

Fire Hydrants and Associated Water Mains **33.11.19**

Description:

The purpose of the section is to highlight the current applicable UMCP Design Standards for the design of fire hydrants and associated water mains.

Related Sections:

- TBD

Effective Date:

July 10, 2009

Applicable Standards:

- State of Maryland Fire Prevention Code NFPA 1 National Fire Prevention Code (latest edition)
- State of Maryland Model Performance Code (BOCA National Building Code --. Section 917) (latest edition)
- WSSC - Washington Suburban Sanitary Commission (Note: Projects not in the jurisdiction of the Washington Suburban Sanitary Commission (WSSC), substitute local water authority, State of Maryland Plumbing Code, International (BOCA) Plumbing Code and NFPA 24 as applicable) (latest editions)
- National Fire Prevention Code - NFPA 291

General Requirements:

- The campus receives water supply from WSSC and by legal agreement, complies with WSSC rules and regulations, including, but not limited to design standards and specifications.
- The campus facilities are serviced by two methods: metered and unmetered.
 - Metered: The contiguous campus is connected to WSSC by a number of underground fire flow bypass meters. The double meters record ordinary domestic flow and when large volumes are demanded, open a second, larger size meter.
 - Unmetered: Individual buildings and locations generally not on the contiguous campus have unmetered systems where all fire protection systems are supervised for flow with an executed fire supervision agreement with WSSC. The alternative is a meter set in the building or an outside shed constructed for the purpose.
- The campus system between the WSSC meters and the various buildings and site facilities is the "campus on-site" system, and consists of mains up to 12 inches in diameter of various ages and conditions. Individual buildings and locations not on the campus are "on-site" systems for those buildings or complexes and usually consist of a single main.
- The campus on-site system is the underground distribution from WSSC meters for all campus building and facilities including, but not limited to, domestic, irrigation, mechanical, fire protection systems, and fire hydrants. Individual building or complex on-site systems provide services required for the individual building or facilities.
- The campus on-site system with multiple supply point meters, loops, and grids minimally performs at 2,000 gallons per minute (GPM) at 20 pounds per square inch (PSI) fire flow over almost all the system. Individual building or complex facilities were provided fire flow in accordance with the calculated facility requirements.

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1. Water Service

- Sufficient fire flow shall be provided for the individual project as determined by a recognized standard method. Fire flow is additive to-all other-demand flows. The campus on-site system extension by loop, grid, or individual fire hydrant shall result in not less than 2,000 GPM at 20 PSI residual. Individual buildings or complexes shall meet minimum WSSC criteria (1,000 GPM at the last fire hydrant and 500 GPM additional at the adjacent fire hydrant at not less than 20 PSI residual).
- The minimum size of additions or replacement mains to the campus on-site system (loop or-grid is 8-inch. Mains to single fire hydrants are minimum 6-inch but must maintain minimum fire flow. The minimum size of on-site mains to individual buildings shall be as calculated and meet WSSC criteria (minimum 8-inch where the fire flow requirement is over 1,000 GPM).

2. Valves

- In the campus on-site system, gate valves shall be provided to sectionalize the system so that any outage will minimally affect fire protection.
 - Valves shall be provided for each hydrant lead-in connection so that no more than one fire hydrant may be out of service at any time.
 - Valves shall be installed so that fire hydrants and fire suppression systems for an individual building will not be out of service at the same time.
 - Valves shall be installed on each side of a tee or cross to maintain the loop or grid flow.
- Valves shall be located in streets, sidewalks or other paved surfaces. Where a paved surface is not possible, valve boxes shall be set in a 12 inch by 12 inch by 4 inch deep reinforced concrete square.
- Valve box covers shall be marked "WSSC WATER" where owned and maintained by WSSC and "WATER" on the campus on-site system and where owned or maintained by the university.

3. Fire Hydrants

- The number and spacing of fire hydrants provided shall be sufficient for the calculated fire flow and distribution requirements.
 - The campus on-site system requirement is approximately 300 feet between fire hydrants. Individual building or complex fire hydrant spacing is project dependent (WSSC criteria for dense, built-up areas is 250 to 300 feet).
 - Provide additional fire hydrants if the building is more than 300 feet from an existing campus on-site fire hydrant or public (WSSC) fire hydrant.
 - Fire hydrants should be available so that the first-hydrant is no more than 100 feet from the building and the-second fire hydrant no more than 400 feet from the building.
 - A fire hydrant shall be within 100 feet of a fire protection system fire department connection (siamese).
- Fire hydrants shall be located only on streets and fire lanes as follows:
 - Locate at street and fire lane intersections but not within 15 feet of the intersection.
 - Locate fire hydrants on public sides of street or fire lane access controls (gates, bollards).
 - Locate fire hydrants 2 feet from curbs and streets (per WSSC detail). Exceptions shall not be granted except in case of unusual site conditions.
 - The pumper connection shall directly face the street or fire lane. Elevations of the center line of the pumper connection shall be between 12 and 24 inches above finished grade.
 - Locate fire hydrants so there are no obstructions to operation or visibility.
- Fire hydrants shall be as specified by WSSC.
- Fire hydrants shall be painted as follows:
 - WSSC owned and maintained are grey with green tops (WSSC specifications).

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- UMCP on-site campus system (metered) are safety yellow with black tops and caps (2,000 gpm and over at 20 PSI). (Note: for fire hydrants less than 2,000 gpm, the cap and top colors are as listed in NFPA 291).
 - UMCP individual building or facility fire hydrants (unmetered) are red.
 - Fire hydrants shall be factory painted with two coats of rust-preventive paint.
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- Unmetered fire hydrants under the WSSC fire supervision agreement are electrically supervised as follows:
 - Waterflow alarm (pressure) switch (listed or approved) in NEMA 4 enclosure strapped securely to the hydrant barrel above grade. The switch is provided with a 1/2 inch tap into the hydrant barrel.
 - Metallic conduit, minimum 3/4 inch rigid with conductors.
 - Underground to building. Connect to building monitoring system or fire alarm system unless contracting with commercial alarm company (depending on project location and scope).
- 4. Construction, Alterations, and Demolition**
- Design water service and fire hydrants to be installed, in service, and accessible to fire department apparatus before construction begins - or combustibles are present on the site.
 - Design installation to minimize outages of existing fire protection.
 - Design replacement fire protection to be installed prior to demolition of existing fire protection,
 - Require that fire hydrants not in service be provided with a secure sign or marking which states "OUT OF SERVICE" or install a secured opaque covering.