Fire Chiefs Association of Santa Cruz County
FIRE PREVENTION OFFICERS SECTION

FIRE PREVENTION STANDARDS	DATE: **06/10/98**	NUMBER: **FP0-006**
	APPROVED:	REVISED: **Jan. 11, 2018**
	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 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 Guide # 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.

1. Plans shall be submitted to allow a minimum of 14 days for plan check and approval. Approval shall be obtained from the Fire Prevention Office having jurisdiction.

2. The following information is required:

   When field variations are made to Fire Department approved sprinkler plans, the contractor shall provide "As Built" plans and calculations to re-verify system demand requirements as installed prior to overhead rough inspection. Insulation and wall/ceiling sheeting installations may be delayed if review of new plans and calculations is delayed.

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 6A 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,

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.

The appropriate local agency should be contacted regarding local requirements and permit amounts. Refer to the table below to determine which fire agency will oversee plan review, installation activities, perform compliance inspections and collect permit fees, if any. For those agencies marked with an (*) on the following table, CalFire/Santa Cruz County Fire Department is the agency responsible for all aspects of the automatic fire sprinkler installations.

Location	Fire Agency Name	Address	Telephone
Aptos	Aptos/La Selva FPD	6934 Soquel Drive Aptos, CA 95003	(831) 685-6690
Ben Lomond	.Ben Lomond FPD	9430 Highway 9 Ben Lomond, Ca 95005	(831) 336-5495
*Bonny Doon	CalFire / Santa Cruz County Fire Dept.	P.O. Drawer F-2 Felton, CA 95018	(831) 335-5353
Boulder Creek	Boulder Creek FPD	13230 Central Ave Boulder Creek, CA 95006	(831) 338-7222
Branciforte	Branciforte FPD	2711 Branciforte Dr Santa Cruz, Ca 95065	(831) 423-8856
Brookdale	Boulder Creek FPD	13230 Central Ave Boulder Creek, CA 95006	(831) 338-7222
Capitola	Central FPD	930 17th Ave. Santa Cruz, CA 95062	(831) 479-6843
*Corralitos	CalFire / Santa Cruz County Fire Dept.	P.O. Drawer F-2 Felton, CA 95018	831) 335-5353
*Davenport	CalFire / Santa Cruz County Fire Dept.	P.O. Drawer F-2 Felton, CA 95018	(831) 335-5353
Felton	Felton FPD	131 Kirby St. Felton, CA 95018	(831) 335-4422
*Freedom	CalFire / Santa Cruz County Fire Dept.	P.O. Drawer F-2 Felton, CA 95018	(831) 335-5353
La Selva Beach	Aptos/La Selva FPD	6934 Soquel Drive Aptos, CA 95003	(831) 685-6690
Live Oak	Central FPD	930 17th Ave. Santa Cruz, CA 95062	(831) 479-6843
Mount Hermon	Felton FPD	131 Kirby St. Felton, CA 95018	(831) 335-4422
Rio Del Mar	Aptos/La Selva FPD	6934 Soquel Drive Aptos, CA 95003	(831) 685-6690
*Salispuedes	CalFire / Santa Cruz County Fire Dept.	P.O. Drawer F-2 Felton, CA 95018	(831) 335-5353
Santa Cruz City	Santa Cruz FD	230 Walnut Ave Santa Cruz, CA 95060	(831) 420-5280
Scotts Valley	Scotts Valley FPD	7 Erba lane Scotts Valley, CA 95066	(831) 438-0211
Soquel	Central FPD	930 17th Ave. Santa Cruz, CA 95062	(831) 479-6843
Watsonville	Watsonville FD	374 Airport Blvd. Watsonville, CA 95076	(831) 728-6060
Zayante	Zayante FPD	7700 E.Zayante Rd Felton, Ca 95018	(831) 335-5100

Attachment 6A

Fire Chiefs Association of Santa Cruz County
FIRE PREVENTION OFFICERS SECTION

Contractor's Material and Test Certificate for Aboveground Piping

PROCEDURE

Upon completion of work, inspection and tests shall be made by the contractor's representative and witnessed by the property owner or their authorized agent. 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	APN

Plans	Accepted by approving authorities (names)					
	Address					
	Installation conforms to accepted plans ☐ Yes ☐ No					
	Equipment used is approved ☐ Yes ☐ No					
	If no, state deviations					
Instructions	Has person in charge of fire equipment been instructed as to location of control valves and care and maintenance of this new equipment? ☐ Yes ☐ No					
	If no, explain					
	Have copies of the following been left on the premises?					
	1. System components instructions ☐ Yes ☐ No					
	2. Care and maintenance instructions ☐ Yes ☐ No					
	3. NFPA 25 ☐ Yes ☐ No					
	4. With whom have the copies been left?					
Location of system	Supplies buildings					

	Make	Model	Year of manufacture	Orifice size	Quantity	Temperature rating
Sprinklers						

Pipes and fittings	Type of pipe	
	Type of fittings	

	Alarm device			Maximum time to operate through test connection	
Alarm valve or flow indicator	Type	Make	Model	Minutes	Seconds

Attachment 6A

Dry pipe operating test

	Dry valve			Q.O.D		
Make	Model	Serial No.	Make	Model	Serial No.

	Time to trip through test connection [a,b]		Water pressure	Air pressure	Trip point air pressure	Time water reached test outlet [a,b]		Alarm operated properly	
	Minutes	Seconds	psi	psi	psi	Minutes	Seconds	Yes	No
Without Q.O.D.									
With Q.O.D.									

If no, explain

Deluge and preaction valves

Operation ☐ Pneumatic ☐ Electric ☐ Hydraulics

Piping supervised ☐ Yes ☐ No | Detecting media supervised ☐ Yes ☐ No

Does valve operate from the manual trip, remote, or both control stations? ☐ Yes ☐ No

Is there an accessible facility in each circuit for testing? ☐ Yes ☐ No | If no, explain

Make	Model	Does each circuit operate supervision loss alarm?		Does each circuit operate valve release?		Maximum time to operate release	
		Yes	No	Yes	No	Minutes	Seconds

Pressure-reducing valve test

Location and floor	Make and model	Setting	Static pressure		Residual pressure (flowing)		Flow rate
			Inlet (psi)	Outlet (psi)	Inlet (psi)	Outlet (psi)	Flow (gpm)

Test description

Hydrostatic: Hydrostatic tests shall be made at not less than 200 psi (13.6 bar) for 2 hours or 50 psi (3.4 bar) above static pressure in excess of 150 psi (10.2 bar) for 2 hours. Differential dry pipe valve clappers shall be left open during the test to prevent damage. All aboveground piping leakage shall be stopped.

Pneumatic: Establish 40 psi (2.7 bar) air pressure and measure drop, which shall not exceed 1½ psi (0.1 bar) in 24 hours. Test pressure tanks at normal water level and air pressure and measure air pressure drop, which shall not exceed 1½ psi (0.1 bar) in 24 hours.

Tests

All piping hydrostatically tested at _____ psi (_____ bar) for _____ hours | If no, state reason

Dry piping pneumatically tested ☐ Yes ☐ No

Equipment operates properly ☐ Yes ☐ No

Do you certify as the sprinkler contractor that additives and corrosive chemicals, sodium silicate or derivatives of sodium silicate, brine, or other corrosive chemicals were not used for testing systems or stopping leaks? ☐ Yes ☐ No

Drain test | Reading of gauge located near water supply test connection: psi(bar) | Residual pressure with valve in test connection open wide: psi(bar)

Underground mains and lead-in connections to system risers flushed before connection made to sprinkler piping

Verified by copy of the Contractor's Material and Test Certificate for Underground Piping. ☐ Yes ☐ No

Flushed by installer of underground sprinkler piping ☐ Yes ☐ No | Other Explain

If powder-driven fasteners are used in concrete, has representative sample testing been satisfactorily completed? ☐ Yes ☐ No | If no, explain

[a] Measured from time inspector's test connection is opened.

[b] NFPA 13 only requires the 60-second limitation in specific sections.

Blank testing gaskets	Number used	Locations	Number removed

Welding	Welding piping ☐ Yes ☐ No	
	If yes...	
	Do you certify as the sprinkler contractor that welding procedures used complied with the minimum requirements of AWS B2.1, ASME Section IX *Welding and Brazing Qualifications*, or other applicable qualification standard as required by the AHJ?	☐ Yes ☐ No
	Do you certify that all welding was performed by welders or welding operators qualified in accordance with the minimum requirements of AWS B2.1, ASME Section IX *Welding and Brazing Qualifications*, or other applicable qualification standard as required by the AHJ?	☐ Yes ☐ No
	Do you certify that the welding was conducted in compliance with a documented quality control procedure to ensure that (1) all discs are retrieved; (2) that openings in piping are smooth, that slag and other welding residue are removed; (3) the internal diameters of piping are not penetrated; (4) completed welds are free from cracks, incomplete fusion, surface porosity greater than $^{1}/_{16}$ in. diameter, undercut deeper than the lesser of 25% of the wall thickness or $^{1}/_{32}$ in.; and (5) completed circumferential butt weld reinforcement does not exceed $^{3}/_{32}$ in.?	☐ Yes ☐ No
Cutouts (discs)	Do you certify that you have a control feature to ensure that all cutouts (discs) are retrieved?	☐ Yes ☐ No

Hydraulic data nameplate	Nameplate provided ☐ Yes ☐ No	If no, explain

Sprinkler contractor removed all caps and straps? ☐ Yes ☐ No

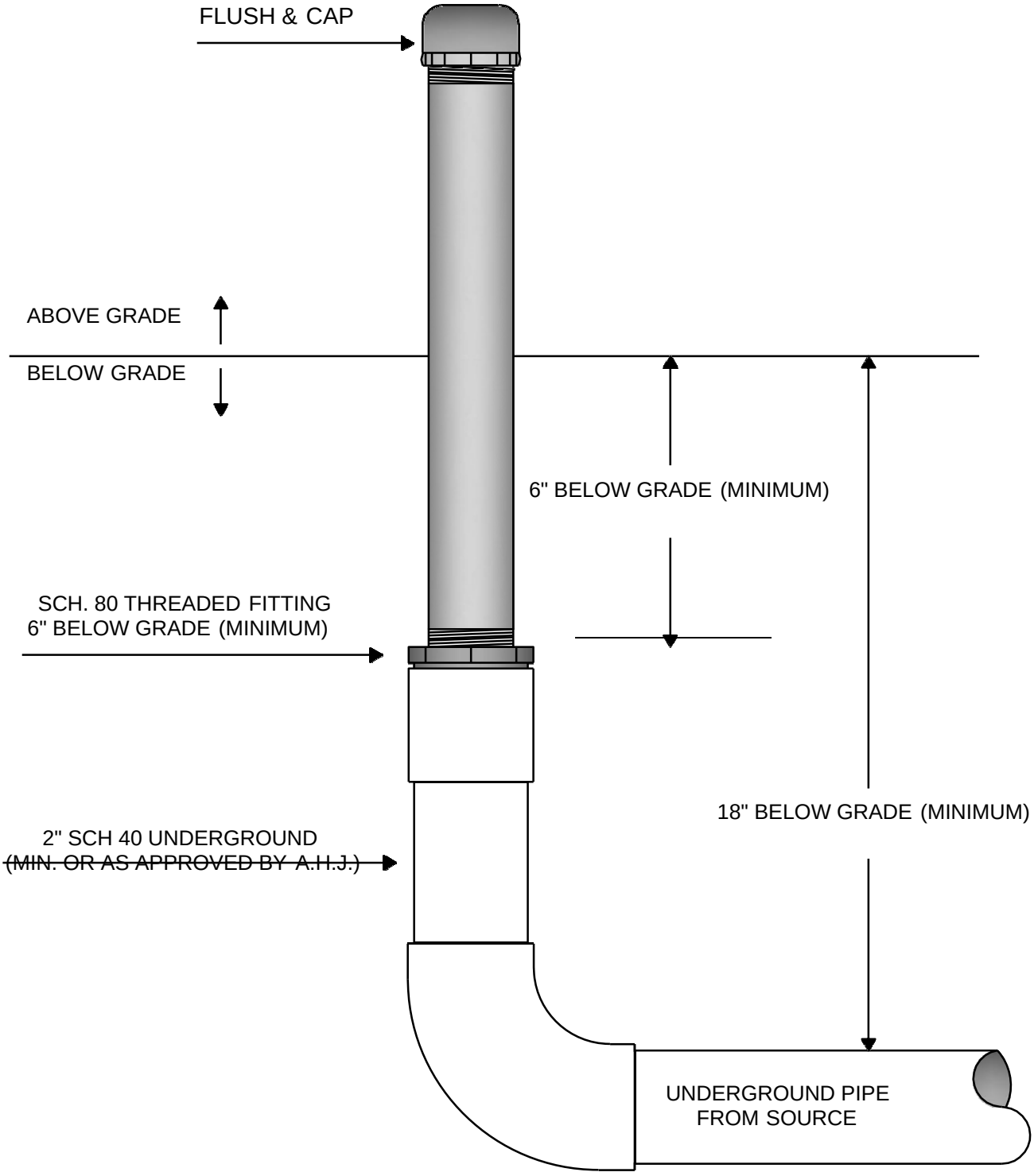
Remarks	Date left in service with all control valves open		
Signatures	Name of sprinkler contractor		
	Tests witnessed		
	The property owner or their authorized agent (signed)	Title	Date
	For sprinkler contractor (signed)	Title	Date

Additional explanation and notes

Attachment 6B

UNDERGROUND FIRE SERVICE NOTES

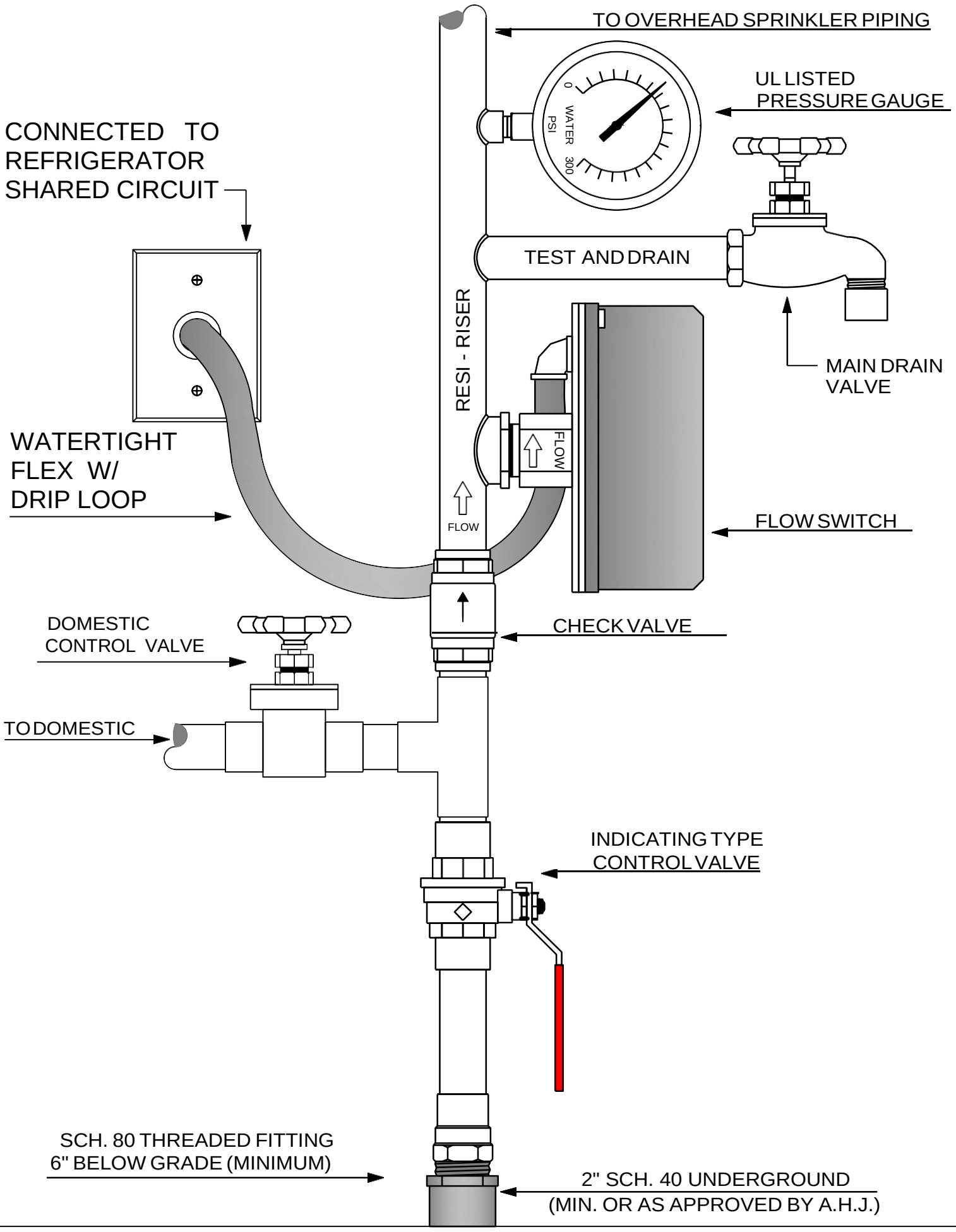
1. Underground fire service line to have a minimum of 18" of cover. Schedule 40 pipe and fittings are acceptable, but threaded fittings shall be schedule 80.
2. Pipe shall transition from plastic to metallic a minimum of 6" below grade.
3. All residential sprinkler system underground piping systems shall 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.



Attachment 6C

SPRINKLER RISER DETAIL

FROM PRIVATE WATER SOURCE



Attachment 6D

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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		APN
Plans	Accepted by approving authorities (names)	
	Address	
	Installation conforms to accepted plans	☐ Yes ☐ No
	Equipment used is approved	☐ Yes ☐ No
	If no, state deviations	
Instructions	Has person in charge of fire equipment been instructed as to location of control valves and care and maintenance of this new equipment?	☐ Yes ☐ No
	If no, explain	
	Have copies of appropriate instructions and care and maintenance charts been left on premises?	☐ Yes ☐ No
	If no, explain	
Location	Supplies buildings	
Underground pipes and joints	Pipe types and class	Type joint
	Pipe conforms to _____ standard	☐ Yes ☐ No
	Fittings conform to _____ standard	☐ Yes ☐ No
	If no, explain	
	Joints needing anchorage clamped, strapped, or blocked in accordance with _____ standard	☐ Yes ☐ No
	If no, explain	
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 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.	
	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 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 10.10.2.2.4):	
	$L = \frac{SD\sqrt{P}}{148{,}000}$ 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) ☐ Yes ☐ No If no, explain	
	How flushing flow was obtained ☐ Public water ☐ Tank or reservoir ☐ Fire pump	Through what type of opening ☐ Hydrant butt ☐ Open pipe
	Lead-ins flushed according to _____ standard by (company) ☐ Yes ☐ No If no, explain	
	How flushing flow was obtained ☐ Public water ☐ Tank or reservoir ☐ Fire pump	Through what type of opening ☐ Y connection to flange and spigot ☐ Open pipe
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	
Hydrants	Number installed Type and make All operate satisfactorily ☐ Yes ☐ No	
Control valves	Water control valves left wide open ☐ Yes ☐ No If no, state reason 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