CITY OF NORFOLK DEPARTMENT OF UTILITIES
DESIGN AND CONSTRUCTION STANDARDS
Appendix F2 - Drinking Water System Design Checklist

1. Cross connections between drinking and non-potable water are strictly prohibited.
2. Service connections may require backflow prevention devices.
3. Proposed and existing water mains are properly labeled with type and class of pipe, size, and the horizontal and vertical distances shown on the drawings.
4. The minimum pipe size for distribution mains is 8 inches.
5. All existing and proposed sanitary sewer, storm sewer, gas, telephone, power, any other utility lines, and all water and sewer services which cross or run parallel to the water main(s), are shown with horizontal and vertical separations. Subsurface exploration has been performed where potential conflicts exist.
6. A minimum of eighteen (18) inches of vertical clearance has been designated and obtained at all crossings of other utilities, or as specified by other utility agencies, or otherwise approved by the Department.
7. Adjacent road and drainage projects are shown as required.
8. Consideration has been given to areas where roads and drainage structures may be lowered in the future.
9. Proposed water main(s) are shown with horizontal distance from rights-of-ways, buildings, other utility lines, and visible surface features.
10. All designs conform to the latest City and State tree protection and erosion control and sedimentation rules, regulations, and ordinances. Tree protection and erosion and sediment control devices are shown on the drawings.
11. The Design Engineer has coordinated the utility design and construction work with other Design Engineers where their projects connect or affect each other.
12. All revisions of previous submittals include an explanation of change or correction with the revised submittal documents.
13. Contract Documents (drawings and specifications) have been submitted to Virginia Health Department for review and approval for water mains greater than 18 inches in diameter.
14. If horizontal bore is required, bore location, length of bore, pit location(s) are shown in relation to all existing and/or proposed utilities on plan and profile.
15. Main line valves are shown at intervals not greater than 1000 feet and at tees and crossings. One less valve than the number of connecting mains at tees and crosses may be allowed.
16. Water mains 16 inches and smaller are shown a minimum of 10 feet from any part of a structure. Water mains larger than 16 inches are shown a minimum of 20 feet from a structure.

17. All water lines less than 24 inches in diameter have a minimum depth of cover of 36 inches. All water lines 24 inches and greater have a minimum depth of cover of 42 inches.
18. The location of fire hydrants has been coordinated with the Fire Department by the Department of Utilities. Fire hydrant locations comply with design standards.
19. Dead-ends shall be minimized by the looping of all water mains.
20. Hydrants or blow-off valves are designed at major low places in the line where possible and air release valves are designed at the high points.
21. A fire hydrant is located at the end of all lines. If this is not possible, then a 2-inch blowoff valve may be used.
22. All proposed water services are sized adequately and shown in accordance with the design standards.
23. Proposed water main location is shown a minimum of 5’ from face of curb or 2’ off pavement where there is a ditch.
24. Ditch lines are shown on the drawings and depth of ditch(es) are shown on the profile at the fire hydrant locations and service lines, where necessary.
25. Water main stubs for future extensions are designed to prevent future disturbance of an intersection.
26. Location of water meter boxes are shown outside of non-vehicular traveled areas, driveways, and sidewalks. The boxes are shown in the right-of-way.
27. Where connecting to an existing water main, the Design Engineer has evaluated tapping the water main versus cutting the water main.
28. Valves and sample taps are located at both ends of underwater crossings. The pipe specified is appropriate for water crossings.
29. Water lines crossing over surface water are adequately supported, protected from freezing, are accessible for maintenance, and are located one foot above the 100-year flood elevation.
30. The Design Engineer has developed a tabular analysis of the total number of people proposed to be served based on existing zoning. The analysis assumes full build-out of the proposed service area using the Regional Technical Standards.
31. Average, maximum day, maximum hour, and fire flows have been developed for areas and sub-areas and tabulated in the report.
32. The system is designed to maintain a minimum pressure of 40 psi in the distribution system at the design flow, but no more than 80 psi at any service tap.
33. Domestic and fire flows have been calculated in accordance with AWWA and ISO standards. Calculations have been provided, and hydraulic modeling information (if applicable) is provided with all design assumptions clearly indicated.
34. A Hazen-Williams coefficient of friction equal to 120 shall be used for new mains and 100 for existing mains if no other information is available.

35. Design Engineer has designed the water system in accordance with available pressures and has provided hydrant flow test results.
36. The maximum allowable velocity is 5 fps for domestic design and 9 fps for domestic and fire flows combined.
37. Appropriate joint restraints are shown and design calculations with summary tables are provided.
38. Steel casing requirements have been considered, and design conforms to design standards and standard details.
39. Service and meter sizing calculations are provided and conform to the design standards.
40. Appropriate corrosion protection has been considered, with zinc coating being the minimum standard. For pipe sizes greater than 18 inches, a corrosion specialist shall be consulted.