

Subdivision Water System Design Requirements and Plan Review Checklist

Design Engineer Responsibilities for Coordination with Other Entities

- Coordinate with joint trench designer.
 - Provide joint trench plans for review along with water system improvements to ensure that there are no conflicts between trees and water facilities.
 - Provide landscaping plans along with water system improvements.
- Coordinate with other utilities regarding water improvements, including but not limited to (as applicable):
 - Contra Costa County Public Works
 - City of Oakley
 - Contra Costa County Fire Protection District
 - East Contra Costa Irrigation District
 - Ironhouse Sanitary District
 - PG & E
 - Reclamation District 799
 - Bethel Island Municipal Improvement District
 - Others as applicable
- Verify consistency of water system information on plans with adjacent subdivisions' plans.
- Provide soils report for review along with improvement plans, if requested.
- Pothole or use GPR to verify existing utilities.
- For developments with more than 50 lots, install ground water monitoring wells in accordance with District Regulation No. 10.

Water Mains – Sizing and Plan

- Minimum pipe size: 6-inch without fire hydrants and 8-inch with fire hydrants.
- Size water mains to provide adequate fire flows for planned development. Sizes of mains larger than 12-inches must conform to the DWD Facilities Plan.
- Avoid dead end mains if possible.
- Locate water lines so that they are 6-feet North or West of road centerline.
- When a center median exists in roadway, water main shall be centered 6-feet from face of curb.
- Label water line, including size, in a box on the water line.
- Confirm that polyvinyl chloride (PVC) pipe or ductile iron pipe (DIP) will accommodate the bending radius shown on drawings.
- Pipe material for sizes over 12-inches shall be DIP unless otherwise noted.
- New or existing developments with 6-inch water mains shall be replaced with 8-inch water mains to meet the current fire flow standards.
- Design connections to existing water lines to reflect planned future conditions (or as-built conditions, if known).
- Location of stubs to future subdivisions and adjoining properties must be based on approved tentative map (or map under review by City).

Water Mains – Profile

- Provide required pipe cover:
 - Minimum of 3-feet of cover for all mains and water services; 4-foot minimum cover for major roadways
 - Maximum of 6-feet of pipe cover
 - Provide adequate cover beneath curbs, where water line crosses over storm drain, and other crossing locations. If cover is not adequate at crossing, pipe encasement is required
- Design pipe slopes as follows:
 - Design pipe slopes at minimum of 0.1% (in non-residential areas), and maximum of 10%
 - Avoid flat pipe slopes
 - Use consistent (smooth) pipe slopes (avoid frequent or abrupt changes in slope)

- Use pipe elbows or offsets as a last resort, if the bending radius is too tight or if the pipe is too deep (deeper than 6 feet).
- Confirm that PVC or DIP pipes accommodate the bending radius shown on drawings.
- Label pipes with material, size and slope.
- Locate callouts for water line features below the water line (include leader lines, stationing and invert elevation).
- Show size of crossing pipes in correct proportion (for example, an 8-inch pipe should appear smaller than a 24-inch pipe).
- Label elevation grids on both sides of profiles.

Existing Utilities

- Show existing utilities in plan view.
- Show crossings of existing utilities by waterline in profile.
- Show both existing and new utilities in cross sections.
- Label existing utilities with the type and size.

Separation of Water, Sewer, and Storm Drain

- Provide minimum horizontal clearance of 10 feet between the outside to outside of pipes for water and sewer.
- Provide minimum 12-inch vertical separation between the outside to outside of pipes for water and sewer at crossings, and in locations where less than 12-foot center to center horizontal separation exists between water and sewer.
- Provide minimum 12-inch vertical separation between water and storm drain if possible. Where unavoidable a minimum of 6-inch vertical separation is required.
- Provide minimum 4-foot horizontal separation clearance from outside to outside of pipes between water and storm drain.
- Cross water and sewer pipes at right angles whenever possible and no less than 45-degrees to and at least 1 foot above the fluid pipeline.
- Comply with California Department of Drinking Water (DDW) Guidance Criteria for the Separation of Water Mains and Non-Potable Pipelines (Revised October 2018 or most recent version). For special cases, the District may approve exceptions as allowed by the DDW criteria.
- Fulfill DDW requirements for pipe materials if separation is not met. Use DIP or Class 200 PVC when minimum separations cannot be maintained.

Fire Hydrants

- Locate fire hydrants every 500-feet for residential areas, and every 300-feet for commercial areas, or as directed by the local fire protection district.
- Locate a fire hydrant at the end of cul-de-sacs and no more than 250-feet from the end of each cul-de-sac.
- Include a tee, 6-inch valve, and 6-inch lateral for each fire hydrant.
- Do not use reducing elbows.
- Locate fire hydrants so that they are 2-feet clear of the sidewalk.
- Locate fire hydrants so that they are 5-feet clear of the back of curb if there is no sidewalk.
- Provide adequate clearance at fire hydrant laterals that cross other utilities.

Valves

- Position valves approximately every 500 feet for residential streets.
- Position valves approximately every 700 to 1000-feet for non-residential streets.
- Provide each court with at least one valve located at the tee in the cross street.
- Locate valves so that a pipe break will not affect more than 20 residences (services).
- Use gate valves for pipe sizes up to and including 12-inches, and butterfly valves for pipes larger than 12-inches.
- Where gate valves (GVs) are installed on tees (or crosses) connecting water lines of differing sizes, locate reducers such that the reducer lies between the tee (or cross) and the GV, and the size of the GV matches the adjacent nominal pipe size.

- Butterfly valves shall be Mueller Lineseal III 150B, with EPDM seat, provided with holiday-free certification.

Air-Release Valves

- Design pipes to minimize the need for air release valves, i.e., minimize high points. Use air release valves only when necessary.
- Locate air release valves at high points.
- Locate air release valves anywhere off the street and behind the sidewalk, as long as piping is sloped consistently upward.

Blowoffs

- In cul-de-sacs and stubs to future development areas, use fire hydrants as an alternative to blowoffs wherever possible.
- If blowoffs are used:
 - Use 2-inch blowoffs for pipe sizes up to an including 12-inches
 - Use 4-inch blowoffs for pipe sizes larger than 12-inches
- Locate blowoffs within the subdivision, otherwise an easement is required.
- If applicable, a blind flange may be used at a tee or cross with a valve that will provide a future connection point. Locate the blind flange immediately adjacent to the valve.

Services

- Do not directly connect services to mains larger than 12-inches.
- Separate water and sanitary sewer laterals by 5-feet for their entire lengths.
- Stagger multiple taps at least 18 inches apart lengthwise and a minimum of 36 inches along the same line/side of the pipe.
- Use 1-inch service piping.
- Call out stationing for each service.
- Do not locate meter box in sidewalk or driveway.
- Show meter box on typical cross sections.
- Locate double check valves behind water main (if required).
- If a fire hydrant is located at the end of a main, locate all services prior to reducers.

Note: Services to future lots and adjoining properties will require payment of connection fees.

Cathodic Protection

- Include Cathodic Protection plans at the end of the plan set.
- List Cathodic Protection sheets in the sheet index.

Details/Cross Sections

- Include a note that thrust blocks shall be installed per DWD Standard Drawings 2 and 3, and provide the specific soil bearing pressure for the subdivision.
- Provide soils report, when available, and/or when requested by the District.
- If pipe encasement is required, include a note referring to DWD Standard Drawing 4 for reinforced pipeline cover section.
- Locate the joint trench underneath the sidewalk, and in front of fire hydrants.
- Position joint trench beneath all water lines.
- For cross sections with a joint trench, include a note stating that the joint trench shall be located under all water lines.

Right-of-Way and Easements

- Locate water mains, services and meters in the public right-of-way or public utility easement.
- Locate fire hydrants within the right-of-way.
- Locate off-site facilities within the right-of-way.
- In special cases subject to approval of DWD, locate water mains in a minimum 20-foot wide utility easement dedicated to DWD. Locate water mains 5-feet from either edge of an easement.
- Provide additional easements for water meters and other water facilities, if necessary.

General Requirements for Drawings

- Drawing size shall be minimum of 22x34 inches and maximum of 24x36 inches.
- Include sign-off block for Diablo Water District on title sheet.
- Include sign-off block for developer's Geotechnical Engineer and statement of site conditions if subdivision is geotechnically sensitive (as designated by the District).
- List DWD General Water Notes as contained in these "Design Requirements".
- Use a unique symbol for each water system item.
- Show symbols in legend.
- List all abbreviations used for water facilities. Use the standard abbreviations below:
 - ARV Air release valve
 - BF Blind flange
 - BFV Butterfly valve
 - BO Blowoff
 - DIP Ductile iron pipe
 - FH Fire hydrant
 - GV Gate valve
 - PVC Polyvinyl chloride pipe
 - TBO Temporary blowoff
 - W Water main
 - WS Water service
- Label street names consistently.
- Show North arrows consistently in plan and index map.
- Indicate location of fire hydrants, air release valves, blowoffs, and valves on the index map.
- Show lot numbers on index map.
- Show lot numbers on key map.
- Show key map on each plan and profile sheet (for subdivisions with more than three plan & profile sheets). Highlight the street that is the subject of the sheet.
- Quantities Table:
 - Show at a minimum in table format: pipe, valve, fire hydrant, service, and blowoff quantities
 - For re-submittals, update water system quantities