

Sacramento Suburban Water District

Improvement Standards

Section A. Purpose and Definitions

A- 1 Purpose

It is the purpose of these Improvement Standards to provide standards to be adhered to in the design and construction of water system improvements, which are to be conveyed to and accepted by the District for operation and maintenance.

All improvements, modifications, and repairs to the District's water system will be planned, designed, and constructed in conformance with these Improvement Standards, the Standard Technical Specifications, Standard Detail, District Regulations, plus any applicable Special Conditions that have been approved by the District.

A- 2 Definitions

Whenever the following terms or titles are used in these standards, the intent and meaning will be as herein defined:

- (a) **District** – Will mean Sacramento Suburban Water District.
- (b) **General Manager/Engineer/Inspector** – Will mean the General Manager of the District or his duly appointed representative.
- (c) **Consulting Engineer** – Will mean any person or persons, firm, partnerships, or corporation duly licensed to practice engineering in the State of California who prepares or submits improvement plans and specifications to the District for approval.
- (d) **Applicant** – Will mean any person or persons, firm, partnership, corporation, or combination thereof financially responsible for the water system improvements.
- (e) **Development** – Will mean the act or process of any construction on properties as well as subdivision improvement.
- (f) **Contractor** – Will mean the person or persons, firm, partnership, corporation, or any combination thereof who has entered into a contract with the District or the Applicant, and who is duly licensed under the laws of the State of California to do or perform such tasks as the said contract may define.

- (g) **Standard Technical Specifications** – Will mean the latest Standard Technical Specifications adopted by the District governing the construction of Water System Improvements.
- (h) **Standard Details** – Will mean those drawings included herein, adopted by the District and as may be subsequently modified, revised, or added, illustrating and governing the design and construction of Water System Improvements.

Section B. General Requirements

B- 1 Approved Plans Required

No work will commence on any water system, which is intended to become attached to the District's system unless complete plans and specifications covering all phases of the proposed construction have been submitted to, and approved by, the District in accordance with the provisions of Section B-7 hereof. Furthermore, no work will commence after the date said approval expires, as specified in the approval block contained on the said plans.

An exception to this requirement would be the installation or upgrade of a single item such as a water service, fire hydrant or fire service.

B- 2 Plans by an Appropriate Engineer

All plans and specifications for improvements to the District's water system will be prepared by a duly licensed Consulting Engineer of the appropriate branch of engineering covering the work.

B- 3 Existing Utilities

All existing utilities shall be shown on the plans. In addition, the Consulting Engineer will submit prints of the preliminary and approved plans to the utility companies involved. Copies of the transmittal letters to the utility companies will be provided to the District with the initial plan submittal.

B- 4 Partial Plans

Where the improvement plans submitted cover only a portion of ultimate development, the plans submitted will be accompanied by an overall plan of the entire project showing proposed streets, lots, water, sewer, and drain systems, plus topographic features of the ultimate development at an adequate scale to clearly show the proposed improvements.

B- 5 Improvement Plan Submittal

Consulting Engineers contemplating the preparation of improvement plans for a project are encouraged to discuss the design and details with the District's staff prior to final design and drafting.

The initial submittal of improvement plans to the District will consist of the following:

- (a) Two sets of plans complete and in accordance with these Improvement Standards and the Standard Technical Specifications, along with any required specifications, computations, or other material requested by the General Manager or his authorized representative. Plans will be clearly marked or stamped to indicate that they are Preliminary—Not for Construction.
- (b) Two copies of the proposed Draft Final Map if applicable.
- (c) The name, address, and telephone number of the Applicant.
- (d) Payment of the District's current Plan Review Charge.
- (e) Copies of utility transmittal letters.

Should there be required alterations or revisions to the plans submitted the District will return one copy with the corrections marked or indicated thereon and stamped and dated "NOT APPROVED FOR CONSTRUCTION SACRAMENTO SUBURBAN WATER DISTRICT". If the plans submitted are not prepared in accordance with these Improvement Standards and the Standard Technical Specifications, or do not meet minimum accepted engineering standards, the plans may be returned unmarked and unacceptable.

B- 6 Improvement Plan Resubmittal

Plans being resubmitted will consist of two complete sets of plans and Final Map, if applicable. The District may require additional sets. Resubmitted plans may be sent via email in PDF format; however the plan must be to scale.

Plans being resubmitted that contain revisions or alterations other than those required by the District on previously corrected plans will require the Consulting Engineer to bring those revisions and alterations to the attention of the District by use of words or colors placed on the plan which clearly describe such revisions and/or alterations.

B- 7 Plan Approval

The approval of plans will be signified by the signature thereon of the General Manager, or his authorized representative, in the District's signature block on the plans. The plans will be signed when:

- (a) All such changes, corrections, or additions as previously described by the District have been made to the original plans.
- (b) All applicable charges and fees have been paid to the District.

- (c) All applications, agreements, annexation forms and required easement documents have been prepared, signed, and presented to the District for acceptance.

B- 8 Submittal of Plans for Approval

For plan approval the Applicant/Engineer will provide the following items:

- (a) Original Mylar plans for signatures. Plans must be signed by the fire department prior to water district signatures.
- (b) A check for the calculated fees for water service.
- (c) Completed application for water main extension and/or water service application.
- (d) Signed and notarized grant of easement and right of way forms with legal description and plat map.
- (e) Signed annexation forms including legal description, maps and fees as necessary.
- (f) Electronic version of plans on CD in Auto Cad (Latest Version). Digital data shall be in NAD83, California State Plane, Zone II Coordinate System.

B- 9 Re-approval of Plans after Expiration

Re-approval of plans after expiration will require the Consulting Engineer to resubmit plans for review and possible revisions and/or alterations. New fees and/or additional fees will be assessed and paid, along with all applicable required documents as stated in B-7, prior to re-approval. Previous paid fees will be credited to the new assessed fees. **NO WORK SHALL BE STARTED UNTIL EXPIRED PLANS ARE REAPPROVED.**

B- 10 Final Plans Required

Following approval, one set of prints of approved drawings with County approval will be furnished to the District; one copy of the water plan only will be a reproducible Mylar transparency or vellum and one copy of final complete plans on CD-Rom in the latest Auto Cad software. **NO CONSTRUCTION WILL BEGIN UNTIL THE DISTRICT RECEIVES THE ABOVE APPROVED PLANS AND SUBMITTALS.**

B- 11 Other Agency Notifications

The Applicant is responsible for obtaining the approval and necessary permits of all other governmental or municipal agencies when their facilities and/or regulatory authority are involved.

B- 12 Improvement Plan Revisions During Construction

Should changes become necessary during construction, the Consulting Engineer will first obtain the consent of the General Manager, or his authorized representative, and will then resubmit the title sheet and the plan sheets affected for approval. The changes on the plans will be made in the following manner:

- (a) The original proposal will not be eradicated from the plans but will be lined out.
- (b) In the event that eradicating the original design is necessary to maintain clarity of the plans, approval must first be obtained from the District.
- (c) The changes will be clearly shown on the plans with the changes and approval noted in the revision block.
- (d) The revision number in a triangle delineated on the plans adjacent to the change and in the revision block will identify the changes.

Minor changes which do not affect the basic design or contract may be made upon the authorization of the District, but said changes must be shown on "As Built" plans when the contract is completed.

The District may order changes in the plans in order to complete the necessary facilities. Changes in the plans ordered by the District will conform to all of the above.

In all cases where changes are made to the plans during construction, prints of the revised drawings will be furnished to the District in accordance with B-9.

B- 13 As-Built Plans

The Contractor will keep an accurate record of all approved deviations from the plans and will provide a copy of these records to the Consulting Engineer upon completion of the work. These are to be utilized by the Consulting Engineer along with the Inspector's accurate records for preparing a complete and accurate set of "As Built" plans for the permanent records of the District. One set of completed "As Built" plans will be promptly submitted to the District, one copy of the water plan only will be a reproducible vellum and/or one copy on CD-Rom in the latest Auto Cad software.

B- 14 Conflicts, Errors, and Omissions

Excepted from approval are any features of the plans that are contrary to, in conflict with, or do not conform to any State law or regulation, Sacramento County Code, or District ordinance, resolution, regulation, or generally accepted good engineering practice in keeping with the standards of the profession, even though such errors, omissions, or conflicts may have been overlooked in the District's review of the plans. The District will have no liability for errors of either commission or omission.

B- 15 Change in Consulting Engineer

If the Applicant elects to have a registered civil engineer or licensed land surveyor other than the engineer who prepared the plans provides construction staking, the Applicant will provide the District in writing the name of the individual or firm one week prior to the staking of the project. The Applicant continues to be responsible for providing all professional engineering services which may be required during construction, the preparation of revised plans for construction changes, and the preparation of "As Built" plans upon completion of the construction.

B- 16 Work in Sacramento County Rights-of-Way, Easements, and Waterways

Any Contractor performing construction within Sacramento County rights-of-way, easements, and waterways will be in possession of County-approved plans or a County Encroachment Permit, and will comply with all conditions imposed therein, all at no expense to the District.

B- 17 Compliance with Statutes

The Contractor will conduct the work in compliance with all existing State and federal safety code laws and County and Municipal ordinances and regulations limiting or controlling the work in any manner.

B- 18 Construction Safety

All construction of water systems intended to be connected with the District's system must be constructed in strict compliance with the statutory safety requirements of the State of California as set forth in the California Administrative Code, Title 8, and all amendments thereto.

B- 19 Boring/Jacking Requirements

Any boring or jacking operation of 100 feet or greater length and involving an opening greater than 30 inches in diameter is subject to the State of California Division of Industrial Safety's tunnel safety requirements. The Consulting Engineer will submit to the Division of Industrial Safety plans and specifications applicable to the tunnel operation with a letter requesting tunnel classification. This procedure also is recommended to avoid project delay if there is the possibility of any personnel entering the tunnel, regardless of diameter and length. The letter should identify the District as the agency responsible for the project and the District's mailing address. The plans will identify underground utilities and tanks or areas for storing fuel and toxic gasses in the vicinity of the tunnel site. The request for classification should be submitted allowing ample time for the Division of Industrial Safety to review in order that any special requirements can be included in the project plans and specifications. The Consulting Engineer will also attend the required pre-job safety conference.

B- 20 Pre-Construction Meeting

An on-site meeting with the District Inspector, Consulting Engineer, County Inspector, and Contractor must be held at least two days in advance of beginning construction of the approved

project to inspect materials, schedule inspections, and review the approved water system construction plans. Pre-construction meetings will not be scheduled until all District costs and fees have been paid in full and the material list, guarantee letter, and guarantee/maintenance bond submitted. In addition all items in B-10 above must be received prior to scheduling a pre-construction meeting.

B- 21 Construction Requirements

Any improvement constructed in accordance with the approved plans, the Special Conditions, and the General and Standard Technical Specifications, for which it is intended that the District will assume maintenance responsibility, will be inspected during construction by an authorized representative of the District. Any improvements constructed without inspection as provided above or constructed different from the contrary of the order or instructions of the District will not be accepted by the District for maintenance purposes and permission to connect with the existing system will be denied until corrected to the satisfaction of the District.

Within ten days after receiving the request for final inspection, the District will inspect the work. The Contractor, Consulting Engineer, and Applicant will be notified in writing as to any particular defects or deficiencies to be remedied. The Contractor will proceed to correct any such defects or deficiencies at the earliest possible date. At such time as the work has been completed, the District will make a second inspection to determine if previously mentioned defects have been repaired, altered, and completed in accordance with the plans.

On assessment districts and projects where the District participates in the costs thereof, quantities will be measured in the presence of the District, Consulting Engineer, and Contractor, and witnessed accordingly.

B- 22 Statement of Final Costs

A statement of final costs of the water system, on a unit cost basis or lump sum, will be stated in the guarantee letter in its appropriate space.

No work shall begin if the final cost is not stated on the guarantee letter.

B- 23 Construction Approval – Temporary and Final System Acceptance

Approval of a constructed water system will be as follows:

- (a) Temporary Approval: When a water system, the plans and specifications concerning which have been theretofore approved in accordance with the provisions of paragraph B-7 above, are in place and have received inspection approval as required in accordance with the provisions in paragraph B-20 above, the General Manager may grant temporary approval with interim hook-up to the District's system. This temporary approval does not mean acceptance by the District of the in-place system and is intended only as a means of permitting completion of construction of Applicant's improvements.

- (b) Final Approval: When the Applicant produces proof to the General Manager's, or his authorized representative's, satisfaction that all utilities required for the subject property have been approved and accepted by the County of Sacramento, and provided the in-place system has been constructed in strict compliance with the approved plans and specifications, the District will issue a written Final Approval.

B- 24 Guarantee and Maintenance Bond

Prior to commencement of the work accomplished under District-approved plans, and as a condition of final acceptance herein, the Contractor will execute and deliver to the District a guarantee of the materials, workmanship, and/or equipment that he or she will have constructed or installed in the course of said work. This guarantee will be in the form attached hereto and will remain in full force and effect for a period of one year from the date upon which the District accepts the work. Should any failure of the work occur within the guarantee period, which can be attributed to faulty materials, poor workmanship, or defective equipment, the Contractor will promptly make the needed repairs at his expense. A completed guarantee form will be required before each job performed by a Contractor in the Sacramento Suburban Water District. **THE DISTRICT WILL NOT ACCEPT THE GUARANTEE LETTER AND NO WORK SHALL BEGIN UNLESS THE LETTER IS PLACED ON THE CONTRACTOR'S LETTERHEAD, SIGNED BY THE CONTRACTOR, FILLED OUT COMPLETELY AND INCLUDES THE STATEMENT OF FINAL COST OF THE WATER SYSTEM.**

Prior to commencement of any work performed in Sacramento Suburban Water District, each Contractor will be required to furnish an overall maintenance bond or corporate surety bond, payable to the District, issued by an acceptable surety company authorized to do business in the State of California, to protect the District against the results of faulty materials, poor workmanship, or defective equipment, and to guarantee the Contractor's responsibility for each completed work or project, as outlined above, for a period of one year from the date the District accepts the work or project. The bond also will cover all subsequent jobs performed by the Contractor in the Sacramento Suburban Water District, if such works or projects are being constructed simultaneously or serially. The time limit of such bond will begin from the date the District first accepts the bond and will end on the anniversary date of the acceptance letter. The Contractor will obtain the bond on forms furnished by the District in the sum of not less than \$7,000.00. It will be the Contractor's responsibility to renew the bond on the anniversary date so as to cover all jobs that are started after initial bond submittal and so that it remains in effect for at least one year after the District accepts the last work on the project and issues an acceptance letter. Should the Contractor be unable to obtain a bond for the project, and then the Developer will furnish a bond. Said bond will only cover the project and will be no less than 50% of the contract amount for water facilities and be in effect for a period of one year from the date of the District's acceptance of the work or project.

GUARANTEE

(To be submitted on Contractor's letterhead)

Sacramento Suburban Water District ("District")
3701 Marconi Avenue, Suite 100
Sacramento, CA 95821

Dear Sir or Madam:

We hereby unconditionally guarantee that the construction performed under approved plans and/or contract dated _____, 20__, for the project entitled _____ will be done in accordance with the approved drawings and specifications and that work as installed will fulfill requirements of the guarantee included in the specifications. We agree to repair and/or replace at our sole cost and expense, and to the satisfaction of the District and its engineers, any or all of our work, together with any other adjacent work which may be displaced by doing so, that may prove to be defective in workmanship or materials within a period of one year from date of acceptance of above-named project by District, without any expense to said District, ordinary wear and tear excepted. We further guarantee that we will leave the site of any repair or replacement work in satisfactory working order and condition.

In the event of our failure to comply with the above-mentioned conditions, within ten days after being notified in writing by the District, we, collectively or separately, do hereby authorize the District to have said defects repaired and made good at our expense, and we will honor and pay the costs and charges therefore upon demand. In the event of such failure on our part, we further promise to pay such reasonable litigation costs, including attorney's fees and expert witness fees and costs, as a court with jurisdiction in the matter shall decide, should the enforcement or interpretation of this guarantee or any part thereof require legal action.

Company Name (Print)

Address

Phone Number

Contractor's License Number

Contractor's Signature

Print Name

The contract amount for water construction only: _____

Section C. Plan Sheet Requirements

C- 1 Paper Details

All improvement plans will be prepared on sheets 24" x 36" in size. Scales: horizontal 1" = 20', 40', or 50', vertical 1" = 2', 4', or 5', but only the scale, horizontal and vertical, for which the sheet was intended will be used.

C- 2 Drafting Standards

All plans approved by the District may be microfilmed. Therefore, certain drafting standards are necessary to produce legible film and subsequent prints. All line work must be clear, sharp, and heavy. Letters and numerals must be 1/8-inch minimum height, well formed, and sharp. Station grid lines will not bisect numerals showing profile elevations. Sharp solid arrowheads will terminate dimension lines.

C- 3 Title Block

Each sheet within the set of drawings will have an approved title block showing the sheet title, number, date, scale, the Consulting Engineer's name, signature, and license number; the street address or Assessor's Parcel number, and the name of the subdivision project or assessment district.

C- 4 General Information Requirements

- (a) The following information will be shown on the cover or title sheet of plans, or on the first sheet if there is no title sheet:
 - (1) Location map
 - (2) Index of sheets
 - (3) Legend of symbols

- (b) In addition, the following information will be shown on the water plan and/or the title sheet:
 - (1) The entire subdivision or parcel and project
 - (2) District boundary
 - (3) Assessment District limits
 - (4) Street names and widths
 - (5) Adjacent subdivisions, including lot lines and lot numbers
 - (6) Signature blocks in the lower right hand corner of the sheet for approval by the District and the responsible fire district.

C- 5 Required Notes

District “WATER SYSTEM CONSTRUCTION NOTES” (Standard Detail A) will be required and placed on a sheet in the plans.

C- 6 Plan Details

In addition to the other requirements of these Improvement Standards, the following details will be shown on water plans submitted for approval. This does not in anyway exempt the Consulting Engineer from the responsibility of preparing neat, accurate, and comprehensive plans in keeping with the standards of the profession.

- (a) **Right-of-Way** – Right-of-way lines, the boundaries of lots, easements, section lines and corners, land grant lines and temporary construction easements, both existing and proposed, will be shown on the plans. All right-of-way and easement lines will be properly dimensioned.
- (b) **Topography** – All pertinent topographic features will be shown, such as street lines, medians, driveways, curbs, sidewalks, high water and frequent inundation levels, water lines, gas lines, telephone conduits, other underground utilities, existing structures, houses, trees (6” and larger) and other foliage, traffic signals, street lights and pull boxes, underground electrical conduits, drainage ditches, utility poles, fire hydrants, retaining walls, masonry structures, and all other features of the area which may affect the design requirements. When a potential utility conflict exists, “As Built” elevations of the utilities will be verified by the Consulting Engineer.
- (c) **Profiles** – Plans will include profiles of proposed water mains whenever the pipeline diameter will be 16 inches or greater, or whenever the cover over the pipeline will be less than 30 inches or more than 6 feet. The District may also require profiles if it determines that conditions require them or as required by the County.

When profiles are required, the proposed pipeline will be shown, together with all crossing and closely paralleling sewers, drains, and utilities. The ground line over the pipeline will be shown, except where pipeline is to be located within an improved street, in which case either the street centerline or the gutter flow line may be shown.

- (d) **Stationing and Orientation** – The stationing on plan and profile will read from left to right. Sacramento County stationing will be used whenever possible. Stationing will increase from south to north or from west to east. Plans will be so arranged that North arrow points toward the top or upper 180 degrees, insofar as practical.
- (e) **Bench Marks** – The benchmarks and datum will be clearly delineated on the plans both as to location, description, and elevation. The data will be 1929 North American datum (U.S.G.S. or U.S.C. & G.S.). Consulting Engineers will contact Sacramento County for location and elevation of the nearest official bench mark.

- (f) **Special Notes and Details** – Will be employed wherever necessary in order to clearly convey the design intent. The District’s standard details may be reproduced and included, but are not required, within the plans.

Section D. Design Standards

D- 1 Design Criteria

The wells, pumps, and distribution system will be designed to supply and maintain an adequate positive pressure in all parts of the system at all times with an economical loss of head, keeping in mind that the systems must be designed to provide emergency as well as normal flow.

- (a) Water Quality

- (1) California Health and Safety Code, Division 5, Part 1; Chapter 7
- (2) California Administrative Code, Title 17, Chapter 5, Subchapter 1, Group 4
- (3) California Administrative Code, Title 22, Chapters 15 and 16
- (4) Standards of Minimum Requirements for Safe Practice in the Production and Delivery of Water for Domestic Use (California Section of the AWWA).
- (5) Sacramento County Ordinance No. 508.

- (b) Water Quality and Supply

The system or facilities will be designed to deliver water at a rate adequate to supply the total requirements of all consumers served by the system or facilities under the more extreme of the following two conditions:

- (1) Peak Hour Demand; or
- (2) Maximum Day Demand plus Fire Flow

Care must be used in estimating fire flows, which are discussed in (c) below.

Special consideration will be given to the design of systems to supply multiple family dwelling projects, commercial, and/or industrial developments. Computations for the design of such systems will be submitted with the plans and specifications. Each system, subdivision, or development will have a sufficient number of independent well systems or production facilities to maintain maximum consumption and fire flow at the required pressures with one well out of service. The District will prepare detailed plans and specifications of wells and pumping plants. Sites for wells or production facilities will be located and sized by the District, and conveyed to the District by the Applicant at no cost to the District.

(c) Required Fire Flows

The design of the system will provide for the delivery of fire flows in accordance with the following:

- (1) Single Family Detached Residential: Required fire flows – to be determined by the responsible Fire District.
- (2) Multiple Family Residential, Commercial, and Industrial: Required fire flows to be determined by the responsible Fire District.

(d) Pressure Requirements

Under max day plus applicable fire flow requirements, the static pressure will not be less than 35 P.S.I in water mains and not be less than 30 P.S.I at service connections. Service connection will be the outlet side of meter setter, curb stop, or meter. Static pressure will not exceed a maximum of 75 P.S.I.

(e) Velocity Requirements

The velocity of flows in transmission and distribution pipelines will not exceed 5 feet per second under any design condition.

D- 2 Minimum Water Main Size

The minimum size for water distribution mains necessary to adequately deliver domestic water and public fire protection to all new developments and construction of whatever kind or size will be determined with reference to the Real Property Use Zones established by the County of Sacramento, including any variance granted thereto, and specifically in compliance with the following provisions:

Sacramento County Zoning	Minimum Water Pipeline Size
Commercial (BP, SC, LC, GC, AC, TC)	12-Inch
Mobile Home Park (RM-1)	12-Inch
High Density Residential (RD-20, RD-30, RD-40, and greater)	12-Inch
Public (Schools, Parks, etc.)	12-Inch
Quasi-Public (Hospitals, Churches, Meeting Halls, etc.)	12-Inch
All Other Zoning*	8-Inch

Industrial (All types) MP, M-1, M-2	16-Inch
*Exception: Cul-de-sacs – Single Family (Non Fire-Hydrant Req. or as determined by District)	6-Inch

Larger sized mains may be required to adequately handle design flows.

D- 3 Location of Water Mains

All water mains and pipelines will be constructed and installed within improved streets, between curbs. Alternate locations will be permitted only with specific approval of the General Manager or his duly authorized representative.

All runs of non-metallic and metallic pipes will have a No. 10 gauge solid, blue insulated, Copperhead Reinforced Tracer Wire affixed along the top of the pipe taped with 20 mil black tape. Bare wire connections are to be made with DryConn Direct Bury Lug connectors. Blue caution tape shall be laid along the top of the initial backfill to facilitate notification of facilities. See Standard Detail No. 4.

D- 4 Separation of Water and Sewer Lines/Storm Drains

- (a) Separation between water and sewer (sanitary and storm) facilities will comply with the requirements of the State Department of Public Health Services.
- (b) Water lines will be laid in separate trenches with a minimum horizontal separation of ten (10) feet from nearby sanitary sewers.
- (c) Water lines will be installed at a higher elevation than nearby sanitary sewers. Stepping of facilities will not be allowed.
- (d) When pipelines cross, the bottom of the water line will be at least twelve (12) inches clear above the top of the sewer pipe and eighteen (18) inches clear above or below the storm pipe. No joints will be over a sewer pipe. A full length of water pipeline shall be centered over the crossed pipe.
- (e) When the sewer crosses over the top of the water main, the sewer will be replaced with a full length of C900 PVC or DIP Class 350 pipeline centered over the crossed pipe with 12-inch clearance or as per County Improvement Standards.

D- 5 Distribution System

- (a) Layout of Mains

The distribution system will be in a grid or looped form so that pressures throughout the system tend to equalize under varying rates and locations of fire flow drafts. The

distribution system will be gridded with 12-inch or larger cross-connecting mains at intervals of approximately 1,300 feet, with an intermediate 8-inch or larger main as required.

Dual Mains (one pipeline on each side of the street) will be installed in streets for which the right-of-way width is 80 feet or greater. The minimum size of pipelines will be as required in Section D-2 herein. Larger sized mains may be required to serve multiple-family residential, commercial, or industrial projects or areas, as determined by an analytical evaluation of the anticipated requirements.

Dual Mains will be interconnected (“cross-tied”) with pipe of the same diameter at intervals of not more than 800 feet and at each cross street.

Dead-end water mains will be avoided whenever possible. When unavoidable, dead-end mains will be provided with a standard blow-off connection or other means of flushing acceptable to the District. See Standard Detail Nos. 8 and 9.

(b) Valves

The distribution system will be designed with a sufficient number of valves so located that no single shutdown will result in shutting down a transmission main or necessitate the shutdown of a distribution main for a distance of more than 500 feet. No more than 20 customers will be without service from any single shutdown. In no case will more than two fire hydrants be out of service from any single shutdown.

The valves will be so located that any section of main can be shut down without going to more than three locations to close valves.

Valves will be installed in conformance with Standard Detail No. 5.

Valves at junction will be flange-connected to tees or crosses, or as specified on plans.

(c) Fire Hydrants

Fire hydrants will be “WET BARREL” type, constructed in accordance with Standard Detail No. 6 and installed at locations specified by the responsible Fire Agency or as specified herein.

Fire hydrants will be located to minimize the hazard of damage by traffic. They will have a maximum normal spacing of 500 feet in residential areas and 300 feet in commercial or industrial areas, measured along the street frontage, or as determined by the Fire Agency. “Wet Barrel” hydrants will be set with the lowest outlet a minimum of 18 inches above ground level, with the Steamer Outlet facing the street or point of engine access, as determined by the responsible Fire Agency. Wet Barrel outlets will be within 10 feet of the engine access point.

Fire hydrants will be located and spaced to provide the required fire flows as set forth under Section D-1 (c) herein.

All fire hydrants will be staked for location and finished grade by a licensed surveyor or civil engineer.

Fire hydrants will be placed at 4 feet from property lines and/or back of sidewalk and/or curbs. Unobstructed access and ability to see the fire hydrants shall be maintained at all times.

Blue reflective markers shall be installed per local fire department standards.

(d) Service Lines

A separate water service connection must be installed for each lot, parcel, or premises and will be a minimum of one-inch diameter unless otherwise specified on the approved water plan. Each water service meter box will be staked for location and finished grade by a licensed surveyor or civil engineer or District representative.

Service lines from the water main to the property line will be installed at the time the main is constructed to avoid frequent cutting of the street. No service connection will be permitted within 20 feet of a blow-off assembly.

Service lines in sizes up to and including 2 inches in diameter will be polyethylene coated copper tubing, Type K soft tempered, meeting ASTM 688 and will be equipped with a service saddle and corporation stop at the main, and a meter setter, meter and meter box at the property line. At the District's direction, a water meter will be placed on all services, residential or commercial. Residential service lines will be installed in the middle one-third of the lot frontage, but not less than 10 horizontal feet from any sewer. Installation of service lines will conform to Standard Detail Nos. 12, 13, 14 and 15. Service lines larger than 2 inch shall be per Standard Detail 16 or as approved by the District Engineer.

No new connections to service lines will be permitted, and the water system cannot be approved or accepted until permanent property corner markers are in place and the location and installation of service connections in accordance with District Standard Specifications have been verified by the District, as well as the payment of all fees and the satisfaction of all requirements.

(e) Thrust Blocks

Thrust blocks of Class "B" concrete will be cast in place at all horizontal or vertical bends of four (4) degrees or more, behind each plug, tee, or cross which is valved or plugged in such a manner that it can act as a tee or elbow, and at the back of each fire hydrant. The thrust block will extend from the fitting to undisturbed soil, will be kept clear of the joints, and will be of such bearing area as to assure adequate resistance to the force to be encountered. All bolts, valves, and flanges will be covered with

plastic wrap, 4 mil thick minimum prior to pouring concrete thrust blocks. Size of blocking will be in accordance with Standard Detail No. 3.

(f) Meters

When required by the District, meters will be installed in conformance with Standard Detail Nos. 13, 14, 15, 16, 16A and 16B.

(g) Backflow Prevention Devices

A reduced pressure backflow prevention assembly will be required with each meter which services a non-residential parcel including irrigation services, except that a backflow prevention device may be required for residential parcels used for business purposes as determined by the District or served with an alternative source.

Backflow devices will comply with guidelines set forth in the State of California Health and Safety Code, Section 116875, subdivision (a) and AB1953, which prohibits the use of any pipe or plumbing fitting or fixture, solder or flux that is not "lead free", as define in the statute, in the installation or repair of any public water system or any plumbing in a facility providing water for human consumption. Backflow devices shall be Wilkins Model 975XL2, Wilkins Model 375XL or 975XL2, Febco Model LF825Y or Watts Model LF919 or approved equal.

Backflow prevention devices will be installed at the point of delivery within 5 feet downstream of the meter to the Applicant or customer. Backflow devices will be installed per Sacramento County Standard Drawings. The devices will be owned, maintained tested by the Customer. Due to potential theft and freezing during in-climate weather conditions, the District recommends the Customer place protective freeze bag (Polar Bags) and wire cages over the device.

Existing backflow devices shall be upgraded as required on all improvement projects. Upgrade may include replacement per current State Department of Public Health standards.

Final acceptance and permanent water service will be granted after the Applicant or Contractor has delivered to the District a certified test report stating the satisfactory operation of the device after installation.

(h) Private Fire Service

Double detector check valve assembly will be required with each private fire service. No single check assemblies will be allowed. All devices will be installed above ground per Sacramento County or Fire Department Standard Drawings.

D- 6 Final Acceptance Criteria

Prior to final acceptance, the Applicant or Contractor will show to satisfaction of District the following:

- (a) Water facilities have been installed completely as per approved improvement plans and District's latest set of improvement standards and details.
- (b) All outstanding fees or costs have been satisfactorily paid to the District and other responsible agencies.
- (c) The Applicant has remedied any deficiencies on the water facilities to the satisfaction of the District and other responsible agencies.
- (d) A passing hydro-test has been completed on the main.
- (e) A satisfactory bacteriological test has been taken with results meeting State limits.
- (f) A certified backflow test report stating satisfactory operation of all devices after installation delivered to District.
- (g) As-built drawings have been submitted by the Consulting Engineer and approved by District.