

CITY OF LATHROP

Department of Public Works

*Design & Construction
Standards
Section 4 Water System
Standards*

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SECTION 4 WATER SYSTEM STANDARDS

4-1 PURPOSE

These water system standards apply to any facility or supply system in the City that meets any one or more of the following conditions:

- A. The system is or will be in the City right-of-way or other public easement.
- B. The system serves, or plans to serve, water to any land development project that is subject to approval of the City Council, Planning Commission, or Public Works Department.
- C. The system provides water for fire protection in the City of Lathrop.

4-2 WATER SYSTEM EXPANSION/REPAIR

Expansions or repairs of an existing system shall meet the standards provided herein without reducing the supply, flow, or storage presently available to the existing system, unless such reduction does not reduce the quality or quantity below the requirements for the whole system based on those standards, and approval of the City Engineer is obtained.

Calculations shall be submitted with the improvement plan submittal. The calculations shall show existing and projected demands, existing and projected source capacity and storage, and distribution system performance under design flow conditions under the requirements of Section 4-5.4 below.

4-3 DEFINITIONS

See Section 1.2 – DEFINITIONS.

4-4 WATER SUPPLY REQUIREMENTS

4-4.1 Quality

Water supplied for use in domestic water systems in the City of Lathrop shall conform to US EPA Standards (40CFR 141, 142 & 143), the requirements of the California Health and Safety Code and the California Water Works Standards containing the California Administrative Code, Title 22 and any other laws and regulations of the State of California.

4-4.2 Community Water System

For those projects for which a new community water system is required, or a connection to an existing community water system is required, the following shall serve as the minimum requirements when determining adequate capacity.

- A. **Water Demand:** Water demand shall be calculated using the water demand factors in gallons per day per dwelling unit (gpd/du) or gallons per day acre (gpd/ac) according to the land use type presented in Table 4-1.

TABLE 4-1

WATER DEMAND FACTORS

Land Use Category	Residential Density (DU/acre)	Water Demand Factor (gpd/du or ac)	
		City-Wide	West Lathrop
Low Density Residential	1.0 – 9.0	330	315
Medium Density Residential	9.0 – 15.0	250	235
High Density Residential	15.0 – 35.0	170	
Commercial	-	1,550	
Industrial	-	1,200	
Parks, Open Space & Public Landscape	-	2,450	
Schools / Institutional	-	1,250	

- B. **Supply:** A public water system shall be designed to meet the following criteria for water supply.
 - 1. For developments and subdivisions requiring a public water system, all facilities and services for water supply shall conform to the requirements of the LMFD, the Public Works Department, the City’s Master Plan, Urban Water Management Plan, and applicable state and federal agencies.

- 2. Sufficient water shall be available from the water sources, distribution reservoirs, and distribution system to adequately, dependably, and safely supply the total water demand requirements of all users under maximum conditions. The maximum condition shall be defined as the higher of either maximum hourly demand or maximum day demand plus fire flow. Maximum day demand is defined as 1.7 times the average demand, and maximum hourly demand is defined as 3.4 times the average demand. Average demand can be obtained from the City’s most current Water Master Plan.

- C. Water Supply/Demand: If required, approval of SB 610 Water Supply Assessment and/or a SB 221 Written Verifications of Water Supply report(s) and any necessary updates to the City Urban Water Management Plan and/or the Master Plan shall be completed prior to approval of the project.

- D. Fire Flow: Fire flow shall meet the requirements of the LMFD and as outlined in Table 4-2:

TABLE 4-2

FIRE FLOW REQUIREMENTS

Land Use	Examples of Specific Developments	Fire Flow Required (2 Hour Duration) (gpm)
Very Low Density – Medium Density Residential	All existing single family residential developments as well as Planned Unit Development and Recreation Residential	1,250
High Density Residential	All existing Apartment and Condominium developments	2,000
General Commercial and Office	Highway, Village, Regional, Service, Neighborhood Commercial designations. Includes Professional Offices and Community Commercial designations.	3,000

Land Use	Examples of Specific Developments	Fire Flow Required (2 Hour Duration) (gpm)
Heavy Commercial	Areas designated as Recreation and/or Resorts	4,000
Industrial	Limited and General Industrial	4,000

- E. Fire Hydrant Spacing shall meet the requirements of the LMFD and as shown in Table 4-3:

TABLE 4-3

FIRE HYDRANT SPACING

<u>PROPERTY TYPE</u>	<u>MAX HYDRANT SPACING</u>
Very Low Density – Medium Density Residential	500'
High Density Residential	350'
Neighborhood and Community Commercial	350'
Offices	350'
Highway and General Commercial	300'
Industrial and Heavy Commercial	250'

- F. Storage Capacity: The requirements of the City’s Water Master Plan shall be used to design new water distribution systems with sufficient storage capacity.

4-5 WATER DISTRIBUTION SYSTEM

Distribution facilities shall be designed to provide the lowest cost over their expected life. This may not necessarily result in the lowest initial cost when long-term operation and maintenance costs are considered. This policy, however, results in a water supply system that yields optimum quality at the lowest cost to the

customer. Minimum distance from finished grade to top of pipe is four (4) feet or a minimum of two (2) feet below the top of subbase; whichever is greater.

4-5.1 Materials

- A. All domestic water mains shall be polyvinyl chloride (PVC) C900-16 Class 150.
- B. All fire lines shall be PVC C900-16 Class 200.
- C. All water mains shall be blue or white in color.
- D. Warning tape shall be placed above all pipe per Standard Drawings
- E. All valves or other buried metallic pipes and appurtenances shall be completely wrapped or “bagged” in minimum 10 mil polywrap and tape.
- F. Ductile iron pipe shall only be used as approved by the City Engineer.

4-5.2 Horizontal Location of Water Mains

All pipelines designed for the transmission or distribution of domestic water supply shall be located within right-of-way dedicated for public streets or roads unless the use of an easement is specifically approved by the City Engineer.

- A. Water mains in all new streets shall be located on the north or west side of the street per Standard Detail R-63. Standard Details R-64, or R-66 shall be used only if approved by the City Engineer. When water lines are to be constructed in existing streets, they shall be placed in the same location as new streets when practicable. However, traffic conditions, existing utilities, and other physical features shall be considered.

4-5.3 Easements

Permanent easements shall be provided for water mains not located in public right-of-way. The pipe shall be located in the center of the easement.

- A. The minimum easement width shall be fifteen (15) feet and located all on one parcel. All easements shall have a minimum width in feet equal to the required trench width according to the standard detail for trench backfill plus two (2) additional feet of width for every foot of depth of the pipe as measured from the bottom of the pipe to finished grade. All water lines shall be centered within their easements unless otherwise approved by the City

Engineer.

- B. Temporary construction easements may be required for installing mains off-site.
- C. All easements shall include right of ingress and egress over adjoining property for maintenance, replacement and operation. No permanent structures shall be constructed in such easements, except fences and utilities that are subject of any overlapping easement.
- D. Where easements are parallel to a property line, they shall all be on one property and not split by the property line.
- E. Pipelines in easements shall be placed along the center of the easement unless the easement will contain multiple facilities as water, sewer, or storm drainage.

4-5.4 Design of Distribution System

Whenever possible, the distribution system shall be in grid form so pressures throughout the system tend to equalize under varying rates and locations of drafts.

- A. **Water Mains:** System design shall be based on the Hazen-Williams formula with $C = 140$.
 - 1. All mains shall be designed to satisfy the more critical of the two following conditions:
 - a. At maximum day peak hour demand, the operating or “residual” pressure at all water service connections shall be at least 40 pounds per square inch.
 - b. At average maximum day demand plus fire flow, the operating or “residual” pressure in the area of the fire shall not be less than 20 pounds per square inch.
 - 2. Normal operating pressures shall be in the target range of 55 to 65 pounds per square inch, and shall not be greater than 80 pounds per square inch at customer service connections.
 - 3. Maximum velocities shall not exceed 10 ft/sec in design.
 - 4. Maximum flow from any single fire hydrant shall be assumed to be 1500 gal/min for design purposes.

5. A Hardy-Cross hydraulic analysis of any proposed distribution system shall be supplied to the City Engineer upon request.
6. The minimum size pipe shall not be less than 6 inches nominal inside diameter. The minimum pipe size (6") shall only be used within cul-de-sacs and end runs of less than 500 feet where future extensions will not occur and no fire hydrants are located.
7. Larger size pipes shall be provided to serve multiple housing, schools, commercial or industrial areas as determined by an engineering study. Minimum size pipes serving commercial or industrial areas shall be 10 inches nominal inside diameter.
8. Dual mains may be required in streets which carry heavy concentrations of traffic, or in right-of-ways which are 84 feet or more in width. State highways or major city arterials generally are in this category.
 - a. In those streets classified for dual mains, the minimum pipe size shall be 8 inches in diameter on each side in residential areas.
 - b. In commercial districts, the sizes of pipe shall not be less than one 10-inch and one 8-inch.
9. The distribution system grid shall contain at a minimum, 12-inch or larger cross-connecting mains at intervals of approximately 1,300 feet, with intermediate 8-inch lines.
10. Dead-end water mains or distribution systems with single tie-in connections are to be avoided. Exceptions are short length streets with cul-de-sacs or temporary dead ends at the end of streets that will be extended in the future. All dead-end mains shall be provided with a fire hydrant.

The minimum size and limits of length of dead end water mains is as follows:

- a. Six-inch diameter dead end main is limited to a maximum length of 100 feet
- b. Eight-inch diameter dead end main is limited to a maximum length of 1,200 feet.
- c. Twelve-inch diameter dead end main is limited to a maximum length of 2,400 feet.

The City will determine where it may be necessary to deviate from these maximum lengths of dead end main.

11. Whenever an area outside a development can be logically served by future extension of a main or mains within the development, such mains shall extend as close as practicable to the development boundary, and be provided with a fire hydrant as a means of flushing.
12. To facilitate locating the pipe, all non-metallic water mains shall have a No. 10 gauge solid, insulated, soft drawn copper wire laid along the pipe, accessible in each valve box or other access opening to the system. Wire junctions shall be per Standard Detail L-33 & W-3. (See Standard Details for Water). Provide access box for tracer wire where no valves are located within 400 feet. A continuity test shall be performed on all new wire.
13. All ductile iron pipe shall be encased in polyethylene wrapping.
14. Any requirements of this section that cannot be met due to terrain or other factors may be varied with the specified approval of the City Engineer.

B. Horizontal and Vertical Separation of Water Mains:

Water mains and non-potable pipelines shall be placed to conform to the California Code of Regulations Title 22, Division 4, Chapter 6, Section 64572:

If the requirements of the California Code of Regulations cannot be met, a waiver must be submitted and reviewed by the State Water Resources Control Board:

- https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/dwdocuments/2018/main_separation_ltr_to_pws.pdf

C. Valves: Valves shall be of the same size as the pipeline in which they are installed. Valves shall be resilient wedge gate valves for main sizes up to 10 inches and butterfly valves for main sizes equal to or larger than 12 inches.

1. The distribution system shall be equipped with a sufficient number of valves located and spaced such that the following conditions are met:
 - a. Any shutdown of any section of water main will not result in shutting down a transmission main.

- b. Removing any section of pipe from service will not result in any section greater than 400 feet in multiple family residential, school, commercial or industrial districts, or greater than 600 feet in other areas.
 2. In no case shall more than two fire hydrants be removed from service.
 3. All sections of a main water line should be able to be shut down without going to more than three locations to close valves.
 4. Insofar as practicable, valves shall be located at street intersections opposite the curb return. If it is necessary to locate valves between intersections, the valves shall be installed on a property line.
 5. Water mains shall be valved on each side and outside State Highway and canal right-of-way crossings.
 6. At “tees”, valves will be required as follows:
 - a. Two (2) valves where one leg is less than 8 inches with one valve on the smaller leg.
 - b. Three (3) valves where all legs are 8 inches or larger.
 7. At “crosses”, valves will be required as follows:
 - a. Three (3) valves where one or more leg is less than 8 inches with valves on each of the smaller legs.
 - b. Four (4) valves where all legs are 8 inches or larger.
- D. Fire hydrants:** Fire hydrants shall be placed at street intersections whenever possible, and shall be located to minimize the hazard of damage by traffic. Fire hydrants located at intersections normally will be installed at the curb return. All others should be located on a property line. Any cul-de-sac in excess of 300 feet shall have an additional fire hydrant located equal distance from the intersection to the end of the said cul-de-sac or as required by the LMFD.
 1. Fire hydrants spacing shall be in accordance with Table 4-3.
 2. Additional hydrants may be required on property frontage or onsite as indicated by the Uniform Fire Code or LMFD.

3. The main, valve, and service connection serving a fire hydrant shall not be less than 8 inches in diameter. There shall not be more than two fire hydrants on an 8-inch main, unless the mains are in a looped portion of the distribution system.
 4. The type of fire hydrant installation shall be as specified in Standard Detail W-19 or as required by the LMFD.
- E. Service lines:** Service lines from the water main to the property line shall be installed at the time the main is constructed wherever it is known or wherever it can be reasonably assumed that a connection is or will be required.
1. Service lines for all residential homes shall be minimum 1½ inch unless a separate fire suppression service is provided. All service lines shall be designed to provide adequate service to the facility to be served, and shall be identified on the plans. (see Standard Details).
 2. For residential services for homes equal to or greater than 4,000 square feet, the minimum size of service line shall be determined by Design Engineer and shall be sized to meet domestic, fire, and any other demands as required by the City Municipal Code Section 15.32.070. The design calculations shall be submitted for approval by the City Engineer.
 3. Service lines shall be polyethylene pressure pipe with compression type fittings.
 4. Service lines shall be equipped with angle ball curb stop or gate valve either side of the water meter.
 - a. A gate valve may be used only when the service is 2 inches in diameter or larger.
 - b. Installation of a valve or meter box is required.
 5. Service lines shall not be allowed to tap into transmission lines 12 inches or larger, unless specific written approval is obtained from the City Engineer.
 6. The location of water service lines shall be permanently indicated by embedding the letter “W” in the curb, directly above the line. (See Standard Detail R-5).
 - a. It is the developer’s responsibility to mark any curb, which is

poured after the installation of the service.

- b. Where curbs do not exist and are not planned during the improvement project, a 2" x 2" x 24" construction grade redwood stake shall be driven into the ground directly above the curb stop at a property line, and shall be painted bright blue and have a "W" stamped in the top.
 7. If a lot is served by both treated and untreated water systems, the location of the service lines shall be at opposite ends of the front lot line, or as widely separated as is practical, and with the approval of the City Engineer. Backflow prevention devices are required on the treated water service line of all lots having both treated and untreated systems.
 8. Service lines shall have PVC insulated No. 10 solid copper wire from the water main locating wire to the meter box. The wire shall be looped and accessible in the meter box.
- F. Thrust blocks:** All tees, bends, plugs, fire hydrants and other sections of piping and appurtenances that might be capable of being displaced by the action of either working pressures or test pressures within the water system shall be anchored in place by the use of thrust blocks. Thrust blocking or harnesses shall be built as shown on the Standard Details W-2.
1. The bearing pressures of thrust blocking on the supporting soil shall not exceed the allowable bearing pressure for the soil involved. If the allowable thrust block bearing pressure exceeds the 1000-psf allowable soil bearing pressure as determined from the detail, the thrust block must be modified to reduce actual soil pressures to below allowable and calculations shall be provided to verify the modifications.
 2. Required thrust block bearing areas shall be in accordance with Standard Detail (W-2) or as designed by the Engineer of Record
- G. Valve boxes and vaults:** A valve box or vault or capped standpipe shall be provided for every valve installed below ground surface. The cover for all valve boxes and vaults shall be metallic construction capable of withstanding H-20 traffic loading.
1. Valve boxes shall be placed in accordance with Standard Details for Water.
 2. Design for vaults shall be approved by the City Engineer.

- H. Bacteria sample stations:** Bacteria sample stations shall be installed in all new subdivisions having a public water system. The bacteria sample stations shall be installed on main water lines only and at locations that will be representative of the systems water quality and pressure zones in accordance with Standard Details W-16.
1. Each water system shall have a minimum of two bacteria sample stations with one additional bacteria sample station for every 1000-service connections installed on the water system.
 2. Bacteriological Sampling Taps shall be installed per Standard Details for Water.
 3. Any deviation from these Standards shall be approved by the City Engineer.
- I. Blow-off valves (flush outs):** All blow-off (flush outs) shall be a minimum outlet size of 2" and shall be designed for a minimum operating pressure of 150 psi. A blow-off or fire hydrant shall be installed at the terminus of all dead-end water mains or non-circulating flow water mains.
1. The blow-off shall be sized to provide a minimum of 2.0 ft/sec velocity in the attached main.
 2. Blow-off valves shall be used on temporary dead ends only.
 3. Blow-off valves shall be installed per Standard Details for Water.
- J. Air and vacuum release valves:** Air and vacuum release valves shall be installed in the water system at all points where air pockets may form. (See Standard Details). The design shall insure the release of air automatically from the water main. The valves shall also prevent the entrance of air into the water main when the pressure inside the line is below atmospheric pressure.
1. All valves shall be designated for a minimum of 125 psi operating pressure.
 2. The inlet to each valve shall be provided with a gate valve or corporation stop to provide a positive closure between the drain pipeline and the air and vacuum release valve. The air and vacuum release vent outlet shall be installed 12" above adjacent ground in such a manner as to preclude backflow.
 3. All valves shall be protected by the use of a Hot Box or other equivalent product in accordance with Standard Detail (W-11)

- K. Water Meters:** Meters are required on all services from the public system. Meters shall read in gallons and meet the requirements of the latest revision of AWWA Standard C704 or as required by the City Engineer, whichever is more stringent.
1. All meters selected for the application and approved by the City Engineer or Public Works Director. Meter shall be of the following brand, make and models. The City may change the brand, make and model from time to time so the installer shall verify the current standard with the City prior to installation.
 - a. Residential
 - i) Less than 4,000 sf without fire suppression: Badger Model 25 $5/8'' \times 3/4''$
 - ii) 4,000 sf or larger or with fire suppression: Badger Model 70 1''
 - b. Commercial, Industrial, and Irrigation
 - i) $1\frac{1}{2}''$ service: Badger Model 120
 - ii) 2'' service: Badger Model 170
 - c. All meters on service laterals 3'' or greater shall be approved by the City Engineer.
 2. All water meters shall include Badger register reading in US Gallon.
 3. All water meters shall be installed with Integral Orion Transmitter (SE) in US Gallon units.
 4. For subdivision or commercial construction, Orion SE Network Gateway Transceivers may be required to collect water meter transmitter data. The mounting location and method of connection to the City's network shall be approved by the City Engineer or Director.
 5. All meters shall be installed in a meter box, which reaches ground surface.
 6. Meter boxes shall be clearly marked as containing water meters and shall be capable of withstanding vehicular traffic if set near driveways, sidewalks, or other areas subject to vehicular traffic.
 7. Meters shall not be placed in driveways.

- L. Corrosion protection:** In general, all new piping shall be PVC; however, for all steel, cast iron, or ductile iron replacements or new installations approved by the City, the applicant shall provide the City Engineer with a soil corrosion report of the work area conducted by a Corrosion Specialist certified by the National Association of Corrosion Engineers or a Corrosion Engineer registered by the State of California. The soil corrosion report shall form the basis for proposed mitigation measures to be submitted with the plans and specifications for City review.
- M. Check valves:** All check valves shall seat readily and completely to assure water tightness. The face of the closure element and valve set shall be a bronze composition, or other non-corrodible material, which will seat tightly under all prevailing conditions of field use. All check valves, 4-inches and larger, for use on distribution mains, shall be designed for a minimum of 150-psi cold water working pressure.
- N. Corporation valves, curb valves, and bronze fittings:** Miscellaneous bronze fittings (e.g. elbows, insulation couplings) shall be used where appropriate throughout the system, subject to the approval of the City Engineer. Corporation and curb valves and miscellaneous bronze fittings shall conform to the Standard Specifications.
- O. Pipe fittings and joints:** Joints and fittings shall conform to applicable AWWA specifications. Mechanical joints for straight lengths of pipe will be allowed only when specifically approved by the City Engineer.

The City does not intend to unreasonably limit the installation of any type of fittings, joint, or proprietary device. However, installation of any such fittings, not specifically approved by these standards, is subject to the approval of the City Engineer.

Written request for approval of items deviating from the City Standards items shall be made in advance through the City Engineer.

1. Flange joints are required when installing four-inch (4”) and larger line valves in steel pipe, four-inch (4”) and larger tapping sleeves and other fittings. No other type of joint shall be used without the specific approval of the City Engineer.
2. Mechanical couplings shall be of a gasket, sleeve-type with a diameter to properly fit the pipe.
 - a. Tolerance on pipe and coupling, together with proper bolt and gasket arrangements, shall be sufficient to ensure permanent watertight joints under all conditions.

- b. Where pipes of different outside diameter are connected together, or where pipe is connected to fittings of different materials, great care shall be taken to ensure that the proper ring or adapter is selected.
3. Repair clamps, repair sleeves, joint clamps, and similar devices shall not be used to repair or join water mains. Pipe damaged during installation shall be removed and replaced.
4. Adapters, plugs, end caps, bullheads, slip sleeves, anchor boxes, lock-joint gaskets, yokes and rods, and other appurtenances shall be used where appropriate throughout the system, subject to the approval of the City Engineer.
5. Tapping sleeves or clamps shall be used to tap existing water mains that are in service and under pressure without interrupting service. NO TAP SHALL BE MADE ON ANY EXISTING WATER MAIN WITHOUT THE WRITTEN CONSENT OF THE CITY ENGINEER.
 - a. Notification shall be made a minimum of 2 working days in advance under normal conditions Monday through Friday.
 - b. Care shall be exercised to select sleeves and gaskets that are properly sized to fit the type and class of pipe to be tapped.
 - c. Where four-inch (4") or larger tapping sleeves or clamps are used, a thrust block shall be formed and poured behind the sleeve to prevent possible damage to the main from pressure shocks which develop as valves are first opened.
6. In-line valves shall be the same size as the main and shall open to the left (counterclockwise) with resilient seat. In-line valves in ductile iron or PVC pipelines shall have push-on ends. Pipelines in connection with tapping sleeves or clamps shall have flange ends.

P. Testing: Testing shall meet the following requirements.

1. Domestic hydrostatic test shall be at a pressure of 150 psi for a minimum of 2 hours.
2. Fire hydrostatic test shall be at a pressure of 200 psi for a minimum of 2 hours.
3. Bacteriological testing shall conform to AWWA Section C-651 including two consecutive samples taken at least 24 hours apart.

Samples shall be taken by the laboratory contracted with the City and paid for by the Contractor.

4. All labor, materials and equipment required for testing shall be provided by the contractor. The cost of testing shall be paid by the contractor.

4-5.5 Backflow and Backflow Prevention Devices:

- A. Backflow, which is the flow of water or other liquid or foreign materials into the distribution mains of the water systems from another source, is strictly prohibited and shall be prevented by the installation of an appropriate, approved backflow prevention device, purchased, installed, and maintained by the Owner, all certified, all at his/her expense
- B. Type of protection required: The type of protection that shall be provided to prevent backflow into the approved water supply shall be commensurate with the degree of hazard that exists on the consumer's premises. The type of protective assembly required includes:
 1. Reduced Pressure Principle Backflow Prevention Assembly (RP), Double Check Valve Detector Check Assembly (DC) and an Air-Gap separation (AG). The water user may choose a higher level of protection than required.
 2. The minimum types of backflow protection required to protect the approved water supply at the user's water connection to premises with varying degrees of hazard are given in Table 4-4.
 3. Situations which are not covered in Table 4-4 shall be evaluated on a case by case basis and the appropriate backflow protection shall be determined by the City Engineer and/or LMFD.
 4. Two or more services supplying water from different street mains to the same building, structure, or premises through which an inter-street main flow may occur, shall have, as a minimum, a standard check valve on each water service to be located adjacent to and on the property side of the respective meters.
 5. A check valve shall not be considered adequate if backflow protection is deemed necessary to protect the water system from pollution or contamination. In such cases, the installation of approved backflow assemblies at such service connections shall be required.

**TABLE 4-4
TYPE OF BACKFLOW PROTECTION REQUIRED**

<u>Degree of Hazard</u>		<u>Minimum Type of Backflow Prevention</u>
Sewage and Hazardous Substances		
(1)	Premises where the public water is used to supplement a reclaimed water supply.	AG
(2)	Premises where there are wastewater pumping and/or treatment plants and there is not any interconnection with the public water system. This does not include a single-family residence that has a sewage lift pump.	AG
(3)	Premises where reclaimed water is used and there is no interconnection with the potable water system. A RP may be provided in lieu of an AG, if approved by the City Engineer.	AG
(4)	Premises where hazardous substances are handled in any manner in which the substances may enter a potable water system. This does not include a single-family residence that has a sewage lift pump. A RP may be provided in lieu of an AG, if approved by the City Engineer.	AG
(5)	Premises where there are irrigation systems into which fertilizers, herbicides or pesticides are or can be injected.	RP
Auxiliary Water Supplies		
(1)	Premises where there is an unapproved auxiliary water supply, which is interconnected with the public water system. A RP may be provided in lieu of an AG if approved by the City Engineer.	AG
(2)	Premises where there is an unapproved auxiliary water supply and there are no interconnections with the public water system.	RP
Fire Protection Systems		
(1)	Premises where the fire system is directly supplied from the public water system and there is an unapproved auxiliary water supply on or to the premises (not interconnected).	RP

TABLE 4-4

TYPE OF BACKFLOW PROTECTION REQUIRED

<u>Degree of Hazard</u>		<u>Minimum Type of Backflow Prevention</u>
(2)	Premises where the fire system is supplied from the public water system and interconnected with an unapproved auxiliary water supply. An RP may be provided in lieu of an AG, if approved by the City Engineer and LMFD, or chemical additions to fire suppressant.	AG
(3)	Premises where the fire system is supplied from the public water system and where either elevated storage tanks or fire pumps which take suction from the private reservoirs or tanks are used.	RP
Dockside Watering Points and Marine Facilities		
(1)	Pier hydrants for supplying water to vessels for any purpose.	RP
(2)	Premises where there are marine facilities.	RP
Restricted Entry		
(1)	Premises where entry is restricted so that inspections for cross-connections cannot be made with sufficient frequency or at sufficiently short notice to assure that cross-connections do not exist.	RP
(2)	Premises where there is a repeated history of cross-connections being established or re-established.	RP

4-5.6 Storage Facilities

All steel tanks, standpipes, reservoirs and elevated tanks for water storage shall comply with “AWWA D100” or Standard 12B Bolted or Welded Equivalent and also meet all foundation and seismic requirements of the AWWA Standard. All inspection, repairing, painting and repainting of steel tanks, standpipes, reservoirs, and elevated tanks for water storage shall comply with “AWWA D102”. All above grade steel tanks, reservoirs, and elevated tanks for water storage shall be coated with anti-graffiti coating approved by the City Engineer to full height of structure.

4-5.7 Pumping Stations

Pumping facilities may be needed to provide adequate water pressure in the distribution system. The booster pump station shall be designed and constructed in accordance with the applicable specifications provided in Appendix H, Pump Station Design. (Note – A low flow Pump is not required.)

4-6 WELLS

Public production wells shall be sited so that the draw down from one well does not adversely affect adjacent wells, but in no case shall adjacent wells be closer than 1,000 feet. New wells shall be located within 100 feet of a public street, unless an alternate location is approved by the City Engineer.

- A. On a case-by-case basis, site improvements shall be as required by the Director.
- B. Each new site shall be a minimum of 100 feet by 100 feet and its own separate parcel unless the site is contained within a larger parcel dedicated to the City.
- C. The site shall be improved with a minimum of 10 inches of aggregate base with a 12-foot-wide paved access to the street and a paved turnaround on site. Access and turnaround area shall be paved with a minimum of three inches AC on ten inches AB.
- D. Each site shall be fenced with six-foot high chain link and a twelve-foot wide double gate at the access drive. In residential neighborhoods, the fence shall include slats.

4-6.2 Well Abandonment

Abandon and destroy private water wells in accordance with the provisions of the Department of Water Resources California Well Standards, Bulletin 74 Series and County Environmental Health Department Standards. The well owner shall also provide a well destruction plan prepared by a registered engineer or certified hydrogeologist. The primary purpose of the plan shall be to prevent groundwater movement, utilizing the existing well structure, between the various underground aquifers as well as prevent the direct movement of surface water (via the well structure) into the underlying aquifers. The well destruction plan will be reviewed and approved by the City Engineer prior to commencement of any such work.

The well destruction plan content shall include:

- A.** Copy of original “Water Well Driller’s Report” (State DWR).
- B.** Conduct a down-hole closed circuit television (CCTV) inspection of the well and provide a copy of the recording; include written report of findings.
- C.** Recommended well destruction activities based on the following minimum steps:
 - 1. Remove scaling and other encrustations that are blocking well screens. Purpose is to maximize movement of cement grout through screens into gravel pack.
 - 2. Remove any accumulated fill material at bottom of well down to original completed depth.
 - 3. Mechanically perforate the blank (unscreened) portions of the well casing. Portions within any concrete seal near the ground surface do not need to be perforated.
 - 4. Prepare a CCTV inspection and recording of the well after the above activities.
 - 5. Remove the existing well top block and casing to a depth of 5 feet below ground surface.
 - 6. Fill the well via a tremie pipe with a combination of neat cement and/or cement grout to 2 feet above the top of the exposed casing. The viscosity of the neat cement and/or cement grout shall be low enough to allow for movement through the screens into the gravel pack.
 - 7. Backfill and compact the well head excavation and perform other cleanup activities.
 - 8. Prepare and file a State DWR Water Well Driller’s Report upon completion of well destruction and abandonment activities. Provide a copy to the City.
- D.** The above steps shall be adjusted or additional steps added as required to achieve the primary purpose of eliminating or minimizing inter-aquifer movement of groundwater and surface water intrusions into the subsurface strata via the existing water well structure.

4-7 SECURED FACILITIES

All storage facilities, pumping stations and wells shall be secured in accordance with the requirements of Appendix G, Secured Facilities.

END OF SECTION