effluent.
 2. Provide an outside drop pipe for sewers entering a manhole at an elevation of 600 mm (2 feet) or more above the manhole invert. Where the difference in elevation between the incoming sewer and the manhole invert is less than 600 mm (2 feet), the invert should be filleted to prevent

the depositing of solids. Drop manhole shall be constructed in accordance with Standard Detail 7.07 B-1.

3. Provide public manholes in improved streets or other public rights-of-way accessible to vehicular access and sewer maintenance equipment, not more than 240 m (800 feet) measured in a straight line along the sanitary sewer.

H. Service Drops in Manholes:

1. New construction: Outside service drops shall be provided as per Standard Detail 7.07 B-1 in new construction when a proposed sanitary service enters a proposed manhole more than 600 m (2 feet) above the invert of the manhole. With the permission of the Water District for existing manholes an inside drop connection as per Standard Detail 7.07 B-2 may be used. See Section 17.03.J.3. for exception to this requirement.

I. Sewer Service Laterals:

1. Location: All services shall terminate at a point at least 0.6 m (2 feet) inside the property line or a minimum of 0.6 (2 feet) beyond any front yard easement containing a Water District or County/Township owned utility. For properties presently occupied/developed, services may terminate at or near property lines at District's option.

Sewer services to individual lots, which are to be privately maintained, shall not be located in easements across other lots, except for short distances to reach the public sewer main located in an easement immediately adjacent to the lot being served, or to reach the public sewer main located in a front yard easement on the opposite side of, and adjacent to, the street right-of-way from the lot being served.

2. Depth: All services shall terminate at a depth of no less than 8 feet or more than 9 feet below the adjacent top of curb unless otherwise approved by the Water District.
3. Slope: All services shall be laid at a slope of 1.0% or greater. The last length of pipe at the property line shall be laid at 1.0%. Changes in slope on services may be made by "breaking joints" provided the joint seal is air tight and the recommendations of the manufacturer are not exceeded. Fittings not greater than a 45° bend may be used where changes in grade dictate.
4. Service tees or wyes over 3.6 m (12 feet) deep shall be encased in portland cement concrete as per Standard Detail 7.07 C.

5. All sewer service laterals shall be a minimum of 150 mm (6 inches) diameter.
6. The waste piping from a point five feet (5') outside the building to the District Sanitary Sewer shall be considered the house sewer (or sewer service lateral) and shall be constructed of the following materials with a minimum diameter of six inches (6"): ductile iron, PVC Schedule 80 with cement joints, PVC Schedule 21 type PSM-SDR slip joint, PVC Schedule 40. Cellular core PVC is prohibited.

All material shall be embedded in sand or washed pea gravel with a minimum of four inches (4") below the sewer pipe and six inches (6") above the top of the sewer pipe.

Cleanouts are required in accordance with the Illinois Plumbing Code.

J. Sewer Connections to Bloomington-Normal Water Reclamation District (BNWRD):

1. All proposed sanitary sewers shall connect to BNWRD interceptor sewers at existing BNWRD manholes wherever possible.
2. Proposed sanitary sewer connection details shall be submitted for approval by BNWRD prior to construction on a case by case basis and shall include a new manhole adjacent to the existing BNWRD manhole, location, and elevation(s) to be approved by BNWRD and BTPWD.
3. Flow line elevation of proposed sanitary sewer shall be 4 ft.± or as designated above flow line elevation of BNWRD interceptor sewer at point of connection.

14.04 RIGHT-OF-WAY DEDICATION

Generally, all sanitary sewers which are to be maintained by the BTPWD, shall be installed in public easements or dedicated public rights-of-way. Such easements and rights-of-way are to be of sufficient width and the sewers to be installed at such locations as to permit open cut installation, maintenance and repair within the confines of the easement or right-of-way without relocation or other unreasonable interference with other public utilities located therein and so as to meet the following minimum standards:

- A. 4.5 m (15 feet) width plus 1.5 m (5 feet) for each additional utility other than water main and 3 m (10 feet) for a water main.
- B. For sewers exceeding 4.5 m (15 feet) in depth, additional width may be required.

14.05 ADDITIONAL CHARGES FOR SANITARY SEWER UPSIZING VARIOUS TRUNK LINE SANITARY SEWERS

- A. Sanitary Sewers. Where installation of sanitary sewer lines of larger capacity than required to serve land owned by the developer is required by the Water District to serve future growth in the vicinity of the development, the developer shall pay for only his portion, based on the Code requirements for his development, of the total cost of installation; the balance to be borne by others, as outlined in Section 3, H of Ordinance No. 12, latest revision, An Ordinance to Establish Rules, Fees and Regulations for the Operation of the Bloomington Township Public Water District.
- B. Engineering Costs. The developer will be responsible for all engineering costs for design of sanitary sewer facilities including pump stations within his/her development.
- C. Reimbursement to Developer. The proposer shall pay all costs to oversize Sanitary Sewer to serve upstream properties, sizes to be approved by the BTPWD; and, shall be paid to the District prior to final acceptance by the District. The District will recover costs (from "upstream" and "downstream" developers) to upsize these sanitary sewers for reimbursement to the proposer with the use of the "Additional Charges for Sanitary Sewer Upsizing Various Trunk Line Sanitary Sewers." As outlined in Section 3, H of Ordinance No. 12, latest revision, an Ordinance to Establish Rules, Fees and Regulations for the Operation of the Bloomington Township Public Water District.

14.06 APPROVAL AND ACCEPTANCE/ASSIGNMENT

The Water District will only accept public improvements after full compliance with the standards, as set forth by this Ordinance, has been verified by the Water District Engineer and/or Water District Manager. The developer, or other party tendering a public improvement for acceptance, must affirmatively state that he/she is unaware of any material defects in the public improvement which could lead to its early deterioration, maintenance or repairs prior to the standard expected maintenance or repairs on similar public improvements, and that developer is also unaware of damage to drainage tiles, other utilities, or septic fields/systems during the construction of the public improvement.

14.07 SPECIFICATIONS & SPECIAL PROVISIONS

All sanitary sewers shall be installed in accordance with all applicable sections of the "Standard Specifications for Water and Sewer Main Construction", then current edition as modified, supplemented and amended by this Ordinance or the Water District, or BNWRD specifications whichever is most restrictive. These modifications, amendments and amplifications have been provided in this Ordinance.

Special Provisions for Sanitary Sewer

Granular Cradle: A granular cradle (bedding and haunching) will be required for all sanitary sewers as shown in the Standard Details and in accordance with Section 20-2.20B of the "Standard Specifications for Water and Sewer Main Construction".

Trench Backfill: All trenches under another sewer or water main, or under or within 0.6 meters (2 ft) of existing or proposed streets, existing sidewalks and driveways shall be backfilled with trench backfill material in accordance with Section 208 of the "Standard Specifications For Road And Bridge Construction".

Material for Trench Backfill shall comply with Article 1003.04 of the "Standard Specifications For Road and Bridge Construction", except that the following graduations may be used in addition to FA6: CA6, and CA10, and except that the maximum size shall be 75 mm (3 inches) and that no material over 13 mm (1/2 inch) shall be used below 300 mm (1 foot) over the top of the sewer.

Backfill of Trenches: All sewer trenches under streets, driveways or sidewalks shall be compacted by jetting, mechanical compactor or as directed by the Water District.

Leakage Test: The leakage test will be by the low pressure air method. The contractor shall notify the Water District when the sewer is ready for testing 48 hours prior to testing operation. The ground shall be leveled and all manholes shall be accessible to the air testing equipment.

All sanitary sewers shall be cleaned and televised by an approved televising company, with a video tape recording provided to the Water District.

The video tape recording shall record a clear picture of the entire periphery of the pipe and shall include recorded locations of all data and features seen on the video tape.

Televising shall occur just prior to final acceptance and/or placement into service by the Water District.

Sewer Service Markings: The contractor shall place 50 mm x 100 mm wood studs (2x4's) extending from the bottom of the sewer service to 0.6 m (2 feet) above the ground at the location where each sewer service terminates. A minimum of the upper one (1) foot of each wood stud (2x4) shall be painted green. These markers shall be installed at the time the services are constructed.

Curb Marking of Sewer Mains & Sewer Services: At the time the curb and gutter is poured, the contractor shall mark the top of the curb with a permanent "S" for sewer to mark location of said services.

Adjustment of Manhole And Casting Within Pavement: Final grade for all manhole castings will be determined after the curb and gutter has been poured and the subgrade and/or base has been constructed. Final adjustment of the frame and grate shall be made in the following manner:

After the curb and gutter has been poured and the base constructed the final elevation will be determined by the Water District. The frame and grate will be adjusted to this elevation in accordance with the Standard Specifications. Any material disturbed while adjusting the frame and grate will be disposed of and all fill made with lean concrete. A maximum of 300 mm (12 inches) of adjusting rings shall be allowed.

Utilities: The Owner or his designee shall notify the utility companies of the impending project and the plans shall indicate the general location of the utility main lines. The Contractor shall have the responsibility before any construction work has begun, of obtaining from all utilities the exact location of any underground facilities in the area of construction, whether indicated on the plans or not. Any facilities disturbed by the Contractor shall be restored by him at his own expense. The Contractor shall coordinate with the proper utility the relocation of any facility designated on the plans or deemed necessary to be relocated by the Water District in order to complete construction of the project.

Residents shall be notified a minimum of 48 hours in advance of impending service outages, and no residence shall be without service overnight.

Special Provisions Modifying Standard Specifications for
Water and Sewer Main Construction in Illinois

30-3.01 F DUCTILE IRON PIPE

Add:

Inside of all pipes shall have standard cement mortar lining and the inside and outside shall be tar (seal) coated.

31-1.11 A (1) SELECTION OF TEST SECTIONS

Delete paragraphs two, three and four and substitute the following:

All sections of the sewer shall be tested, except for those designated portions of the sewer that are placed into service during the construction process.

32-2.07 CAST IRON FRAMES AND COVERS

Add the following:

Covers shall be Neenah, East Jordan or equal. Neenah numbers are given as examples.

For Sanitary Manholes: Standard Type 1 Frame and Cover – Neenah R-1772 B with Type “B” Lid and NF-9204 pick hole. All lids for sanitary manholes shall be self-sealing.

32-3.05 PRECAST MANHOLES

Add the following to paragraph 3:

No bitumastic material shall be used on the inside of manholes. Inside of all joints shall be finished with non-shrink type grout and rubber gaskets.

32-3.09 PLACING CASTINGS

Change to read:

Castings placed on concrete or masonry surfaces shall be set in a full mortar bed or on approved solid bituminous gaskets.

32-3.09 C MANHOLES NOT WITHIN STREET OR ALLEY AREAS

Change 450 mm (18 inches) to 600 mm (24 inches).

Change second paragraph to read:

Unless otherwise directed, the top of manhole castings shall be at grade of existing surface.

32-3.11 PIPE CONNECTIONS

Add the following sentence:

Bituminous material shall be used on the outside of the manhole only.

14.08 STANDARD DETAILS

<u>Standard Drawing</u>	<u>Title</u>
7.07 A	Standard Sanitary Manhole Details
7.07 B-1	Standard Drop Manhole Details
7.07 B-2	Inside Drop Service Connection
7.07 C	Typical House Connections
7.07 D	Standard Concrete Collar & Pipe Bedding and Excavation Details
7.07 E	Water & Sewer Separation Requirements (Horizontal)
7.07 F-G	Water & Sewer Separation Requirements (Vertical)

14.10 VALIDITY

That if any section, paragraph, clause or provision of the Ordinance shall be held to be invalid or unenforceable for any reason, the invalidity or unenforceability of such section, paragraph, clause or provision shall not affect any of the remaining provisions of this Ordinance.

14.11 ORDINANCE IN FORCE

Sec. 1 This Ordinance shall be in full force and effect from and after its passage and approval and publication as provided by law.

Sec. 2 Passed and adopted by the Board of Trustees of the B.T.P.W.D. of McLean County, State of Illinois on the 9th day of March, 2004 by the following vote:

Ayes 5 namely Edwards, Oehler, Pap Ton, Roseman, Friedrich

Nays 0 namely _____

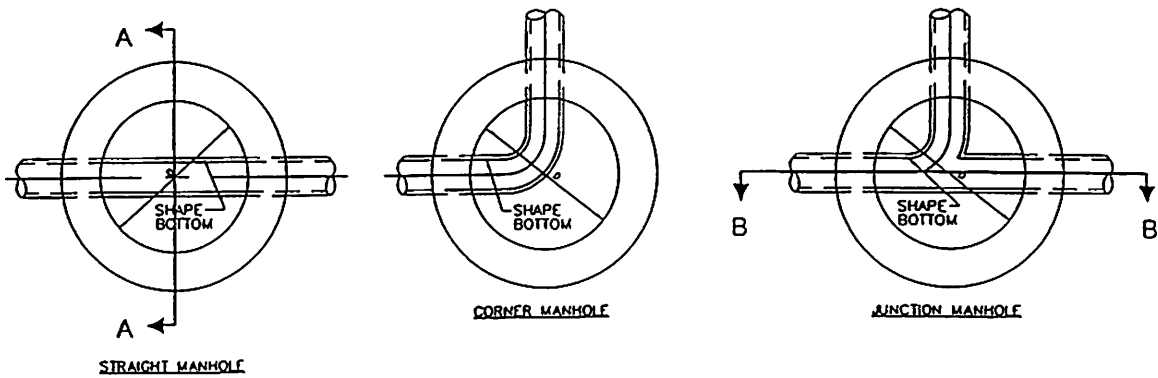
Approved this 9th day of March 2004

Signed [Signature]
(Chairman)

ATTEST:

Signed Evelyn G. Day
(Secretary)

(WATER DISTRICT SEAL)



FINAL ADJUSTMENT MADE WITH BRICK LAID RADIALLY & MORTAR OR CONCRETE "ADJUSTING" RINGS 4" MINIMUM / 12" MAXIMUM MASTIC IS NOT PERMITTED ON ADJUSTIVE RINGS

STANDARD TYPE 1 FRAME & GRATE NEENAH R-1772-B WITH TYPE 'B' LD & NF-9204 PICK HOLE FOR SANITARY SEWER

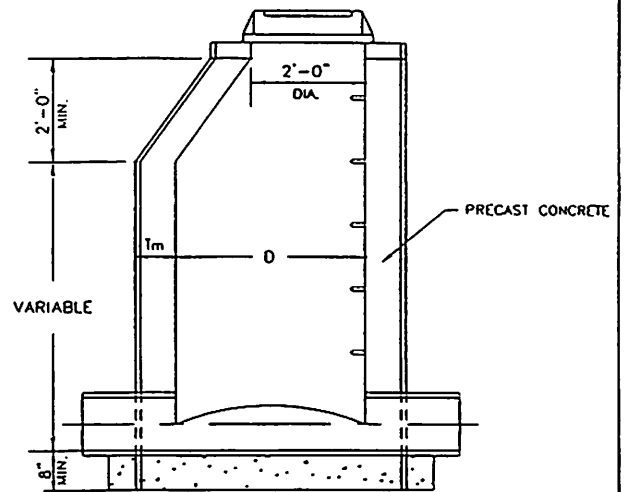
CAST IRON MANHOLE STEPS 16" CENTERS CLOW F-3650 OR EQUAL

TROWLED SURFACE

CONCRETE BASE

6" MIN. (TYP)

SECTION A-A



SECTION B-B

d = DIA. OF SEWER	D = DIA. OF MANHOLE	PRECAST Tm
8" THRU 30"	D = 48"	4"
33" THRU 48"	D = 60"	5"
54"	D = 72"	6"

ALL CAST IN PLACE
MANHOLE SHALL BE : Tm=6" MIN

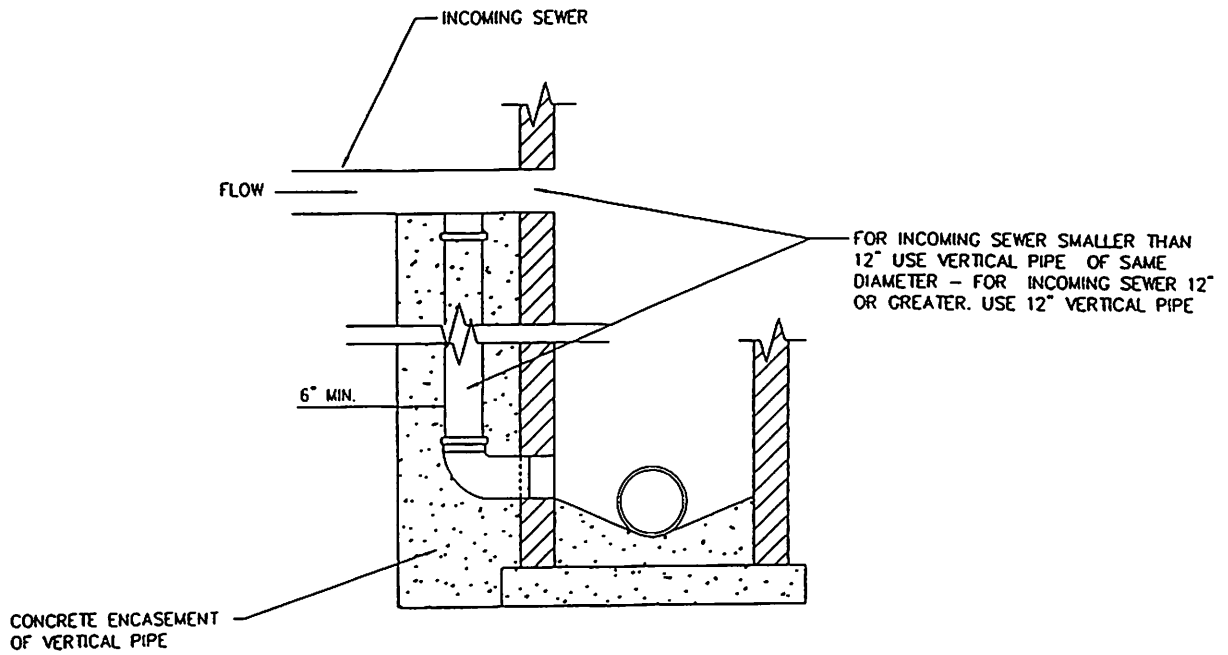
DETAIL OF SANITARY MANHOLE - TYPE A

1 OF 1 SHEET

DESIGN BY: FARNSWORTH GROUP
STANDARD MANHOLE
STANDARD DETAIL 7.07A

BY:
APPROVED
DATE:

BLOOMINGTON TOWNSHIP
PUBLIC WATER DISTRICT



DROP MANHOLE CONNECTION

NOTES

TO BE USED IN CONJUNCTION WITH TYPE "A" MANHOLES WHERE SEWER ENTERS 24" OR MORE ABOVE LOWEST INVERT.

THIS DETAIL APPLIES TO INCOMING SEWERS OF 18" DIA. OR LESS

1 OF 1
SHEET

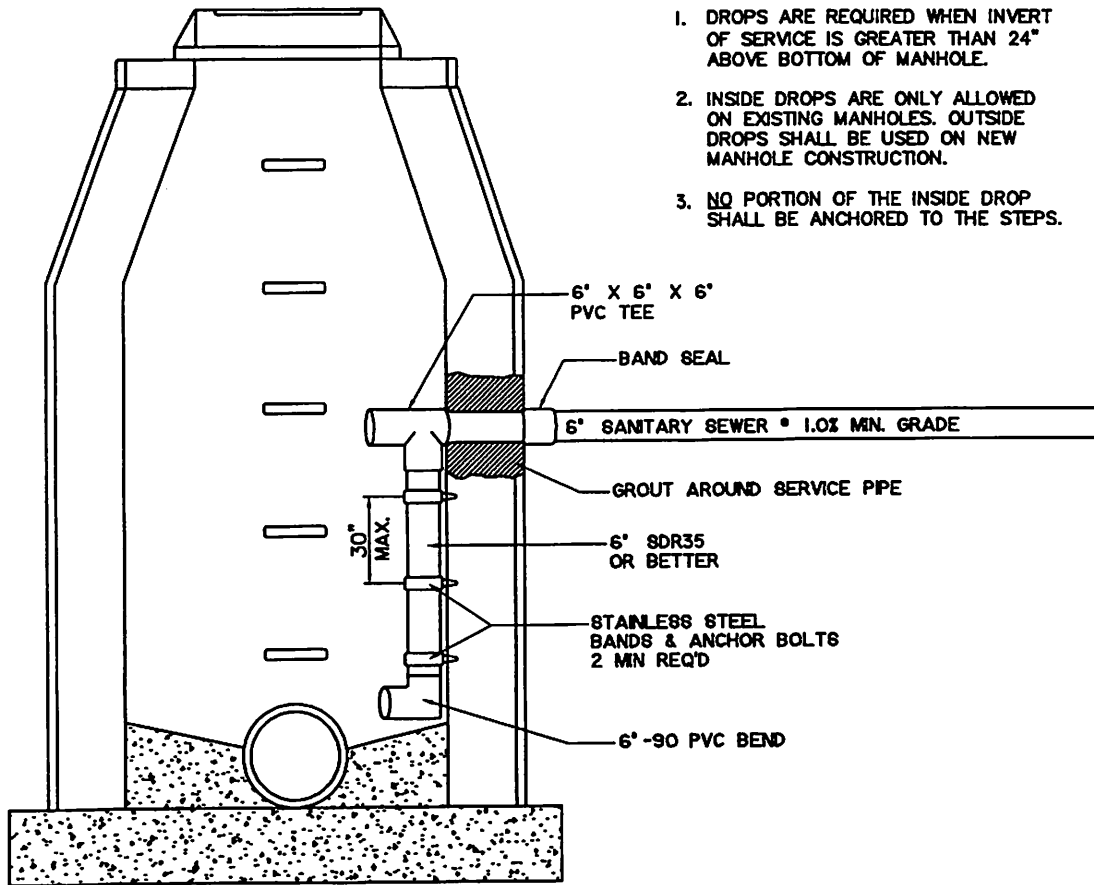
DESIGN BY: FARNSWORTH GROUP

STANDARD DROP MANHOLE

STANDARD DETAIL 7.07B-1

BY:
APPROVED
DATE:

BLOOMINGTON TOWNSHIP
PUBLIC WATER DISTRICT

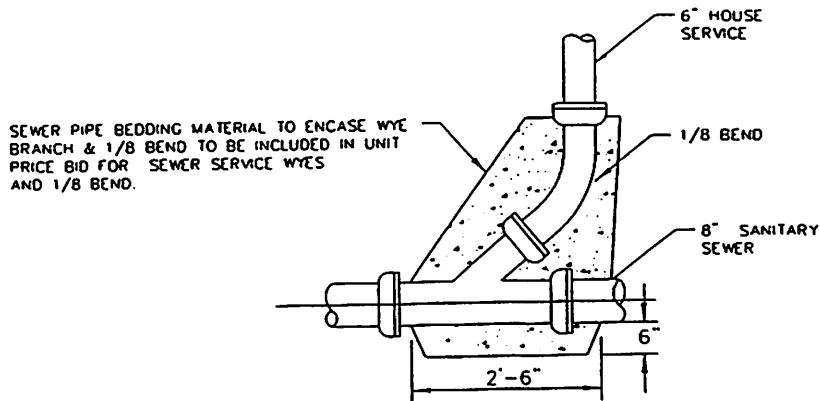
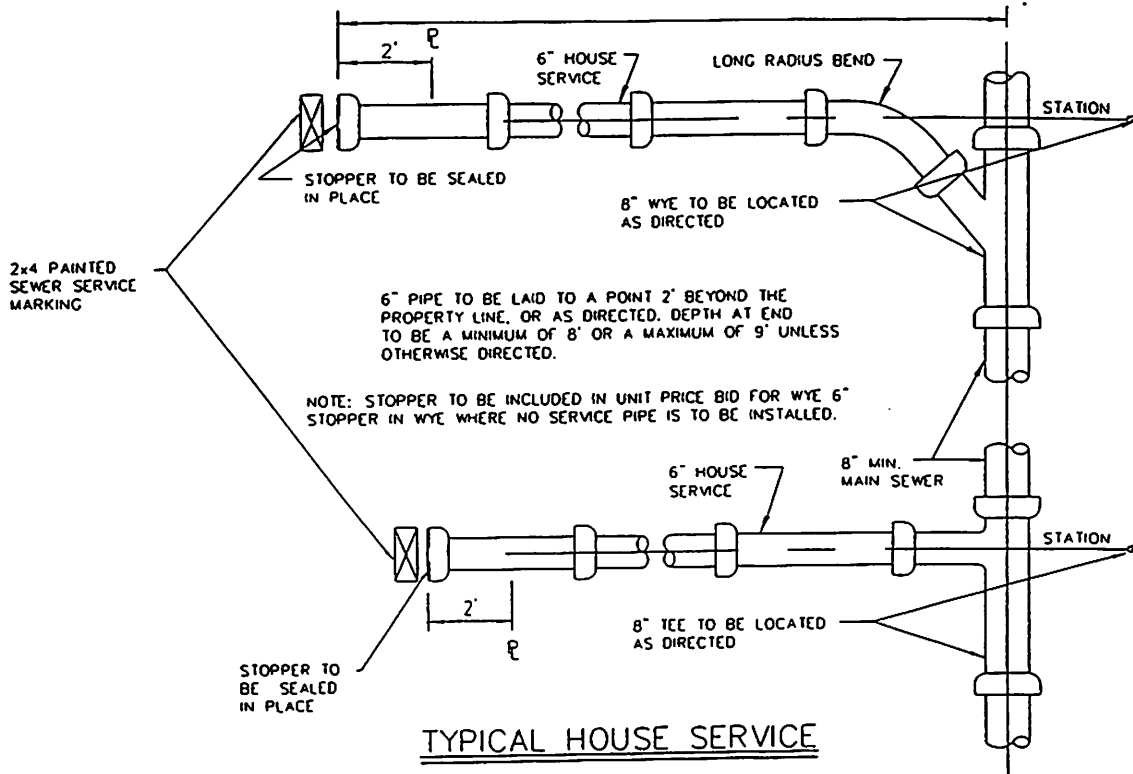


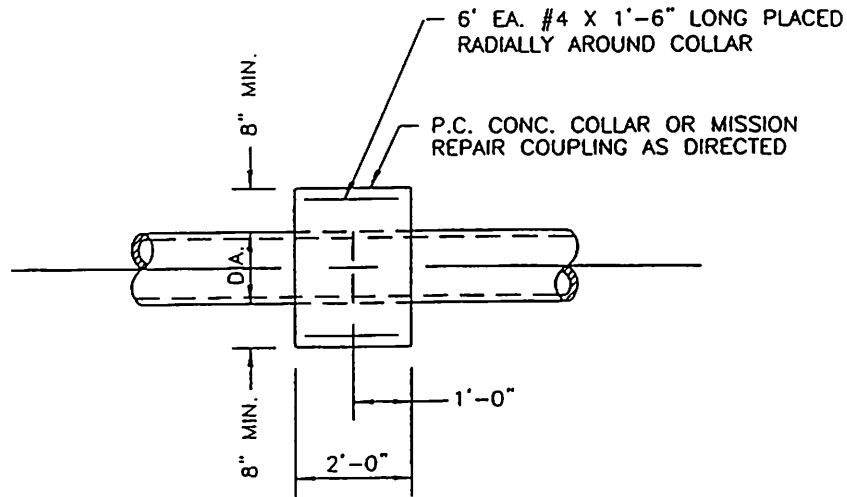
NOTES:

1. DROPS ARE REQUIRED WHEN INVERT OF SERVICE IS GREATER THAN 24" ABOVE BOTTOM OF MANHOLE.
2. INSIDE DROPS ARE ONLY ALLOWED ON EXISTING MANHOLES. OUTSIDE DROPS SHALL BE USED ON NEW MANHOLE CONSTRUCTION.
3. NO PORTION OF THE INSIDE DROP SHALL BE ANCHORED TO THE STEPS.

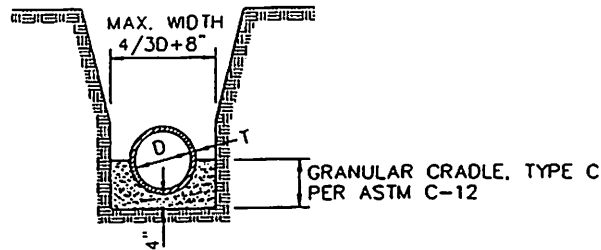
SHEET 1 OF 1	DESIGN BY: FARNSWORTH GROUP	APPROVED BY: <i>EWE</i>	BLOOMINGTON TOWNSHIP PUBLIC WATER DISTRICT
	INSIDE DROP SERVICE CONNECTION	DATE: 3/9/04	
	STANDARD DETAIL 7.07B-2		

NOTE: 6" SERVICE TO BE PAID FOR BY MEASURING FROM CENTERLINE MAIN SEWER TO END OF 6" SERVICE 1/8 BEND TO BE INCLUDED IN UNIT COST OF 6" SERVICE

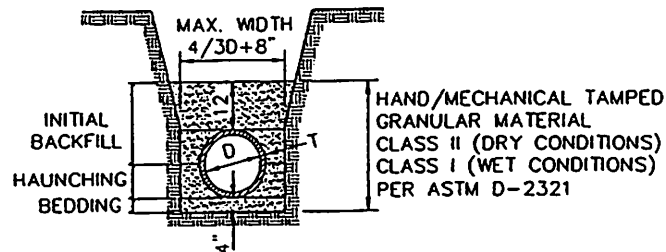




CONCRETE COLLAR DETAIL



RIGID SEWER BEDDING & EXCAVATION DETAIL (DUCTILE IRON OR E.S.V.C.P.)



FLEXIBLE SEWER BEDDING & EXCAVATION DETAIL (PVC)

1 OF 1
SHEET

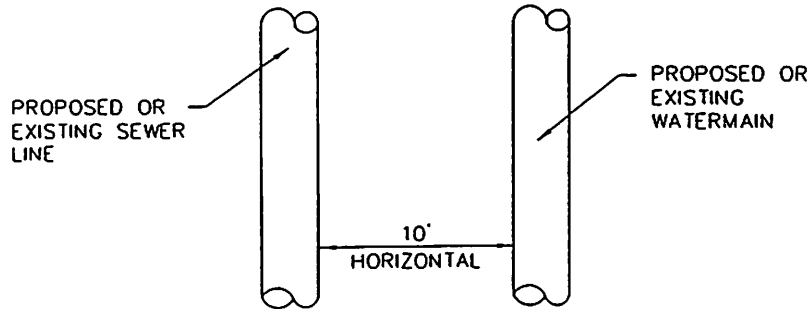
DESIGN BY: FARNSWORTH GROUP
STANDARD CONCRETE COLLAR & PIPE BEDDING & EXCAVATION DETAILS

STANDARD DETAIL 7.07D

BY:
APPROVED
DATE:

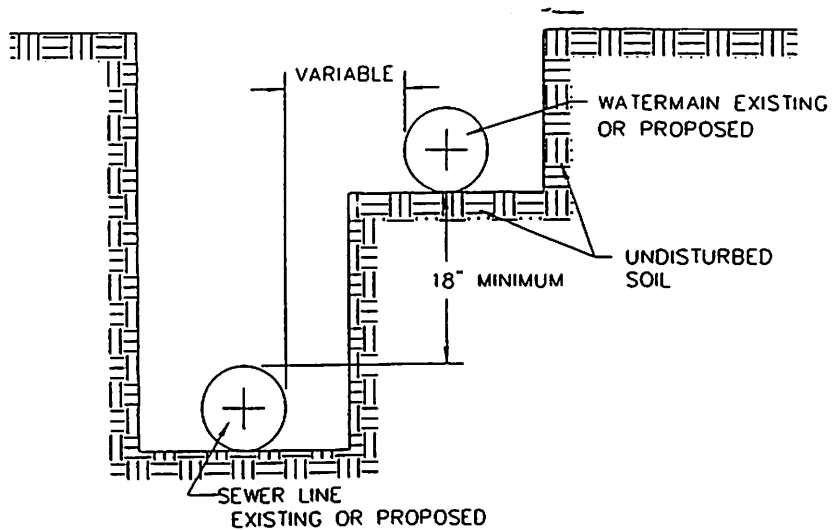
BLOOMINGTON TOWNSHIP
PUBLIC WATER DISTRICT

WHEN PROPOSED SEWER (OR WATER) IS LOCATED 10 FEET OR MORE FROM EXISTING WATER (OR SEWER), NO SPECIAL CONSTRUCTION IS REQUIRED



PLAN VIEW

WHEN PROPOSED SEWER (OR WATER) IS LOCATED LESS THAN 10 FEET FROM EXISTING WATER (OR SEWER), DETAILS BELOW SHALL APPLY



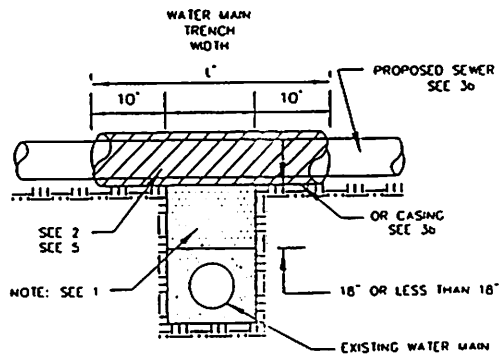
WATER AND SEWER
SEPARATION REQUIREMENTS
HORIZONTAL SEPARATION

NOTE:
SEWER BEDDING DETAILS NOT SHOWN

SHEET 1 OF 1	DESIGN BY: FARNSWORTH GROUP	BY: APPROVED DATE:	BLOOMINGTON TOWNSHIP PUBLIC WATER DISTRICT
	WATER/SEWER SEPARATION REQUIREMENTS		
	STANDARD DETAIL 7.07E		

EXISTING WATERMAIN BELOW PROPOSED SEWER LINE WITH 18" MINIMUM SEPARATION.
 EXISTING WATERMAIN BELOW PROPOSED SEWER LINE WITH LESS THAN 18" SEPARATION.

NOTE: CLASS IV MATERIAL TO BE COMPACTED TO 95% OF STANDARD PROCTOR MAXIMUM DENSITY.



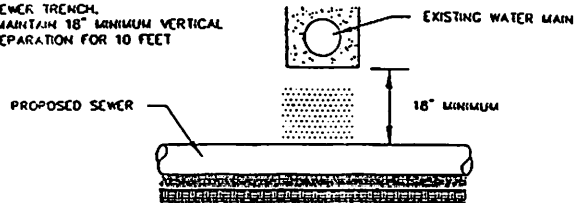
GUIDELINES

1. IF SELECT GRANULAR BACKFILL EXISTS: REMOVE WITHIN WIDTH OF PROPOSED SEWER TRENCH AND REPLACE WITH SELECT EXCAVATED MATERIAL (CLASS IV) AND COMPACT.
2. OMIT SELECT GRANULAR CRADLE AND GRANULAR BACKFILL TO ONE (1) FOOT OVER TOP OF PIPE AND USE SELECT EXCAVATED MATERIAL (CLASS IV) AND COMPACT THE LENGTH OF L'
3.
 - a. CONSTRUCT 10 FEET OF PROPOSED SEWER OF WATERMAIN MATERIAL AND PRESSURE TEST, OR:
 - b. USE L' OF WATER MAIN MATERIAL FOR CASING FOR PROPOSED SEWER AND SEAL ENDS OF CASING.
4. POINT LOADS SHALL NOT BE ALLOWED BETWEEN SEWER OR SEWER CASING AND WATER MAIN.
5. PROVIDE ADEQUATE SUPPORT FOR EXISTING WATER MAIN TO PREVENT DAMAGE DUE TO SETTLEMENT OF SEWER TRENCH.

PROPOSED SEWER LINE BELOW EXISTING WATER MAIN WITH 18" MINIMUM SEPARATION.

GUIDELINES

1. PROVIDE ADEQUATE SUPPORT FOR EXISTING WATER MAIN TO PREVENT DAMAGE DUE TO SETTLEMENT OF SEWER TRENCH.
2. MAINTAIN 18" MINIMUM VERTICAL SEPARATION FOR 10 FEET

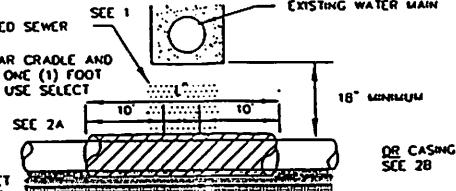


PROPOSED SEWER LINE BELOW EXISTING WATER MAIN WITH LESS THAN 18" SEPARATION.

NOTE: CLASS IV MATERIAL TO BE COMPACTED TO 95% OF STANDARD PROCTOR MAXIMUM DENSITY.

GUIDELINES

1. OMIT SELECT GRANULAR CRADLE AND GRANULAR BACKFILL TO ONE (1) FOOT OVER TOP OF PIPE AND USE SELECT EXCAVATED MATERIAL (CLASS IV) AND COMPACT FOR 10 FEET ON EITHER SIDE OF WATER MAIN.
2.
 - a. CONSTRUCT 10 FEET OF PROPOSED SEWER OF WATER MAIN MATERIAL AND PRESSURE TEST, OR:
 - b. USE L' OF WATER MAIN MATERIAL FOR CASING OF PROPOSED SEWER AND SEAL ENDS OF CASING.
3. POINT LOADS SHALL NOT BE ALLOWED BETWEEN SEWER OR SEWER CASING AND WATER MAIN.
4. PROVIDE ADEQUATE SUPPORT FOR EXISTING WATER MAIN TO PREVENT DAMAGE TO SETTLEMENT OF SEWER TRENCH.



**WATER AND SEWER SEPARATION REQUIREMENTS
 VERTICAL SEPARATION**

DESIGN OF SEWERS
 RATIO OF PEAK FLOW TO DAILY AVERAGE FLOW
 (REFER TO 35 ILL. ADM. CODE 370.122(b))

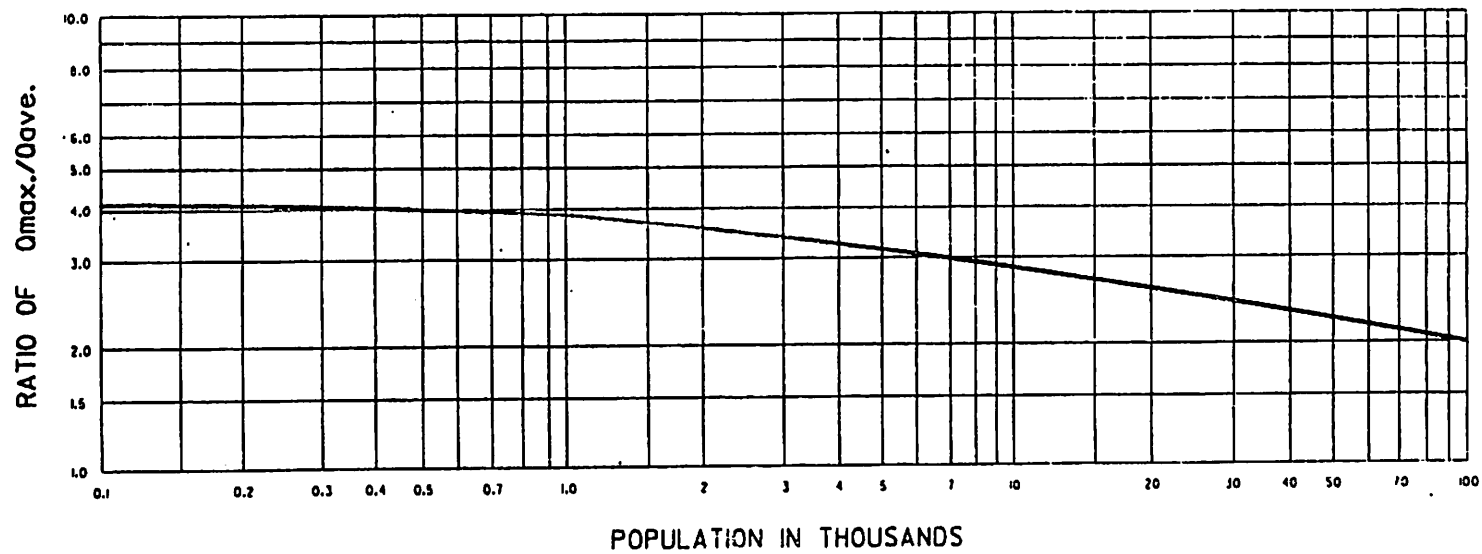


EXHIBIT Q

14.09

Qmax: Maximum Rate of Sewage Flow (Peak Hourly Flow)

Qave: Average Daily Sewage Flow

Source: $Q_{max.}/Q_{ave.} = \frac{18 + \sqrt{P}}{4 + \sqrt{P}}$ (P = population in thousands)

Fair, G.M. and Geyer, J.C. "Water Supply and Waste Water Disposal"
 1st Ed., John Wiley & Sons, Inc., New York (1954), p. 136