

VILLAGE OF CARO

ENGINEERING DESIGN STANDARDS

APRIL 2004

SECTION 2 – WATER DISTRIBUTION SYSTEM
VILLAGE OF CARO
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A. Plans and Specifications — Submittal Procedure

1. The plans and specifications shall be submitted in accordance with “Section 1- General Requirements & Submittals.”
2. The Applicant may proceed with water main permitting once the Village has conducted an initial review of the entire construction plan submittal and all revisions pertaining to the water main have been completed.

B. Plans and Specifications — Design Considerations General

1. All water systems shall be designed conforming to the current edition of the “Recommended Standards for Water Works”, published by Health Education Services, also known as the “Ten State Standards”.
2. Plans shall consist of a cover sheet showing plan and profile views of the complete job.
3. Reference “Section 1 - General Requirements & Submittals” for specific requirements pertaining to the presentation of plans.
4. The cover sheet shall contain a total quantity listing of the proposed water main improvements, indicating the lengths of pipe, type of pipe and their respective sizes.
5. Provide continuous stationing. Identify all existing and proposed tees, valves, bends, hydrants, etc.

C. Benchmarks and Elevations

1. Elevations shall be on U.S.G.S. Datum. There shall be a minimum of two (2) benchmarks with one (1) benchmark at least every 1,200 feet.
2. Proposed finish grade elevations at hydrants and gate wells shall be shown on the plans.

D. Soil Conditions

1. Water main design, relative to pipe bedding and location, shall reflect the proper selection of materials and construction method compatible with the field conditions. Areas which show unsatisfactory ground material for pipe bearing or possible chemical deterioration due to soils, shall be avoided or the pipe shall be suitably installed on adequately designed bedding and/or enclosed in protective wrap or coating.

E. Location and Layout

1. The distribution system in all developments requiring more than six hundred (600) feet of water main, shall have a minimum of two (2) connections to a source of supply and shall be a “looped” system, whenever possible.

2. Generally, water mains shall be installed in a public street right of way or in easements exclusively reserved for such use on the opposite side of the street from sanitary sewers. Whenever possible, water main shall be located on the north side of an east-west street and on the east side of a north-south street.
3. Water main shall be installed parallel to the property lines or building lines, with clearance distances to allow for a twenty (20) foot width dedication of easement centered on the water main. Water mains shall be kept on one side of the street for the entire length of the street.
4. Water main shall be constructed outside of paved parking areas, streets and drives, unless approved by the Village. The Village shall not be liable to repair improved areas within an easement.
5. In new developments water mains shall be installed from boundary to boundary in abutting roads and interior streets and at other locations, as may be deemed necessary by the Village for future extensions.
6. When connecting to an existing water main, a cut in tee with gate valve or a tapping sleeve and valve will be required. A full body sleeve is required for all taps made to ductile iron, cast iron or PVC water main, or as directed by the Village. Same size tapping sleeves will be allowed.
7. The plans shall indicate the finish grades of all hydrants, valve boxes and gate wells.
8. All water mains shall be located so as to provide a minimum of ten (10) feet horizontal clearance between the nearest edge of the water main and the nearest edge of any sanitary or storm sewer.
9. Where conditions require tunneling or boring, consult the Village for specific requirements. These conditions may include road crossings or conflicts with trees, shrubs, structures or other utilities. Where water mains cross improved roads of any type, the pipe shall be installed by tunneling or boring and be placed in a steel casing pipe, or as approved by the Village. All boring work shall be in accordance with the current MDOT standards and as approved by the Village.

F. Easements

1. Easements for possible extensions or looped connections shall be extended to the property line at locations designated by the Village. All easements shall be a minimum of twenty (20) feet wide and shall be dedicated to the Village.
2. The easement descriptions shall include the hydrant leads and shall extend a minimum of ten (10) feet beyond the hydrant on any lead. The easement documents shall contain a provision prohibiting the construction of or locating of any above ground structures within the limits of such easements.

G. Pipe Sizes

1. Eight (8) inch diameter water mains are the minimum size to be installed in single family residential areas.

2. Twelve (12) inch water mains are considered to be the minimum size in commercial, office, industrial and multiple family residential areas, except in a looped system of 1,500 feet or less where eight (8) inch mains may be permitted, if approved by the Village.
3. Water main shall be sized to provide the volumes required by the proposed developments. Design shall include ample research to verify that the required volumes and pressures are available.
4. Water mains shall be designed to provide adequate volumes for the fire fighting purposes. Insurance Services Office (ISO) Standards shall be used, as a minimum guideline, to provide 1000 gallons per minute (GPM) for emergency use.
5. All single hydrant leads longer than seventy-five (75) feet must be a minimum of eight (8) inches in diameter.

H. Pipe Materials

1. Water mains sixteen (16) inches in diameter or less, shall be cement-lined, ductile iron pipe, Class 54. Connectivity wedges shall be installed in each joint.
2. Ninety (90) degree bends are not permitted, except as detailed for hydrant assemblies.

I. Valves - Location

1. A valve shall be provided at every connection to existing mains, unless otherwise approved by the Village.
2. In general, valves on cross connecting mains shall be arranged so that no single line failure will require more than eight hundred (800) feet of main to be out of service. Also, sufficient valves shall be placed such that not more than twenty-four (24) homes, thirty (30) multiple family units, or two (2) hydrants shall be out of service within such section of water main, which can be isolated. On transmission mains, valves shall be spaced not more than one –quarter (1/4) mile apart. Valves shall be so arranged that any section can be isolated by closing not more than four (4) valves.
3. A valve shall be provided on every dead-end line where required for future extension, at a location approved by the Village. All dead-end mains must be valved at the tee.
4. Valves shall be as specified within the detail sheets.
5. Valves should not be located under roadway pavement, bike paths, sidewalks or driveway approaches, unless approved by the Village.

J. Gate Wells

1. All valves and tapping sleeves should be placed outside of hard surfaces whenever possible. Valves located outside of hard surface areas shall utilize a valve box, as specified on the Standard Detail Sheet. Approval from the Village is required for all valves to be located within a hard surface area. Those valves shall be housed within a valve well.

K. Fire Hydrants

1. In general, no residential dwelling shall be more than three hundred (300) feet from a fire hydrant, as measured along the street right of way line. Hydrants should be positioned as close to lot lines as possible. Locations shall be approved by the Village.
2. Commercial building sites shall be serviced by a minimum of two (2) hydrants located no closer than forty (40) feet from the structure.
3. Spacing of hydrants around commercial and/or manufacturing establishments shall be considered on an individual case and shall be determined by consultation with the Village and the Fire Department.
4. A hydrant shall be installed at the end of every dead-end main. Temporary blow-offs may be allowed at the end of dead-end mains when future extension is imminent, as approved by the Village.
5. In general, hydrants shall be located in the road right of way nine (9) feet from the right of way line, but not closer than six (6) feet to the back of curb. The location of hydrants with respect to the right of way line shall be indicated on the plans. Hydrant valves shall face the road and hydrants shall be plumb and set to grade prior to final acceptance.
6. In all other areas, no part of the exterior of commercial buildings shall be further than two hundred and fifty (250) feet from a hydrant, measured along the shortest feasible exterior route for laying hose.
7. Hydrants and valves shall be as specified within the Standard Detail Sheets.

L. Pipe Restraints

1. Thrust blocks shall be installed at all bends, dead-ends, tees, reducers and hydrants (See Standard Detail Sheet).
2. Restrained joints of a type acceptable to the Village may be used in lieu of thrust blocks with the number of restrained joints determined by the manufacturer and approved by the Village.

M. Services

1. Service lines are to be shown to all buildings other than single family detached dwellings.
2. Service lines shall be installed using Type “K” soft copper for services two (2) inches or less. Services over two (2) inches, shall be same material as main.
3. A curb stop for each service line shall be provided and located at the right of way. Curb stops in drives and sidewalk will not be allowed.
4. The internal diameter shall be shown for each service and the minimum size shall be one (1) inch in diameter. Meter brackets shall be “Angled Meters Stop” and can be purchased from the Village.

N. Fire Protection Lines

1. Fire protection lines, where applicable, are to be shown to all buildings.
2. A valve and a back flow device for each fire protection line shall be provided.
3. The domestic supply lead shall be a separate lead from the fire protection line.

O. Acceptance of Utilities

1. Preliminary Acceptance

- a. The installed mains must pass all required pressure tests and bacteriological tests, as required by the current Village Standards, prior to the final connections.
- b. Prior to acceptance, water mains shall be flushed in accordance with the Village Standards.
- c. All structures and valve boxes must be clean and free of construction debris.
- d. The Developer shall submit record drawings, which must include rim elevations, pipe size and tie downs to all water main appurtenances.

2. Final Acceptance

- a. Approved “mylar” record drawings shall be submitted to the Village prior to final acceptance of the water mains.