

City of Vista Fire Department

Development Services Section
600 Eucalyptus Avenue, Vista CA 92084

Guideline:

Underground Piping for Private Fire Hydrants & Fire Sprinkler Supply.



Guideline G-06

Updated: January, 2008

Underground Piping – Private Hydrants & Sprinkler Systems

PURPOSE

The purpose of this guideline is to provide the basic information necessary to meet minimum requirements for the design and installation of private hydrant and sprinkler supply underground piping in accordance with 2007 California Fire Code (CFC), 2007 Building Code (CBC), 2007 NFPA 24, 2002 NFPA 13, 13D, 13R and locally adopted amendments to these codes.

Fire Department approval of site, grading or improvement plans is not an approval to install private fire service underground systems. A separate plan review and permit is required prior to commencing the installation.

SCOPE

This guideline is applicable to all private underground piping for hydrants and/or sprinkler supply lines within the jurisdiction of Vista Fire Department (VFD). This guideline is not applicable to underground piping serving fire sprinkler systems designed in accordance with NFPA 13D systems nor with NFPA 13R systems that utilize combination fire and domestic water service.

PLAN SUBMITTAL

General

1. Plans for all underground piping for hydrants and/or fire sprinkler supply lines shall be submitted to VFD for review and approval prior to installation. Plan check fees are due at the time of plan submittal. Plan review and approval is also required from the Water Purveyor prior to connecting to the water system.
2. Provide a minimum of three copies of the plans.
3. Plans shall be legible, scaled to nationally recognized standards, and printed as a blue- or black-line drawing. VFD does not accept pen and ink plans.
4. A current (within six months) completed Water Availability form (fire flow letter) shall accompany plans.
5. Where underground plans are submitted as part of a building fire sprinkler system package the plans must comply with the requirements of this guideline. A separate underground permit will be issued and additional plan check fees will be charged.

Title page information

1. Applicable codes and standards used for the system design.
2. Project location including the full legal address of the facility, and building number(s) if applicable; tract or parcel number.
3. The installing contractor's name, telephone number, address, and California State contractor license number and classification. Installing contractor must possess a C16, C34, or C36 specialty license or General Engineering Contractor (A) license. Plans may be prepared by a Registered Professional Engineer (RPE) or the installing contractor.

Note: If the piping plan is designed by a RPE, the plans shall contain the name, license number and classification of the installing contractor along with the designers contact information and wet stamp.

4. VFD underground notes verbatim on the plan (see attached).

Additional Required Information

1. Plans shall indicate complete compliance with VFD fire department notes. Plan details shall be provided for all appliances installed as well as the sprinkler system point of connection.
2. Size and location of public mains and whether project is connected to a looped or dead-end main.
3. Location of all public hydrants within 300 feet of the project site.
4. Location of all valves. Specify the type for each e.g., post indicator valve (PIV), key gate valve, system control valve, reduced pressure detector assembly (RPDA), outside stem and yoke (OS&Y) and fire department connection (FDC).

Note: An RPDA may be used as the control valve only with prior approval provided that it does not serve a fire hydrant. The FDC may be co-located with the RPDA when approved as a control valve.

5. Pipe size, class, and type; specify lined or unlined if applicable.
6. Thrust block locations or means of restraint as approved by 2007 NFPA 24. The thrust block bearing surface required for all curves shall conform to Vista Irrigation District standard drawing 5-8 and identified on the plans (see attached). For conditions not covered by the standard drawing thrust blocks must be computed using the formulas provided in NFPA 24. Calculations shall be shown on the plans.

System design requirements

1. Any connection to Water District lines requires authorization, inspections and engineered improvement plans approved by the Water District having jurisdiction, and the Fire Prevention Division, prior to the commencement of any installation and/or connection.
2. Minimum depth of bury to top of private fire service main is 36 inches per Water District engineering standards and NFPA Standards. Bedding and backfill shall be to Water District engineering standard drawings and specifications and to manufacturer's specifications.
3. All non-metallic pipelines shall be provided with No. 10 AWG insulated copper wire laid along the top of the pipe and secured to prevent movement.
4. All private fire service mains to be rated Class 200 pipe, regardless of lesser standard pressures in the serving utility main.
5. At no time shall pipes pass through or under any bearing foundations or footing. All underground piping, fittings and fixtures shall terminate and rise to the exterior of any wall, footing or structural member. Sprinkler supply line shall penetrate the foundation wall above grade and a minimum of 2 inches clearance (interstitial space) shall be provided where the pipe passes through the wall.
6. Service mains with two points of connection to the water supply that serve multiple sprinkler systems shall have post indicating type sectional control valves (supervised) or underground gate valves with roadway boxes to enable isolation of any section of the main under repair without disrupting fire protection water to the other systems.
7. All ferrous pipe shall be protected with a loose 8-mil Polyethylene Encasement (poly sleeve) in accordance with AWWA C-105. The ends of the tube and any splices made shall be sealed with 2" tape approved for underground use. Complete details shall be shown on the drawings. All ferrous fittings shall be cleaned and thoroughly coated with asphalt or other corrosion retarding material. The assembly shall be wrapped with two layers of 8 mils polyethylene sheeting and taped and sealed prior to pouring thrust blocks or supports.
8. All fire hydrants must meet VFD standards, as well as those of the Water District having jurisdiction. Installation must be per fire department and Water District criteria. Hydrants must be painted traffic yellow (public) or OSHA red (private) and be marked with blue reflective dots on the pavement. Approved fire hydrants are: Jones 3765 and Clow 2060 or as otherwise directed.

9. Concrete aprons shall be installed on all fire hydrants. Concrete pads shall be 3' x 3' minimum.
10. On-site fire hydrants, post indicator valves and fire department connections located less than four (4) feet behind the face of a curb shall be protected by guard posts. All guard posts shall be painted yellow.
11. All fire sprinkler systems require a post indicator valve (PIV) as the sole control valve, located away from the building at a location approved by the Fire Marshal, minimum forty (40) feet from the structure or across the fire lane. Wall mounted OS&Y valves may be provided if approved by the Fire Marshal. Fire department connections (FDC) shall be co-located with the control valve in a location approved by the Fire Marshal. FDCs and PIVs shall be visible, accessible and installed along fire access roadways with the top between 30" and 36" above the finished grade. With prior approval, the reduced pressure detector assembly (RPDA) may be used as a control valve only when there are no on-site fire hydrants served by the RPDA.
12. All fire sprinkler system control valves are required to be supervised for tamper and locked in the open position. Supervision shall be electronic from a listed Central Station or a constantly attended location. The only approved padlock is the Master Lock "break away" model 500KABRK with key #197. Keys to the padlock are to be placed in the Knox key security box and in the spare sprinkler cabinet.
13. PIVs or other approved indicating valves shall be located a minimum of 40 feet from the building served. Where it is impractical to locate a control valve 40 feet from the building, provisions may be made to allow the indicating valve to be located closer utilizing one of the following methods:
 - 1) Approved wall mounted indicating valves provided they are located on blank walls (i.e., no glazed openings above or within 15 feet on either side of the valve).
 - 2) Approved indicating valves may be placed in valve rooms accessible only from the exterior. An approved sign shall be provided for the door.
 - 3) Approved indicating valves may be placed on exterior risers (when approved) provided they are located on blank walls.
14. Fire department connections (FDC) shall be co-located with the control valves in a location approved by the Fire Marshal. FDCs and PIVs shall be visible, accessible and installed along fire access roadways with the top between 30" and 36" above the finished grade.

15. FDCs shall be no more than 150 feet from a *public* hydrant measured along fire department access roadways. The FDC may be located within 150 feet of a private hydrant if the FDC is connected to the fire sprinkler system by a dedicated pipe that connects on the system side of the fire sprinkler check valve. FDCs shall be painted OSHA safety red.
16. Fire Department Connection (FDC) shall be of an approved type. FDC's shall be located on the address side of building and located immediately adjacent to the approved fire department access road. FDC shall be co-located with the control valve. The FDC shall contain a minimum of two 2 ½" inlets on a 4 inch riser. When the total sprinkler system demand, including hose allowance, is 1,000 to 1500 GPM the FDC riser shall be 6 inches and shall contain a 3-way connection. System demands greater than 1500 GPM shall be provided with a *minimum* 6 inch riser and a standard 4-way connection.
17. Fire department connection check valves shall be located above grade and shall be attached to the fire department connection riser by threaded or flanged fittings. Roll grooved mechanical fittings are not acceptable and shall not be used.
18. Post indicator valves (PIV), private fire hydrants and fire department connections (FDC) shall be painted OSHA red. RPDA's shall be painted tan or other color as approved.
19. Each post indicator valve and related fire department connection shall be labeled with a sign identifying the building or building portion served by that FDC/PIV. Sign criteria and examples of signs appear in an appendix of this policy. See attached and Appendix 5.5 of the fire sprinkler policy.
20. VFD form *Contractor's Material and Test Certificate for Underground Piping* shall be completed and presented to the VFD Inspector prior to final approval of the installation.

NOTES FOR UNDERGROUND PIPING FOR PRIVATE FIRE HYDRANTS & SPRINKLERS

1. Prior to installation, all required permits shall be obtained from VFD and the Building Department. Plans shall also be approved by the Water Purveyor prior to doing any work involving connection to the water system.
2. Inspections are required: 1) prior to pouring thrust blocks; 2) pipe installation and thrust blocks; 3) for hydrostatic testing; 4) for flush. Schedule all inspections two working days in advance at (760) 639-6140.

Note: The water purveyor (VID) shall have sole authority to approve the installation of RPDA's and public fire hydrants. Fire Department inspection and approval begins on the private side of the RPDA at the lower 90° elbow.

3. Installation, inspection, and testing shall conform to 2002 NFPA 13 and 2007 NFPA 24 and VFD policy.
4. Private fire hydrants shall be either Clow 2060 or James Jones 3765 with a minimum of two 2 ½" and one 4" outlet. Private hydrants shall be painted OSHA red.
5. Fire hydrant supply piping shall be a minimum of six inches in diameter. The lowest operating nut shall be a minimum of 18" above the finished grade and the hydrant flange shall be a minimum of 2" above grade. Fire hydrants shall be provided with a 3' x 3' (minimum) concrete splash pad.
6. Fire hydrants shall be installed in approved locations. A keyed gate valve shall be provided for each hydrant in an accessible location. Valves shall not be located in parking stalls.
7. All pipes shall be approved for use in fire service systems and shall be Class 200 regardless of static pressure.
8. Thrust blocks or other approved methods of restraint shall be provided wherever pipe changes direction.
9. The trench shall be excavated for thrust blocks and inspected prior to pour. All corrosion protection and tracer wire shall be in place.
10. A hydrostatic test (200 psi for two hours or 50 psi over maximum static pressure, whichever is greater) shall be witnessed by a VFD Inspector. The trench shall be back filled between the joints to prevent movement of the pipe.
11. The system shall be thoroughly flushed before connection is made to overhead piping. Flow shall be through a minimum of 4" hose or pipe unless otherwise approved by the VFD Inspector. The VFD Inspector shall witness the test.
12. All control valves shall be locked in the open position. Valves shall be electronically supervised for tamper per VFD policy.
13. An approved stamped set of plans shall be available on-site during inspections. If an approved set is not made available the inspection will be cancelled.
14. VFD form: **Contractor's Material and Test Certificate for Underground Piping** shall be completed and presented to the VFD Inspector prior to final approval.
15. All non-metallic pipelines shall be provided with No. 10 AWG copper wire on the top of the pipe and taped in place to prevent movement.
16. All underground piping, fittings and fixtures shall terminate and rise to the exterior of any wall, footing or structural member. Sprinkler supply line shall penetrate the foundation wall above grade and a minimum of 2 inches clearance (interstitial space) shall be provided where the pipe passes through the wall.

THE INSTALLING CONTRACTOR ASSUMES ALL RESPONSIBILITY FOR THE ADEQUACY OF THE PRIVATE MAIN TO SERVE THE FIRE SPRINKLER SYSTEM DEMAND AND FIRE HYDRANT FIREFLOW. IF THE CAPACITY IS NOT SUFFICIENT, THE UNDERGROUND PRIVATE MAIN AND/OR FIRE SPRINKLER SYSTEM MUST BE REPLACED OR OTHERWISE AUGMENTED IN AN APPROVED MANNER.

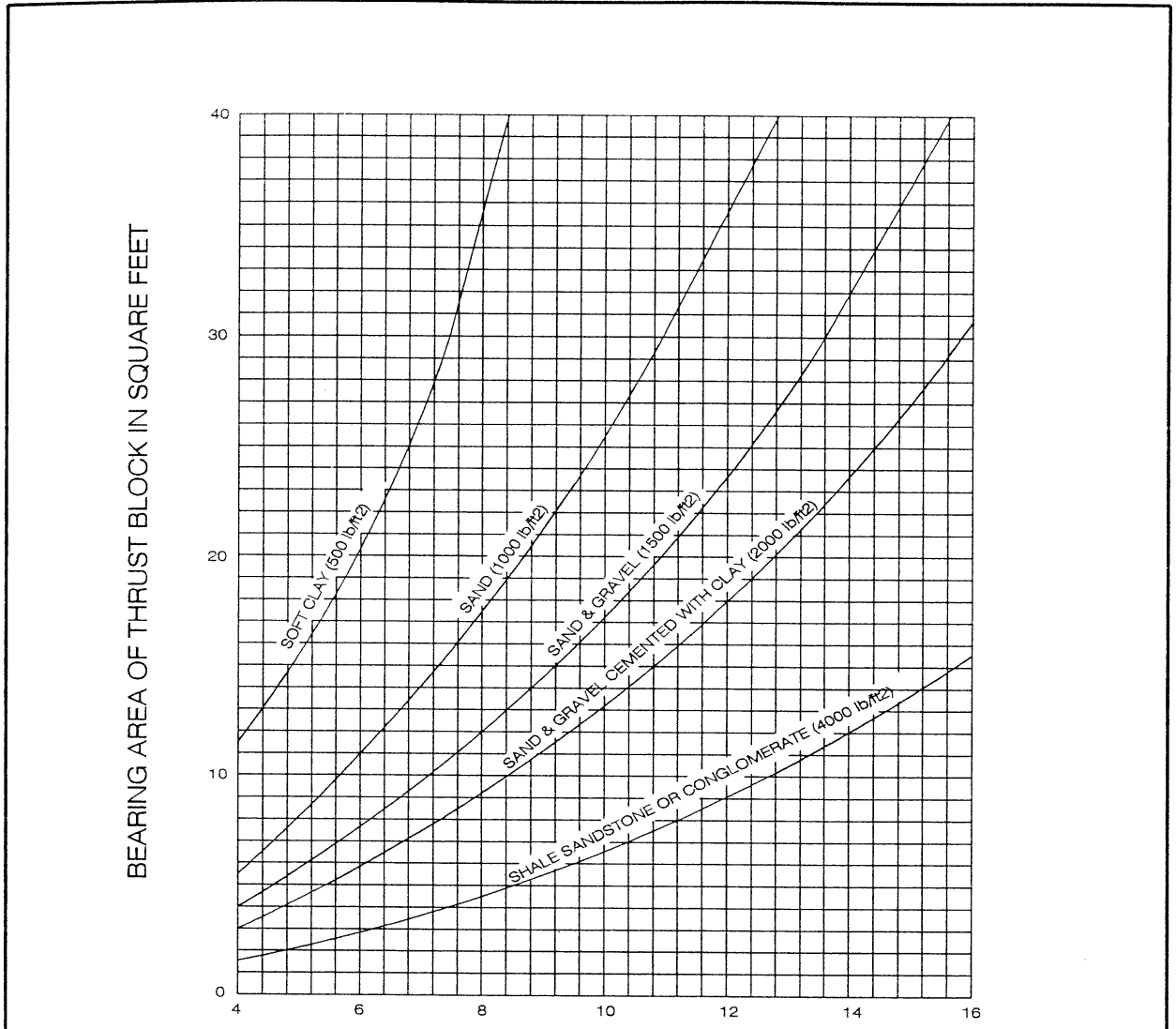
Vista Fire Department

175 N. Melrose Drive, Vista 92083
 ...SERVING THE CITY OF VISTA & THE VISTA FIRE PROTECTION DISTRICT

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 <input type="checkbox"/> Yes <input type="checkbox"/> No Equipment used is approved <input type="checkbox"/> Yes <input type="checkbox"/> 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? 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 buildings
Underground pipes and joints	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 needed 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> 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 150 psi (10.3 bar) for 2 hours. <u>Leakage:</u> New pipe laid with rubber gasketed joints shall, if the workmanship is satisfactory, have little or no leakage at the joints. The amount of leakage at the joints shall not exceed 2 quarts per hour (1.89 L/hr) per 100 joints irrespective of pipe diameter. The leakage shall be distributed over all joints. If such leakage occurs at a few joints, the installation shall be considered unsatisfactory and necessary repairs made. The amount of allowable leakage specified above can be increased by 1 fluid ounce per inch valve diameter per hr. (30 mL/25 mm/hr) for each metal seated valve isolating the test section. If dry barrel hydrants are tested with the main valve open so the hydrants are under pressure, an additional 5 ounces per minute (150 mL/min) leakage is permitted for each hydrant.
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 Through what type opening <input type="checkbox"/> Public water <input type="checkbox"/> Tank or reservoir <input type="checkbox"/> Fire pump <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 Through what type opening <input type="checkbox"/> Public water <input type="checkbox"/> Tank or reservoir <input type="checkbox"/> Fire pump <input type="checkbox"/> Y connection to flange <input type="checkbox"/> Open pipe and spigot

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	
	Water control valves left wide open If no, state reason		<input type="checkbox"/> Yes <input type="checkbox"/> No	
Control valves	Hose threads of fire department connections and hydrants interchangeable with those of fire department answering alarm		<input type="checkbox"/> Yes <input type="checkbox"/> No	
	Date left in service			
Remarks				
Signatures	Name of installing contractor			
	Tests witnessed by			
	For property owner (signed)	Title	Date	
	For installing contractor (signed)	Title	Date	
Additional explanation and notes				

Additional required certifications/statements:

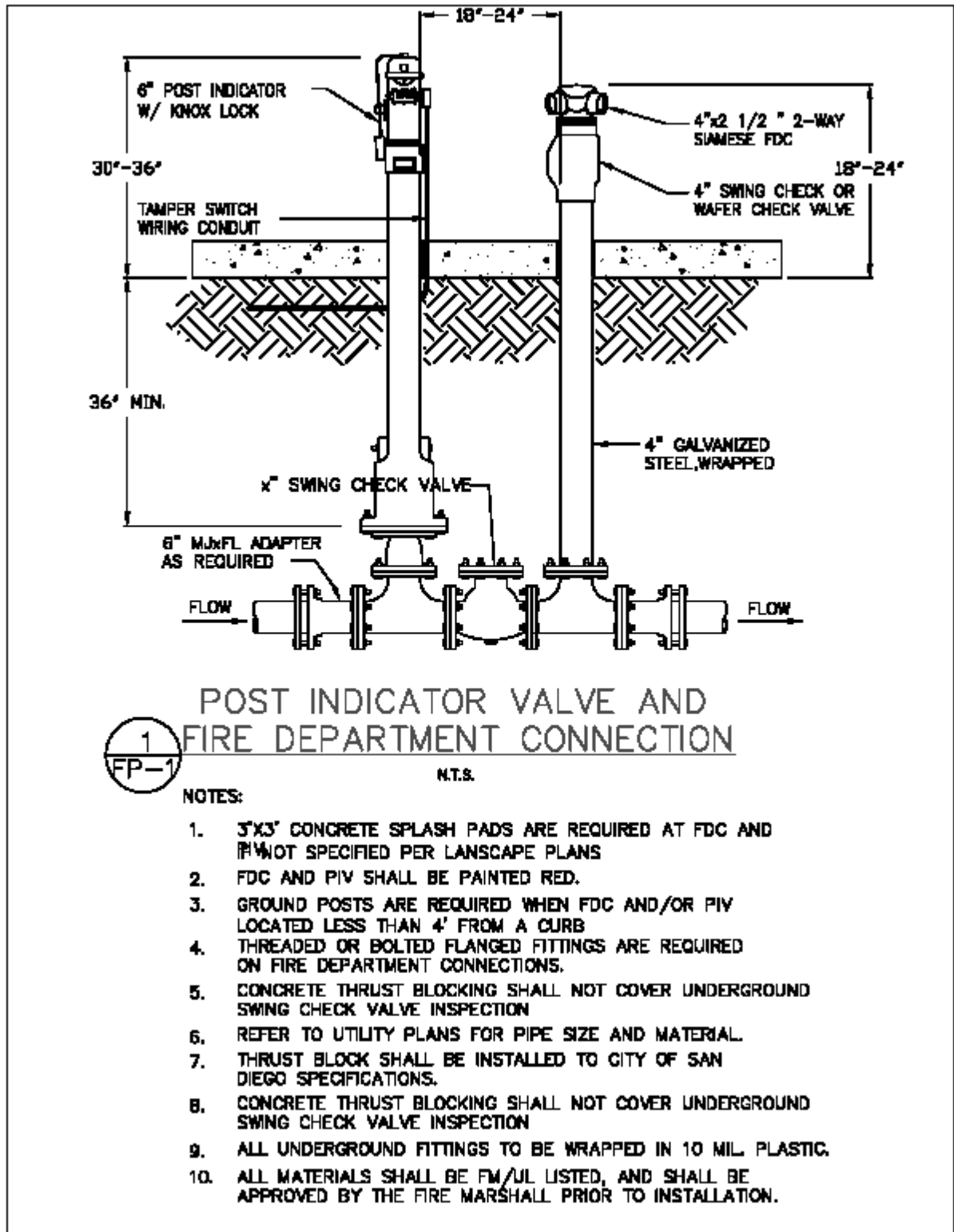


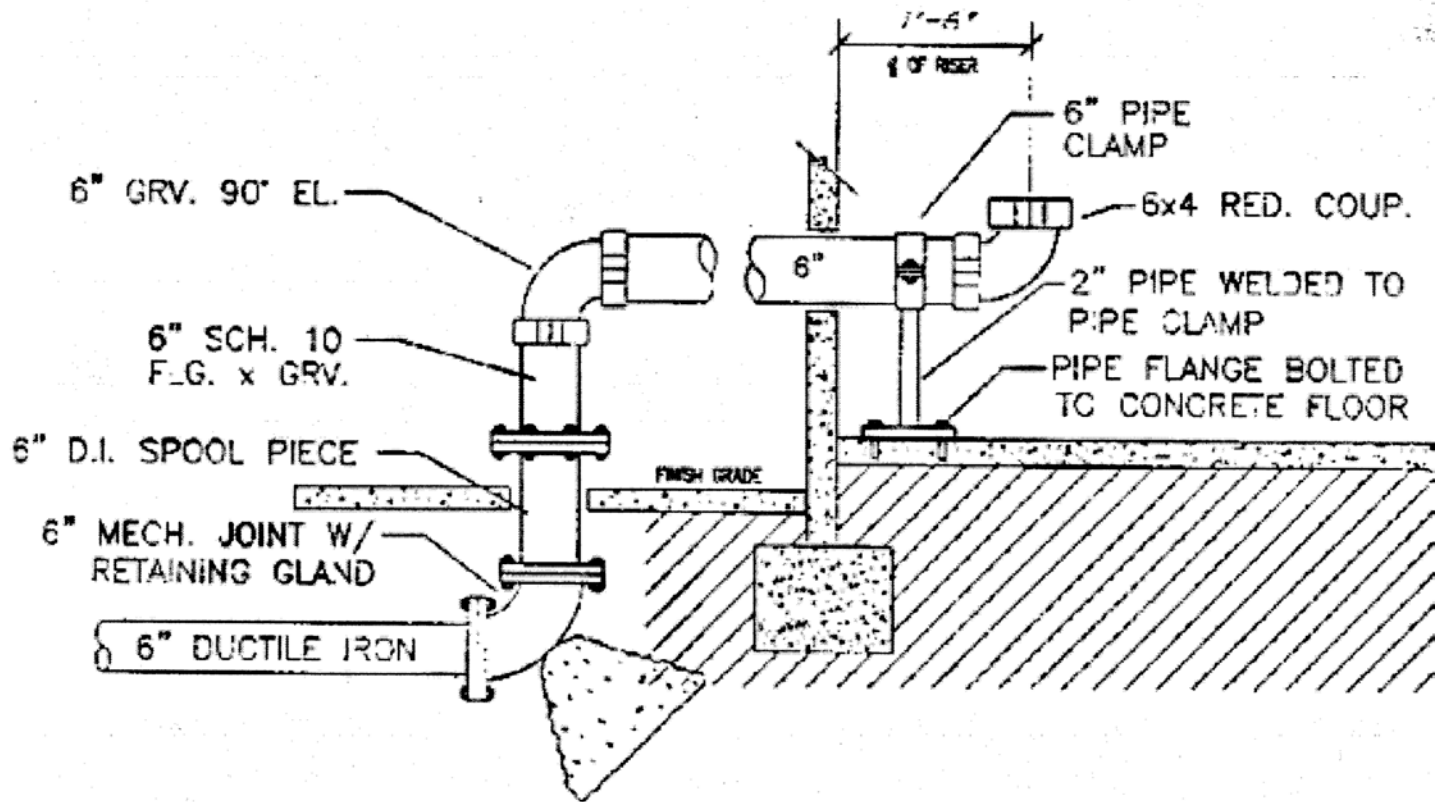
NOTES:

PIPE DIAMETER IN INCHES

- 1 BASED ON 225 PSI TEST PRESSURE AND BEARING VALUES OF DRY SOIL
- 2 VALUES FROM CURVES ARE FOR TEES AND DEADENDS, I.E.; STRAIGHT LINE THRUST
 FOR 90° BEND 1.4 VALUE FROM CURVE
 FOR 45° BEND 0.8 VALUE FROM CURVE
 FOR 22° 1/2 BEND; 0.4 VALUE FROM CURVE
- 3 FOR CONDITIONS NOT COVERED BY CURVES, SPECIAL THRUST BLOCKS MUST BE COMPUTED AND APPROVED

REVISIONS	APPROVED	DATE	VISTA IRRIGATION DISTRICT	PATH: (TOM) H:\STDDWGS\5-8.DWG
			THRUST BLOCK BEARING AREAS	<i>John A. Amodeo</i> 12/2/98
				JOHN AMODEO R. C. E. 31161
ACAD		6/96		STANDARD DRAWING 5-8





RISE UP DETAIL FOR FIRE RISER
NO SCALE

SPRINKLER SYSTEM IDENTIFICATION SIGNS

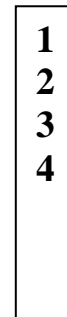
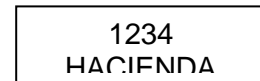
1.0 SIGN CONSTRUCTION

All signs are to be made of aluminum. Signs are to be secured to the riser, FDC or PIV or to the building in a secure manner. Sign placement should be approved by the fire department prior to permanent installation.

2.0 POST INDICATOR SIGNS

2.1 Single PIV

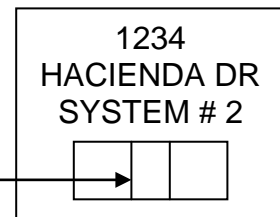
- 1" block lettering
 - Red lettering
 - White background
- Or, as an alternative:
- 3" (or larger) reflective address numbers mounted vertically on the PIV post.



2.2 Multiple PIVs

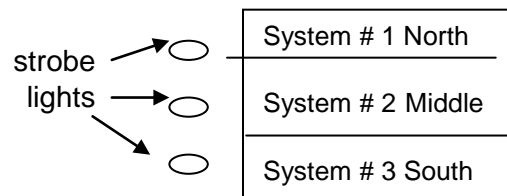
- 1" block lettering
- Red lettering
- White background

Hash marks indicate area of system operation



3.0 Bell Signs

- 3" block lettering
- Red lettering
- White background



4.0 MULTIPLE RISER IDENTIFICATION SIGNS

- 1" block lettering
- Red lettering
- White background

System # 2 North

5.0 MULTIPLE SYSTEM INSPECTOR TEST VALVE SIGNS

- 1" block lettering
- Red lettering
- White background

Inspector's Test
System #2

6.0 RPDA (double detector check)

- 2" block lettering
- Red lettering
- White background

1234
HACIENDA DR.