WINDSOR SEVERANCE FIRE RESCUE
LIFE SAFETY DIVISION
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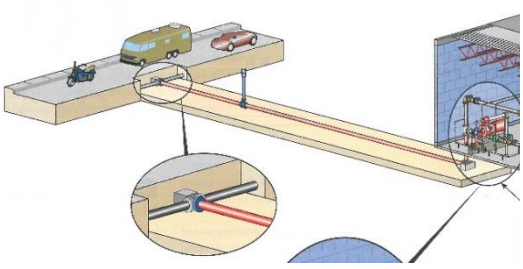
UNDERGROUND FIRELINE REQUIREMENTS

Background

Since January 1, 1991, The Colorado Fire Suppression Program (SB 90-4) has instituted requirements related to the design, installation and inspection of underground supply lines for fire sprinkler systems. This is the section of piping between the municipal or private water main and the base of a riser in a fire sprinkler system that supplies water to that system.



Underground Piping Connecting Municipal Supply Pipe to Fire Pump
(Stephan Laforest, *NFPA 13 Handbook,* 2016 edition).

Definitions

Underground Supply Line-the piping and appurtenances downstream from the system installed and maintained of the municipal water supply which supplies water to the Fire Suppression System. This system is also known as an “Underground Fireline”.

General Requirements

Installation contractors:

1. Individuals or companies installing Underground Supply Lines from public water lines to system risers must be registered as “FIRE SUPPRESSION SYSTEM CONTRACTOR-UNDERGROUND” with the State of Colorado. State licenses must be renewed yearly on June 30.

2. Upon initial application or renewal, Fire Suppression System Contractors-Ungrounds will attest that all personnel performing work on fire suppression systems have received training on and retain copies available for use of NFPA 13, NFPA 22, and NFPA 24, as adopted by the Colorado Division of Fire

Prevention and Control (DFPC) in 8 CCR 1507-101, and a copy of these Fire Suppression Program rules.

3. All Fire Suppression System Contractors-Underground personnel shall at all times have immediate access to copies of NFPA 13, NFPA 22, and NFPA 24, as adopted by the DFPC in 8 CCR 1507-101, and a copy of these Fire Suppression Program rules.

4. Upon initial application or renewal, Fire Suppression System Contractors-Ungrounds will attest that until they release responsibility for the underground fire main installation to the owner, they will not allow any fire suppression system to be connected to the underground fire main by any person not registered with the DFPC as a Fire Suppression System Contractor, unless said person is exempt from registration by Section 3.1.1 of 8 CCR 1507-11.

Installation:

1. All components, including aboveground and underground piping must be accessible for inspection by a certified Fire Inspector II. Whenever any installation subject to inspection is covered or concealed prior to being inspected, the inspector must have the authority to require that such work be exposed for inspection.

2. A “Contractor’s Material and Test Certificate for Aboveground Piping” or “Contractors Material and Test Certificate for Underground Piping”, as appropriate, must be completed with all test results documented and copies provided by the contractor to the owner and certified Fire Inspector.

3. Required hydrostatic, operational, and flush testing must be witnessed and signed by a certified Fire Inspector. At the discretion of the inspector, all or part of the test may be witnessed by the general contractor or another responsible, independent party.

4. Underground supply lines installed between the public water main or a private water source and the Fire Suppression System riser must be installed in accordance with NFPA 24 or NFPA 13 (Chapter 10, Underground Piping).

5. Underground supply lines must be installed by registered Fire Suppression Contractors-Underground.

6. The certified Fire Inspector may require flushing of the aboveground sprinkler piping if required tests for the underground piping cannot be documented.

Inspections

1. *First Inspection:* Installed underground supply line is inspected and approved by a Fire Inspector or other designated responsible party prior to burial. This inspection is used to confirm that the approved materials and techniques have

been used for piping, thrust blocks and drainage around piping. See Appendix A “Supply Line Installation” for information on approved installation practices.

2. The municipal or private water authority will conduct supply line chlorination between the first and second inspections.

3. *Second Inspection:* hydrostatic, operational and flush testing is conducted during an inspection prior to the installation of a fire riser on the underground supply line. Inspection is conducted by a Fire Inspector or other designated responsible party.

    - For the second inspection, an adaptor with a 90-degree fitting shall be bolted with two-hole alignment to the top of the underground supply line. Hose used during testing shall be the same diameter as the installed underground line up to 8-inch diameter. Underground supply lines greater than an 8-inch diameter can be gated down to an 8-inch fitting (Table 10.10.2.1.3 of NFPA 24 *Installation of Private Fire Service Mains and Their Appurtenances*, 2016 ed.).

    - *Flushing* shall achieve and maintain a 10 foot/second velocity until water flow is verified to be clear of debris. See Table 10.10.2.1.3 to determine minimum flow rate (NFPA 13 *Standard for the Installation of Sprinkler Systems*, 2016 ed). A burlap sack or similar material will be affixed to the end of the hose to catch debris.

4. The municipal or private water authority may require a hydrostatic test after an underground supply line has been flushed.

Appendix A-
NFPA 13: Contractor's Material and Test Certificate for Underground Piping

Contractor's Material and Test Certificate for Underground Piping

PROCEDURE

Upon completion of work, inspection and tests shall be made by the contractor's representative and witnessed by an owner's representative. All defects shall be corrected and system left in service before contractor's personnel finally leave the job.

A certificate shall be filled out and signed by both representatives. Copies shall be prepared for approving authorities, owners, and contractor. It is understood the owner's representative's signature in no way prejudices any claim against contractor for faulty material, poor workmanship, or failure to comply with approving authority's requirements or local ordinances.

Property name	Date
Property address	

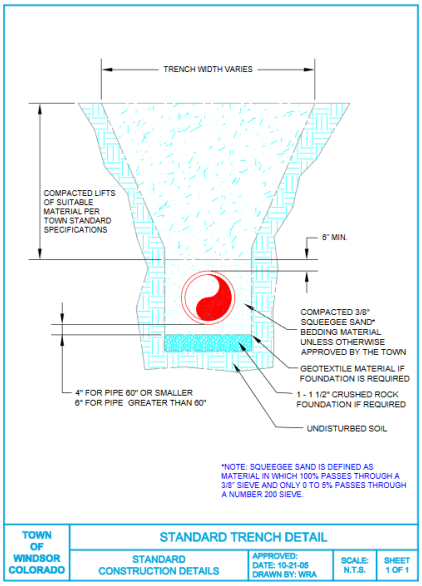
Plans	Accepted by approving authorities (names)		
	Address		
	Installation conforms to accepted plans	❑ Yes	❑ No
	Equipment used is approved If no, state deviations	❑ Yes	❑ No
Instructions	Has person in charge of fire equipment been instructed as to location of control valves and care and maintenance of this new equipment? If no, explain	❑ Yes	❑ No
	Have copies of appropriate instructions and care and maintenance charts been left on premises? If no, explain	❑ Yes	❑ No
Location	Supplies buildings		
Underground pipes and joints	Pipe types and class / Type joint		
	Pipe conforms to _____ standard Fittings conform to _____ standard If no, explain	❑ Yes ❑ Yes	❑ No ❑ No
	Joints needing anchorage clamped, strapped, or blocked in accordance with _____ standard If no, explain	❑ Yes	❑ No
Test description	Flushing: Flow the required rate until water is clear as indicated by no collection of foreign material in burlap bags at outlets such as hydrants and blow-offs. Flush in accordance with the requirements of 10.10.2.1.3. Hydrostatic: All piping and attached appurtenances subjected to system working pressure shall be hydrostatically tested at 200 psi (13.8 bar) or 50 psi (3.4 bar) in excess of the system working pressure, whichever is greater, and shall maintain that pressure ±5 psi (0.34 bar) for 2 hours. Hydrostatic Testing Allowance: Where additional water is added to the system to maintain the test pressures required by 10.10.2.2.1, the amount of water shall be measured and shall not exceed the limits of the following equation (for metric equation, see 10.10.2.2.6): $L = \frac{SD\sqrt{P}}{148{,}000}$ L = testing allowance (makeup water), in gallons per hour S = length of pipe tested, in feet D = nominal diameter of the pipe, in inches P = average test pressure during the hydrostatic test, in pounds per square inch (gauge)		
Flushing tests	New underground piping flushed according to _____ standard by (company) If no, explain	❑ Yes	❑ No
	How flushing flow was obtained: ❑ Public water ❑ Tank or reservoir ❑ Fire pump / Through what type opening: ❑ Hydrant butt ❑ Open pipe		
	Lead-ins flushed according to _____ standard by (company) If no, explain	❑ Yes	❑ No
	How flushing flow was obtained: ❑ Public water ❑ Tank or reservoir ❑ Fire pump / Through what type opening: ❑ Y connection to flange and spigot ❑ Open pipe		

NFPA 13 (p. 1 of 2)

Hydrostatic test	All new underground piping hydrostatically tested at _____ psi for _____ hours	Joints covered ❑ Yes ❑ No
Leakage test	Total amount of leakage measured _____ gallons _____ hours	
	Allowable leakage _____ gallons _____ hours	
Forward flow test of backflow preventer	Foward flow test performed in accordance with 10.10.2.5.2: ❑ Yes ❑ No	
Hydrants	Number installed / Type and make	All operate satisfactorily ❑ Yes ❑ No
Control valves	Water control valves left wide open If no, state reason	❑ Yes ❑ No
	Hose threads of fire department connections and hydrants interchangeable with those of fire department answering alarm	❑ Yes ❑ No
Remarks	Date left in service	
Signatures	Name of installing contractor	
	Tests witnessed by	
	For property owner (signed) / Title / Date	
	For installing contractor (signed) / Title / Date	

Additional explanation and notes

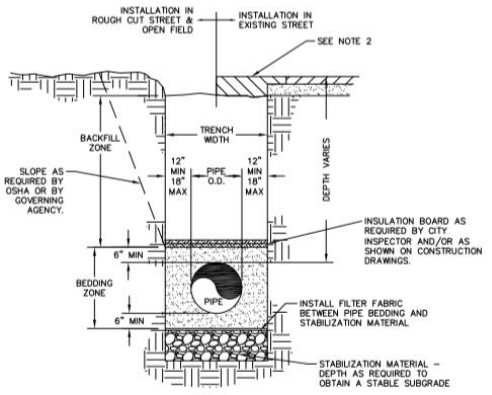
Appendix B- Supply Line Installation



Plan review detail for the Town of Windsor's underground supply line standards and specifications.

Concrete thrust block installed between underground supply line and undisturbed soil (courtesy of Steve Iacino, FFFPD).

"Jeeping"-using corrosion retarding material to protect underground supply lines (courtesy of Steve Iacino, FFFPD).



NOTES:

1. REFER TO WATER AND SEWER DEPARTMENT CONSTRUCTION SPECIFICATIONS FOR STABILIZATION, FILTER FABRIC, BEDDING, BACKFILL MATERIAL, AND COMPACTION REQUIREMENTS. FOR ANY CONFLICT BETWEEN WATER AND SEWER AND PUBLIC WORKS BACKFILL MATERIAL SPECIFICATIONS AND COMPACTION REQUIREMENTS, THE MORE STRINGENT SPECIFICATION SHALL APPLY.
2. REFER TO STREETS DETAIL S-31 "EXISTING STREET PAVEMENT PATCH DETAIL FOR ASPHALT & CONCRETE", CURRENT VERSION, FOR STREET CUT REQUIREMENTS.
3. AN OVER EXCAVATED TRENCH SHALL BE BACKFILLED AND COMPACTED (AS PER SPECIFICATIONS) UNDER THE DIRECTION OF THE CITY.
4. PIPELINE SHALL BE LAID IN A PROPOSED FILL AREA PRIOR TO AREA BEING COMPLETELY FILLED TO PROPOSED FINAL GRADES AND COMPACTED PER THE CITY OF GREELEY SPECIFICATIONS.
5. COMPACTION TESTING METHODS AND FREQUENCY SHALL BE IN ACCORDANCE WITH PUBLIC WORKS CONSTRUCTION SPECIFICATIONS.
6. TRENCHES SHALL BE SHORED, BRACED, OR SHEETED AS NECESSARY FOR THE SAFETY AND PROTECTION OF PERSONNEL AND OTHER UTILITIES.
7. INSULATION BOARD SHALL BE 2" THICK MINIMUM, CONSISTING OF TWO BOARDS (1" MINIMUM PER BOARD) WITH OFFSET JOINTS PLACED ACROSS FULL TRENCH WIDTH.

Plan review detail for the Town of Severance's underground supply line standards and specifications.

Verification of saddle valve, bedding, pipe wrap, tracer wire and joint constraints (courtesy of Steve Iacino, FFFPD).