

SECTION 18

WATER PROJECTS DESIGN STANDARDS & DETAILS

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18.1 General

The City and Town Engineer shall issue final approval for the installation of all public works facilities. All facilities shall be designed and installed in accordance with these Standards as well as applicable State and Federal regulations.

18.2 Water Distribution System Design Criteria

A. General

All water mains shall be designed and constructed in accordance with IDEM and Ten States Standards for Water Works requirements.

All water mains shall be designed to provide fire protection and sized by hydraulic analysis based on flow demands and pressure requirements. The system shall be designed to maintain a minimum pressure of twenty (20) psi at ground level at all points in the distribution system under all conditions of flow. The normal working pressure in the distribution system shall be approximately sixty (60) psi and not less than thirty-five (35) psi. System design shall be such that fire flows and facilities are in accordance with the requirements of the State Insurance Services Office.

All designs shall assume a peak hourly flow of no less than one (1.0) gpm per residential customer and no less than ten (10.0) gpm for a minimum dead-end flow analysis unless conditions warrant otherwise.

B. Mains

1. Pipe Capacities and Size

The minimum size of water main for providing fire protection and serving fire hydrants shall be six (6) inch diameter. Larger size mains will be required, if necessary, to allow the withdrawal of the required fire flow while maintaining the minimum residual pressure specified in **Section 5.2(A)**. Hydraulic calculations shall be prepared by the Developer/Contractor's Engineer and submitted to the City and City Engineer for review and approval. Any departure from minimum requirements shall be justified by hydraulic analysis and future water use and will only be considered in special circumstances. If necessary, booster pump systems shall be supplied to maintain minimum pressures at the Developer/Contractor's expense.

2. Minimum Depth

The minimum depth for all water lines shall be five (5) feet (60 inches) to the top of the pipe.

3. Dead Ends

In order to provide for additional reliability of service and reduce pressure loss, dead end mains shall be minimized by making appropriate tie-ins (looping) whenever possible. Where dead end mains occur, they shall be provided with a fire hydrant if flow and pressure are sufficient, or with an approved flushing hydrant or blow-off for flushing purposes as approved by the City and City Engineer. Flushing devices should be sized to provide flows with a minimum velocity of 2.5 feet per second in the water mains being flushed. No flushing device shall be directly connected to any sewer.

C. Hydrants

1. Location and Spacing

Hydrants shall be provided at each street intersection and at intermediate points between intersections as recommended by the State ISO. In general, hydrant spacing shall range from three hundred fifty (350) to six hundred (600) feet depending on the area being served.

2. Valves and Nozzles

The fire hydrants shall be 5¼ inch (main valve opening) with 6-inch auxiliary valve and connection pipe with breakoff flange and coupling assembly. The fire hydrants shall have two (2) 2½" hose nozzles and one (1) 4½" pumper nozzle threaded to meet the requirements of the local Fire Department. Nozzle caps shall be equipped with chains. All fire hydrants shall be arranged for operation with operating nut of size and shape which is the same as that of the existing fire hydrants, or as specified by the local Fire Department. Pumper nozzle shall have a nominal setting of between eighteen (18) and twenty-four (24) inches above the curb or centerline of road and if necessary, the Developer/Contractor shall furnish extensions. Hydrant color shall be per the Owner's request.

3. Hydrant Connection

The hydrant connection to the water main shall be a minimum of 6 inches in diameter. Auxiliary valves for hydrant isolation shall be installed in all hydrant connection lines.

4. Drainage

Hydrants shall be provided with a suitable drain. Hydrant drains shall not be connected to or located within ten (10) feet of sanitary sewers or storm drains.

D. Valves

Sufficient valves shall be provided on water mains so that mains can be isolated for repairs without inconvenience to water users or creating a sanitary hazard. Valves and tee fittings shall be provided at all locations where future mains will be installed to serve future development. Valves should be located at not more than five hundred (500) foot intervals in commercial districts and at not more than one block or eight hundred (800) foot intervals in other districts.

E. Air Relief Valves

1. Air Relief Valves

At high points in water mains, where air can accumulate, provisions shall be made to remove the air by means of hydrants or air relief valves. Automatic air relief valves shall not be used in situations where flooding of the manhole or chamber may occur. Manual air relief valves or hydrants are to be used as approved by the City or City Engineer.

2. Air Relief Valve Piping

The open end of an air relief pipe from automatic valves shall be extended to at least one foot above grade and provided with a screened, downward-facing elbow. The pipe from a manually operated valve should be extended to the top of the pit.

3. Chamber Drainage

Chambers, pits or manholes containing valves, blow-offs, etc. in a distribution system shall not be connected directly to any storm drain or sanitary sewer, nor shall blow-offs or air relief valves be connected directly to any sewer. Such chambers or pits shall be drained to the surface of the ground where they are not subject to flooding by surface water, or to absorption pits underground.

F. Water Services and Plumbing

Water services shall conform to the latest edition of the Uniform Plumbing Code and to these Standards.

The water service for individual users shall be connected to the water main with a service saddle or tee and a corporation stop.

All water services shall be sized for the anticipated water usage at the service, but in no case shall be less than 3/4 inch. All water services one (1) inch or larger shall have backflow preventers installed as approved by the City.

Provisions shall be made for metering of water usage to each service connection either by use of a meter pit or by a meter at the water service entrance to the building. If a service is metered at the building, a key curb stop shall be installed

at the edge of the right-of-way or easement line.

Water services installed for future connections shall be terminated at the right-of-way or easement line and valved and capped to insure one hundred (100) percent water tightness.

Individual booster pumps shall not be allowed for any individual service connection from the water main.

18.3 Easements

A. General

Whenever possible water mains shall be constructed within the public right-of-way. Should the construction be outside the limits of the public right-of-way, recorded easements shall be acquired, dedicated and recorded solely for the benefit of the City of Monticello.

The minimum permanent easement width to be dedicated to the City for the water main is fifteen (15) feet.

All water mains shall be centered in the easement unless sewer line is present. In that case, maintain minimum ten (10) foot separation between water and sewer lines.

The easements shall be exclusively under the discretion and control of the City. Ingress and egress shall be available to the City's crew at all times. No utility companies are allowed to use the easements for installation of their utility lines without the expressed written permission of the City. All plan sheets shall clearly identify the easement and the location of all other proposed utilities. The horizontal and vertical plans shall identify all utilities proposed to cross the easement.

B. Right-of-Way Plan Sheet

1. Geographic location map showing the extent of the project and including where applicable:
 - a. Directional North Arrow and Scale;
 - b. County;
 - c. Civil Township;
 - d. Section, Township and Range Identification;
 - e. Subdivision Names, Recording Information and Lot Numbers;
 - f. Highway, Road and Street Identification;
 - g. Rivers, Creeks and Named Ditches;
 - h. Assigned Parcel Numbers Arranged in Ascending, Numerical Order from the Project Beginning to End; and

- i. List of Apparent Owners (last deed of record) by Assigned Parcel Numbers.
2. In addition to the above, there should be sufficient information on the design drawings to properly correlate with the right-of-way plan sheet; i.e., property lines, subdivision information, parcel number or name, width of right-of-way, permanent or temporary and special conditions; for example, structures, trees, shrubs to be removed or replaced, sodding, riprap, etc.

C. Description Sheets

The following shall be provided:

1. Parcel Number;
2. Project Number;
3. Project Name;
4. Identification as to permanent or temporary easement;
5. Separate descriptions on separate sheets are required where both permanent and temporary easements are to be taken;
6. Meets and bounds descriptions shall be clear, concise and complete with sufficient detail to positively establish from known and referenced points, monuments, lines, etc. Total area should be stated at end of description, in acres;
7. Descriptions of easements from platted subdivision lots, including strips off sides of lots should include name of subdivision and recording information for the subdivision as well as affected lot number(s). NOTE: These are usually small areas; therefore, area should be stated in square feet; and
8. Registered land surveyor's licensed in the State of Indiana, seal and signature.

D. Property Plats

1. Parcel Number;
2. Project Number;
3. Project Name;
4. County;
5. Civil Township;
6. Section;
7. Township;
8. Range;
9. Owner;
10. Permanent or Temporary Legends;

11. Permanent or Temporary Easement Areas;
12. Total area of property out of which easement is to be taken;
13. Drawn By;
14. Directional North Arrow;
15. Scale;
16. Unplatted properties: complete boundaries of property description out of which easements are to be taken, including properly identified referenced corners, P.O.B.'s, monuments, roads, bearings, distances, etc.;
17. Platted subdivisions: dimensions of lot(s) as well as the lot number(s) and including the subdivision name and recording information;
18. Easement boundaries, including regulated drain boundaries, as described in Item A. of this subsection, including referenced bearings, distances, etc., and identified as in legend; and
19. Registered land surveyor seal and signature.

18.4 Drafting Standards for Project Plans

A. General

These Standards have been established for the purpose of ensuring uniformity in the design and drafting techniques of projects to be submitted for review and acceptance.

1. All projects submitted, having more than two (2) sheets, shall have a title sheet which will include:
 - a. General Overall Area Map;
 - b. Vicinity Location Map;
 - c. A Site Plan Map Detailing the Project;
 - d. Name/Title of Project, including Section Number if applicable;
 - e. Owner and Engineer's Name; and
 - f. Professional Engineer's Seal and Signature.
2. All plan and profile sheets are to be certified and dated by a professional engineer of the State of Indiana.
3. All sheets are to be numbered, with total number of sheets included.
4. Include detail sheet(s)/specification sheet(s), as applicable.
5. Design drawings shall be twenty-four (24) inch by thirty-six (36) inch.

B. Scales

The following scales for drawings are required:

1. Plan and Profile: Variable; Not to Exceed 1"=50' Horizontal and 1"=5'

Vertical.

2. Cross Sections: 1"=5' Horizontal and Vertical

C. Materials

Mylar type drafting film shall be used for all reproduction "originals" to be submitted as record drawings. They shall be of a quality suitable for blueline printing.

D. Plan and Profile Sheets

1. General

- a. A North Arrow;
- b. The Scales Used;
- c. Project Name and Number, Sheet Number, Date Drawn, Date and Nature of Revisions;
- d. All topography in the area affected by construction;
- e. Right-of-Way lines; property lines and easements;
- f. Locations of benchmarks and their descriptions;
- g. Locations of all existing and proposed utilities in the project area; and
- h. Match lines shall be easily identifiable.

2. Water Main Profile Drawings

All water main profile drawings shall include the following, as a minimum:

- a. Existing and finished grade lines;
- b. Depth of burial to top of pipe;
- c. Elevations to USGS datum;
- d. Types of materials used;
- e. Profile of existing and proposed utilities; and
- f. Special construction required due to unfavorable soil conditions, jacked and bored casing pipe, etc.

E. Record Drawings

All plans submitted as record ("as-built") drawings shall have all pertinent items shown on the plan view and properly scaled. This includes pipes, manholes, valves, hydrants, casing, etc. All sheets shall have the phrase "as-built" or "record drawing" boldly printed on them with the date and shall be stamped and signed by a professional engineer registered in the State of Indiana.