UNDERGROUND FIRE SERVICE STANDARD

SCOPE:
This standard is applicable to all private underground piping for hydrants and/or sprinkler supply lines within the City of Santa Clara. This standard is not applicable to underground piping serving fire sprinkler systems designed in accordance with NFPA 13D or for undergrounds piping less than 4" in nominal diameter serving fire sprinkler systems designed in accordance with NFPA13R.

PERMIT FEES:
Permit fees shall be assessed in accordance with the Permit Fee Schedule as adopted in the City of Santa Clara Municipal Fire & Environmental Code.

DESIGNER & INSTALLER:
1. Underground fire protection plans shall be designed by a licensed contractor (A, C-16, C-36 or C-34) or by a Registered Professional Engineer (Civil, Mechanical, or Fire Protection), licensed by the State of California (Board of Professional Engineers). All copies of the plans shall be stamped and signed by the licensed individuals (when applicable).
2. Class A, C-16, C-36, and C-34 contractors can only design underground fire service projects if their staff performs the entire installation without subcontracting any of the work out.

SUBMITTAL REQUIREMENTS:
1. A minimum of three copies of the plans and hydraulic calculations shall be submitted.
2. Plans shall be legible, scaled to nationally recognized standards.
3. When hydraulic calculation are required current water flow data from the City of Santa Clara Water Department.

PLAN DETAILS:
1. Legend;
2. The contractor's name, telephone number, address, and California State contractor's license number and classification.
3. Applicable codes and standards used for the system design (e.g., 2016 CFC, 2016 NFPA 24, etc.).
4. Project location, including the full legal address of the facility, and building number(s);
5. All driveways and fire department access roads shall be shown on plans.
6. Location of public mains and all public hydrants within 300 feet of the site.
7. Location of all valves. Specify the type for each (e.g., post indicator valve (PIV), key gate valve, system control valve, double detector check (DDC), outside stem and yoke (OS&Y), etc.).

8. Pipe size, class, type, etc.

9. Thrust block locations, or specify the means of restraint as approved by 2016 NFPA 24.

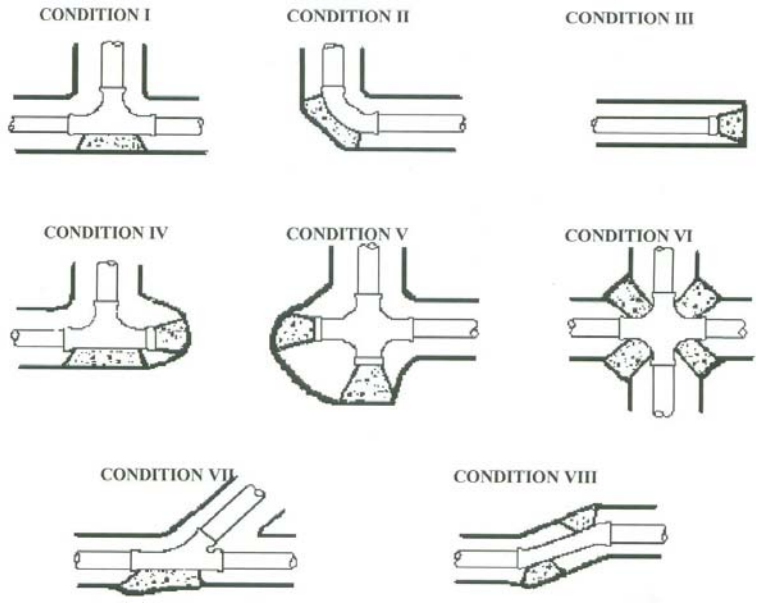
10. Material data submittal.

DESIGN REQUIREMENTS:

1. Only City approval back flow preventers (BFP) shall be utilized in the hydraulic calculations.

2. Manufacture's specifications and pressure loss charts for the back flow preventer and the water meter where applicable.

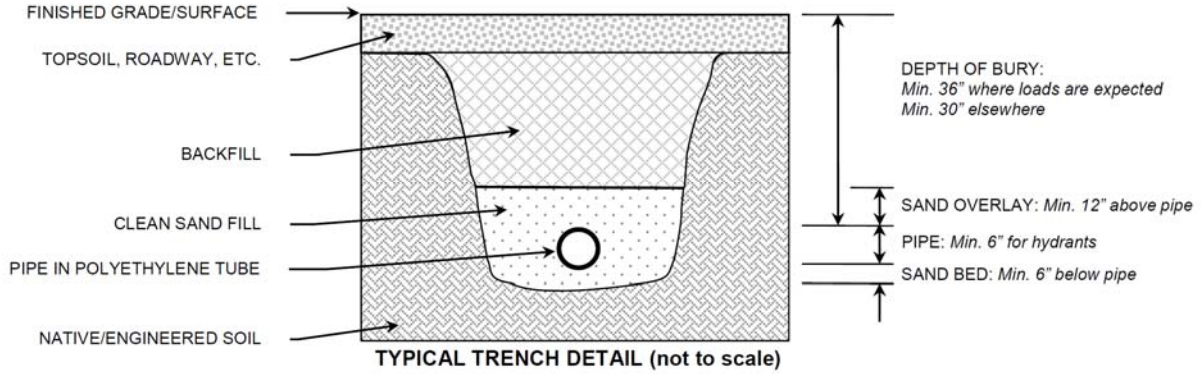
3. Thrust blocks, or another approved method of thrust restraint, shall be provided wherever pipe changes direction. Thrust block calculations are required with every submittal when thrust blocks are utilized. Calculations are required to be in accordance with NFPA 24.



$$Area = \frac{7.9\ \text{ft}^2\,(0.541)\left(\frac{150}{100}\right)}{\left(\frac{3000}{1000}\right)} = 2.1\ \text{ft}^2$$

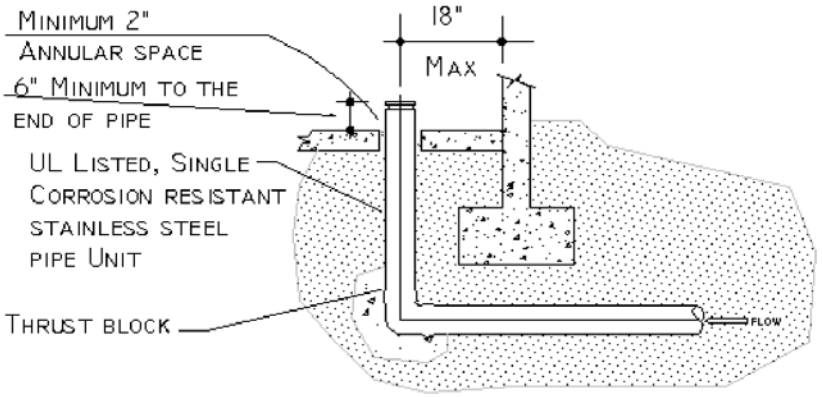
4. Depth of cover shall be a minimum of 30-inches from the top of the pipe.

5. A six-inch bed of clean fill sand shall be provided around entire perimeter of piping (6-inches below, 6-inches above, and 6inces on both below sides.

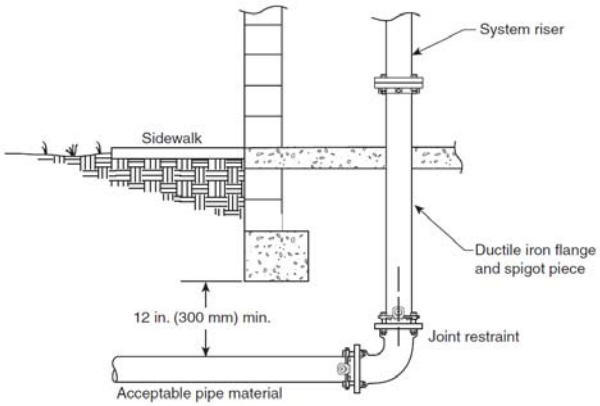


TYPICAL TRENCH DETAIL (not to scale)

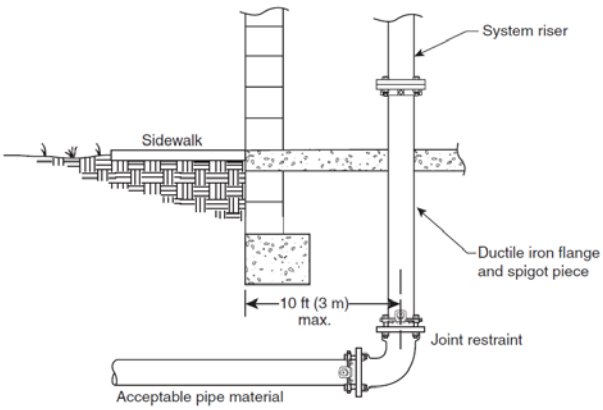
4. All bolts used for underground connections, including T bolts, shall be stainless steel. All bolts and ferrous fittings shall be cleaned and thoroughly coated with asphalt or other corrosion retarding material after assembly and prior to the installation of poly-tube.
5. A minimum two-inch clearance shall be provided where the pipe passes through slabs or walls. Underground system shall terminate at the riser flange and placed a maximum of 18 inches from an exterior wall and 6 inches above the slab.
6. When a pipe runs under footings or foundations of the building, a single corrosion resistant stainless steel pipe unit assembly is required. The pipe shall terminate a maximum of 18-inches from the exterior wall and a minimum of 6-inches above the finished floor. A minimum of 4-inches clearance (annular space) shall be provided where the pipe passes through the floor or wall.



7. Piping shall be installed a minimum of 12 in. (300 mm) below the bottom of building foundations or footers.



8. Where approved, private fire service mains supplying systems within the building shall be permitted to extend more than 10 feet under the building



9. A PIV is required to be installed downstream and adjacent to the City's back flow preventer.

10. PIV's or other approved indicating valves, shall be located a minimum of 40 feet from the building served. Where it is *impractical* to locate control valve(s) 40 feet from the building served, they may be located closer by one of the following methods:

    a. Approved wall mount indicating valves: Located on exterior walls without openings within 15 feet of the valve/s.
    b. Other approved manner acceptable to SCFD based on site conditions.

11. Fire department connections shall be located on the address side of the building.

12. Fire Department Connections shall be mounted at 48-inches above grade or access level.

13. Fire Department Connections shall be provide a minimum 36-inch 'x 36-inch x 4-inch square concrete pad.
14. Fire department connections shall be located be within 100-feet of a public hydrant.

15. The FDC shall be in a position allowing hose lines to be readily and conveniently attached. The FDC shall contain a minimum of *two* 2½" inlets. When the sprinkler and/or standpipe demand is greater than 500-gpm additional inlets shall be provided for each additional 250-gpm to maximum of 8-inlets.

16. FDCs shall have durable signs clearly indicating the address of the facility they serve.

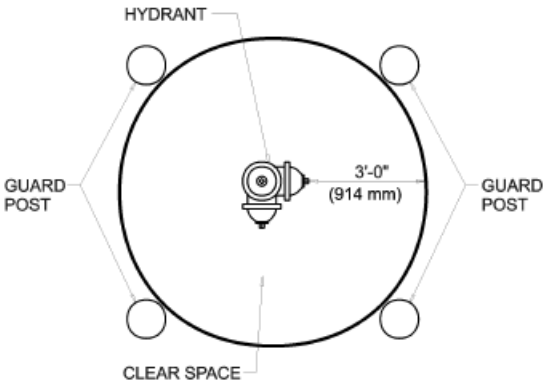
17. Large private fire service mains shall have post indicating type sectional control valves at appropriate points in order to permit isolation of the system in the event of a break or during repair or extension (A large system is considered one with more than 6 connections including fire hydrants).

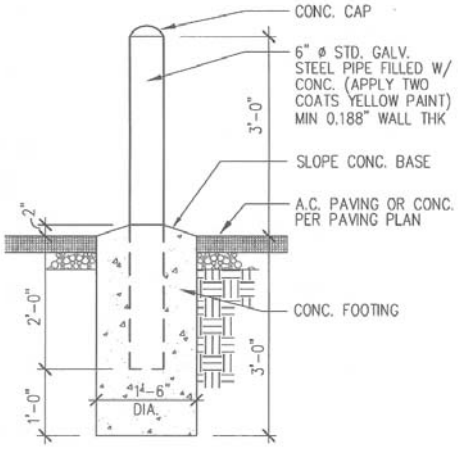
18. Fire Hydrant center of hose outlet shall be not less than 18 inches or more than 36" above final grade.

19. All fire hydrants shall be wet barrel equivalent to the CLOW #860 type with a 4-inch steamer outlet and two 2-1/2 inch hose outlets. The 4-inch outlet shall be directly facing the street.

20. The 4" outlet shall face the fire department access road. All outlets shall be provided with National Standard threads (NST). Private hydrants shall be painted OSHA safety yellow.

21. When subject to mechanical damage fire protection equipment shall be protected with bollards.





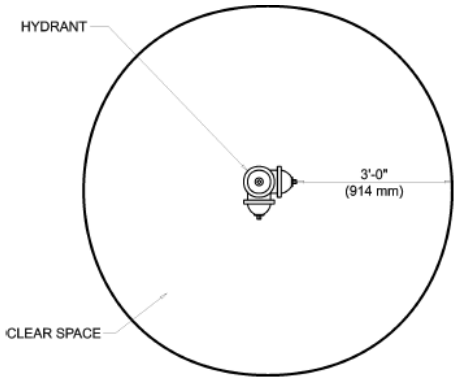
22. Fire hydrant supply piping shall be a minimum of six inches in diameter. The lowest valve-operating nut shall be a minimum of eighteen inches above grade and the hydrant flange shall be a minimum of two inches above grade.

23. A keyed gate valve shall be provided for each hydrant in an accessible location. Keyed gate valves shall be located within six to ten feet of the hydrant in an area that is unobstructed and clearly visible. Valves shall not be located in parking stalls.

24. All fire hydrants shall have a "Blue Reflective Pavement Marker" indicating their location. Private hydrants and markers are to be maintained in good condition by the property owner.

25. Vegetation shall be selected and maintained in such a manner as to allow immediate location of, and unobstructed access to; all hydrants, control valves, fire department connections, and other devices or areas used for firefighting purposes.

26. A minimum three-foot (36 inch) clearance shall be provided around all hydrants and post indicating valves. A minimum three-foot (36 inch) clearance shall be provided on at least one side of a detector check assembly to allow proper operation of the device. The front of FDC and the adjacent fire access roadway shall be free of any obstructions. Vehicle parking shall not obstruction access to any fire department equipment.



<u>ROUGH & HYDROSTATIC TESTING</u>:

1. Thrust blocks shall be in place and properly cured.
2. All piping shall be in place and exposed for visual inspection.
3. Pipe shall be laid on a minimum 6-inch bed of clean sand.
4. Bolts and ferrous joints shall be coated with asphaltic sealant or other corrosion retarding material.
5. Pipe shall be center loaded with clean sand to prevent uplift, but all joints shall remain exposed. The system shall be hydrostatically tested at 200 psi (or 50 psi over maximum static pressure, whichever is greater) for a duration of at least two hours prior to the arrival of the SCFD inspector.
6. A time stamped photo of when the test started shall be available

FLUSHING OF SYSTEM:

1. All portions of the underground system shall be flushed to remove debris.

2. The minimum flow velocity shall be 10 feet per second which is necessary to for cleaning the pipe and for lifting foreign material to an aboveground flushing outlet. The following table shall be utilized to base the number of hose connections required:

Nominal Pipe Size		Flow Rate	
in.	mm	gpm	L/min
2	50	100	380
2½	65	150	570
3	75	220	833
4	100	390	1500
5	125	610	2300
6	150	880	3350
8	200	1560	5900
10	250	2440	9250
12	300	3520	13,300

3. Discharged water shall be collected, diverted to an approved location, or properly treated.

INSPECTION SCHEDULING:

Inspection appointments can only be made by the permit applicant or designated representative. It is the responsibility of the permit applicant or designated representative to have a representative to be present at al inspections inspection. Failure to do so will result in the cancellation of the inspection and a re-inspection fee will be assessed.

The City of Santa Clara Water & Sewer Utilities shall be contacted prior to any flush. The installing Contractor shall coordinate the flush inspection between both SCFD and the City of Santa Clara Water Utility.

GRANTING FINAL:

1. Complete and submit NFPA Acceptance form for installation/modification of underground fire service.
2. Electronic As-Built's for the project is submitted and validated accurate.