



Illinois Department of Transportation

Memorandum

To:	Studies and Plans Squads	PPM 50-01
From:	J. W. Witters	Revised: Tim Brandenburg
Subject:	Water Mains	
Date:	November 9, 1972	Revision Date: May 10, 2004

PLAN PREPARATION MEMORANDUM 50-01

BACKGROUND

This memorandum revises Plan Preparation Memorandum 72.35P Design Water mains and supplements Section 561 of the Standard Specifications in providing uniformity of District preference concerning construction of water mains.

PROCEDURE

Article 561.02 of the Standard Specifications states: "Materials shall be as shown in the contract." Materials used for construction of watermain are certified prior to use according to requirements of the Illinois Environmental Protection Agency. Municipalities who request watermain improvements are responsible for sending plans to the IEPA for approval and to obtain a permit. The "Application for construction Permit" and "Schedules A and B may be found at the Illinois Environmental Protection Agency website; <http://www.epa.state.il.us/water/permits/drinking-water/index.html>.

This website also provides a list of frequently asked questions. Studies and Plans members should review these questions prior to beginning design of watermain. Following are a few of the FAQ's:

These FAQ's have been developed by the Bureau of Water of the Illinois Environmental Protection Agency in order to increase awareness of the water main protection requirements from sewers by answering frequently asked questions. Watermain must be protected from sanitary sewers, storm sewers, combined sewers, house sewer service connections, drains, and septic fields according to the requirements stated in the Agency Rules For Public Water Supplies (formerly Technical Policy Statements); the formal citation is: Title 35, Subtitle F, Chapter II, Parts 651-654).

- 1. Does the water main have to be separated ten feet horizontally from the sewer, if the sewer is constructed with water main equivalent pipe?**

Yes, unless local conditions prevent it. The water main must be located at least ten feet horizontally from any existing or proposed drain, storm sewer, sanitary sewer, combined sewer, or sewer service connection, unless local conditions prevent a lateral separation of ten feet.

- 2. If local conditions prevent a lateral separation of ten feet, what alternatives are available?**

If it is not possible to obtain ten feet separation the Agency may approve construction in which the water main invert must be 18 inches above the crown of the sewer. In parallel situations where it is not possible to obtain the lateral or vertical separation, then the Agency may approve construction in which the sewer is constructed of water main equivalent pipe and pressure tested to the maximum expected surcharge head before backfilling.

- 3. How is Agency approval obtained for deviations from the horizontal and vertical separation requirements?**

Agency approval is obtained during the construction permit application process. The construction Page 2 documents must clearly show those locations where the required horizontal and vertical separation cannot be provided. On the back of the Schedule B – Water Main Construction form or on an attached sheet, indicate the location(s) where the separation requirements are not met, the reason that proper separation cannot be provided, and how the water main will be protected. The construction permit, which lists the approved plans that clearly detail the situation(s) and indicate the alternative protection, serves as the Agency's acceptance of the deviation(s).

- 4. How is the distance between pipes's measured?**

The distance between pipes is measured edge to edge.

- 5. When local conditions prevent ten feet of horizontal separation can a casing pipe be used?**

No, casing pipe can only be used at crossings where the vertical separation requirement is not met.

6. If local conditions prevent a separation of ten feet between a water main and a force main can the two pipes be located closer together?

No, the exception criteria for gravity sewers do not apply to force mains. A horizontal separation of ten feet must be maintained in all instances.

7. If the invert of the sewer is 18 inches above the crown of the water main, is the water main properly protected?

No, when the water main crosses below a sewer, the sewer must be constructed with water main equivalent pipe or else either pipe must be installed in a casing. The protection must extend on each side of the crossing until the normal distance from the water main to the sewer or drain is at least ten feet. In addition, the water main must be located at least 18 inches below the sewer. This 18 inches is a structural protection to prevent the sewer from settling and breaking the water main.

8. What type of casing pipe is acceptable at water and sewer crossings?

If the invert of the water main is not 18 inches above the crown of the sewer when the pipes cross, a casing pipe can be installed around either the water main or sewer in lieu of constructing the sewer with water main equivalent pipe. The casing pipe must be a material that is approved for use as water main. Concrete is not an acceptable encasement. The casing must extend on each side of the crossing until the normal distance from the water main to the sewer or drain is at least ten feet. For example, 30 feet of casing would be required for a 6-inch water main crossing an 8-inch sewer at a 45 degree angle.

9. Can the storm sewer be constructed with reinforced concrete pipe with a flexible gasket joint meeting ASTM C361 or ASTM C443 as an alternative to constructing the storm sewer with water main equivalent pipe at locations where it is not possible to meet the separation requirements?

In parallel situations where local conditions prevent a ten foot separation the answer is no. At crossings, the answer is yes. Storm sewer constructed with reinforced concrete pipe is not a Page 3 approvable alternative when the storm sewer is parallel to a water main. At crossings when the invert of the water main is not 18 inches above the crown of the storm sewer, the storm sewer can be constructed with reinforced concrete pipe using flexible gaskets instead of providing a casing pipe or constructing the storm sewer with water main equivalent pipe.

10. Can the water main and sewer be installed in the same casing pipe when boring under roads, railroad tracks, streams, or other similar situations?

No, the water main and sewer must be installed in separate casing pipes, at least ten feet apart, to meet the sanitary protection requirements.

11. Does the water main have to be ten feet from a manhole?

No, the water main should be located as far as possible from manholes. The water main must not pass through or come into contact with a manhole.

12. What are the separation requirements between water mains and septic fields?

Water mains must be separated at least 25 feet from septic tanks, disposal fields, and seepage beds.

13. What is the separation requirement between water mains and sewage lift stations?

Water mains must be separated at least 25 feet from a sewage lift station.

14. Do the same horizontal and vertical separation requirements apply to water service lines?

Yes; locate water service taps on a water main so that either the ten foot horizontal separation or 18 inch vertical separation above sanitary sewers, storm sewers, combined sewers, drains, and sewer service connections is provided. For additional information on protection of water service lines refer to the Illinois Plumbing Code or contact the Illinois Department of Public Health.

15. Does a polyethylene pipe have to be protected from sewers when using a directional drilling technique to install the water main at least 18 inches below a sewer, if the material between the invert of the sewer and the crown of the water main is not disturbed?

Yes; the water main protection requirements still apply, regardless of the technique used to install the water main.

16. What action must be taken if, during the course of construction, existing utilities, water or sewer lines, are uncovered in unexpected locations which would interfere with the permitted and approved construction?

The water main protection requirements still apply. Take necessary action to provide the protection options as described in the Agency rules at part 653.119. (See below) Protective measures as detailed in the Standard Specifications for Water and Sewer Main Construction in Illinois' are also generally acceptable. Contact the Permit Section for approval of changes.

For further information, please contact the IEPA, Division of Public Water Supplies, Permit Section.

Section 653.119 Protection of Water Main and Water Service Lines (From Title 35, Subtitle F, Chapter II)

Water mains and water service lines shall be protected from sanitary sewers, storm sewers, combined sewers, house sewer service connections and drains as follows:

- a) Water Mains:
 - 1) Horizontal Separation:
 - A) Water mains shall be laid at least ten feet horizontally from any existing or proposed drain, storm sewer, sanitary sewer, combined sewer or sewer service connection.
 - B) Water mains may be laid closer than ten feet to a sewer line when:
 - i) local conditions prevent a lateral separation of ten feet;
 - ii) the water main invert is at least 18 inches above the crown of the sewer; and
 - iii) the watermain is either in a separate trench or in the same trench on an undisturbed earth shelf located to one side of the sewer.
 - C) Both the water main and drain or sewer shall be constructed of slip-on or mechanical joint cast or ductile iron pipe, asbestos-cement pressure pipe, prestressed concrete pipe, or PVC pipe meeting the requirements of Section 653.111 when it is impossible to meet (A) or (B) above. The drain or sewer shall be pressure tested to the maximum expected surcharge head before backfilling.

- 2) Vertical Separation:
 - A) A water main shall be laid so that its invert is 18 inches above the crown of the drain or sewer whenever water mains cross storm sewers, sanitary sewers or sewer service connections. The vertical separation shall be maintained for that portion of the water main located within ten feet horizontally of any sewer or drain crossed. A length of water main pipe shall be centered over the sewer to be crossed with joints equidistant from the sewer or drain.
 - B) Both the water main and sewer shall be constructed of slip-on or mechanical joint cast or ductile iron pipe, asbestos-cement pressure pipe, prestressed concrete pipe, or PVC pipe meeting requirements of Section, 653.111 when:
 - i) It is impossible to obtain the proper vertical separation as described in (A) above; or
 - ii) The water main passes under a sewer or drain.
 - C) A vertical separation of 18 inches between the invert of the sewer or drain and the crown of the water main shall be maintained where a water main crosses under a sewer. Support the sewer or drain lines to prevent settling and breaking the water main.
 - D) Construction shall extend on each side of the crossing until the normal distance from the water main to the sewer or drain line is at least ten feet.
- b) Water Service Lines:
 - 1) The horizontal and vertical separation between water service lines and all storm sewers, sanitary sewers, combined sewers or any drain or sewer service connection shall be the same as water main separation described in (a) above.

- 2) Water pipe described in (a) above shall be used for sewer service lines when minimum horizontal and vertical separation cannot be maintained.
- c) Special Conditions – Alternate solutions shall be presented to the Agency when extreme topographical, geological or existing structural conditions make strict compliance with (a) and (b) above technically and economically impractical. Alternate solutions will be approved provided watertight construction structurally equivalent to approved water main material is proposed.
- d) Water mains shall be separated from septic tanks, disposal fields and seepage beds by a minimum of 25 feet.
- e) Water mains and water service lines shall be protected against entrance of hydrocarbons through diffusion through any material used in construction of the line.

Part 8.6.5 Force mains (From the “Recommended Standards for Water Works”)

There shall be at least a 10 foot horizontal separation between water mains and sanitary sewer force mains. There shall be an 18 inch vertical separation at crossings. (Agency note: The water main is to be located above the force main at the crossing.)