Design Guidance for Backflow Installations.

Water Service Connections and Backflow Prevention

The location proposed for a water service connection has a significant impact on the location required for a service's backflow preventer. Because of this, the location requirements of both must be considered when designing locations for water service connections so that an optimal location for the backflow preventer can be achieved. It is strongly recommended to first contact Charlotte Water Installation and Development Services to approve the metering plan and location before submission for Building Permits.

Location Requirements for Water Service Connections

Service connections are typically installed at nominal right angles to the public water main in accordance with Charlotte Water Standards. The point of service connection typically will not be within a street or driveway intersection from curb return to curb return, nor will any portion of the service connection be within the intersection. The meter location will be directly adjacent to the parcel of land being served within the public right-of-way if possible. Meters shall be located at a point as close as feasible to the property line within which the main is located. All meters shall be located outside of driveways and other areas where access by Charlotte Water personnel for operation and maintenance may be restricted. The meter vault shall be located outside of travel lanes and driveways and shall be protected from vehicular traffic, as determined by Charlotte Water.

Location Requirements for Backflow Assemblies

While service connections are installed by Charlotte Water or its authorized contractor per an approved plan, backflow prevention assemblies are required to be installed by the customer's contractor in compliance with the plan approved by Charlotte Water's Backflow Prevention staff.

Water service connections requiring backflow compliance must have the correct type of backflow preventer installed in a location directly behind and as near to the water meter as possible (see zoning setbacks requirements below). Due to the potential for future connections to the water service line and the risks of a catastrophic failure causing flooding conditions, it is Charlotte Waters' position that backflow assemblies must go outside. Therefore, backflow preventers shall be installed:

- at or near the meter such that no service branches are present upstream,
- at an elevation at least one foot above the community and FEMA 100-year floodplains, and
- in an area where grades provide positive drainage and slope is not excessively steep.

Zoning setbacks requirements impact the location allowed for outside above ground installations of backflow prevention assemblies. Above-ground backflow preventers shall be installed just after (on the building side) the front setback line and out of side yards, rear yards, and buffers when required by zoning ordinances.

Indoor Location Requirements for Backflow Assemblies

For sites meeting at least one of the following criteria:

1. The "footprint" of the existing building occupies almost all the property.
2. Building located close to ROW due to minimal setback restrictions.
3. Building up fit requires retrofit of existing water service with backflow prevention.

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If Charlotte Water determines that there is no room outside to install the backflow assembly, an indoor installation may be allowed following Charlotte Water indoor installation requirements. In certain new & existing urban developments with zoning designations such as UMUD, MUD, TOD, PED, TS & RE-3 where there is a need to maintain pedestrian flow with a required outdoor streetscape that precludes adequate space for an outdoor backflow installation, an indoor installation may be allowed if the following conditions are met.

- Customer shall agree to accept all risks associated with installing the backflow assembly indoors.
- Customer will not be exempt from Sec. 23-178 – Right of Entry found in Charlotte's Code of Ordinances. This section states that Authorized Charlotte Water Employees will have access to backflow installation upon request.
- Location must never impact customer's ability to comply with initial and annual testing requirements.
- Customer shall never allow any connections on the service line between the Charlotte Water meter and its required backflow prevention assembly. When required to, the customer shall mark all exposed piping between the meter and the backflow assembly with signage stating, "DO NOT TAP".
- An indoor location must meet the following criteria:
    1. The prop. location of the backflow assembly shall be adjacent to an exterior wall near and directly opposite the meter for the service. (*Note: often this will mean that the customer will have to sacrifice leasable space to meet this requirement.)
    2. The backflow assembly shall be installed at grade elevation such that the required drain system for the backflow assembly can discharge directly out of the building, through the exterior wall, to grade that slopes away from the building. A sanitary floor drain or drain system that is adequately sized to carry the combined maximum potential discharge flow from all RPPA's installed in the space would also be acceptable.
    3. All design and construction shall meet the requirements of the NC Building Code and Charlotte Water Standard Details for indoor installations of backflow prevention assemblies. The Charlotte Water Standard Details for "Indoor" installations are available at: https://charlottenc.gov/Water/Development/Pages/Backflow.aspx .

Redundant (Dual) Water Service Connections for supply to Fire Sprinkler Systems

Certain types of construction have building code requirements for a second (redundant) water supply connection to supply the fire sprinkler system. In these cases, compliance with Charlotte Water backflow prevention requirements shall be met for both services. If approved by Charlotte Water and the fire department official, joining the two services together to provide a single supply line into a single backflow prevention assembly may be an option when the two services connections can be provided adjacent to each other and the distance between the meters and the single backflow assembly deemed acceptable by Charlotte Water. This requires plan review approval from both Charlotte Water and the Fire Official having jurisdiction. This would only be allowed on a case by case basis dependent on the specific field conditions. Preliminary discussions with Charlotte Water on meter locations and backflow requirements is highly recommended before site and building design gets too far along.