NEW JERSEY AMERICAN WATER

WATER MAIN EXTENSION DESIGN REQUIREMENTS

This guideline provides minimum requirements for the design of new water main extensions. This guide is not to be used as a substitution for the detailed design of the water system. The Developer's Engineer is responsible for the design of the water main extension project. The design must meet the standards, requirements and policies of New Jersey American Water. This guide, when used in combination with the *Water Main Technical Specifications*, can be used as the basis of design for most water main extensions. If you have any questions, you should call, e-mail or meet with your Water Company Project Manager.

1.0 Hydraulic Considerations and Pipeline Sizing

1.1 ***Minimum Pipe Size -*** The minimum pipe size shall be designed in accordance with NJDEP NJAC 7:10-11 and NJAC 5:21-5.

1.2 ***Standard Pipe Sizes -*** Standard pipe sizes of 4", 6", 8", 12" and 16" shall be used.

1.3 ***Fire Hydrant Lateral Sizes -*** Pipeline laterals to fire hydrants shall be a minimum of 6". Pipeline sizing on longer laterals (>25') shall be supported by hydraulic calculations based upon the needed fire flow.

1.4 ***Design Pressures -*** Pipeline material and joint restraint (also see paragraph 4.1) shall be based upon a minimum anticipated service pressure ranging from 35 to 100psi at the curb. In some areas of the state pressures may be greater. Your Water Company Project Manager will provide the anticipated service pressure for your specific project. Maximum pressures shall be in accordance with the applicable plumbing code. If a pressure reducing valve is required to limit customer pressures, it shall be located as indicated on the applicable *Service and Meter Standards* and it shall be the property and responsibility of the customer. In addition, distribution system pipeline diameters should be based on projected flow rates not exceeding 7fps during peak hour demand conditions and 10 fps during fire fighting events.

1.5 ***Maximum Fire Flow -*** The design should not include features to meet needed fire flows exceeding 3,500 gpm. Individual (non-public water supply) fire suppression systems should be designed by the property owner to meet needed fire flow in excess of 3,500 gpm.

1.6 ***Design Fire Flows -*** The static and residual pressure needs of individual on site fire sprinkler systems should be considered in the network design, but they should not drive the design if the pressures are considerably higher than the pressures that would be required for public fire hydrants. In those cases individual fire booster pumps should be designed to meet individual fire sprinkler system needs.

1.7 ***Off-site Improvements -*** If there is (are) alternative(s) of meeting required hydraulic needs of either off-site piping improvements versus pumping improvements, the Water Company will require off-site piping improvements rather than pumping improvements.

1.8 ***Water Storage Tanks and Pump Stations -*** For those cases where piping networks cannot meet minimum flow and pressure requirements and where a new pump station and or tank is required or proposed, a separate meeting with the Water Company Project Manager is required in order to review project requirements. A water system master plan for the development may be needed in order to evaluate and recommend options to meet system needs through the construction of new pump stations, supplies, and/or storage tanks.

2.0 Piping and Network Layout

2.1 ***Connection to Existing Network -***. In accordance with NJAC 7:10 –11.10 (e), so far is practicable, distribution mains shall be laid in a loop system to eliminate dead ends. In other words, the Water Company encourages the looping of its mains so as to minimize dead ends, or single direction flow patterns.

2.2 ***Sewer Separation -*** Minimum separation shall be maintained for sanitary and industrial sewer lines in accordance with N.J.A.C. 7:10-11.10(e)5.

2.3 ***Other Utilities -*** Water mains cannot be installed in common trenches with other utilities.

2.4 ***Dead-Ends -*** Dead ends shall be minimized and, where necessary, they shall be provided with blow-offs.

2.5 ***Blow-Offs -*** Blow-offs shall NOT be connected to any sewer manholes, catch basins, or sewer mains.

2.6 ***Valves -*** In-line valves shall be installed at every point where pipelines intersect, in every direction.

2.7 ***Air Release Valves -*** If required, the pipe network shall include appurtenances to allow for the release of entrapped air during filling and during normal operations.

2.8 ***Install in Public Rights of Way -*** Pipelines are preferred in dedicated, public rights-of-way. If pipelines cannot be installed in dedicated, public rights-of-way, easements are required.

3.0 Pipe Cover

3.1 ***Minimum Cover -*** The minimum pipeline cover requirement shall be 4 feet.

3.2 ***Cover Variances -*** If minimum cover requirements cannot be achieved in certain areas, a detailed design reviewed and accepted by the Water Company must be provided to insure adequate protection from freezing and from live loads on the pipeline.

4.0 Thrust Restraint

4.1 ***Engineer Responsible -*** The Engineer is responsible for the design of all thrust restraint systems. The proposed systems shall be reviewed and accepted with Water Company representatives prior to final design. A 100 psi surge allowance shall be added to the anticipated service pressure to determine the proper thrust restraint measures.

4.2 ***Acceptable Systems -*** Include:

1) Adequately sized thrust blocks bearing on **undisturbed** soil.
2) A system of wedge action retainer glands on mechanical joint fittings in combination with the use of restrained joint pipe as required on each side of the fitting.
3) Adequate lengths of restrained joint pipe.
4) Other systems may be acceptable, but should be reviewed and approved by the Water Company in concept, before final design.

5.0 Bedding and Backfill

5.1 ***Select Backfill -*** A minimum of six inches of bedding and twelve inches of cover shall be required for all mains and services. All material, construction methods and procedures shall comply with the latest edition of the Water Main Technical Specification.

1) For water mains within an existing Public Right of ways: a minimum of 100% select backfill, which shall be compacted to a minimum of 90% of optimum compaction, is required. However the governing entity that has jurisdiction of right of way, may require a more stringent specification.

2) For water mains within and along proposed Pavement Areas: It is understood that company recommends the use of 100% select backfill, which shall be compacted to a minimum of 90% of optimum compaction and unless provided with a letter from the governing entity that has jurisdiction, 100% select backfill, which shall be compacted to a minimum of 90% of optimum compaction is to be utilized.

3) For water mains outside pavement areas within private easements: It is understood that company recommends the use of 100% select backfill, which shall be compacted to a minimum of 90% of optimum compaction unless existing material is adequate.

If any soil is found that is not similar to the material approved for use for backfill by the governing entity that has jurisdiction of right of way or if the soil is too wet or has a high organic content or cannot be properly compacted, this soil shall be replaced by 100% select backfill which shall be compacted to a minimum of 90% of optimum compaction. Additionally the Water Company reserves the right to require 100% select backfill, which shall be compacted to a minimum of 90% of optimum compaction or reject any material it deems unsuitable.

The cost of the select backfill and any unsuitable excavated material from the trench for the main installed under this contract will be at the developer's expense.

It is recommended that the applicant provide letters from the governing entity that has jurisdiction of right of way with this application.

6.0 Fire Hydrants

6.1 ***Location -*** Fire hydrant locations must be approved by the local municipality or fire district.

6.2 ***Public Fire Hydrants -*** Fire hydrants in dedicated public rights of way shall be considered public fire hydrants. Public fire hydrants shall be installed, owned and maintained by the Water Company. Public Hydrants shall be installed on the short side of the water main unless otherwise approved.

6.3 ***Private Fire Hydrants -*** Fire hydrants on private property or in easements shall be considered private fire hydrants. Each private fire hydrant shall be considered a separate fire service and shall be subject to the fees that apply to each hydrant based upon the size of the connection to the water main. Private fire hydrants shall be installed, owned and maintained by the property owner.

6.4 ***Depth of Bury -*** The total depth of bury shall be a minimum of 4 feet and shall not exceed 6 feet.

7.0 Services, Metering and Backflow Prevention

7.0 ***Design Details –*** The design of services, meters and backflow prevention varies depending upon Project location. Consult your Project Manager for the design details in your Project's Service Area.