

Flow Testing & Fire Line Installation Policy

Design Flow Testing Requirements:

The City of Farmington (City), has implemented the following requirements regarding fire flow testing:

1. The Building Inspection (BI) office will determine the total building/fire area and the type of construction.
2. The Farmington Fire Department (FFD) will determine the required fire flow per the adopted and amended International Fire Code (IFC) Appendix B.
3. All commercial buildings will require a flow test to determine the available fire flow in the area as per section 507.3 and 507.4 of the IFC, following this section;
 1. Sprinkled buildings
 - a. New buildings – Will require flow test for sprinkler design
 - b. Existing buildings – Will require re-design of sprinkler system
 2. New commercial buildings
 - a. All required
 3. Existing commercial buildings
 - a. Level one remodel – Not required
 - b. Level two remodel
 - i. Interior changes only with no change in occupancy – Not required
 - ii. Interior changes only with change in occupancy and change in occupancy classification – Required
 - c. Level three remodel
 - i. Interior changes only with no change in occupancy – Not required
 - ii. Interior only with change in occupancy and change in occupancy classification – Required
 - iii. Addition of square footage
 1. Buildings exceeding the allowable square footage – Required
 2. Buildings adding 100 sq. ft. or less one time – Not required
 3. Buildings adding over 100 sq. ft. required

4. The available fire flow will be compared to the required fire flow for that structure. At which time the City will then determine if additional fire controls are necessary for the proposed structure.

NOTE: The available fire flow shall NOT exceed the Maximum Design Velocity of 10 ft/s on the watermain line. The 10 ft/s parameter shall over-ride the flow test results. A copy of the flow data and results shall be submitted to the City for review purposes.

- a. If the required fire flow meets the minimum available fire flow parameters (pipe size, looped system and maximum velocity (10ft/s), construction shall be permissible without further fire control measures, unless required elsewhere in the IBC (International Building Code), or IFC (International Fire Code).
 - b. If the required fire flow does NOT meet the minimum available flow parameters, alternative fire control measures must be incorporated into the building's design. This may include but is not limited to; fire separation areas, fire walls, fire hydrants, sprinkler systems or off-site watermain line improvements to the property.
5. When additional fire control methods are required and the design includes the addition of fire hydrants and/or fire sprinkler systems, the City's private fire service-line policy shall govern.

Fireflow testing:

1. All fire flow testing shall be conducted in accordance with the most current edition of NFPA.
2. Testing parties shall be competent in flow testing, and must provide all flow testing equipment. Acceptable apparatus is equipment purchased, or calibrated within one calendar year of the test. Proof must be provided upon request.
3. When equipment accuracy questions arise, determination of flow rates will be settled by the Public Works Water Department, or the Fire Department.
4. Only slow acting valves are permitted on flow test equipment. All efforts shall be made to mitigate water hammer by slowly closing any valve.
5. Contractors are not permitted to operate hydrants. All hydrant operation shall be by CH2M.

6. To schedule fire flow tests, contact the BI office at 505-599-1304. Upon final scheduling, and with 24 hours advance notice, the testing party shall notify the Fire Department at (505) 599-1430 so they may witness the test.

Fire-line Design Drawings:

Dedicated and Joint-Use fire-lines shall require approvals from FFD and the Water Utilities Division of Public Works. Drawings of the proposed fire service lines shall be submitted for approval. Farmington Fire Department shall approve all FDC (Fire Department Connections) locations and types.

Design drawings shall be in accordance with all applicable NFPA (National Fire Protection Association), UPC (Uniform Plumbing Code) and City installation standards. When remote FDC's are incorporated into the piping design, components used shall have a minimum working pressure of 175 psi and contain appropriate vaulting and valving to permit service of the required equipment.

An inspection fee at BI shall be assessed prior to plan approval.

Fire-line Configurations (Refer to City Standard Detail D225)

There are two (2) configurations to install a private fire-line:

1. A (Joint-Use) potable pipe connection from the City's watermain to the building served.

A Joint-Use shared connection pertains to a common over-sized potable domestic and fire-service waterline from the City's watermain to the property line. This (joint-use) waterline may be used for additional connections such as City fire hydrants including domestic and/or landscape water meters within the right-of-way area. The City's watermain must have the actual capacity and be large enough to accommodate a Joint-Use waterline as confirmed by hydraulic calculation.

Gate valves on the City's Joint-Use waterline shall be provided to separate any hydrants or water service stubs as a means to isolate each system.

At the property or easement boundary line, the private fire-line may then be reduced in size to match the required fire-flow for the building. A gate valve is required at the property line to separate the private fire-line from the City's Joint-Use waterline. This valve may not be operated by any individual without

prior approval from FFD. When the gate valve is proposed within a non-paved or concreted area, a concrete collar around the valve (per City Standards) shall be added for protection.

When joint use lines feed both fire sprinkler systems, and fire hydrants, fire hydrants shall be located upstream of the both the FDC, and backflow prevention assembly. Hydrants downstream of the FDC and backflow prevention assembly are not allowed.

2. A (dedicated) connection from the City's watermain to the building served.

A dedicated non-shared connection pertains to the private fire-line extending from the City's watermain to the building. Typically, this line is already reduced in size to match the needed fire-flow requirements of the building.

A gate valve at the property line is NOT required for this configuration. It shall be the property owner's sole responsibility to repair and/or replace any portion of this private fire-line including the portion within the City's Right-of-Way area to the City's mainline. The owner is prohibited to operate any gate valve within the City's right of way, therefore must acquire prior approval for the City to operate the valve.

No additional connections are allowed on a private fire-line except private hydrants, upon approval by FFD within the property. The fire-line will be sized to accommodate the needs of the hydrant(s) without causing a detriment to the building as confirmed by hydraulic calculation.

Fire-line Installation and Inspection:

Permits shall be pulled prior to installation of any Joint-Use or Dedicated fire-line. Proof of Certificate of Fitness issued by the State Fire Marshal to work on fire suppression systems is required prior to permit issuance.

The contractor shall be assessed an inspection fee for all (nongovernment financed) commercial building fire-lines connecting to the City's water system. This fee includes inspection for fire-lines up 200 ft. - with no more than two phases. Any fire-lines over 200 ft. may require additional fees depending on overall length and total amount of phasing proposed. Upon payment and issuance of permit, the contractor may commence with the approved installation.

The contractor schedules all fire-line inspections through the City's BI office. The contractor will also provide plans for the inspector. In turn, CH2M will coordinate with the contractor and FFD including other City Departments to finalize

inspections - with exception to government-financed buildings and county property; only then may the contractor coordinate with FFD directly for inspections.

All flushing and pressure testing shall be recorded on an Underground Contractors Material and Test Certificate(UG CMT), provided by the contractor. The contractor shall coordinate all flushing, and pressure testing such that it is witnessed by the Fire Department.

Fire-Line Disinfection:

The contractor shall disinfect the fire-line in accordance with AWWA C651-14.

Fire-line Bacteriological Testing and Flushing:

Procedure for CH2M: In accordance with AWWA C651-14

Identify oneself to the person in charge on site. This may be a City inspector *or contractor representative*. *Note the on-site representative or City inspector in the Sample Log Book*. An appropriate and safe sample tap must be provided by the contractor in order to take the samples. Any attachments added to the line for sampling purposes shall be disinfected with 1:1 chlorine prior to sampling.

There are two options for bacteriological testing:

Option A:

1. The line shall be chlorinated and flushed prior to arrival on site. Check free chlorine of water. It must be *at least 0.8mg/L* OR 80% of the City's present water quality in the area as a passing test.

If not flushed sufficiently, the chlorine level may start high. If the chlorine is greater than 2.0 mg/L, request the line be flushed an additional 15 minutes. Water leaving the WTPs should contain 1.4 – 1.7 mg/L. Water in distribution should not read greater than this. If water in surrounding area is greater than 2.0 mg/L, the chlorine concentration in the area becomes the maximum allowable chlorine level in the new line. If after 15 minutes, water contains greater than 2.0 mg/L, or the maximum allowable, request the line be flushed further and the test should be rescheduled for the *following* day.

The chlorine level should not start at 0 if the line has been chlorinated properly. If the chlorine reads 0, the line fails this portion of the test. If it is a small section of new line, you may allow the contractor 15 minutes to flush fresh water into the line then re-test. If chlorine is still less than 0.8 mg/L OR 80% of what is present in the area, request the contractor to continue flushing. At this point, it is recommended to test the chlorine level at a nearby location to determine the chlorine concentration present in the area. If the chlorine is low at the second location it is acceptable to take the bacteria sample at the hydrant. If not, the contractor must continue to flush until a 0.8 mg/L chlorine OR 80% of the present water quality in the area is achieved. Report this to the contractor or inspector and leave the site. The inspector or contractor must contact the lab to schedule a bacti for the *following* day.

A larger line may require more flushing than 15 minutes. Leave the site after the first failed chlorine test. The line will require flushing to achieve a 0.8 mg/L OR 80% of the present water quality in the area and a second test will need to be scheduled for the *following* day.

2. Have the contractor's representative / City inspector turn off flow momentarily for the sampler (CH2M) to pour approximately ¼ cup of 1:1 chlorine bleach (minimum 5%) and water over the opening to be sampled. Flush the sampling point for 2 minutes to ensure removal of this chlorine.
3. Carefully remove the lid from the sample container. Do not set it down. Slow flow sufficiently to enable filling the container to appropriate level.
4. Label container with location, date, time, chlorine residual and sampler's initials. Place COC label over lid. Place in cooler with appropriate ice.
5. Log sample into Sample Log.
6. Analyze sample as soon as possible upon return to the lab.
7. As per AWWA C651-14, a second sample must be collected a minimum of 16 hours after the initial sample and tested for Total Coliform. Both samples must be Absent of Total Coliforms to pass and for the main to be approved. The scheduling of the second sample shall be done at the time the first sample is collected.

Option B:

1. The line shall be chlorinated & flushed and remain loaded, allowed to sit for a minimum 16 hours without use.

2. The chlorine residual shall be analyzed, without flushing the main. (There's no minimum required chlorine for this type of test.)
3. A sample for Total Coliform shall then be collected, again without flushing the main. The sample port shall be left running for a minimum of 15 minutes.
4. A second chlorine and Total Coliform sample shall then be taken. Both samples must pass for the main to be approved.
5. Carefully remove the lid from the sample container. Do not set it down. Slow flow sufficiently to enable filling the container to appropriate level.
6. Label container with location, date, time, chlorine residual and sampler's initials. Place COC label over lid. Place in cooler with appropriate ice.
7. Log sample into Sample Log.
8. Analyze sample as soon as possible upon return to the lab.

Fire-line Pressure Testing as per NFPA:

Procedure for CH2M and FFD: (Underground pipe, fittings and connections)

1. Visually inspect to confirm the location, proper working pressures and types of components match approved drawings. This shall include but is not limited to: Inspect construction means and methods of trench bedding, utility separation, proper depth, trench backfill & compaction testing within the City's Right-of-Way area (as per NFPA, NM State Standards and Section 24-5 of Farmington City Code) and to ensure 10 gauge tracer wire is in place while the pipe is properly secured to prevent movement. This includes the use of joint restraints for bracing and thrust blocks if required.
2. Test, per NFPA 13, at the greater of 200 psi or 50 psi above the maximum working pressure, for duration of not less than two hours. The psi is not allowed to be below 200 at any time during the test or a failure or restart of the time will occur. The gauge shall be placed at the lowest part of the system or a hydrant/riser outlet. The gauge shall read to a minimum of 250 psi
3. Isolate the device used to achieve the 200 psi pressure at all times during the timed test.
4. Conduct a flush to meet the requirements of NFPA 13. The minimum flush apparatus are dual 2.5-in hoses.

5. Underground piping from the water supply to the hydrants, system riser, and lead-in connections shall be completely flushed before hydrants are placed in service, or before a connection is made to the fire protection system piping.

The flushing operation shall be continued for a sufficient time to ensure thorough cleaning.

The minimum rate of flow shall be not less than one of the following:

1. Maximum flow rate available to the system under fire conditions as flowed through a main line size open pipe. Measurement of flow rate is not necessary.
2. Flow necessary to provide a velocity of 10 ft/sec (3.1 m/sec) in accordance with Table below, measurement of flow rate is required.
3. The hydrant maximum operating flow, or the hydraulically calculated water demand rate of the fire sprinkler system, including any hose requirements. Measurement of flow rate is required.

When supply cannot produce stipulated flow rates, obtain maximum available as indicated in option (1) one.

Flow Required to Produce a Velocity of 10 ft/sec (3 m/sec) in Pipes

<u>Pipe Size</u>		<u>Flow Rate</u>	
in.	mm	gpm	L/min
4	102	390	1,476
6	152	880	3,331
8	203	1,560	5,905
10	254	2,440	9,235
12	305	3,520	13,323

A copy of the UG CMT shall be maintained on the sprinkler riser or attached to the on-site as-builts for the life of the sprinkler system. Fire hydrants shall be equipped with "Out of Service" bags. Automatic fire sprinkler systems shall not be connected to the fire-line until successful acceptance testing.

Notification of Results:

CH2M shall be responsible to verify and provide the results to the contractor, inspector, FFD and Water Utilities Division of Public Works. If any part of the testing fails, CH2M shall notify and explain results to the inspector and schedule for a retest.

1. Upon FFD approval; CH2M will schedule with the contractor to open the fire-line valve at the property line (Joint-Use fire-lines only).
2. Upon Water Utilities Division of Public Works approval; CH2M will schedule with the contractor to open the City's water valve in the street.