



Santa Barbara County Fire Department

Fire Prevention Division

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Development Standard - #3

STORED WATER FOR FIRE PROTECTION

The information contained in this standard is provided solely for the convenience of the reader in complying with the Santa Barbara County Fire Department (SBCFD) requirements. It should be used as a schematic reference only. The SBCFD reserves the right to make changes and improvements to this standard as and when required by law, or otherwise, at any time. The Department's current standards will be posted and made available for downloading by the public at the following web site: www.sbcfire.com

Please note that the SBCFD assumes no liability for any damages incurred directly or indirectly as a result of any errors, omissions, or discrepancies between this standard and any applicable law. It is the sole responsibility of the person or persons conducting any work pursuant to this standard to ensure their work complies with any and all applicable codes, ordinances, and regulations.

CHAPTER 1 ADMINISTRATION

1.1 PURPOSE. The purpose of this standard is to clarify and establish minimum requirements for the installation and maintenance of Stored Water for Fire Protection Systems for new structures. The requirements of this standard shall not be construed as altering any existing code, law or regulation which may require fire protection features not covered or alluded to in these requirements, nor shall they waive any requirements of any code, law or regulation.

1.2 SCOPE. This standard identifies minimum private fire water supply requirements for structures in rural and suburban areas in which an adequate reliable water supply does not exist such as areas not served by a water purveyor, and where the option is proposed by the applicant and approved by the Planning and Engineering Division in accordance with the California Fire Code, Chapter 15 of the Santa Barbara County Code, and NFPA 1142.

1.3 APPLICABILITY. This standard shall apply to all new structures or portions of structures hereafter constructed that are outside of a water purveyor's district. Commercial Projects and any Projects served by a water purveyor shall comply with applicable codes and standards.

1.4 FEES. A plan check fee is required for the installation of or modification to stored water for fire protection systems as required by the current SBCFD fee schedule.

CHAPTER 2 DEFINITIONS

DOMESTIC WATER SUPPLY: Water that is used for domestic consumption, potable water, in-home use, landscaping, or livestock.

DRAFT SYSTEM: A water supply system that does not maintain reliable pressure at the outlet but may be drafted from by the fire department utilizing the fire engine and hard suction hoses to create negative pressure drawing the water from the tank to the fire engine. This type of system is only acceptable for supplying water for fire department use and not fire sprinkler use.

EXPOSURE HAZARD: A structure within fifty feet (50') of another building that is one hundred (100) square feet or larger in area.

FIRE DEPARTMENT HOSE CONNECTION (FDHC): A connection provided in conjunction with a water storage tank that allows fire fighters to connect and obtain needed water for fire-fighting purposes. When installed on the tank, the FDHC is a four inch (4") outlet in accordance with Chapter 6. When installed remote from the tank, the FDHC is a listed Fire Hydrant meeting the requirements of Chapter 9.

FIRE FLOW: The flow rate of a water supply measured at twenty (20) pounds per square inch residual pressure that is available for firefighting.

FIRE FIGHTING WATER SUPPLY: A water supply provided for firefighting purposes only. Water required for domestic, industrial, landscaping, agricultural or any other use are in addition to a fire protection water supply.

FIRE SPRINKLER WATER SUPPLY (SPRINKLER DEMAND) - NFPA 13D: Water supply required to meet the design flow rate of a residential automatic fire sprinkler system, designed and installed by a California licensed C-16 contractor, for a minimum ten-minute duration using a 2-head hydraulic calculation.

PRESSURIZED SYSTEM: A water supply system that maintains adequate pressure at the outlet by a reliable method of pressurizing water such as gravity, booster pump with emergency power, or pressurized cylinders. This type of system is acceptable for supplying water for fire department use and for automatic fire sprinkler systems.

SELF-CONTAINED AUTOMATIC FIRE SPRINKLER SYSTEM: A fire sprinkler system that is supplied from a water source that is not dependent on a municipal (public) system and that consists of a water storage tank and a reliable method of pressurizing water, such as gravity, pump with emergency power, or pressurized cylinder.

WATER PURVEYOR: A public utility, a mutual water company, a government body or other entity, owning and operating a water system and holding a valid permit from the state or county health department to purvey water.

CHAPTER 3 GENERAL

3.1 APPROVED INSTALLERS. Persons authorized to design, install, and work on these systems include:

3.1.1 Water supply system components for fire protection including well drilling, pumps, water storage tanks, and fire hydrant connections shall be laid out, fabricated, and installed by either of the following:

- 1) Class A General Contractor
- 2) A specialty contractor holding a California Well Drilling (C-57) license as defined in California Code of Regulations Title 16, Division 8, Article 3.

3.1.2 Residential fire sprinkler system components from the water storage tank to the building shall be designed, fabricated, and installed by a specialty contractor holding either of the following:

- 1) California Fire Protection Contractor (C-16) license
- 2) California Plumbing Contractor (C-36) license as defined in California Code of Regulations Title 16, Division 8, Article 3.

Exception: Residential water supply systems for fire protection and residential fire sprinkler system designed and installed in accordance with the owner-builder provisions of California Business and Professions Code Section 7026. 12 (b).

3.2 PLAN SUBMITTAL. Stored Water Fire Protection System plans shall be submitted digitally to the SBCFD Planning and Engineering Division by emailing digital copies of all documents to pesubmittals@countyofsb.org and shall be approved prior to construction. Permits may also be required by the Building and Safety Division if tanks are greater than five thousand (5000) gallons, or have a height to width ratio greater than 2:1, or if the tank is not directly supported at grade (i.e. If the tank is elevated). Scaled site plans shall be submitted digitally and shall include:

- 1) All structures - indicate square footage, height, distance between structures, and any other pertinent data to confirm volume of structures.
- 2) Access roads - indicate width and percentage of grade.
- 3) Proposed tank size, material of construction and tank specifications/details to include listing for use or equivalency use.
- 4) Site plan (to scale or dimensioned) with tank location.
- 5) Elevation view of tank indicating point of connections to the tank.
- 6) Proposed outlet size and location.
- 7) Type, size and location of piping.
- 8) Vent Size
- 9) If the hydrant is remote from the tank, show the elevations and distance from the tank and the location of the hydrant outlet. Hydrant outlet elevation shall be at or lower than the tank connection so that the piping configuration results in positive water pressure at the hydrant outlet. Hydraulic calculations may be required by Planning and Engineering to confirm.
- 10) Proposed auto-fill details.

3.3 ALTERNATIVE METHODS. The Fire Chief or designee is authorized to approve alternate materials or methods provided that the Chief finds that the proposed design, use or operation satisfactorily complies with the intent of the Fire Code.

3.4 SYSTEM TYPE. A pressurized system in accordance with Chapter 5 of this standard is required for fire sprinkler system water supply. Draft systems are permitted to provide firefighting water supply at non-sprinklered structures or firefighting water for sprinklered structures when a pressurized system supplies the fire sprinklers. When a structure exceeds three thousand six hundred (3600) square feet, the system shall be pressurized.

3.5 PROTECTION FROM FREEZING. Water tanks and all valves and piping shall be protected from freezing when installed at or above an altitude of three thousand five hundred (3,500) feet above sea level. Freeze protection shall be provided in accordance with NFPA 22.

3.6 DEPTH OF BURY. Underground piping shall be buried a minimum of 30 inches (30") below grade. Piping under driveway and roadways shall be buried a minimum of 36 inches (36") below grade.

3.7 WATER LEVEL MAINTAINED FULL. Water level shall be maintained full to the minimum designated level by means of an automatic refilling device.

3.8 FOUNDATION. Tanks shall be on a three inch (3") compacted crushed stone or granular base, or a concrete foundation, or whatever is required by the Building Department.

3.9 BRUSH CLEARANCE. In designated high fire hazard areas, thirty feet (30') of brush clearance shall be provided from the tank at all times.

3.10 INSPECTIONS REQUIRED. Prior to placing the tank in service, the inspections below and an acceptance test are required. Inspections shall be scheduled at least two business days prior to the desired inspection time via the inspection request webpage found at <https://sbcfire.com/inspection-requests/>

Rough Underground. Any underground piping and restraints shall have a visual inspection prior to being covered.

Hydrostatic Tank Test. For fiber reinforced plastic tanks only, a hydrostatic test is required by filling the tank with water up to three inches (3") into the access openings. The tank shall show no visible signs of leakage after two (2) hours.

Final Inspection. The final inspection is required to verify installation is in accordance with this standard and all referenced standards.

Acceptance Test. An acceptance test shall be conducted in accordance with NFPA 22 and shall verify the auto-fill capability as well as a low water alarm where installed.

3.11 TANK MATERIALS. Tanks shall be constructed of steel, concrete, fiberglass reinforced plastic, or otherwise approved and listed for fire department use.

3.12 SIGNAGE. Signage to indicate the presence and location of the water tank and outlets shall be in accordance with the following:

Water storage tanks shall be labeled with signage stating "FIRE PROTECTION WATER SUPPLY" and the amount of stored fire water. Letters shall be white with red background and shall be reflective.

FDHC valves shall be labeled with signage indicating the address of the property that is served, stating "FIRE DEPARTMENT HOSE CONNECTION". Numbers and letters shall be white with red background and shall be reflective.

3.13 MULTIPLE TANKS. Connecting several tanks together, also known as daisy chaining, is strictly prohibited.

Exceptions. In some instances, with prior approval from the Fire Department, multiple tanks may be installed:

- 1) When topographical or soil conditions prohibit large tanks (technical report required) and/or
- 2) Planning and Building Department land use conditions require reduced visual impact (Coastal Zone screening) and/or
- 3) Where approved by the Fire Chief.

3.13.1 When the exceptions are met, the system of tanks shall comply with the following:

3.13.1.1 All valves shall be chained and locked open.

3.13.1.2 Each tank must be installed with monitored tamper resistance.

3.13.1.3 All tanks must feed into one common manifold serving the fire protection system onsite hydrants or other appurtenances.

3.14 WATER SUPPLY INSTALLED BEFORE VERTICAL CONSTRUCTION. Required water supply shall be installed prior to the start of vertical construction.

3.15 SIGHT GAUGE. A water level sight gauge shall be provided for above ground tanks.

CHAPTER 4 TANK CAPACITY

4.1 TANK CAPACITY FIREFIGHTING WATER SUPPLY. Tank systems covered by this standard shall provide, at a minimum, the capacity of Firefighting Water Supply determined in accordance with Chapter 4 of NFPA 1142. Systems that provide water for a combination of firefighting water supply and either automatic fire sprinkler water supply and/or domestic water supply shall be designed with either piping or automatic controls that ensure the firefighting water supply is always reserved for fire department use.

4.1.1 Dwellings Without Exposure Hazards. The required capacity of Stored Water for Fire Protection in gallons for a dwelling when the structure being protected does not have exposure hazards is the volume of the structure divided by 7.

4.1.2 Dwellings With Exposure Hazards. The required capacity of Stored Water for Fire Protection in gallons for a dwelling when the structure being

protected does have exposure hazards is the volume of the structure divided by 7, multiplied by 1.5.

4.1.3 Allowances for Buildings Equipped with Fire Sprinklers. Buildings equipped with fire sprinklers are permitted a reduction in minimum designated available stored water for fire protection systems as determined by the Fire Chief on a case-by-case basis. The minimum allowed capacity in section 4.1.4. supersedes this section.

4.1.4 Minimum Allowed Firefighting Water Supply Capacity. Minimum capacities designated for stored water for fire protection shall be in accordance with table 4.1.

Exposure Hazard?	Sprinklers?	Minimum Gallons
Yes	No	3,750
No	No	2,500
Yes	Yes	2,500
No	Yes	2,500

Table 4.1

4.2 TANK CAPACITY FIRE SPRINKLER WATER SUPPLY. In addition to the designated water supply for fire department use, additional water supply may be added to the tank system to provide water supply to the residential automatic fire sprinkler system.

4.2.1 If additional water storage capacity is needed in the tank for automatic fire sprinkler system design, the tank size shall be increased 500 gallons minimum, or the amount specified by the Licensed California C-16 Contractor who designs and builds the sprinkler system per the NFPA 13D standard.

CHAPTER 5: TANK PRESSURIZATION

5.1 PRESSURIZED SYSTEM REQUIRED. When stored water is designated for fire sprinkler water supply, or fire fighting water supply for structures over three thousand six hundred (3600) square feet, the system shall be pressurized by gravity, an approved fire pump, or pressurized cylinder to provide twenty (20) psi at the outlet.

5.1.1 Gravity fed systems shall be installed so there is no less than a thirty-six inch (36") decrease in elevation between the bottom of the tank and the FDHC.

5.1.2 Where the option for gravity fed is not feasible, an approved fire pump shall provide the required pressure. Fire pumps shall be installed in accordance with NFPA 20 and the following:

5.1.2.1 Fire pumps shall serve a combination of both domestic and fire protection needs or shall have an approved emergency power source if serving fire protection demand only.

5.1.2.2 Any proposed fire pumps that take suction from water tanks in order to maintain proper head pressure must be listed and approved for fire protection use.

5.1.2.3 Fire pumps shall be tested prior to final acceptance.

5.1.3 When approved by the Fire Chief, a pressurized cylinder system in accordance with NFPA 22 may be allowed.

5.2 DRAFT SYSTEM ALLOWED. A draft system is allowed when all of the following conditions apply:

- 1) For one- to two-family dwellings or structures that are accessory to residential structures.
- 2) The topography of the surrounding area does not allow for an elevated tank.
- 3) The structure is less than three thousand six hundred (3600) square feet.

5.2.1 Draft systems shall comply with the following:

5.2.1.1 The FDHC may be on the tank in accordance with Section 7.2 of this standard.

5.2.1.2 The FDHC may be on a hydrant remote from the tank in accordance with Chapter 9 of this standard.

CHAPTER 6 TANK LOCATION AND SIGNAGE

6.1 TANK LOCATION. Water tanks shall be located a minimum of thirty feet (30') from a structure and shall be visible from the street on the address side of the structure. Where this is impractical, fire proofing of not less than two hours or equivalent may be required as determined by the Planning and Engineering Division.

Exception. When the Fire Department Hose Connection is installed directly on the tank then the location of the tank shall support the location of the outlet as required in Chapter 7.

6.2 TANK SIGNAGE. Water storage tanks shall be labeled with signage stating the following. Letters shall be white with red background and shall be reflective.

“FIRE PROTECTION WATER SUPPLY”,
“XXXX GALLONS FIRE FIGHTING SUPPLY”
“XXXX GALLONS FIRE SPRINKLER SUPPLY”

CHAPTER 7 TANK CONNECTIONS

7.1 ALTERATIONS PROHIBITED Tanks shall not be altered without written approval from the tank manufacturer.

7.2 TANK OUTLET AS FDHC. An outlet on the tank can be utilized as a Fire Department Hose Connection if it meets the following specifications:

7.2.1 Outlet size shall be a four inch (4”) with male National Standard threads and shall be controlled by an independent valve.

7.2.2 Threads must be protected with a threaded metal cap which shall be capable of being removed by a fire hydrant wrench.

7.2.3 The outlet shall be eighteen to twenty-four inches (18” to 24”) above the finished grade of the fire apparatus access road unless otherwise approved. Where two or more tanks are manifolded together, the connections between the tanks must be piped so that water is drawn from each tank at an equal rate.

7.2.4 The outlet shall be located seven to nine feet (7'-9') or seventeen to nineteen feet (17'-19') from the nearest fire apparatus access road edge, and with its face parallel to the road edge. This is to allow the use of a hard suction hose from the fire department apparatus to the tank outlet. There shall be an

unobstructed path from the apparatus access road to the tank outlet to accommodate the use of a hard suction-hose.

7.2.5 A turnout shall be provided so that fire apparatus may connect to the FDHC without blocking the access way. The turnout shall be centered with the outlet and shall be twenty-four feet (24') wide, thirty feet (30') long, and include twenty-five foot (25') foot tapers.

7.3 VALVES ON TANKS. When a standpipe or other fire service connection is remote from the tank, an approved shutoff valve, locked in the open position, shall be installed on the tank.

7.4 DOMESTIC SUPPLY OUTLET. Where domestic and Fire Protection System water are included in the same tank, the Domestic Supply Outlet shall be located above the plane of the minimum required water supply required and designated for Fire Protection as determined in Chapter 4.

CHAPTER 8 PIPING

8.1 ABOVE GROUND PIPING. All above ground piping shall be installed in accordance with the following:

8.1.1 For projects located in a designated High Fire Hazard Area, all above ground piping shall be galvanized metal.

8.1.2 Where above ground piping passes through an area subject to freezing, it shall be protected by a reliable means to maintain the temperature of the water in the piping between forty degrees Fahrenheit and one hundred twenty degrees Fahrenheit (40° F and 120° F).

8.1.3 Above ground piping shall be adequately supported.

8.2 UNDERGROUND PIPING. Underground piping shall be installed in accordance with NFPA 24 and the following:

8.2.1 Approved thrust blocks or mechanical restraints shall be provided for stability of underground piping between the tank and the FDHC.

8.2.2 Steel pipe shall be minimum schedule forty (40) and fittings schedule eighty (80).

8.2.3 CPVC pipe shall be a minimum schedule forty (40).

8.3 CORROSION RESISTANCE. All exposed piping, elbows and risers shall be corrosion resistant and suitable for the environment installed.

8.4 INTERIOR DIMENSIONS. The interior dimension of the piping and valves between the tank and the FDHC shall be six inches (6")

8.5 VALVES. Valves shall be indicating type and locked in the open position.

8.6 PAINTED RED. Piping and Riser shall be painted red.

CHAPTER 9 HYDRANTS

9.1 HYDRANT OUTLET SIZING. For Residential occupancies, both a four inch (4") and a two-and-a-half inch (2 ½") outlet shall be provided. For Commercial structures, both a four inch (4") and a two (2) two-and-a-half inch (2 ½") outlets shall be provided. All outlets shall be National Standard Hose Thread. See Figure 9.1 for residential hydrant and Figure 9.2 for commercial hydrant at the end of this chapter.

9.2 HYDRANT LOCATION FOR PRESSURIZED SYSTEMS. When pressurized systems have outlets not provided on the tank in accordance with Chapter 6, Hydrants shall be located:

9.2.1 No closer than fifty feet (50') and no farther than one hundred fifty feet (150') from the structure being protected.

9.2.2 Hydrants shall be installed so there is no less than a thirty-six inch (36") decrease in elevation between the bottom of the tank and the highest outlet.

9.2.3 Within ten feet (10') of an access road installed in accordance with SBCFD Standard 1.

9.2.4 A turnout shall be provided so that fire apparatus may connect to the hydrant without blocking the access way. The turnout shall be twenty-four feet (24') wide, thirty feet (30') long, and include twenty-five foot (25') tapers. The turnout shall be centered at the Hydrant.

9.3 HYDRANT LOCATION FOR DRAFT SYSTEMS. When pressurized systems have outlets not provided on the tank in accordance with Chapter 5, hydrants shall be located:

9.2.1 No closer than forty feet (40') and no farther than one-hundred feet (100') from the structure being protected.

9.2.2 The hydrant outlet shall be located seven to nine feet (7' to 9') or seventeen to nineteen feet (17' to 19') from the nearest fire apparatus access road edge, and with its face parallel to the road edge. This is to allow the use of a hard suction hose from the fire department apparatus to the tank outlet. There shall be an unobstructed path from the apparatus access road to the hydrant outlet to accommodate the use of a hard suction-hose.

9.2.3 A turnout shall be provided so that fire apparatus may connect to the hydrant without blocking the access way. The turnout be twenty-four feet (24') wide, thirty feet (30') long, and include twenty-five foot (25') tapers. The turnout shall be centered at the hydrant.

9.2.4 The hydrant shall be positioned perpendicular to the access road so the four inch (4") outlet is directly facing the access road.

9.4 HYDRANT OUTLET HEIGHT. The height of the outlets shall be eighteen to twenty-four inches (18" to 24") above the finished grade of the access road.

9.5 CLEARANCE. A minimum of three feet (3') clear unobstructed space shall be provided around the circumference of the hydrant.

9.6 PROTECTIVE CAPS. The hydrant outlets shall be protected by a threaded metal cap with a pentagonal nut that can be opened with a hydrant wrench.

9.7 PROTECTION. When subject to the possibility of vehicle impact, hydrants shall be protected by approved bollards.

9.8 DRAFTING HYDRANT SIGNAGE. Each Hydrant shall be identified by a sign posted three feet (3') from the hydrant outlet. The sign shall be no less than three feet (3') nor greater than five feet (5') above the finished grade, in a horizontal position and visible from the driveway. The sign shall be durable and state the following with reflective white lettering four inch (4") tall on red background:

DRAFTING HYDRANT
ADDRESS
XXXX GALLONS

9.9 PRESSURIZED HYDRANT SIGNAGE. Each Hydrant shall be identified by a sign posted three feet (3') from the hydrant outlet. The sign shall be no less than three feet (3') nor greater than five feet (5') above the finished grade, in a horizontal position and visible from the driveway. The sign shall be durable and state the following with reflective white lettering four inch (4") tall on red background:

PRESSURIZED HYDRANT
STREET NUMBER, STREET NAME
XXXX GALLONS

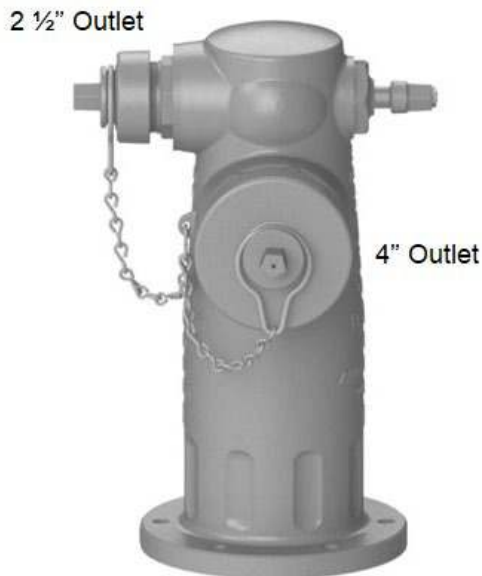


Figure 9.1 Residential Hydrant

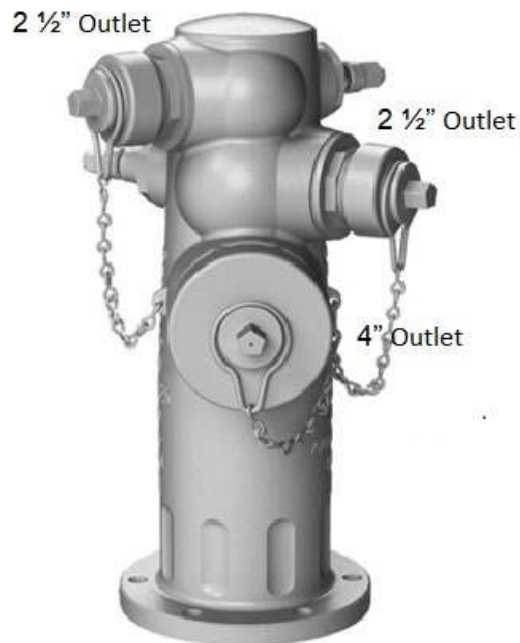
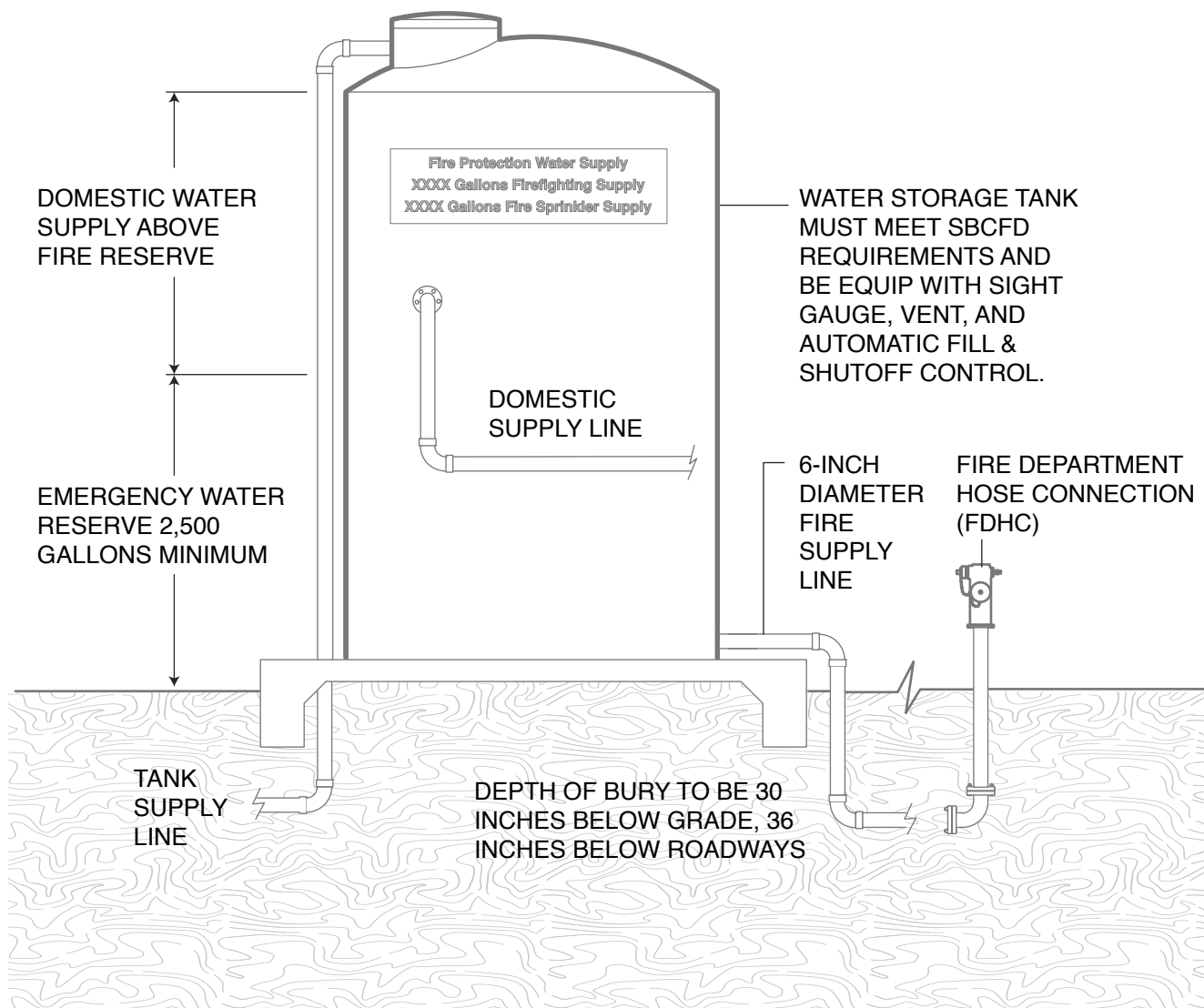


Figure 9.2 Commercial Hydrant



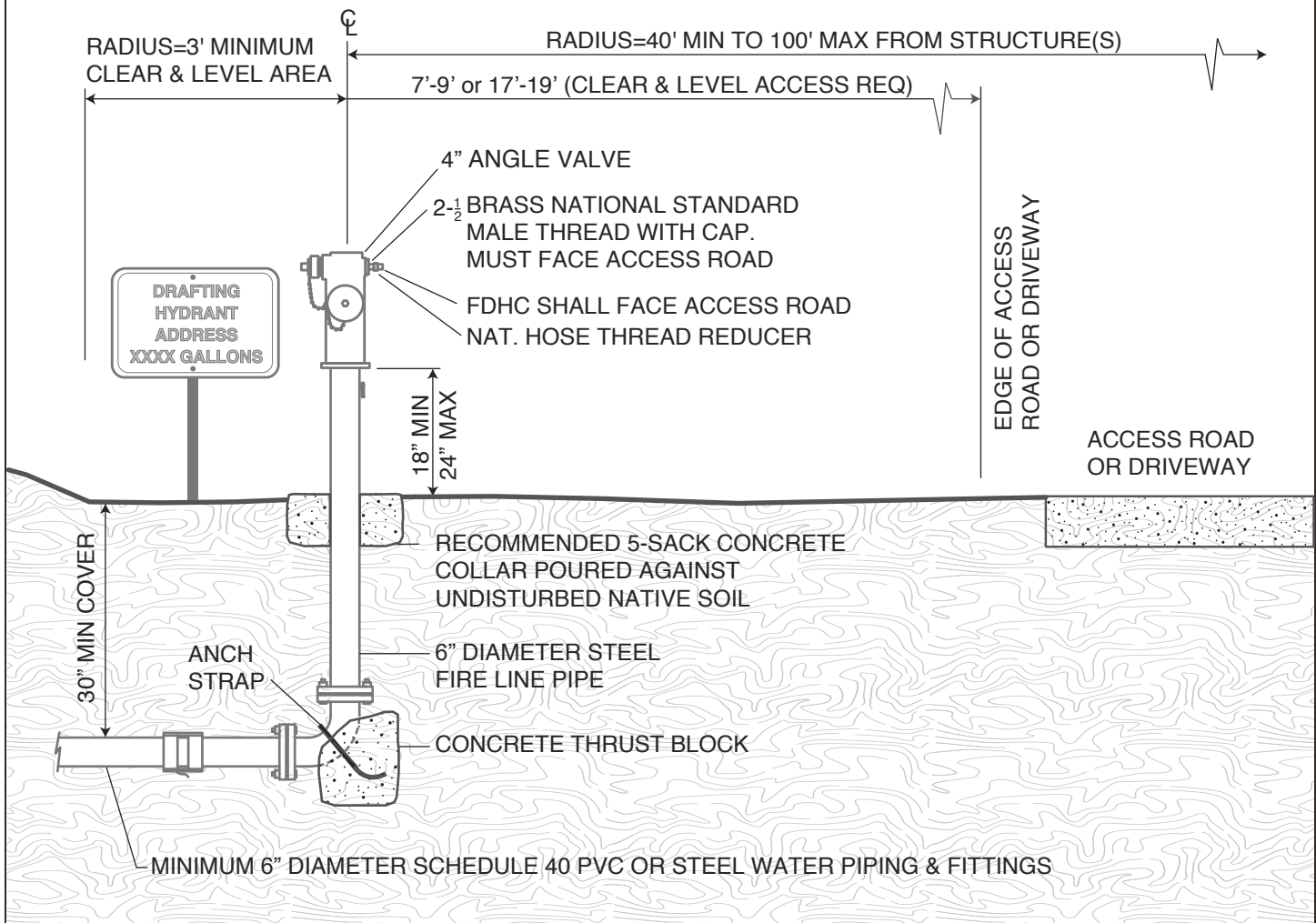
Notes:

1. Refer to water storage requirements for total required tank capacity.
2. When multiple water storage tanks are used the connection between the tanks must be by an approved 6-inch minimum diameter water line.
3. Foundation to be 3 inch compacted stone or granular base, or concrete
4. Thirty Feet of brush clearance required from tank
5. Tanks shall be constructed of steel, concrete, fiberglass reinforced plastic, or otherwise approved and listed for fire department use.

FIGURE 1

Santa Barbara County Fire Department

Drafting Hydrant

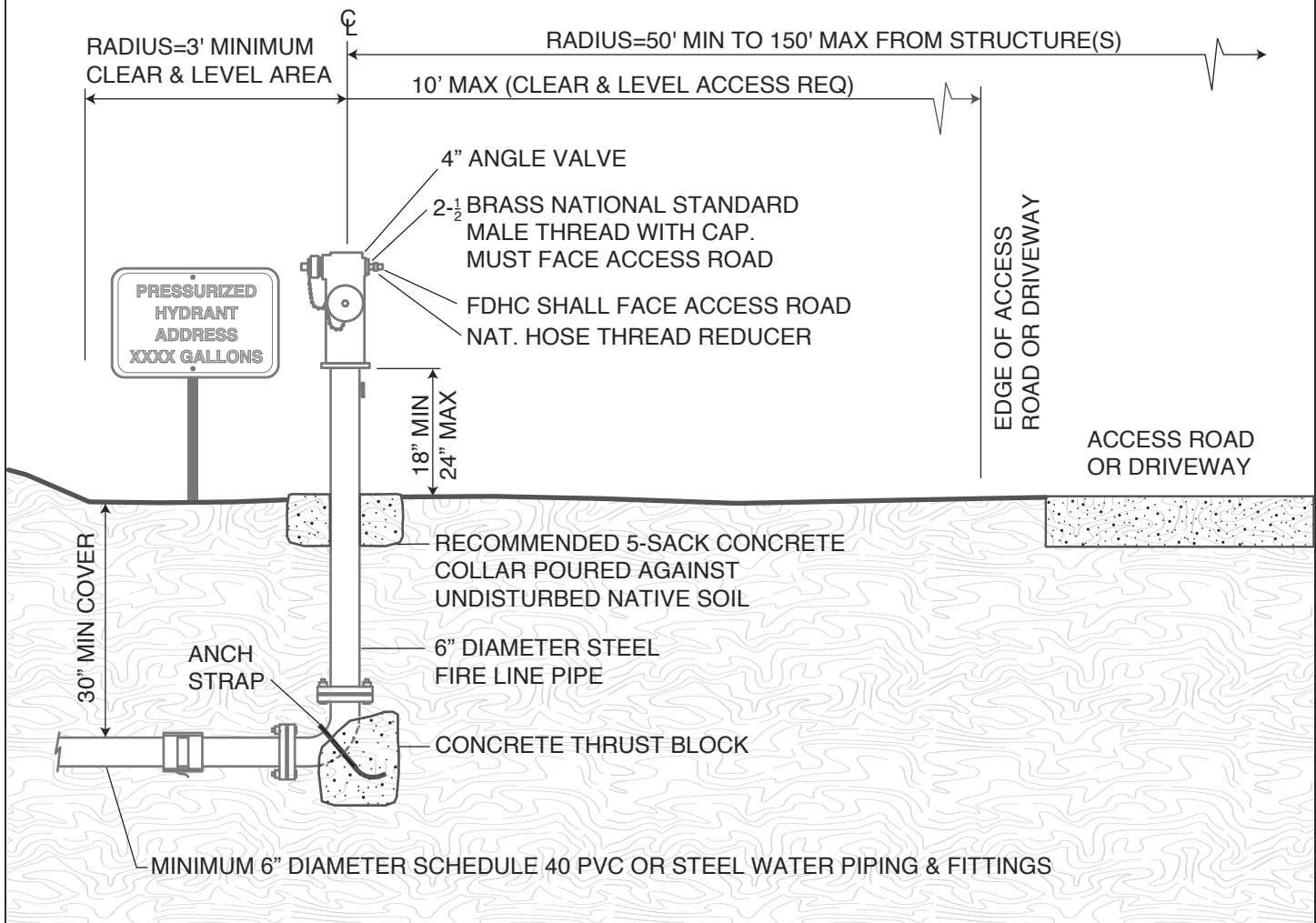


Notes:

1. Fire Department Hose Connection (FDHC) must be installed and fully functional prior to and during construction.
2. FDHC must be installed within 7'-9' or 17'-19' of the edge of access road or driveway and the area between must be Level and clear of all obstacles.
3. The FDHC outlet must be 18"-24" above finished grade.
4. The FDHC must be equipped with a metal cap.
5. The FDHC must be located between 40-feet and 100-feet from all structures.
6. A 3-foot minimum clear and level zone must be provided all around the center of the FDHC.
7. A 10' clear zone must be maintained for Fire Department access.
8. Commercial hydrants must comply with SBCFD Standard 2.

FIGURE 2

Pressurized Hydrant



Notes:

1. Fire Department Hose Connection (FDHC) must be installed and fully functional prior to and during construction.
2. FDHC must be installed within 10' of the edge of access road or driveway and the area between must be Level and clear of all obstacles.
3. The FDHC outlet must be 18"-24" above finished grade.
4. The FDHC must be equipped with a metal cap.
5. The FDHC must be located between 50-feet and 150-feet from all structures.
6. A 3-foot minimum clear and level zone must be provided all around the center of the FDHC.
7. A 10' clear zone must be maintained for Fire Department access.
8. Commercial hydrants must comply with SBCFD Standard 2.
9. For gravity fed systems, the FDHC shall be installed so there is no less than a 36" decrease in elevation between the bottom of the tank and the outlet.

FIGURE 3

Santa Barbara County Fire Department