FIRE PREVENTION STANDARDS	DATE: **8/21/96**	NUMBER: **FP0-007**
	APPROVED:	REVISED: 01/22/2026
	TITLE: **Guide to Water Storage for Fire Protection**	

Guide to Water Storage for Fire Protection

These are the minimum requirements for water storage for fire protection.

1. The National Standard utilized for water storage requirements is the latest edition of NFPA 24.

2. All requirements and final locations of water tanks and fire hydrants shall be approved by the local fire agency Authority Having Jurisdiction (AHJ).

3. Plans shall be submitted to the AHJ for approval and permitting. When field variations are made to the approved water storage plans, the contractor shall provide "As-built" plans prior to the final inspection.

System Design Requirements

A. Water Supply (Storage Tank)

1. Minimum required amount of stored fire protection water for one- and two-family dwellings is 10,000 gallons.
2. For more than two dwellings, contact the local fire agency Authority Having Jurisdiction.
3. Domestic Water Storage:
   The water tank shall be used for domestic water storage in conjunction with fire protection water storage and designed to the following standards:
   a. The tank is equipped with a minimum 1-inch fill line and a float valve to ensure that the tank is kept a minimum of 80% full.
4. Tank Location:
   The location of the tank shall be approved by the local fire agency Authority Having Jurisdiction.
5. A minimum 30' clearance of all vegetation and flammable and combustible materials around the circumference of the tanks shall be maintained.

B. Fire Department Connection (Hydrant)

1. The fire hydrant location shall be a minimum of 50 feet to a maximum of 150 feet from the protected structure and not more than six to eight feet from the edge of the driveway or roadway. The location of the fire hydrant shall not impede access road/driveway. Location subject to the approval of the local fire agency Authority Having Jurisdiction.

2. The fire department connection (hydrant) may be located at the base of the tank if accessible to fire department equipment.

3. The fire department connection (hydrant) must be equipped with a minimum of one 2 ½" National Standard Thread outlet. The outlet will be 30 to 36 inches above surrounding grade level and be equipped with a cap.

4. All fire department connections (hydrants) shall be painted and marked in accordance with the Santa Cruz County's Fire Prevention Officer's Standard FPO-017 "Fire Hydrant Markings".

5. All fire hydrants shall be maintained and have a 3' clear space around the circumference of the fire hydrant.

C. Fire Department Connection (Hydrant) Piping

1. The minimum size pipe and tank outlet for a fire line is 4 inches. For remote hydrants, a larger size may be required upon review of the systems hydraulic calculations.

2. Minimum underground pipe depth is 30 inches. Where piping passes under access roads or areas subject to heavy loads, the minimum bury is 36 inches.

3. Approved pipe materials for underground wharf hydrant supply piping shall include Ductile Iron, AWWA C900, AWWA C906 (HDPE), Schedule 40 CPVC or other material listed for fire protection service.

4. Where plastic pipe is used, tracer wire shall be secured to the top of the piping for its entire length.

5. All transition from metal to plastic will be through schedule 80 plastic fittings. Metallic pipe to extend 6 inches below grade level. No exposed PVC pipe allowed.

   EXCEPTION: An approved AWWA Dressler coupling may be used in lieu of schedule 80 plastic fitting if approved by the local fire agency Authority Having Jurisdiction .

6. Concrete thrust blocks or other approved listed devices shall be required when appropriate as determined by the local fire agency Authority Having Jurisdiction to stabilize the underground pipe.

NOTE: Underground metallic pipe shall be wrapped in accordance with the requirements of the Uniform Plumbing Code.

7. A concrete pad at grade, supporting the hydrant, shall be a minimum of 24"x24"x4" thick.

8. An approved full flow hydrant line shut off valve shall be installed at the tank.

9. All underground piping systems shall be inspected **before** back fill by the local fire agency Authority Having Jurisdiction to verify compliance.

10. Underground pipe shall be flushed with water until water runs clear, ensuring the line is free of contamination.

Attachments:

- **6E – Fire Pump Contractors Materials and Test Certificate** – to be completed prior to final
- **G1 and G2 – Guide to Water Storage**
- **E and F – Storage Tank-Hydrant Line Detail**
- **6D- Underground Contractors Materials and Test Certificate** – to be completed prior to final

Attachment 6E

Contractor's Material and Test Certificate for Fire Pump Systems

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
	ALL EQUIPMENT USED IS APPROVED FOR FIRE SYSTEM SERVICE IF NO, STATE DEVIATIONS	☐ YES	☐ NO
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	☐ YES	☐ NO
	HAVE COPIES OF APPROPRIATE INSTRUCTIONS AND CARE AND MAINTENANCE CHARTS BEEN LEFT ON PREMISES? IF NO, EXPLAIN	☐ YES	☐ NO
LOCATION	SUPPLIES BUILDING(S) (CAMPUS, WAREHOUSE, HIGH RISE) EXPLAIN		
PUMP ROOM EQUIPMENT	IS THE PUMP ROOM EQUIPMENT PER THE PLANS AND SPECS?	☐ YES	☐ NO
	IS THE FIRE PUMP PROPERLY MOUNTED AND ANCHORED TO THE FOUNDATION? IF NO, EXPLAIN	☐ YES	☐ NO
	IS THE FIRE PUMP BASE PROPERLY GROUTED? IF NO, EXPLAIN	☐ YES	☐ NO
	DOES THE PUMP ROOM HAVE THE PROPER FLOOR DRAINS? IF NO, EXPLAIN	☐ YES	☐ NO
	IS THE SUCTION AND DISCHARGE PIPING PROPERLY SUPPORTED?	☐ YES	☐ NO
	IS THE PUMP ROOM HEATED AND VENTILATED PER NFPA 20?	☐ YES	☐ NO
PIPES AND FITTINGS	PIPE TYPES AND CLASS		
	PIPE CONFORMS TO _____ STANDARD	☐ YES	☐ NO
	FITTINGS CONFORM TO _____ STANDARD IF NO, EXPLAIN	☐ YES	☐ NO
	SUCTION AND DISCHARGE PIPING ANCHORED OR RESTRAINED?:	☐ YES	☐ NO
PRE-PACKAGED PUMP HOUSE	IS THIS A PACKAGE OR SKID MOUNTED PUMP?	☐ YES	☐ NO
	IS THE PACKAGE/SKID PROPERLY ANCHORED TO A CONCRETE FOUNDATION? IF NO, EXPLAIN	☐ YES	☐ NO
	IS THE STRUCTURAL FOUNDATION FRAME FILLED WITH CONCRETE TO FORM A FINISHED FLOOR?	☐ YES	☐ NO
	IS THERE A FLOOR DRAIN INSTALLED?	☐ YES	☐ 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.		

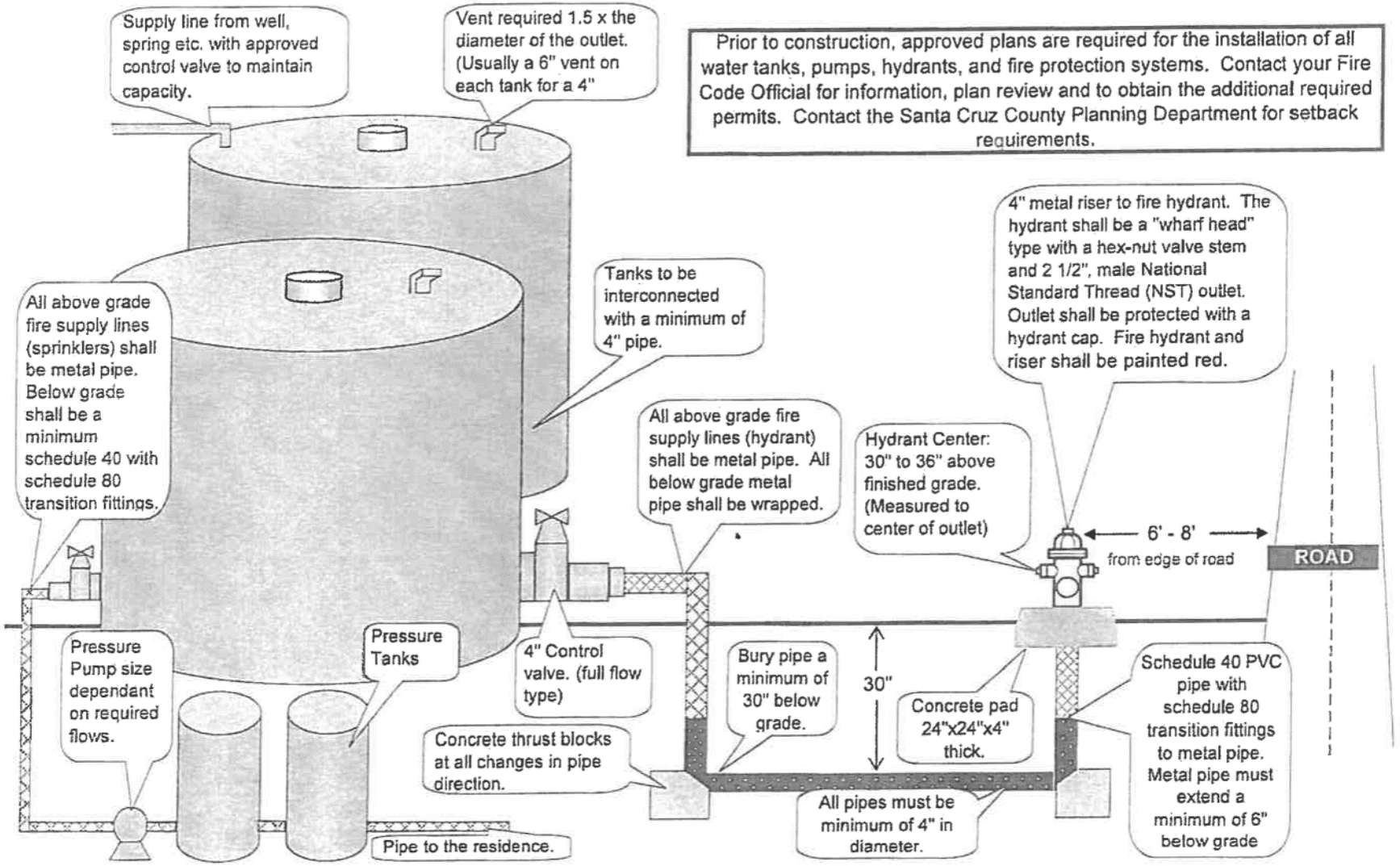
FLUSHING TESTS *(continued)*	NEW PIPING FLUSHED ACCORDING TO _____ STANDARD ☐ YES ☐ NO BY (COMPANY) _____ IF NO, EXPLAIN	
	HOW FLUSHING FLOW WAS OBTAINED ☐ PUBLIC WATER ☐ TANK OR RESERVOIR ☐ OTHER (EXPLAIN)	THROUGH WHAT TYPE OPENING ☐ TEST HEADER ☐ OPEN PIPE
	LEAD-INS FLUSHED ACCORDING TO _____ STANDARD ☐ YES ☐ NO BY (COMPANY) IF NO, EXPLAIN	
	HOW FLUSHING FLOW WAS OBTAINED ☐ PUBLIC WATER ☐ TANK OR RESERVOIR ☐ OTHER (EXPLAIN)	THROUGH WHAT TYPE OPENING ☐ Y CONNECTION TO FLANGE & SPIGOT ☐ OPEN PIPE
FIELD ACCEPTANCE TEST	ALL EQUIPMENT APPROVED? ☐ YES ☐ NO	
	ALL REQUIRED REPRESENTATIVES PRESENT FOR TEST ☐ YES ☐ NO	
	AHJ AND OWNER'S REPRESENTATIVE PRESENT FOR TEST ☐ YES ☐ NO IF NO, EXPLAIN	
	ALL ELECTRICAL WIRING COMPLETE AND PER *NFPA 70* AND NFPA 20 ☐ YES ☐ NO IF NO, EXPLAIN	
	CALIBRATE TEST EQUIPMENT USED ☐ YES ☐ NO CALIBRATION DATE	
	FLOW TESTS PUMP DESIGN _____ GPM _____ PSI DOES THE PUMP MEET OR EXCEED THE CERTIFIED CURVE? ☐ YES ☐ NO PUMP TYPE ☐ HORIZONTAL ☐ VERTICAL TURBINE ☐ OTHER PUMP MAKE _____ MODEL # _____ SERIAL # _____ COMMENTS _____	
	ELECTRIC DRIVER OPERATIONAL TEST SATISFACTORY ☐ YES ☐ NO ELEC. DRIVER _____ MODEL # _____ SERIAL # _____ VOLTAGE _____ VAC @ _____ HP _____ RPM _____ FLA	
	ENGINE DRIVEN ☐ YES ☐ NO ENGINE MAKE _____ MODEL # _____ SERIAL # _____ _____ HP _____ RPM SPEED DIESEL DRIVER OPERATIONAL TEST SATISFACTORY? ☐ YES ☐ NO OTHER EXPLAIN	
	CONTROLLER MAKE _____ MODEL # _____ SERIAL # _____ VARIABLE SPEED PRESSURE LIMITING CONTROL ☐ YES ☐ NO TESTED AT MINIMUM, RATED, AND PEAK FLOW ☐ YES ☐ NO CONTROLLER TEST: SIX AUTO STARTS ☐ YES ☐ NO SIX MANUAL STARTS ☐ YES ☐ NO PHASE REVERSAL TEST PERFORMED (ELECTRIC ONLY) ☐ YES ☐ NO ALTERNATE POWER SOURCE TESTED (ELECTRIC ONLY) ☐ YES ☐ NO ELECTRONIC FUEL MANAGEMENT (ECM) FUNCTION TEST PERFORMED (DIESEL ONLY) ☐ YES ☐ NO	
CONTROL VALVES	SYSTEM 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 _____ ADDITIONAL COMMENTS:	
SIGNATURES	NAME OF INSTALLING CONTRACTOR	
	TESTS WITNESSED BY FOR PROPERTY OWNER (SIGNED) TITLE DATE	
	FOR INSTALLING CONTRACTOR (SIGNED) TITLE DATE	

ADDITIONAL COMMENTS AND NOTES:

GUIDE TO WATER STORAGE FOR FIRE PROTECTION

Attachment G-1

Santa Cruz County requires a minimum of 10,000 gallons of water storage and a fire department hydrant to access the water for all new residential, non-residential and building additions of more than 500 square feet. (Exception: If an approved municipal water system fire hydrant, is located within 600' of structure, then a private water supplied hydrant system is not required.) Note: All new dwellings require the installation of a residential fire sprinkler system. Hydrant location: To be a minimum of 50' and a maximum of 150' from the protected structures. The hydrant is to be located a minimum of 6' or a maximum of 8' from the edge of the road, driveway or turnout. A turnout is required if the driveway or road is less than 18' in width to allow additional fire apparatus to pass. Questions regarding the location of the fire hydrant will be addressed by the Fire Code Official.

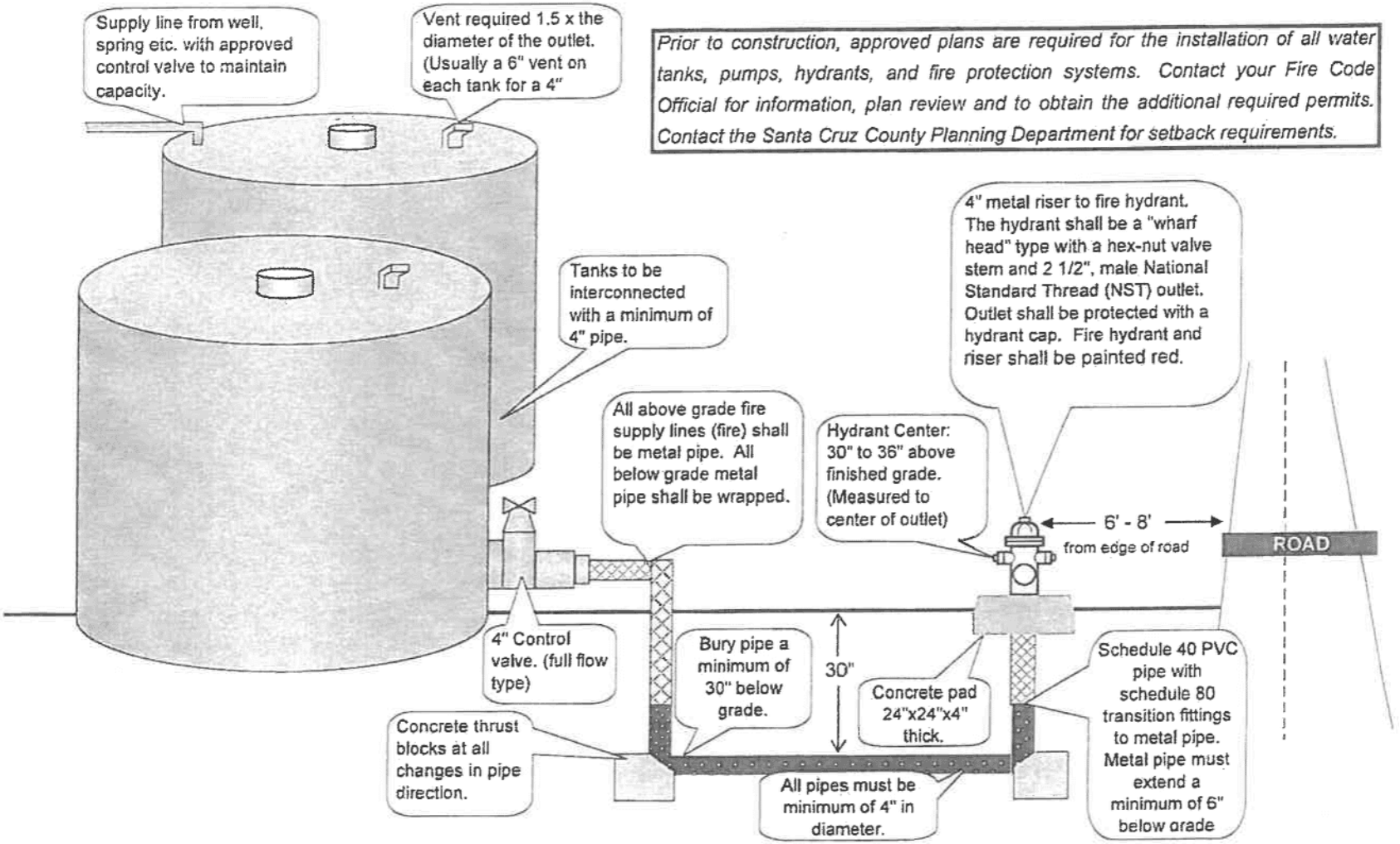


GUIDE TO WATER STORAGE FOR FIRE PROTECTION

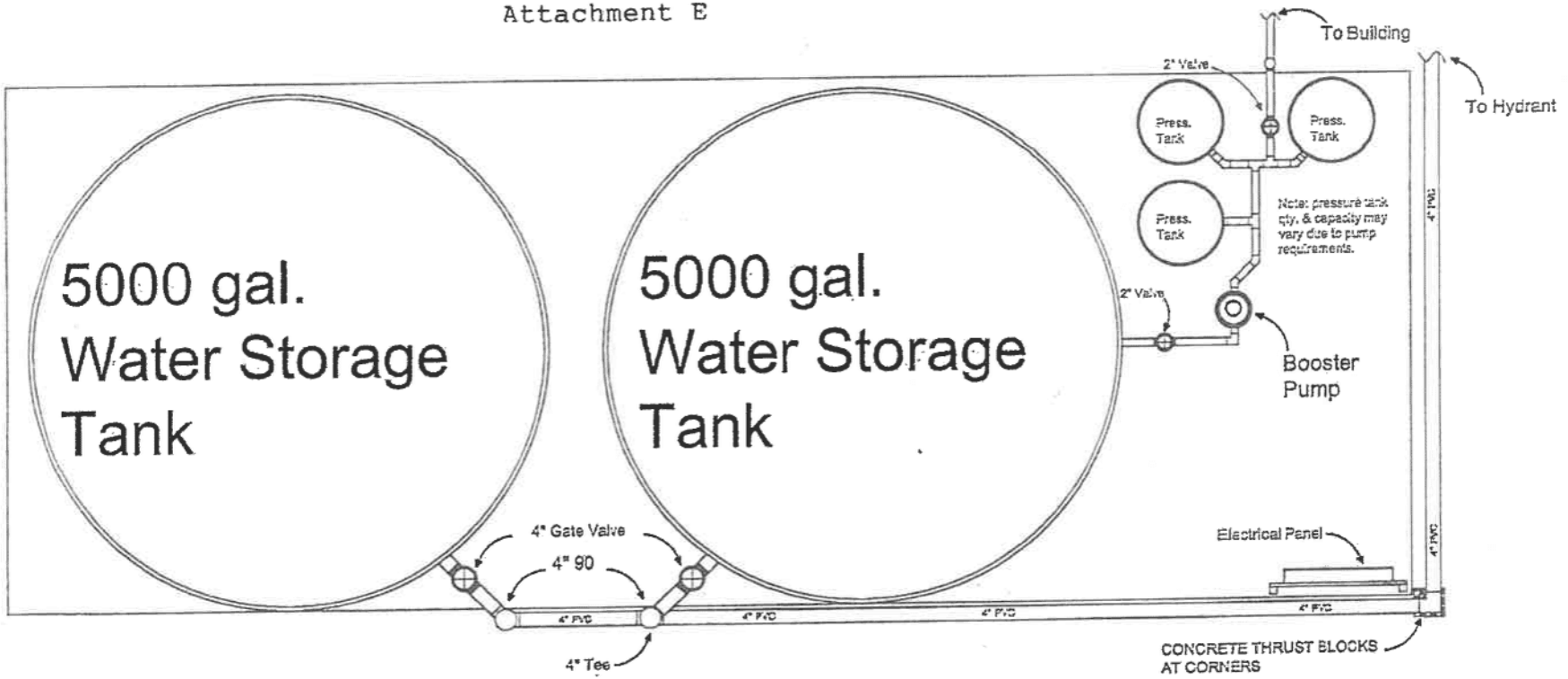
Attachment G-2

Santa Cruz County requires a minimum of 10,000 gallons of water storage and a fire department hydrant to access the water for all new residential, non-residential and building additions of more than 500 square feet. (Exception: If an approved municipal water system fire hydrant. is located within 600' of structure, then a private water supplied hydrant system is not required.) Note: All new dwellings require the installation of a residential fire sprinkler system. Hydrant location: To be a minimum of 50' and a maximum of 150' from the protected structures. The hydrant is to be located a minimum of 6' or a maximum of 8' from the edge of the road, driveway or turnout. A turnout is required if the driveway or road is less than 18' in width to allow additional fire apparatus to pass. Questions regarding the location of the fire hydrant will be addressed by the Fire Code Official.

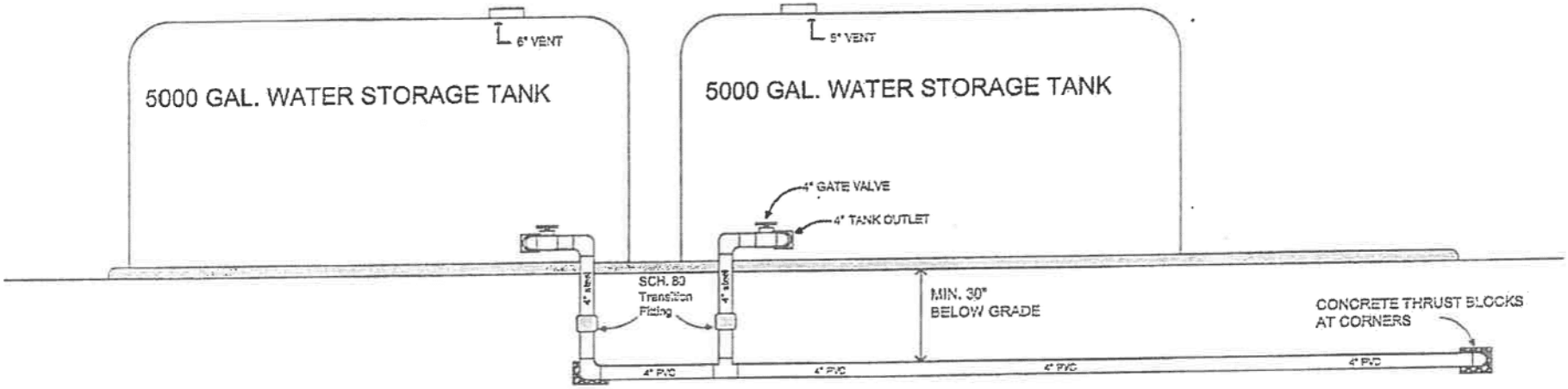
Prior to construction, approved plans are required for the installation of all water tanks, pumps, hydrants, and fire protection systems. Contact your Fire Code Official for information, plan review and to obtain the additional required permits. Contact the Santa Cruz County Planning Department for setback requirements.



Attachment E

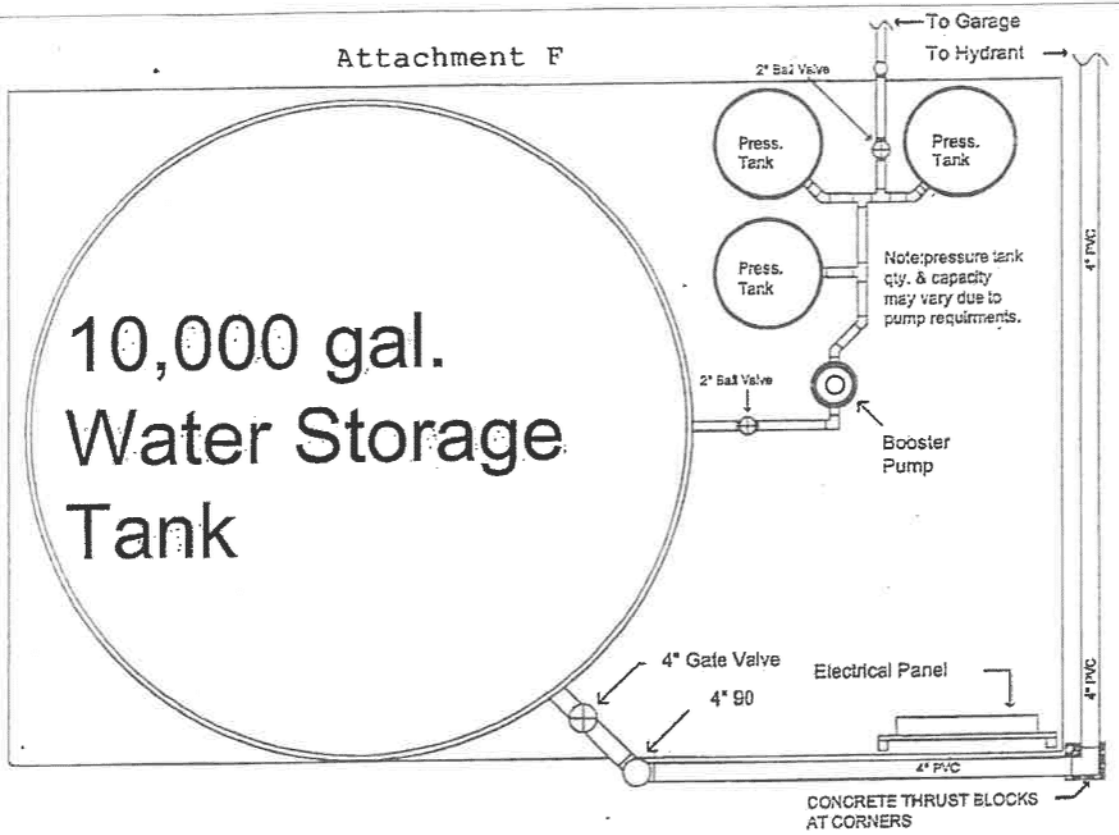


STORAGE TANK/PUMP STATION DETAIL TOP VIEW - N.T.S.

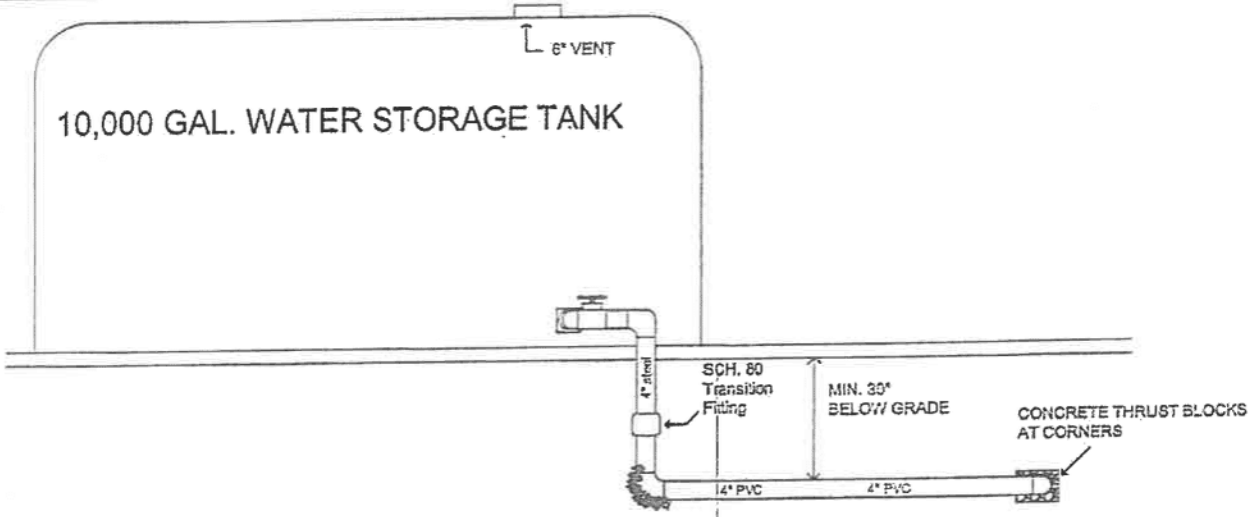


STORAGE TANK/HYDRANT LINE DETAIL SIDE VIEW - N.T.S.

Attachment F



STORAGE TANK/PUMP STATION DETAIL TOP VIEW - N.T.S.



STORAGE TANK/HYDRANT LINE DETAIL SIDE VIEW - N.T.S.

Attachment 6D

Fire Chiefs Association of Santa Cruz County
FIRE PREVENTION OFFICERS SECTION

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)	

Attachment 6D

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		