VALLECITOS WATER DISTRICT
SECTION 500

DESIGN CRITERIA
WATER FACILITIES

This section contains design criteria for proposed water systems. The developer and engineer shall be responsible for ensuring that designs submitted to the District are consistent with and comply with the latest editions of the VWD Master Plan, VWD Standard Specifications, VWD Standard Drawings, VWD Approved Materials List, VWD policies, rules and regulations, and generally accepted engineering practice.

The developer shall be responsible for constructing the complete water distribution system shown on the plans including but not limited to the necessary piping, valves, fire hydrants, fittings, vaults, power (including backup power), control systems, telemetry, pressure reducing stations and related appurtenances.

500.1 MINIMUM SIZE MAINS

The minimum size distribution main shall be an 8-inch main in public right of way or separate easement. The water mains must be sized to meet maximum day plus fire flow demands.

500.1.1 Water-System Reliability

Water systems shall be designed to meet the pressure criteria under max day plus fire flow demands. Each project or development shall have at least two connections to waterlines in different streets to form a looped water system. If connection to different streets is impractical or impossible in the opinion of the Engineer, connections to a waterline in the same street may be permitted, provided that adequate design criteria is met and valving for isolation of the segments of waterlines is incorporated. Non-looped systems will be permitted only with the express permission of the District.

Water mains and valving shall be designed so that no more than one average City-sized block (approximately 30 homes) is out of service at any one time, and no more than two fire hydrants are on a dead end or out of service at any time. Water mains serving more than two fire hydrants, or more than 30 homes (EDU's) shall be looped/duel fed.

500.1.2 Full Frontage Extension

Water lines will be required, at the District's discretion, along the entire length of at least one property line frontage of the property to be developed whenever there is a possibility of future main extension, or there are other lots that could connect to the new main at a later date. The property line frontage is that portion of the property along the public right-of-way. If a parcel to be developed has more than one property line frontage, the District may require a water line to be installed along the other frontage(s).

500.2 SYSTEM DEMANDS AND DESIGN CRITERIA

The design of water system facilities shall be based on the ultimate build-out water demand for the District, as described in the District's Master Plan. The water system must meet the fire flow requirements of the local governing agency.

The minimum residual pressure at any point in the system shall be 20 psi under maximum day plus fire flow demands. The minimum residual pressure at any point in the system shall be 40 psi at peak hour demand.

The minimum static pressure at any water service location (meter) shall be 40 psi. To protect the meter, pressure regulators are required on the District side of the meter if the static pressure is greater than 175 psi.

The maximum velocity in a line shall not exceed 7 fps (feet per second) during the maximum day demand plus fire flow or during the peak hour demand. Refer to the District's current Master plan for maximum day and peak hour demand peaking curves. The maximum desirable head loss is 5 feet per 1,000 feet of pipeline but the maximum allowable is 15 feet per 1,000 feet.

500.3 TYPE OF MAIN PIPE

Residential Areas (Distribution Mains). Only C900 PVC pipe, DR14 (pressure class 305 psi) is to be used for distribution mains of 8-inches thru 12-inches in diameter. For pipe over 12-inches in diameter up to 14-inches, C900 DR14 PVC pipe, ductile-iron pipe (DIP), or CML&C steel pipe may be used. For pipes 16-inches or larger in diameter, only DIP or CML&C steel pipe is allowed.

Pipe shall be fully restrained within easements with restricted access and slopes exceeding 10%.

500.4 MINIMUM DEPTH TO TOP OF WATER MAIN PIPE

500.4.1 Residential Areas (Distribution Mains 12-inch and smaller)

The top of the pipe shall be a **minimum** of 42-inches below the top of street finished grade, unless otherwise indicated on District-approved plans or directed by the District inspector because of unusual field conditions.

500.4.2 Transmission Mains. (Generally larger than 12-inch)

The top of the pipe shall be a **minimum** of 48-inches below the street finished grade, unless indicated otherwise on job plans or directed otherwise by the District inspector because of unusual field conditions.

500.5 STANDARD LOCATION

Water main center-lines shall normally be located 12 feet south or east of street centerline (middle of a lane preferably) or in the center of an easement for water only, or at least 10 feet from a sewer in a District joint easement.

500.6 WATER VALVE SPACING

At each tee connection, there shall be three (3) control valves. Where two mains cross, there shall be four valves. On long blocks, intermediate (inline) valves shall be installed so that no more than 30 lots, 600 feet of main, or two fire hydrants are out of service during a shutdown.

Where water mains pass through easements outside traveled streets, a valve shall be located at each end of the easement. The final determination of valves and locations shall be at the District's discretion.

500.7 COMBINATION AIR AND VACUUM VALVES

Combination air and vacuum valves may be required on pipeline high points, at gate valves, and changes in grade, depending on the main size and terrain. The valves shall also be placed down slope of a permanently closed valve separating two pressure zones. Combination air and vacuum valves shall be made in a level section of pipe no closer than 30-inches to a coupling, joint, valve, or fitting. Combination air and vacuum

valve assemblies shall be sized as shown:

1. 1-inch combination air and vacuum valve – pipeline sizes 10-inch and less.
2. 2-inch combination air and vacuum valve – pipeline sizes 12-inch.
3. 4-inch combination air and vacuum valve – pipeline sizes 14-inch through 21-inch.
4. 6-inch combination air and vacuum valve – pipeline sizes 24-inch through 36-inch.

500.8 BLOW-OFF VALVES

Blow-off valves are required on all dead-end pipe runs and at low points of the water main, A 2-inch assembly shall be placed on mains up to 12-inches in diameter. Larger main sizes require a 4-inch or 6-inch blow-off assembly, depending on the size of main and distance between valves and blow-off points. A blow-off assembly may not be required if a fire hydrant is located near the dead end, gate valve, or low point. A blow-off shall be no closer than 30-inches to a coupling, joint, valve, or fitting.

500.9 THRUST BLOCKS AND ANCHOR BLOCKS

Thrust and anchor blocks are required at all caps, valves, reducers, tees, bends, and fittings used to change the pipe direction. They shall be installed in accordance with the Standard Specifications and Standard Drawing W-15.

500.10 SEPARATION OF DOMESTIC WATER, SEWER, AND RECYCLED WATER LINES

500.10.1 Horizontal Separation

County Health Department regulations require a 10-foot minimum wall-to-wall separation between water and sewer water mains. Minimum separation of domestic water service line and sewer lateral shall be 5 feet. Special construction methods may be approved where the separation cannot be achieved. Separation other than the required minimum, must be reviewed and approved by the District.

500.10.2 Vertical Separation

Normally, water, sewer, and recycled water shall be located vertically from the street surface in order of the higher quality, i.e., domestic water shall be above recycled water and recycled water shall be above sewer.

Encasement may be required if separation conditions cannot be met.

If a sewer is above a water main, the special construction shall extend a sufficient distance on both sides of the crossing to provide a minimum of 10 feet of horizontal clearance. If a sewer is located below a water main, and within a vertical distance of 1-foot clearance, the special construction shall extend a sufficient distance on both sides of the crossing to provide a minimum 4 feet of horizontal clearance. These construction requirements shall not apply to house laterals that cross perpendicular less than 1-foot below a pressure water main.

500.11 FIRE FLOW DEMAND

The design criteria to be used for determining fire flow requirements shall be **the actual fire flow requirements as determined by the Fire Marshal of the agency having jurisdiction.** Before designing

the domestic water system for a project, the applicant shall obtain the Fire Marshal's fire flow requirements for the project. These requirements, plus the signature of the Fire Marshal, are required to be on the improvement plans prior to District's approval. A hydraulic analysis is required to confirm that the proposed water system improvements meet the required flows.

500.12 FIRE HYDRANT LOCATIONS

The spacing and location of fire hydrants shall be as determined by the Fire Marshal of the agency having jurisdiction. The location with respect to the curb and sidewalk shall be as shown in District standards W-4 and W-5.

500.12.1 Fire Hydrant Spacing

In general, the maximum fire hydrant separation shall be 300 feet from fire hydrant to fire hydrant. The only exceptions will be at the discretion of the Fire Marshal.

Fire hydrants shall be located near the beginning of curb return (BCR) or lot lines.

Fire hydrants shall not be located within 3 feet of a driveway (unless approved by the Fire Marshal).

500.12.2 Types of Hydrants

Wet barrel all-bronze type hydrants, as specified by the District, are to be used except in high pressure zones, hill areas or special "high-risk" situations where the District may require a wet barrel with pressure valve or check valve, at its discretion.

500.12.3 Plan Requirements

Fire hydrants shall be shown on the plans with respect to the property line or easements, if provided.

500.13 SERVICE MATERIALS AND MINIMUM SERVICE SIZE

500.13.1 General

Approved materials and manufacturers for various service material tubing and connections are as listed in the District's Approved Materials List, latest edition.

500.13.2 Minimum Domestic Service Size

Minimum domestic service line size shall be 1-inch with a 3/4-inch meter. The sizing of the service shall be specified on the plans designated by lot numbers. Services and sizes for commercial or industrial developments are to be as shown on plans or as directed by the District.

For industrial, commercial, private-street residential, and other nonresidential development, the District may require a detail on the plans depicting the location of the proposed service.

500.13.3 Type of Service Line

Acceptable service line material is as described below:

1. 1-inch and 2-inch service line shall be copper tubing.

2. 4-inch and larger service lines, use DIP per Section 15056, or PVC per Section 15064, as determined by the District Engineer. (3-inch size is not a District Standard - use 4-inch piping to meter).

3. 2-inch service line minimum required for all commercial services.

500.13.4 Meters

All meters shall be supplied and installed by the applicant and dedicated to the District subsequent to payment of applicable fees and charges, per District rules and regulations.

500.13.4.1 Pressure Regulators for Meters in High Pressure Areas

In areas of the District where pressures exceed 175 psi, a pressure regulator is required to protect the District meter. It is the responsibility of the property owner to install appropriate piping, fittings and appurtenances on the customer side of the meter for potential high-pressure protection.

500.14 STANDARD WATER NOTES

The District's current General Notes for Improvement Plans and General Notes Grading Plans may be obtained from the Engineering Department or the District website, www.vwd.org.

****END OF SECTION****