JORGE CABALLERO
FIRE MARSHAL

**DEVELOPMENT SERVICES DEPARTMENT**
**BUILDING AND SAFETY DIVISION**

135 N. D. ST. PERRIS, CA 92570
www.cityofperris.org
(951) 943-5003

# Underground Piping for Private Hydrants & Sprinkler Supply Line Guideline

## PURPOSE

The provision of adequate water supplies and distribution systems for fire suppression is a fundamental component of risk reduction. 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/or sprinkler supply underground piping in accordance with the provisions of the 2022 California Fire Code (CFC), the 2022 California Building Code (CBC), and the 2022 editions of NFPA 24, 2022 NFPA 13, 2022 NFPA 13R, including California State amendments, and locally adopted amendments to these codes.

## SCOPE

This guideline is applicable to all private underground piping for hydrants and/or sprinkler supply lines within the City of Perris Office of the Fire Marshal (OFM). This guideline is **not** applicable to underground piping serving residential fire sprinkler systems designed in accordance with 2022 NFPA 13D and some multi-family residential fire sprinkler systems designed in accordance with 2022 NFPA 13R.

## SUBMITTAL REQUIREMENTS

1. **General**

   A. Plans for all private underground piping for private hydrants and/or sprinkler supply line(s) shall be submitted to OFM for review and approval prior to installation.

B. All new plan submittals and revisions shall be in an electronic form. Electronic plan set shall be in the PDF format, flatten with no security restrictions.

C. Plans shall be legible, scaled to nationally recognized standards, and printed as a blue- or blackline drawing. The OFM does not accept either pen and ink plans or pen & ink changes to blueline plans.

D. A current (within **six months**), completed Water Availability form shall accompany plans.

E. Plans shall only contain relevant information to the fire line other utilities and details such as sewer, electrical, stormwater, etc. shall be removed from the plan.

F. Underground plans **shall only** contain information and details relevant to the underground design. Other utilities such as domestic water, sewar, power shall not be included in the plan set.

2. **Information to be provided on the title page**

A. All underground plans shall include a OFM Underground Title Sheet as page 1 of the plan submittal (see Attachment 1).
**NOTE: Designers and installing contractors shall be read and comply with the information on the Title Page.**

B. The applicable information within Project Information, Project Directory, and Title Blocks shall be completed prior to submittal

C. Contractors must possess a valid A, C16, or C34 license or be registered as a Professional Engineer (PE). *Note: If the piping plan is designed by a PE, the plan shall contain the name, license number, and classification of the installing contractor, along with the PE wet stamp*. *If this information is not available at the time the plans are submitted, proof of compliance with this requirement must be provided to the CFD at time of inspection.*

3. **Additional Required Information**

A. Location of public mains and all public hydrants within 300 feet of the site.

B. 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) assembly, outside stem and yoke (OS&Y), etc.).

C. PIVs 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:

1) Approved wall mount indicating valves: Located on exterior walls without openings within 15 feet of the valve/s.
2) Valve room: When the valve is placed in a room separated from the building by a one-hour fire barrier and the room is accessible from outside.
3) Exterior risers: The valve may be placed in locations adjacent to exterior walls without openings within 15 feet of the valve.
4) An approved manner acceptable by OFM.

D. Pipe size, class, and type; specify lined or unlined if applicable.

E. Indicate that ferrous pipe and fittings (excluding stainless steel 316) shall be encased in loose-fitting polyethylene *tubing* (pipe shall not be wrapped in polyethylene sheets) and that ferrous joints, pipe, and fittings shall be coated with asphaltic sealant or equivalent to inhibit corrosion. Exposed edges, cuts, and tears shall be tightly taped to inhibit water infiltration. Where joints are present in tubing, a minimum one-foot overlap shall be provided. Tubing shall extend three feet beyond transition between areas where ferrous pipe or fittings are used and where non-ferrous pipe begins.

F. All bolts used for underground connections, including T bolts, shall be 316 stainless steel. Asphaltic sealants (and other opaque sealants) shall not be used to coat bolts (this is to ensure bolts can still be verified as 316 stainless steel during inspection).

G. Thrust block locations or specify the means of restraint as approved by 2022 NFPA 24.

H. Location of the fire department connection (FDC). FDCs shall be on the address side of the building and located immediately adjacent to the approved fire department access road. The FDC shall be positioned to allow hose lines to be readily and conveniently connected to a fire engine pulling water from a public fire hydrant and does not require hose lines to cross the fire department access roads or a drive entry approach. The FDC shall contain a minimum of *two* 2½" inlets. When the sprinkler demand is 500 gpm or greater (including the interior hose stream demand) or a standpipe system is included, *four* 2½" inlets shall be provided. The FDC shall be a listed assembly, i.e. Potter-Roemer FDC Models 5761-5764, 5775, 5776, 5780, 5781, 5785, 5786, Guardian FDC Models 6224, 6226, 6242, 6244, or similar listed devices. (*Note: These are just examples of the models that would be accepted by OFM. OFM does not endorse any specific manufacturer.*)

I. FDC's shall be no more than 100 feet from a public hydrant. When approved, the FDC may be located within 100 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 (i.e., downstream) of the sprinkler system check valve or an above ground check valve is provided between the FDC and fire hydrant to

prevent a looped condition.

J. FDCs, PIVs, and backflow assemblies shall be readily visible and accessible from the fire lane. Vegetation may be used to screen backflow assemblies on the side that does not face the fire department access roadway.

K. FDCs and PIVs, shall be painted OSHA Safety Red. Backflow assemblies are to be painted Hunter Green per City Planning Department requirements.

L. FDCs, PIVs, and DDCs, shall have durable, legible signs clearly indicating the address of the facility they serve or, where appropriate, their function (e.g., "Sectional Valve 1 of 2"). Signs shall be securely attached to the device.

M. 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. *Note: A large system is considered one with more than five connections including fire hydrants.*

N. Specify that all hydrants will be provided with 3' x 3' flat surface around the hydrant that consist of either concrete asphalt or pavers.

## 4. Underground Service for NFPA 13R Systems

Underground service shall comply with one of the following designs based upon the parameters described:

A. The system design shall comply with 2022 NFPA 13 and 2019 NFPA 24 (see Sections 1 through 3 above) when:

1) Serving more than one R-1, R-2, or R-4 occupancy, *or*

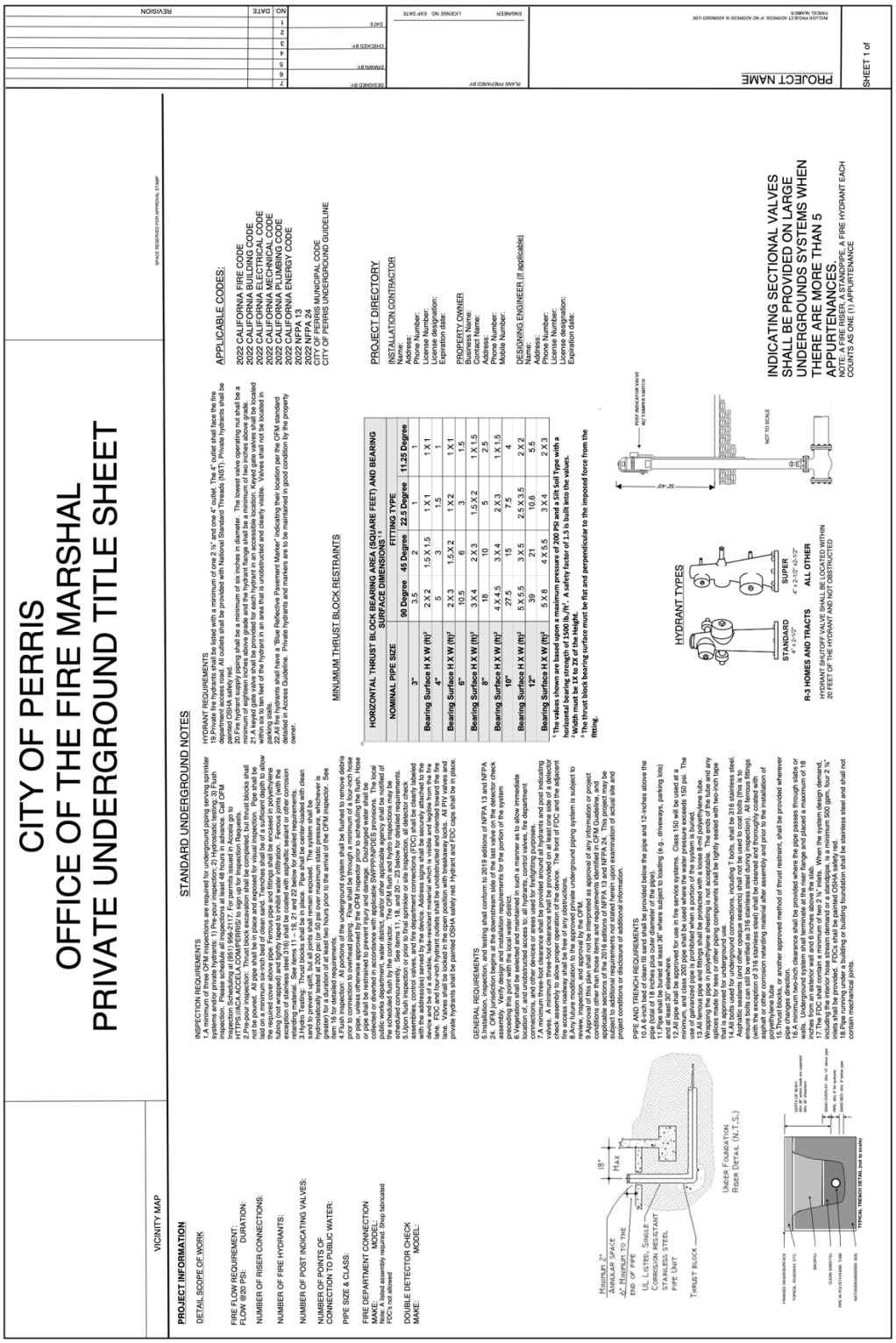
2) The FDC is located between the city supply and sprinkler riser check valve.

B. The system design shall comply with 2022 NFPA 13R and the California Plumbing Code (CPC) when:

1) Serving a single R-1, R-2, or R-4 occupancy, *and*

2) The FDC is located downstream of (i.e., after) the sprinkler system riser check valve. The underground system may be interconnected with the building's domestic water supply line or may be a dedicated fire line. The FDC shall also comply with relevant requirements listed in this guideline including, but not limited to, identification, painting, accessibility, and orientation.

# ATTACHMENT 1


CITY OF PERRIS
OFFICE OF THE FIRE MARSHAL
PRIVATE UNDERGROUND TITLE SHEET
VICINITY MAP
SPACE RESERVED FOR APPROVAL STAMP
PROJECT INFORMATION
DETAIL SCOPE OF WORK
FIRE FLOW REQUIREMENT:
FLOW @20 PSI: DURATION:
NUMBER OF RISER CONNECTIONS:
NUMBER OF FIRE HYDRANTS:
NUMBER OF POST INDICATING VALVES:
NUMBER OF POINTS OF CONNECTION TO PUBLIC WATER:
PIPE SIZE & CLASS:
FIRE DEPARTMENT CONNECTION MAKE: MODEL:
Note: A listed assembly required. Shop fabricated FDC's not allowed
DOUBLE DETECTOR CHECK MAKE: MODEL:
STANDARD UNDERGROUND NOTES
INSPECTION REQUIREMENTS
1.A minimum of three OFM inspections are required for underground piping serving sprinkler systems. Underground fire service mains shall be flushed prior to hydrostatic inspection. Please schedule all inspections at least 48 hours in advance. Call OFM Inspection Scheduling at (951) 956-2117. For permits issued in Accela go to https://aca.accela.com/PERRIS/Default.aspx?TabName=Home
2.Pre-pour inspection: Thrust block excavation shall be completed, but thrust blocks shall not be poured. All pipe shall be in place and exposed for visual inspection. Pipe shall be restrained as required by the approved plans. Trenches shall be backfilled and compacted to the required cover above pipe. Ferrous pipe and fittings shall be encased in polyethylene tubing (not wrapped) and tightly taped to inhibit water infiltration. Ferrous joints (with the exception of approved mechanical joints) shall be coated and wrapped with approved corrosion retarding material. See items 11 – 19, 21 and 22 below for detailed requirements.
3.Hydro Testing: Shall be done after all thrust blocks are in place with clean hydrostatically tested at 200 psi (or 50 psi over maximum static pressure, whichever is greater) for two hours and witnessed by the OFM inspector. See item 16 for detailed requirements.
4.Flush inspection: All portions of the underground system shall be flushed to remove debris and foreign material before connection is made to the sprinkler system. Provide adequate means for the flush. Hose or pipe, unless otherwise approved by the OFM inspector prior to scheduling the flush. Hose or pipe shall be restrained to prevent injury and damage. Discharged water shall be conducted to the nearest approved drainage facility. Coordination with the local public works department, water district, and/or other applicable agency shall be notified of the scheduled flush by the contractor. The OFM flush and hydro inspections may be witnessed by the same inspector. See items 11 – 19, 21 and 22 below for detailed requirements.
5.Upon flush inspection or prior to final sprinkler or site inspection, all detector check assemblies, control valves, and fire department connections (FDC) shall be clearly labeled with approved signs. The approved sign shall read as follows: "This valve to be open when the device and be of a durable, fade-resistant material which is visible and legible from the fire department connection. Lettering shall be a minimum of one inch in height on contrasting background. Valves shall be locked in the open position with breakaway locks. All PIV valves and private hydrants shall be painted OSHA safety red. Hydrant and FDC caps shall be in place.
GENERAL REQUIREMENTS
6.Fire protection systems shall meet existing shall conform to 2019 editions of NFPA 13 and NFPA 24. OFM jurisdiction begins at the downstream side of the last valve on the detector check assembly. Verify design and installation requirements for the portion of the system.
7.A minimum three-foot clearance shall be provided around all hydrants and post indicating valves. A minimum three-foot clearance shall be provided on at least one side of a detector check assembly, fire department connection (FDC), and the edges of fire access roadways. The front of FDCs and the adjacent fire access roadway shall be free of any obstructions.
8.Any future modification to the approved private underground piping system is subject to review and approval by the OFM.
9.Approval of this plan shall not be interpreted as approval of any information or project conditions not specifically stated herein. The project shall comply with all other applicable sections of the 2016 editions of NFPA 13 and NFPA 24. This project may be subject to additional requirements not stated herein upon examination of actual site and project conditions or disclosure of additional information.
PIPE AND TRENCH REQUIREMENTS
10.All buried fittings and joints shall be provided below the pipe and 12-inches above the pipe (total of 18 inches plus outer diameter of the pipe).
11.Pipe shall be buried at least 36" where subject to loading (e.g., driveways, parking lots) and 30" elsewhere.
12.All pipe shall be approved for use in fire service systems. Class 150 will be used at a minimum, and class 200 pipe shall be used where the water pressure exceeds 150 psi. The use of plastic pipe is prohibited above ground and within buildings.
13.All ferrous pipe and fittings shall be protected with a loose 8-mil polyethylene tube. Wrapping the pipe in polyethylene sheeting is not acceptable. The ends of the tube and any overlaps shall be secured with adhesive tape. Split tube may be used on pipe with flanged joints that is approved for underground use.
14.All bolts used for underground connections, including T bolts, shall be 316 stainless steel. All nuts used for underground connections shall be hex head cone type (this is to ensure bolts can still be verified as 316 stainless steel during inspection). All ferrous fittings and connections, including valves and hydrants, shall be painted with two coats of asphalt or other corrosion retarding material after assembly and prior to the installation of polyethylene tube
15.The use of mechanical joints or another approved method of thrust restraint, shall be provided wherever pipe changes direction.
16.A minimum two-inch clearance shall be provided where the pipe passes through slabs or concrete walls. Pipe openings shall be core drilled and sleeved with Schedule 40 galv. four 2 ½" inches from an exterior wall and 6 inches above the slab.
17.The FDC shall contain a minimum of two 2 ½" inlets. When the system design demand, including inside hose, exceeds 500 gpm, the FDC shall contain a minimum 4" 6" 6" 6

# CITY OF PERRIS
# OFFICE OF THE FIRE MARSHAL
# PRIVATE UNDERGROUND TITLE SHEET

VICINITY MAP

SPACE RESERVED FOR APPROVAL STAMP

## PROJECT INFORMATION

DETAIL SCOPE OF WORK

FIRE FLOW REQUIREMENT:
FLOW @20 PSI: DURATION:

NUMBER OF RISER CONNECTIONS:

NUMBER OF FIRE HYDRANTS:

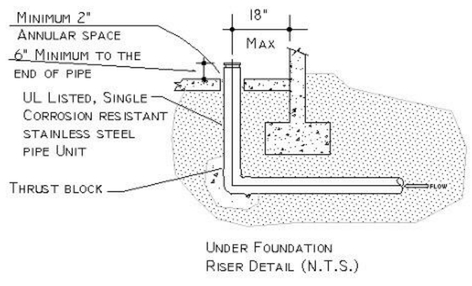
NUMBER OF POST INDICATING VALVES:

NUMBER OF POINTS OF
CONNECTION TO PUBLIC WATER:

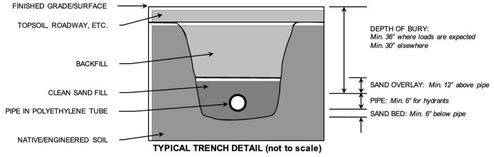
PIPE SIZE & CLASS:

FIRE DEPARTMENT CONNECTION
MAKE: MODEL:
Note: A listed assembly required. Shop fabricated FDC's not allowed

DOUBLE DETECTOR CHECK
MAKE: MODEL:



UNDER FOUNDATION
RISER DETAIL (N.T.S.)



**TYPICAL TRENCH DETAIL (not to scale)**

## STANDARD UNDERGROUND NOTES

INSPECTION REQUIREMENTS
1.A minimum of three OFM inspections are required for underground piping serving sprinkler systems and/or private hydrants: 1) Pre-pour inspection; 2) Hydrostatic testing; 3) Flush inspection. Please schedule all inspections at least 48 hours in advance. Call OFM Inspection Scheduling at (951) 956-2117. For permits issued in Accela go to HTTPS://ACA.ACCELA.COM/PERRIS/ to sign up for Inspection Requests.
2.Pre-pour inspection: Thrust block excavation shall be completed, but thrust blocks shall not be poured. All pipe shall be in place and exposed for visual inspection. Pipe shall be laid on a minimum six-inch bed of clean sand. Trenches shall be of a sufficient depth to allow the required cover above pipe. Ferrous pipe and fittings shall be encased in polyethylene tubing (not wrapped) and tightly taped to inhibit water infiltration. Ferrous joints (with the exception of stainless steel 316) shall be coated with asphaltic sealant or other corrosion retarding material. See items 11 – 19, 21 and 22 below for detailed requirements.
3.Hydro Testing: Thrust blocks shall be in place. 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 OFM inspector. See item 16 for detailed requirements.
4.Flush inspection: All portions of the underground system shall be flushed to remove debris prior to connection to overhead piping. Flow shall be through a minimum of a four-inch hose or pipe, unless otherwise approved by the OFM inspector prior to scheduling the flush. Hose or pipe shall be restrained to prevent injury and damage. Discharged water shall be collected or diverted in accordance with applicable SWPPP/NPDES provisions. The local public works department, water district, and/or other applicable agency shall be notified of the scheduled flush by the contractor. The OFM flush and hydro inspections may be scheduled concurrently. See items 11, 18, and 20 – 23 below for detailed requirements.
5.Upon flush inspection or prior to final sprinkler or site inspection, all detector check assemblies, control valves, and fire department connections (FDC) shall be clearly labeled with the address(es) served by the device. Address signs shall be securely attached to the device and be of a durable, fade-resistant material which is visible and legible from the fire lane. FDC and four-inch hydrant outlets shall be unobstructed and oriented toward the fire lane. Valves shall be locked in the open position with breakaway locks. All PIV valves and private hydrants shall be painted OSHA safety red. Hydrant and FDC caps shall be in place.

GENERAL REQUIREMENTS
5.Installation, inspection, and testing shall conform to 2019 editions of NFPA 13 and NFPA 24. OFM jurisdiction begins at the downstream side of the last valve on the detector check assembly. Verify design and installation requirements for the portion of the system preceding this point with the local water district.
6.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.
7.A minimum three-foot clearance shall be provided around all hydrants and post indicating valves. A minimum three-foot 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.
8.Any future modification to the approved private underground piping system is subject to review, inspection, and approval by the OFM.
9.Approval of this plan shall not be interpreted as approval of any information or project conditions other than those items and requirements identified in OFM Guideline, and applicable sections of the 2016 editions of NFPA 13 and NFPA 24. This project may be subject to additional requirements not stated herein upon examination of actual site and project conditions or disclosure of additional information.

PIPE AND TRENCH REQUIREMENTS
10.A 6-inch bed of clean fill sand shall be provided below the pipe and 12-inches above the pipe (total of 18 inches plus outer diameter of the pipe).
11.Pipe shall be buried at least 36" where subject to loading (e.g., driveways, parking lots) and at least 30" elsewhere.
12.All pipe shall be approved for use in fire service systems. Class 150 will be used at a minimum, and class 200 pipe shall be used where the water pressure exceeds 150 psi. The use of galvanized pipe is prohibited when a portion of the system is buried.
13.All ferrous pipe and fittings shall be protected with a loose 8-mil polyethylene tube. Wrapping the pipe in polyethylene sheeting is not acceptable. The ends of the tube and any splices made for tees or other piping components shall be tightly sealed with two-inch tape that is approved for underground use.
14.All bolts used for underground connections, including T bolts, shall be 316 stainless steel. Asphaltic sealants (and other opaque sealants) shall not be used to coat bolts (this is to ensure bolts can still be verified as 316 stainless steel during inspection). All ferrous fittings (with the exception of 316 stainless steel) shall be cleaned and thoroughly coated with asphalt or other corrosion retarding material after assembly and prior to the installation of polyethylene tube
15.Thrust blocks, or another approved method of thrust restraint, shall be provided wherever pipe changes direction.
16.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.
17.The FDC shall contain a minimum of two 2 ½" inlets. When the system design demand, including the interior hose stream demand or a standpipe, is a minimum 500 gpm, four 2 ½" inlets shall be provided. FDCs shall be painted OSHA safety red.
18.Pipe running under a building or building foundation shall be stainless steel and shall not contain mechanical joints.

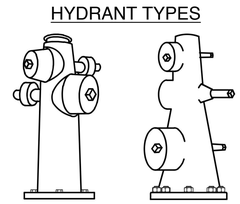
HYDRANT REQUIREMENTS
19.Private fire hydrants shall be listed with a minimum of one 2 ½" and one 4" outlet. The 4" outlet shall face the fire department access road. All outlets shall be provided with National Standard Threads (NST). Private hydrants shall be painted OSHA safety red.
20.Fire hydrant 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.
21.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.
22.All fire hydrants shall have a "Blue Reflective Pavement Marker" indicating their location per the OFM standard detailed in Access Guideline. Private hydrants and markers are to be maintained in good condition by the property owner.

### MINUMUM THRUST BLOCK RESTRAINTS

| HORIZONTAL THRUST BLOCK BEARING AREA (SQUARE FEET) AND BEARING SURFACE DIMENSIONS [1] [3] | | | | |
|---|---|---|---|---|
| **NOMINAL PIPE SIZE** | **FITTING TYPE** | | | |
| | **90 Degree** | **45 Degree** | **22.5 Degree** | **11.25 Degree** |
| **3"** | 3.5 | 2 | 1 | 1 |
| **Bearing Surface H X W (ft)²** | 2 X 2 | 1.5 X 1.5 | 1 X 1 | 1 X 1 |
| **4"** | 5 | 3 | 1.5 | 1 |
| **Bearing Surface H X W (ft)²** | 2 X 3 | 1.5.X 2 | 1 X 2 | 1 X 1 |
| **6"** | 10.5 | 6 | 3 | 1.5 |
| **Bearing Surface H X W (ft)²** | 3 X 4 | 2 X 3 | 1.5 X 2 | 1 X 1.5 |
| **8"** | 18 | 10 | 5 | 2.5 |
| **Bearing Surface H X W (ft)²** | 4 X 4.5 | 3 X 4 | 2 X 3 | 1 X 1.5 |
| **10"** | 27.5 | 15 | 7.5 | 4 |
| **Bearing Surface H X W (ft)²** | 5 X 5.5 | 3 X 5 | 2.5 X 3.5 | 2 X 2 |
| **12"** | 39 | 21 | 10.6 | 5.5 |
| **Bearing Surface H X W (ft)²** | 5 X 8 | 4 X 5.5 | 3 X 4 | 2 X 3 |

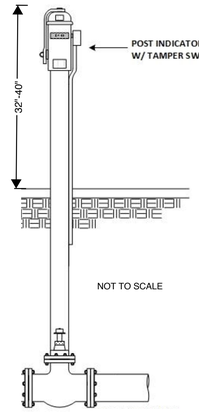
**[1] The values shown are based upon a maximum pressure of 200 PSI and a Silt Soil Type with a horizontal bearing strength of 1500 lb./ft². A safety factor of 1.5 is built into the values.**
**[2] Width must be 1X to 2X of the Height.**
**[3] The thrust block bearing surface must be flat and perpendicular to the imposed force from the fitting.**

### HYDRANT TYPES


**STANDARD**
4" x 2-1/2"
**R-3 HOMES AND TRACTS**


**SUPER**
4" x 2-1/2" x2-1/2"
**ALL OTHER**

HYDRANT SHUTOFF VALVE SHALL BE LOCATED WITHIN 20 FEET OF THE HYDRANT AND NOT OBSTRUCTED




INDICATING SECTIONAL VALVES SHALL BE PROVIDED ON LARGE UNDERGROUNDS SYSTEMS WHEN THERE ARE MORE THAN 5 APPURTENANCES.
NOTE: A FIRE RISER, A STANDPIPE, A FIRE HYDRANT EACH COUNTS AS ONE (1) APPURTENANCE

## APPLICABLE CODES:

2022 CALIFORNIA FIRE CODE
2022 CALIFORNIA BUILDING CODE
2022 CALIFORNIA ELECTRICAL CODE
2022 CALIFORNIA MECHNICAL CODE
2022 CALIFORNIA PLUMBING CODE
2022 CALIFORNIA ENERGY CODE
2022 NFPA 13
2022 NFPA 24
CITY OF PERRIS MUNICIPAL CODE
CITY OF PERRIS UNDERGROUND GUIDELINE

## PROJECT DIRECTORY

INSTALLATION CONTRACTOR
Name:
Address:
Phone Number:
License Number:
License designation:
Expiration date:

PROPERTY OWNER
Business Name:
Contact Name:
Address:
Phone Number:
Mobile Number:

DESIGNING ENGINEER (If applicable)
Name:
Address:
Phone Number:
License Number:
License designation:
Expiration date:

| NO. | DATE | REVISION |
|---|---|---|
| 7 | | |
| 6 | | |
| 5 | | |
| 4 | | |
| 3 | | |
| 2 | | |
| 1 | | |

DESIGNED BY:
DRAWN BY:
CHECKED BY:
DATE

PLANS PREPARED BY
ENGINEER
LICENSE NO. EXP DATE

PROJECT NAME

INCLUDE PROJECT ADDRESS. IF NO ADDRESS IS ASSINGED USE PARCEL NUMBER.

SHEET 1 of