




FIRE PREVENTION STANDARDS	DATE: 06/10/98	NUMBER: FP0-006
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	TITLE: Private Water Systems for 13 -D	

**Guide to Private Water/Private Well Systems
for
Residential Sprinkler Systems**

(One- and Two-Family Dwellings)

These are the basic requirements for private water/private well systems for residential fire sprinkler systems compiled by the Fire Prevention Officers Section of the Santa Cruz County Fire Chief's Association. The appropriate local agency should be contacted regarding local requirements and permit amounts.

The National Standard utilized for residential fire sprinklers is the latest edition on NFPA 13-D. In addition, all automatic residential fire sprinkler systems must also meet the modifications as outlined in "Guide to Sprinkler Requirements for One- & Two-Family Dwellings "(Public Water Supply), FPO Standard # FPO-005.

IF SPRINKLER SYSTEM UNDERGROUND PIPING IS INSTALLED BY SOMEONE OTHER THAN THE SPRINKLER CONTRACTOR, A SEPARATE PLAN CHECK, FEE, AND INSPECTION SHALL BE REQUIRED.

Plans shall be submitted to the Authority Having Jurisdiction (AHJ) prior to installation.

Design and Installation Requirements

- A. NFPA 13D residential automatic sprinkler systems shall be designed and hydraulically calculated by a licensed engineer, Fire Protection Engineer (F.P.E.) licensed C-16 Contractor (must also be the installing contractor), or by an owner-builder of an owner-occupied single-family dwelling.
 - 1. Scale ¼" = 1 foot. North arrow.
 - 2. Dimensions and arrangements of rooms and partitions
 - 3. Systems shall be calculated to provide for a 10% residual.

- B. The sprinkler system shall be installed by a licensed C-16 contractor or by an owner-builder of an owner-occupied single-family dwelling.
- C. The fire sprinkler system shall consist of the overhead and underground piping.
- D. Proof of Engineering or C-16 license shall be submitted with plans and calculations.
- E. When significant field variations including changes to the calculated areas, are made to Fire Department approved sprinkler plans, the contractor shall submit prior to overhead rough inspection "Revised" plans and calculations to re-verify system demand. Insulation and wall/ceiling sheeting installations may be delayed if review of new plans and calculations is delayed.
When minor field variations are made to Fire Department approved sprinkler plans, the contractor shall provide "As-Built" plans prior to scheduling of the final inspection.

System Design Requirements

A. Water supply

1. Minimum Storage

The minimum required amount of stored fire protection water for one- and two-family dwellings is 10,000 gallons with an approved NFPA 13-D sprinkler system

2. Domestic Water Storage

The water tank(s) shall be used for domestic water storage in conjunction with fire protection water storage and designed to the following standard:

- a. The tank(s) are equipped with a minimum 1-inch fill supply line.
- b. Provide an automatic filling device. Pump to automatically activate to maintain water storage tank at a minimum capacity of 10,000 gallons.
- c. If low water cut-off switch is installed, it shall be set to activate no higher than 6" above centerline of suction discharge pipe.

B. Pump System

1. Pump Requirements

- a. Underground pipes will be 2" or as approved by the authority having jurisdiction based on available water, sq. footage and calculations. Indicate on plans with a detail drawing.
- b. The pump shall provide the required GPM (gallons per minute) and PSI (pounds per square inch) for both the fire sprinkler system and domestic water system.
- c. Appropriate size check valve.
- d. Pressure Gauge
- e. Pressure Relief Valve
- f. Pressure switch to be installed between check valve and valve
- g. Pump manufacturer to determine the number of pressure tanks required based on the GPM and PSI required.
- h. Provide full flow control valve after last pressure tank.
- i. Provide Contractor's Pump Acceptance Test Data Certificate at time of final inspection. ***See attachment 6E for copy of certificate**

- j. At plan submittal, provide the pump manufacturer's data guide for flow characteristics.

C. Requirements for Underground Installation

1. Pipe

- a. Underground pipes will be 2" or other sizing as approved by the authority having jurisdiction based on available water, square footage and hydraulic calculations: indicate on plans with a detail drawing. Future structural expansion should be considered when determining UG pipe size.
- b. Provide Schedule 80 PVC fitting between meter and underground pipe.
- c. Minimum underground pipe depth is 18" to top of pipe below rough grade.
- d. Schedule 40 PVC or other listed approved materials are allowed for underground supply line from the water source to the transition fitting. Schedule 80 PVC transition fitting to be installed a minimum of six inches below grade at the base of the riser.
- e. Underground piping will terminate with a threaded or glued cap at a minimum of six inches above finished grade.

Note: This is the termination of the underground piping.

- f. **All pipe transitions from metal to plastic will be through schedule 80 plastic fittings.**
- g. **All piping from the transition fitting to the riser shall be approved metallic pipe. If copper pipe is used for extension, type "L" is required.**
- h. Connection from underground piping to overhead piping to be made by the automatic fire sprinkler contractor. ***See attachments 6B and 6C**

2. Testing

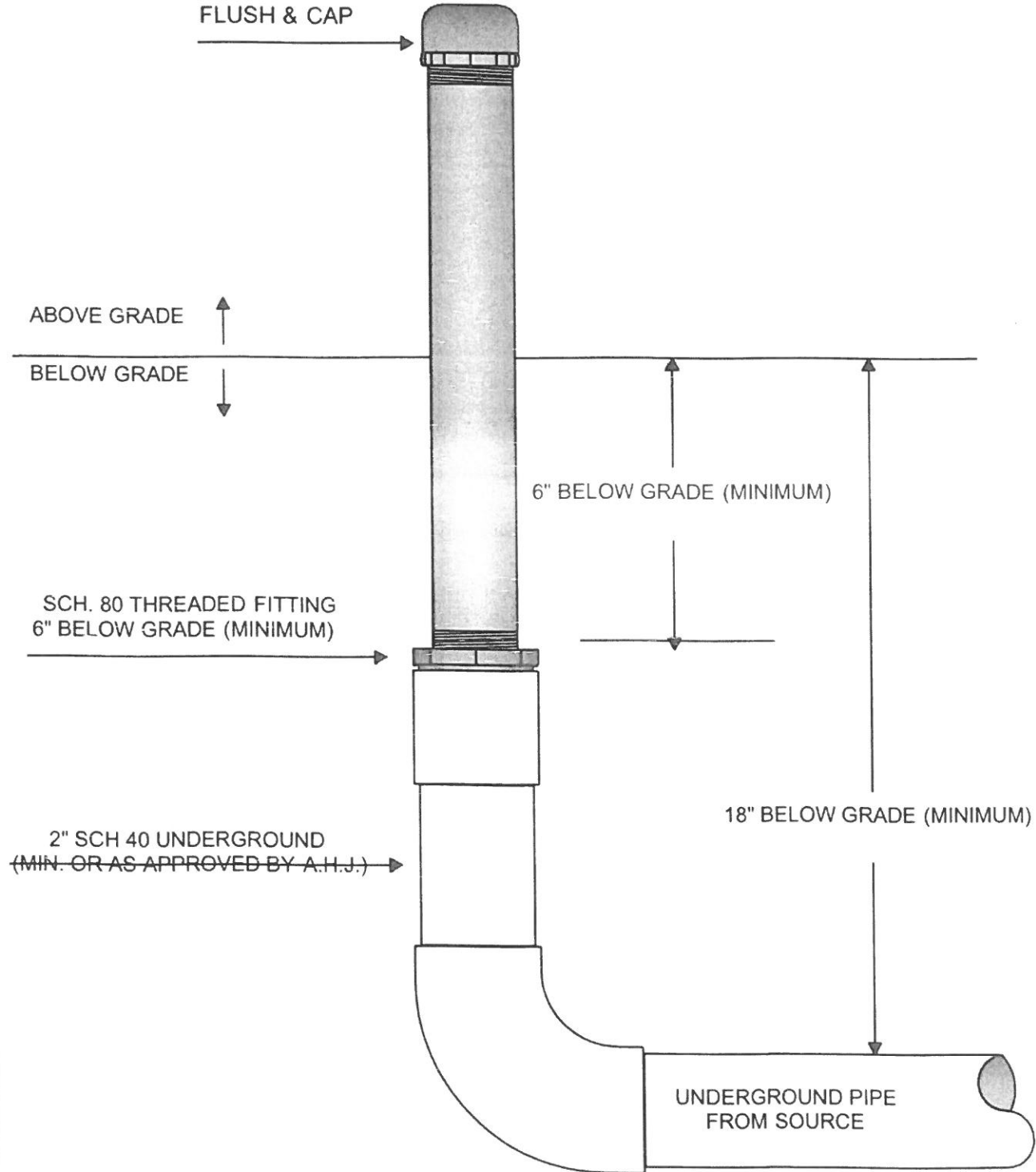
- a. All residential sprinkler system underground piping systems shall be hydrostatically tested in accordance with the requirements of the California Plumbing Code (not less than minimum design working pressure for 15 minutes) and shall be witnessed by the fire department prior to being covered.
- b. Underground pipe shall be flushed with water at the minimum design pressure, **through an opening the size of the underground pipe's diameter**, until the water runs clear, ensuring that the line is free of contamination before the underground pipe is connected to the riser. If the underground piping is not going to be connected to the riser immediately, the underground pipe is to be secured with a threaded or glued cap.
- c. Provide Contractor's Material and Test Certificate for underground piping at time of test. ***See attachment 6D** for copy of certificate.

Contractor's Material and Test Certificate for Fire Pump Systems	
<p>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.</p> <p>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.</p>	
PROPERTY NAME	DATE
PROPERTY ADDRESS	
PLANS	ACCEPTED BY APPROVING AUTHORITIES (NAMES)
	ADDRESS
	INSTALLATION CONFORMS TO ACCEPTED PLANS <input type="checkbox"/> YES <input type="checkbox"/> NO ALL EQUIPMENT USED IS APPROVED FOR FIRE SYSTEM SERVICE <input type="checkbox"/> YES <input type="checkbox"/> NO IF NO, STATE DEVIATIONS
INSTRUCTIONS	HAS PERSON IN CHARGE OF FIRE PUMP EQUIPMENT BEEN INSTRUCTED AS TO LOCATION OF SYSTEM CONTROL VALVES AND CARE AND MAINTENANCE OF THIS NEW EQUIPMENT? IF NO, EXPLAIN <input type="checkbox"/> YES <input type="checkbox"/> NO
	HAVE COPIES OF APPROPRIATE INSTRUCTIONS AND CARE AND MAINTENANCE CHARTS BEEN LEFT ON PREMISES? IF NO, EXPLAIN <input type="checkbox"/> YES <input type="checkbox"/> NO
LOCATION	SUPPLIES BUILDING(S) (CAMPUS, WAREHOUSE, HIGH RISE) EXPLAIN
PUMP ROOM EQUIPMENT	IS THE PUMP ROOM EQUIPMENT PER THE PLANS AND SPECS? <input type="checkbox"/> YES <input type="checkbox"/> NO
	IS THE FIRE PUMP PROPERLY MOUNTED AND ANCHORED TO THE FOUNDATION? IF NO, EXPLAIN <input type="checkbox"/> YES <input type="checkbox"/> NO
	IS THE FIRE PUMP BASE PROPERLY GROUTED? IF NO, EXPLAIN <input type="checkbox"/> YES <input type="checkbox"/> NO
	DOES THE PUMP ROOM HAVE THE PROPER FLOOR DRAINS? IF NO, EXPLAIN <input type="checkbox"/> YES <input type="checkbox"/> NO
	IS THE SUCTION AND DISCHARGE PIPING PROPERLY SUPPORTED? IS THE PUMP ROOM HEATED AND VENTILATED PER NFPA 20? <input type="checkbox"/> YES <input type="checkbox"/> NO
PIPES AND FITTINGS	PIPE TYPES AND CLASS
	PIPE CONFORMS TO _____ STANDARD <input type="checkbox"/> YES <input type="checkbox"/> NO
	FITTINGS CONFORM TO _____ STANDARD <input type="checkbox"/> YES <input type="checkbox"/> NO IF NO, EXPLAIN
	SUCTION AND DISCHARGE PIPING ANCHORED OR RESTRAINED?: <input type="checkbox"/> YES <input type="checkbox"/> NO
PRE-PACKAGED PUMP HOUSE	IS THIS A PACKAGE OR SKID MOUNTED PUMP? <input type="checkbox"/> YES <input type="checkbox"/> NO
	IS THE PACKAGE/SKID PROPERLY ANCHORED TO A CONCRETE FOUNDATION? IF NO, EXPLAIN <input type="checkbox"/> YES <input type="checkbox"/> NO
	IS THE STRUCTURAL FOUNDATION FRAME FILLED WITH CONCRETE TO FORM A FINISHED FLOOR? <input type="checkbox"/> YES <input type="checkbox"/> NO
	IS THERE A FLOOR DRAIN INSTALLED? <input type="checkbox"/> YES <input type="checkbox"/> NO
TEST DESCRIPTION	HYDROSTATIC: Hydrostatic tests shall be made at not less than 200 psi (13.8 bar) for 2 hours or 50 psi (3.4 bar) above static pressure in excess of 200 psi (13.8 bar) for 2 hours.
	HYDROSTATIC TEST: ALL NEW PIPING HYDROSTATICALLY TESTED AT: _____ PSI/BAR FOR _____ HOURS NO LEAKAGE ALLOWED
FLUSHING TESTS	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 blowoffs. Flush at flows not less than 390 gpm (1476 L/min) for 4 in. pipe, 610 gpm (2309 L/min) for 5 in. pipe, 880 gpm (3331 L/min) for 6 in. pipe, 1560 gpm (5905 L/min) for 8 in. pipe, 2440 gpm (9235 L/min) for 10 in. pipe, and 3520 gpm (13,323 L/min) for 12 in. pipe. When supply cannot produce stipulated flow rates, obtain maximum available.
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(NFPA 20, 1 of 2)	

Attachment 6B

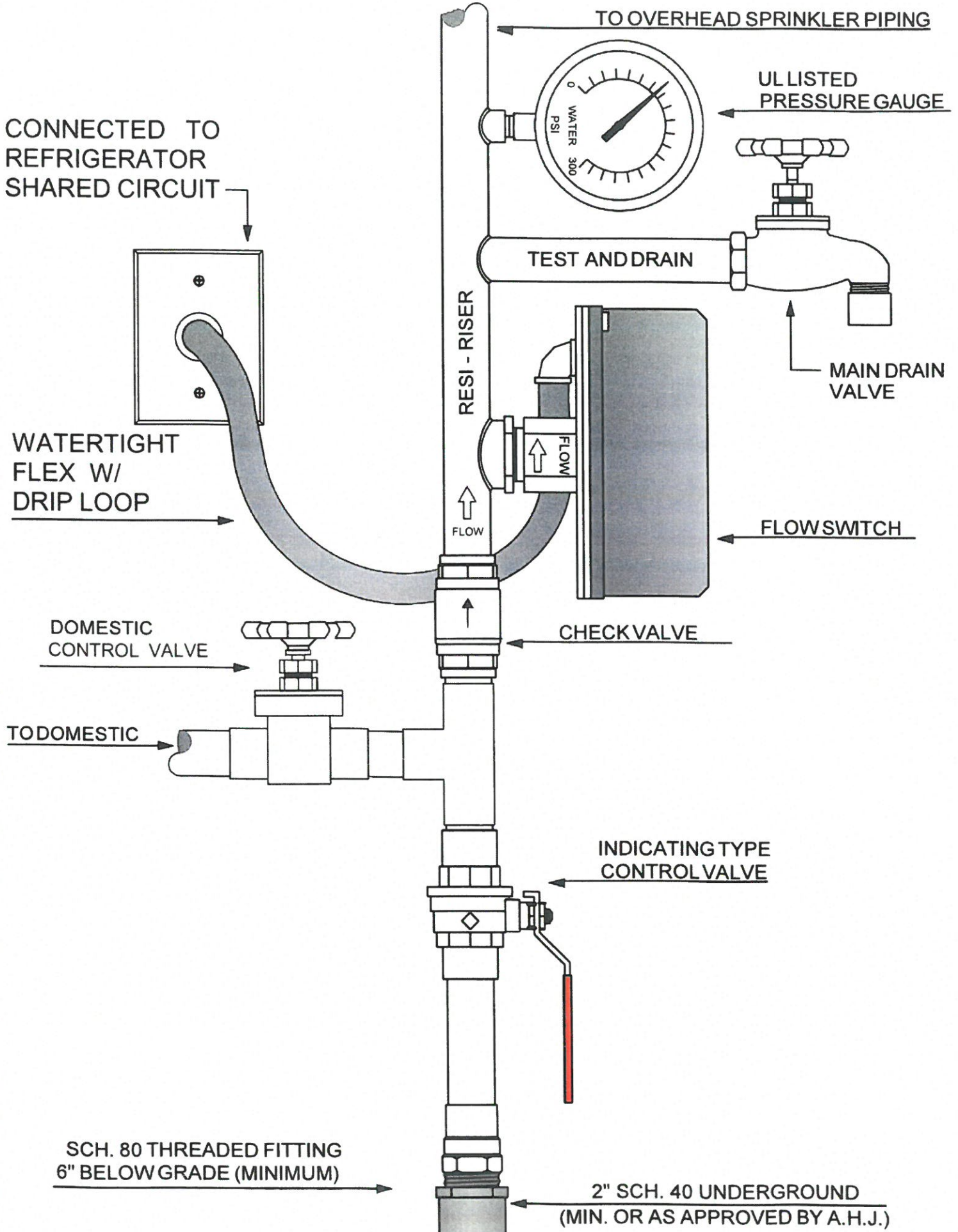
UNDERGROUND FIRE SERVICE NOTES

- 1. Underground fire service line to have a minimum of 18" of cover. Schedule 40 pipe and fittings are acceptable, but threaded fittings shall be schedule 80.
- 2. Pipe shall transition from plastic to metallic a minimum of 6" below grade.
- 3. All residential sprinkler system underground piping systems shall be tested at not less than minimum design working pressure for 15 minutes.
- 4. Underground pipe shall be flushed with water at the minimum design pressure until the water runs clear insuring the line is free from contamination before the underground pipe is connected to the riser.



SPRINKLER RISER DETAIL

FROM PRIVATE WATER SOURCE





Fire Chiefs Association of Santa Cruz County

FIRE PREVENTION OFFICERS SECTION

Contractor's Material and Test Certificate for Underground Piping			
PROCEDURE			
<p>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.</p> <p>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.</p>			
Property name	Date		
Property address	APN		
Plans	Accepted by approving authorities (names)		
	Address		
	Installation conforms to accepted plans <input type="checkbox"/> Yes <input type="checkbox"/> No Equipment used is approved <input type="checkbox"/> Yes <input type="checkbox"/> No If no, state deviations		
	Has person in charge of fire equipment been instructed as to location of control valves and care and maintenance of this new equipment? <input type="checkbox"/> Yes <input type="checkbox"/> No If no, explain		
Instructions	Have copies of appropriate instructions and care and maintenance charts been left on premises? <input type="checkbox"/> Yes <input type="checkbox"/> No If no, explain		
	Location Supplies buildings		
Underground pipes and joints	<table style="width: 100%; border: none;"> <tr> <td style="border: none;">Pipe types and class</td> <td style="border: none;">Type joint</td> </tr> </table>	Pipe types and class	Type joint
	Pipe types and class	Type joint	
	Pipe conforms to _____ standard <input type="checkbox"/> Yes <input type="checkbox"/> No Fittings conform to _____ standard <input type="checkbox"/> Yes <input type="checkbox"/> No If no, explain		
	Joints needing anchorage clamped, strapped, or blocked in accordance with _____ standard <input type="checkbox"/> Yes <input type="checkbox"/> No If no, explain		
Test description <u>Flushing:</u> 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 at flows not less than 390 gpm (1476 L/min) for 4 in. pipe, 880 gpm (3331 L/min) for 6 in. pipe, 1560 gpm (5905 L/min) for 8 in. pipe, 2440 gpm (9235 L/min) for 10 in. pipe, and 3520 gpm (13,323 L/min) for 12 in. pipe. When supply cannot produce stipulated flow rates, obtain maximum available. <u>Hydrostatic:</u> 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 \pm 5 psi for 2 hours. <u>Hydrostatic Testing Allowance:</u> 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 10.10.2.2.4): $L = \frac{SD\sqrt{P}}{148,000}$ <div style="font-size: small;"> <p>L = testing allowance (makeup water), in gallons per hour</p> <p>S = length of pipe tested, in feet</p> <p>D = nominal diameter of the pipe, in inches</p> <p>P = average test pressure during the hydrostatic test, in pounds per square inch (gauge)</p> </div>			

Attachment 6D

Flushing tests	New underground piping flushed according to _____ standard by (company) <input type="checkbox"/> Yes <input type="checkbox"/> No	
	If no, explain _____	
	How flushing flow was obtained <input type="checkbox"/> Public water <input type="checkbox"/> Tank or reservoir <input type="checkbox"/> Fire pump	Through what type of opening <input type="checkbox"/> Hydrant butt <input type="checkbox"/> Open pipe
	Lead-ins flushed according to _____ standard by (company) <input type="checkbox"/> Yes <input type="checkbox"/> No	
	If no, explain _____	
	How flushing flow was obtained <input type="checkbox"/> Public water <input type="checkbox"/> Tank or reservoir <input type="checkbox"/> Fire pump	Through what type of opening <input type="checkbox"/> Y connection to flange and spigot <input type="checkbox"/> Open pipe
Hydrostatic test	All new underground piping hydrostatically tested at _____ psi for _____ hours	Joints covered <input type="checkbox"/> Yes <input type="checkbox"/> No
Leakage test	Total amount of leakage measured _____ gallons _____ hours	
	Allowable leakage _____ gallons _____ hours	
Hydrants	Number installed _____ Type and make _____	All operate satisfactorily <input type="checkbox"/> Yes <input type="checkbox"/> No
Control valves	Water control valves left wide open <input type="checkbox"/> Yes <input type="checkbox"/> No	
	If no, state reason _____	
	Hose threads of fire department connections and hydrants interchangeable with those of fire department answering alarm <input type="checkbox"/> Yes <input type="checkbox"/> 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		