

PICO WATER DISTRICT

STANDARDS & SPECIFICATIONS



PICO WATER DISTRICT

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SECTION 1

GENERAL INFORMATION

1.1 Purpose

The purpose of these Standards and Specifications is to provide Pico Water District (District) customers with a guide to the District's procedures for handling the multitude of service requests received. This Manual will also provide a listing of the general design criteria for each of the two types of systems the District operates and maintains; domestic water and recycled water*. These guidelines are also to be used in conjunction with the District's Rule 11.11 "COSTS AND CHARGES" (see Appendix "B") for any new development taking place in the District's service area.

1.2 Availability of Service

The Pico Water District currently provides domestic water service to all properties within its service area boundaries. For detailed maps and confirmation of service availability, the applicant shall either visit the District headquarters, located at 4843 S. Church Street, Pico Rivera, CA 90660, or call (562) 692-3756 with a location of the proposed project.

Large projects (such as major commercial or residential developments) may require the preparation of a service feasibility study or a Sub-Area Master Plan (SAMP). This SAMP will determine whether the existing District facilities are adequate to serve the needs of the proposed development at build out, or if new District facilities need to be constructed to handle the additional demands. In these cases the Developer will be required to deposit the projected cost of the study with the District in advance. The Developer will be responsible for the full cost of the study, if required by the District. The District reserves the right to perform the study.

1.3 Will Serve Letters

For all proposed developments within the District's boundaries, the Developer must request a "Will Serve" letter (see Appendix "D") or a "Statement of Certification" from the District. These documents may be required by the local jurisdictional agencies for processing tentative maps or development.

1.4 Verification of Service Availability

A request for a "Will Serve" letter, addressed to the General Manager of the Pico Water District, must be accompanied by an 8-1/2 x 11 vicinity map and two (2) copies of the tentative tract map (if one is available) or site plan showing the proposed services and their points of connection to the existing District facilities, otherwise a map of the

proposed development with all requested pertinent information must be submitted. Conceptual sizing of the water systems should be shown along with dwelling unit densities and demand quantities.

1.5 Service Application Processing

Any application for service by the District, as described in Section 1.2, must be in writing and must state the type of service requested. The request must be accompanied by three (3) sets of plans showing the location of the service requested. The specific information required for each of the submittals required during the process is included in Section 2.

1.5.1 Residential and/or Commercial Development Projects

For residential and/ or commercial development projects, the Developer will submit his plans and other required information to District for processing. District will attempt to complete the first plan check of the utility improvement plans within thirty (30) working days of the submittal date, this is providing that all of the required information is submitted at first plan check, and the plans are sufficiently complete to review. The second check should be completed within fifteen (15) working days, and any subsequent check should take no more than seven (7) working days. There may be variances in this schedule due to a number of factors, the District cannot guarantee these processing intervals, but they are general guidelines.

At the completion of the second plan check, the plans should be complete enough that the required bond estimates and agreements can be prepared and sent to the applicant for execution. The Developer shall be required to post a Payment Bond (Appendix “G”) for 100% of the Labor and Material costs for all work to be performed by the District. The District reserves the right to require the Developer to post a Faithful Performance Bond (Appendix “G”) for 100% of the project costs for any work to be done by the Developer which involves District facilities. The agreements, bonds, and required fees must all be executed and endorsed properly by the Developer and returned to the District before the final plans can be signed by the District. All corrections must be made on the final plans before approval. Should the required corrections after second plan check be extensive enough to affect total quantities of the facilities to be constructed, the District reserves the right to postpone the preparation of the agreements and bonds until such time as the quantity of work to be done is finalized.

After District approves the plans they will be returned to the Developer. The Developer or their engineer must provide District with three (3) sets of blueprints of the approved plans. After the three sets of blueprints are received by the District the project will be released for construction, and the inspection by the District can be coordinated by the District’s designated representative(s). When construction has been successfully completed and the final inspections have been performed, the District’s designated representative will notify the Developer, and General Manager. Following final inspection, the Developer will be required to prepare the bills of sale, and Statements of Construction Cost, to provide for the transferring of the facilities to the District.

The Developer is responsible for the installation of all water, and recycled water facilities within and/or adjacent to his development, as required to serve his development. All construction must meet the District's standards. The Developer shall be responsible for any and all repairs or replacements required to the newly installed systems for a period of one year from the date of formal acceptance by the District, which acceptance shall be memorialized in writing by the District.

1.5.2 Individual Service/Meter Requests

Individual service/meter requests must be made in writing and be accompanied by the appropriate plans and required fees. When the plans depicting the service connections are approved, a non-residential service request application will be prepared. This service application will include all applicable fees.

Once the service/meter application is approved and the installation cost has been estimated by the District and paid by the applicant, the service/meter request is forwarded to District's Operations Department for installation of the meter(s). The completed meter installation(s) will be inspected by the District and, if satisfactory, District Billing Department will be notified that the job is complete.

1.6 District Fees

Fees for connection to District facilities, usage charges, and other administrative fees are detailed in Pico Water District Rules & Regulations (see Appendix "B"). All applicable fees shall be paid by the applicant prior to the approval of plans or installation of individual services, per Pico Water District Rules & Regulations (Appendix "B").

1.7 Improvement Plan and Map Checking

It is highly recommended that the Contractor purchase a copy of the Pico Water District Standards & Specifications to help with the project design and construction. Upon submittal of the record map and improvement plans for checking, the District will check the water system thereon, which will include valve location, fire hydrant location, pipe sizing of lines, and other pertinent information. This map will be returned to the Developer's engineer who shall lay out the water system on the street plans based on the District's comments. Final approval will be made prior to any construction or installation by the Developer's or District's contractor.

1.8 Main Locations

- A. Wherever practicable, water lines shall be laid five (5) feet north of the south curb or east of the west curb.
- B. In the event of any approved field change in alignment or depth of lines, valves or laterals, the Developer's engineer shall correct the plans to the as-built condition.

Approval of changes shall be authorized by the General Manager or his designated representative prior to such change.

1.9 Certificate

The contractor shall furnish a certificate, if requested by the General Manager or his designated representative, stating that all pipe, valves, fittings, and protective coatings are new, manufactured in the United States, and fully comply with the specifications in these Standards.

1.10 Alternate Material

The provisions of this Standard are not intended to prevent the use of any material or method of construction not specifically prescribed by this Standard if such alternate is found to be for the purpose intended and at least the equivalent of that prescribed in this Standard in quality, strength, sanitation, durability, safety, and effectiveness.

The District may require the person seeking approval of such alternate to submit to him, a sample of such alternate material together with 4 copies of a technical report, including design data, report of material and chemical analysis, and details of laboratory test which have been performed, plus copies of all tests and approvals, if any under "AWWA," "ASTM," "ASA," or other approved testing laboratories.

1.11 Material Tests

All tests to determine compliance with any of these Specifications shall be made within the continental limits of the United States. If requested by the District, the test results shall be certified by an established, reputable materials testing firm and a copy forwarded to the District.

It is required that the inspection of all materials be made by the District's designated representative. It is the responsibility of the Developer, contractor, and the subcontractor performing the work, to contact the District's designated representative a minimum of 72 hours before commencement of work for scheduling and approval of all materials.

Any materials delivered to the job and suspected of damage due to shipping or handling, if requested by the General Manager or his designated representative shall be tested again, and the test results certified by an approved materials testing firm.

1.12 Accident Prevention

Precautions shall be exercised at all times for the protection of persons and property. The safety provisions of applicable laws and building and construction codes shall be observed. Machinery, equipment, and other hazards shall be guarded in accordance with the safety provisions of the manual of Accident Prevention in Construction published by the Associated General Contractors of America, and the Construction Safety Orders and

Trench Construction Safety Orders as issued by the Division of Industrial Safety of the Department of Industrial Relations of the State of California.

All warning signs, lights, barriers, barricades, delineators, signs, flashers and other safety equipment and measures designed to protect the traveling public shall be erected and maintained in good order by the contractor, and shall conform to the requirements of the Work Area Traffic Control Handbook (WATCH) prepared by the Southern California Chapter of the American Public Works Association; and the California Manual of Uniform Traffic Control Devices (MUTCD) (latest edition); or as required by the General Manager or his designated representative, to ensure safe passage of traffic.

The work shall be carried on with regard for the rights and convenience of the property owners and residents along the line of work and the traveling public. Cross-over steel plates approved by the District shall be placed and other precautions taken wherever necessary to provide for at least one-way traffic along all traveled streets, unless otherwise approved by the District and the agency having jurisdiction over the roads, and to provide access to driveways and residences. In case of an emergency and/or failure to comply with the aforementioned regulations, the necessary remedial measures may be accomplished by the District at Developer's, and/or Contractor's expense. If a sidewalk is closed during working hours, provisions must be made for the safe movement of pedestrians through the construction area. This is vitally important near schools.

1.13 Setting Stakes

Where curbs have not previously been installed, the location of the line as shown on the approved plans shall be staked by a Professional Land Surveyor or Professional Civil Engineer, licensed in the State of California.

1.14 Preservation of Monuments

The Developer shall preserve all existing benchmarks, monuments, and, in case of their removal or destruction by him or his employees, he shall be liable for the cost of their replacement by a Professional Land Surveyor or Professional Civil Engineer, licensed in the State of California.

1.15 Inspection

Once work has commenced, and after initial materials inspection, 48-hour notices are required of the Developer/Contractor, or the Subcontractor, prior to any project or progress inspection. All materials furnished and all work done shall be subject to rigid inspection under direct Supervision of the General Manager or his designated representative. Work or material which does not conform to the Specification, even if accepted through oversight or otherwise, may be rejected by the District at anytime. Before proceeding with work during holidays, the Developer/Contractor shall give the District 48-hour notice in writing and receive approval from the General Manager or his designated representative. If such work is carried out without the District's knowledge, the District may require any portion of the work to be removed in order that a thorough

inspection may be accomplished. No backfill will be allowed until the project is inspected by the General Manager or his designated representative. At the completion of the project, a “materials used” list, a Mylar “as-built” and a digital copy of the plans (TIFF format) shall be submitted to the District for review and approval prior to final payment and release of bonds.

1.16 Guarantee

The Developer and/or Contractor shall guarantee the work against leaks and breaks due to defective materials or workmanship and against settlement of backfill and damage to resurfacing for a period of 1 year from the date of completion of the work. When defective materials or workmanship is discovered in either pipeline, backfill, or resurfacing requiring repairs to be made under this guarantee, all such repair work shall be done by the Developer and/or Contractor at his own expense, within 2 days after written notice of any leaks, breaks or settlements has been given to him by the District. If the Developer and/or the Contractor fails to repair such leaks or damage within 2 days of the receipt of a written notice from the District, which notice may be conveyed by facsimile or e-mail, the District may make the necessary repairs and charge the Developer with the actual cost of all labor and material required. In emergencies demanding immediate attention, the District may make the necessary repairs and charge the Developer and/or Contractor with the actual cost of all labor and material required. The Developer and/or Contractor shall arrange to have his faithful performance bond or a portion thereof run for a period of 1 year after the date of completion of the contract to cover his guarantee as, above, set forth.

1.17 Project Clean-Up & Water Quality Control

The Developer and/or Contractor shall at all times maintain an orderly job. Tools, rubbish, and materials shall be picked up and stored in a workman like manner at all times. The Developer and/or Contractor shall remove from the vicinity of the completed work all materials, etc., belonging to him or used under his direction during construction. In the event of his failure to do so, the same may be removed by the District at the expense of the Developer and/or Contractor and/or Contractor and his sureties shall be liable for any cost or damage occasioned thereby. The Contractor shall comply with all applicable National Pollutant Discharge Elimination System (NPDES) requirements established by the State of California Regional Water Quality Control Board (RWQCB) and the Los Angeles County Department of Public Works (LADPW).

Best Management Practices shall be defined as any program, technology, process, citing criteria, operating method, measure, or device which controls, prevents, removes, or reduces pollution. The Contractor shall obtain and refer to the California Storm Water Best Management Practice Handbooks, Volume 3 Construction BMP Handbook and the Los Angeles County Department of Public Works Best Management Practices Handbook for Construction Activities. These publications are available from:

Los Angeles County
 Department of Public Works
 Cashier's Office
 900 S. Fremont Avenue
 Alhambra, CA 91803
 Telephone: (626) 458-6959

As a minimum, the Contractor shall implement the following BMPs in conjunction with all its activities and construction operations:

No. CONSTRUCTION PRACTICES

CD4 (2) Water Conservation Practices
 CD7 (2) Dewatering

CD8 (2) Paving Operations
 CD9 (2) Structure Construction and Painting

No. MATERIAL MANAGEMENT

CD10 (2) Material Delivery and Storage
 CD11 (2) Material Use
 CD12 (2) Spill Prevention and Control

No. WASTE MANAGEMENT

CD13 (2) Solid Waste Management
 CD14 (2) Hazardous Waste Management
 CD15 (2) Contaminated Soil Management
 CD16 (2) Concrete Waste Management
 CD17 (2) Sanitary/Septic Waste Management

No. VEHICLE AND EQUIPMENT MANAGEMENT

CD18 (2) Vehicle and Equipment Cleaning
 CD19 (2) Vehicle and Equipment Fueling
 CD20 (2) Vehicle and Equipment Maintenance

No. VEGETATIVE STABILIZATION

CD22 (2) Scheduling
 CD23 (2) Preservation of Existing Vegetation
 CD24B (2) Temporary Seeding and Planting
 CD25 (2) Mulching

<u>No.</u>	<u>PHYSICAL STABILIZATION</u>
CD26B (2)	Geotextiles and Mats
CD26A (2)	Soil Stabilizer/Dust Control
CD28 (2)	Temporary Stream Crossing
CD29B (2)	Stabilized Construction Roadway
CD29A (2)	Stabilized Construction Entrance

<u>No.</u>	<u>RUNOFF DIVERSION</u>
CD30 (2)	Sodding, Grass Plugging, and Vegetative Buffer strips
CD31 (2)	Earth Dikes, Drainage Swales, and Lined Ditches
CD32B (2)	Top and Toe of Slope Diversion Ditches/Berms
CD32A (2)	Slope Drains and Subsurface Drains

<u>No.</u>	<u>VELOCITY REDUCTION</u>
CD33B (2)	Flared Culvert End Sections
CD33A (2)	Outlet Protection/Velocity Dissipation Devices
CD34 (2)	Check Dams
CD35 (2)	Slope Roughening/Terracing/Rounding

<u>No.</u>	<u>SEDIMENT TRAPPING</u>
CD36 (2)	Silt Fences
CD37 (2)	Straw Bale Barrier
CD38 (2)	Sand Bag Barrier
CD39 (2)	Brush or Rock Filter
CD40 (2)	Storm Drain Inlet Protection
CD41 (2)	Sediment Traps
CD42 (2)	Sediment Basin

Additional BMPs may be required as a result of a change in actual field conditions, contractor activities, or construction operations. When more than one BMP is listed under each specific BMP category, the Contractor shall select the appropriate and necessary number of BMPs within each category in order to achieve the BMP objective.

BMPs for contractor activities shall be continuously implemented through the year. BMPs for erosion control and sedimentation shall be implemented during the period from October 15 to April 15, and whenever the National Weather Service predicts rain within 24 hours. BMPs for erosion control and sedimentation shall also be implemented prior to the commencement of any contractor activity or construction operation which may produce run-off, and whenever run-off from other sources may occur.

The District is subject to enforcement actions by the State Water Resources Control Board, Los Angeles Regional Water Quality Control Board, Environmental Protection Agency, and private citizens. The District will assess the Contractor a penalty of \$1,000 for each calendar day that the Contractor has not fully implemented required BMPs specified in the Contract and/or is otherwise in noncompliance with these provisions. In addition, the District will deduct, from the final payment due the Contractor, the total amount of any fines levied on the District, plus legal and staff costs, as a result of the Contractor's lack of compliance with these provisions and/or less than complete implementation of the specified BMPs.

1.18 Dust Control

Adequate dust control shall be maintained at all times. Permission for use of water from District facilities must be obtained from the District.

SECTION 2

DEVELOPMENT PLAN AND PERMIT PROCESSING PROCEDURES

2.1 Development Plan

“Capital Improvement Projects” will be designed and constructed by the District unless timing or other considerations make it more feasible to allow the Developer to install the facilities. In these cases, a reimbursement agreement may be entered into by the District to reimburse the Developer for the cost of constructing “Capital Improvement” facilities.

Water lines 10” diameter and smaller and recycled water lines 4” diameter and smaller will be considered Developer facilities and the cost of designing and constructing these facilities will be the responsibility of the Developer. Once the facilities are completed and accepted for maintenance by the District, they will be formally transferred by Bill of Sale (Figure 5, 6 and 7).

If, in the design of a development, a Developer finds that he needs to increase the size of the in-tract facilities to 12” diameter or larger, that will not classify them as capital improvement facilities, unless otherwise determined by the District’s General Manager in connection with the District’s current planning documents and additional future needs.

2.1.1 Development Plan

Three (3) sets of tentative water plans for the proposed development shall be submitted to the District for review at least thirty (30) days prior to the filling of the tentative map for the development, accompanied by a written request for a District water “will serve” letter. The plan will be reviewed by the District, taking into account the following:

- a. Existing water transmission main location and sizes
- b. The proposed points of connection and distribution system shown.
- c. The estimated water demands calculated by the Developer’s engineer.
- d. City and/or County fire flow requirements
- e. District’s 2008 Water System Master Plan
- f. District design criteria for domestic water systems (Section 3)

Correction comments will be indicated on the development water plan and returned to the Developer’s engineer.

2.1.2 Fire Department Approval

The Developer's engineer shall obtain approval from the governing fire department or agency for the fire hydrant spacing and the proposed water main sizing for the fire flows for the tentative water plan. After the first utility improvement plan check by the District, the Developer's engineer must have the governing fire department or agency sign the plans before submitting them for a second plan check.

Upon approval by the District of the development plans for water, one red-lined copy will be returned to the Developer's engineer showing the District's comments and corrections.

2.2 Individual Tract/Parcel Improvement Plans

2.2.1 First Plan Check Submittal Requirements

The Developer/engineer shall submit the following items for first review of any residential, commercial, or industrial development, for which a tract map or parcel map is required:

- A. Three (3) sets of revised utility improvement plans and tract/ parcel map. The plans must be approved by the Los Angeles County Fire Marshal prior to the second plan check.
- B. Two (2) copies of tract/parcel map showing gross acreage, street names, and District easements (if any) with provision for District execution.
- C. One (1) set of grading plans.
- D. Engineer's quantity and cost estimates for water and recycled water facilities'.
- E. Plan check and inspection fees shall comply with Pico Water District Rule 11.11 (see Appendix "B").
- F. Transmittal letter from the Developer's engineer requesting the commencement of District plan check procedure.

After first plan check, the District will return one (1) red-lined set of the utility improvement plans and the red-lined tract/parcel map to the Developer's engineer for corrections.

2.2.2 Second Plan Check Submittal

When the plans are substantially complete with only minor revisions remaining, the District may elect to compute the required water connection fees and any other inspection and engineering fees based on the District's current Rule 11.11 (see Appendix "B"). The Developer will be notified when the agreements

and the fee invoice are available. One (1) red-lined set of plan check comments will be provided upon completion of any plan check.

The status of plans currently in for plan check can be obtained by contacting the District. The District will make a reasonable effort to meet a standard of thirty (30) working days for the first plan check, fifteen (15) working days for the second plan check, and seven (7) working days for each subsequent submittal. However that does not guarantee, or imply to guarantee, that these deadlines will be met. The feasibility of meeting these deadlines will vary on a case by case basis. The extent of the corrections required on a plan set, and the current workload of the District may affect the previously stated time frames.

2.2.3 Required Easements

If an easement to the District is required for construction and/or maintenance of water or recycled water facilities, the minimum easement width shall be twenty feet (20) for domestic and recycled water facilities. Deep water lines will require wider easements equal to twice the facility depth rounded upward to the nearest five feet (5). Easements shall be contained in single lots and shall not straddle lot lines. In the case of parallel facilities, the easement width shall not overlap.

Two (2) copies of easement legal descriptions with accompanying water easement sketch on Pico Water District's Easement Deed form (see Appendix "E") shall be prepared by the Developer's land surveyor, licensed in the State of California, and submitted to the District for review. Easements for facilities which will be transferred to the District may be shown on the tract/parcel map with the correct certificates for District acceptance. The legal description for the easements shall be in a form acceptable to the District and will be checked by the District's Engineer for accuracy. Dedicated easements must also be shown on the construction plans and the index map, without exception. Improvement plans for the District facilities will not be approved until all required easements have been dedicated to the District along with any necessary reconveyances or subordination agreements. Easement exhibits shall be 8-1/2" x 11" without exception.

Where facilities are to be located in private streets, the easement shall be a minimum of twenty feet (20) wide. In multi-family residential complexes or business parks, the Developer may dedicate to the District's use a "blanket easement" over all internal paved area to District as long as it covers the minimum area District needs to access the facilities. The appropriate note shall be included on the tract/parcel map and the plans. Easements ten feet (10) wide and extending five feet (5) beyond all fire hydrants, and water meter locations will also be required unless waived by the General Manager.

2.2.4 Improvement Plan Approval

Utility improvement plans must be approved by the General Manager before any construction can start. Approval by the General Manager will be contingent upon satisfying the following requirements:

- A. All required corrections have been made on the utility improvement plans, and all systems are in conformance with the District's Standards and Specifications, latest edition.
- B. The water and/or recycled water Agreement (Figure 4- page 25) (compare to our existing application), has been executed by the Developer and returned to the District.
- C. The plans have been signed by the Los Angeles County Fire Marshal or his or her designee.
- D. All required easement documents have been executed and delivered to the District. Tract/parcel maps must be signed by the District prior to plan approval.
- E. All required fees and charges have been paid by the Developer.
- F. All required payment and performance bonds have been posted with the appropriate entity.

When these requirements have been satisfied, the Mylar original title sheet, a clean black-line set of plans and the latest check print shall be submitted to the District for approval. When the plans have been approved, the Developer's engineer will be notified, and will provide the District with three (3) fully approved plans. The approved plans shall constitute the District's approval to construct water and/or recycled water facilities.

2.2.5 Bills of Sale

Upon the satisfactory completion of construction and acceptance by the District's designated representative, the facilities shall be conveyed to the District by means of a properly executed Bill of Sale (BOS). The BOS shall be accompanied by Cost of Construction Statements (CCS) reporting the actual cost of construction supplied by the Developer. Forms for the BOS and CCS for the various facilities are shown in Appendix "F". Completed forms should be submitted to the District within thirty (30) days of the final inspection and prior to the release of the final dwelling units along with one (1) "RECORD" Mylar of the improvement plans. Upon receipt of these items, the District will approve the release of the bonds posted for construction of the water and recycled water facilities.

2.3 Improvement Plan Requirements

All plans submitted to the District for plan checking and approval of water or recycled water facilities will be submitted on a 24" x 36" sheets and shall conform to the standards of the jurisdictional agency in which the improvements are located. The plans shall also contain the information detailed in the following subsections.

2.3.1 Title Sheet

Air and vacuum valve assemblies shall be located at all points where air pockets may form, where necessary to prevent vacuums during draining operations at locations shown and/or established by the General Manager.

- A. Project identification, tract/parcel map number, project name, assigned plan check number, etc.
- B. Location map showing general area with the project area clearly indicated and described in words. See Figure 3 for typical location map.
- C. Standard water and recycled water notes as shown in this manual.
- D. An index map which contains the following information:
 - [1] Scale 1" = 100" (Scale of District's Atlas Maps).
 - [2] All existing and proposed water and sewer mains, fire hydrants, water valves, manholes, and clean-outs.
 - [3] The size and material of all mains.
 - [4] The direction of flow for all sewer lines and the number of all manholes and clean-outs.
 - [5] Lot lines for the proposed development, footprints of buildings, total square footage, and number of stories, as known and service stub locations for each lot.
 - [6] North arrow.
 - [7] Street names.
 - [8] Legend of Symbols.
 - [9] All proposed easements for District facilities.
- E. Signature block for District approval of water facilities in the form to be provided by the District, see Figure 1 (page 24).

- F. Signature block for the Los Angeles County Fire Marshal or his or her designee.
- G. Bench mark description and latest elevation.
- H. Basis of bearings.
- I. Name, address, phone number, and contact person of the engineering firm preparing the plans.
- J. Name, address, phone number, and contact person of the property owner Developer.
- K. Index of sheets
- L. Quantity estimate and construction notes may appear on the title sheet. Construction notes for water and recycled water shall not be mixed together and shall appear under separate headings. Different number series shall be used for each type of facility.
- M. Underground Service Alert notification blocks (Figure 2, page 24).

2.3.2 Second Sheet

Typically the second sheet of the plan set will have the following information:

- A. Quantity estimates, if not on the title sheets.
- B. Continuation of standard notes
- C. Construction notes.
- D. Detail drawings
- E. May contain the index map if it will not fit conveniently on the title sheet.
- F. Street sections showing street widths to right-of-way and location of sidewalks.

2.3.3 Plan and Profile Sheets

All plan and profile sheets include the following information:

- A. Scale. Horizontal scale shall be 1" = 20" or 1" = 40" and be clearly indicated. The vertical scale shall be 1" = 2" or 1" = 4" and be clearly indicated.
- B. North arrow.

- C. At least two (2) separate points of the utility system must be tied into the California Coordinate System.
- D. Plan and profile shall be on the same sheet for all water mainlines.
- E. Existing water and recycled water facilities adjacent to the proposed development must be shown. Size and material of these facilities must be indicated.
- F. Proposed and existing easements to be dedicated to the District for water and recycled water facilities must be shown on the plan.
- G. Storm drain alignment shall be indicated in the plan view and all crossings of water, or recycled water facilities and the storm drain shall be shown in the storm drain profile. Where water lines cross over the storm drains the top of the storm drain and the bottom of the water line must be shown, along with the proposed depth of cover.
- H. Provisions and requirements of Section 3 shall be adhered to in designing the various facilities.

2.4 Non-residential Application Requirements

2.4.1 Domestic Water Services

All services for non-residential developments must be equipped with approved backflow prevention devices; a double detector check assembly for fire lines and an RPPD backflow device for non-residential domestic water service. Refer to the District Cross Connection Control Program (Appendix “C”) for specific backflow prevention requirements.

Items required to make application for non-residential domestic water service are,

- A. One (1) set of improvement plans with service lateral location highlighted.
- B. One (1) set of plumbing plans showing number of fixture units.
- C. A letter from the Developer or his agent requesting a (size) meter, not to exceed (quantity) gpm, at (address) and payment for the cost of installation.

Domestic water service for irrigation requires a site plan and a letter as described above. A request for domestic water service for irrigation must be approved by the General Manager. Recycled water must be used for irrigation service, when/where available.

2.4.2 Fire Service Requirements

All fire service connections will be made through a double detector check valve assembly as shown in Standard Drawing W-9 and the plan check submittal package shall include a site utility plan showing:

- A. Property lines and required easements.
- B. Building footprint
- C. All on-site private fire hydrants (note: all on-site private fire hydrants must be painted red)
- D. Stamp or signature of Los Angeles County Fire Marshal.
- E. Address of the Building.
- F. Payment of plan check and inspection fees.

2.4.3 Public Fire Hydrant Requirements

- A. Property lines and required easements.
- B. Building footprint.
- C. Location of public fire hydrant approved by the Los Angeles County Fire Marshal or his or her designee.
- D. Payment of plan check and inspection fees. The owner or Developer will bear the responsibility and cost of installing the fire hydrant after the plans are approved by District.

2.4.4 Recycled Water Service Requirements.

All requests for recycled water service must be accompanied by one set of landscape irrigation system plans which have been approved by the District and payment of the cost of installing the requested service (s). There must be an address assigned to each recycled water service.

In conformance with State Water Code, Section 13551, if recycled water is currently available, or will be available as determined by the General Manager, it must be used for landscape irrigation. The General Manager must approve any decision not to use available recycled water for landscape irrigation.

2.4.5 Additional Requirements, Standards and Fees for all Non-Residential Applications

- A. All non-residential service applications must be accompanied by the appropriate plans, payment of the installation costs and the signature of the applicant or his authorized agent.

- B. The District will install all domestic water, recycled water, and bypass meters for non-residential services, unless otherwise authorized by the General Manager.
- C. The submitted improvement plans must contain the following information and conform to the following criteria:
 - (1) Maximum size is 24" x 36"
 - (2) District standard notes must appear on the plans.
 - (3) Signature block for District approval must be provided in the form required by District (See Figure 1)
 - (4) Signature of the Los Angeles County Fire Marshal or his or her designee, if applicable.
 - (5) Quantity and cost estimates for all proposed improvements.
- D. Water meter sizing standards:

<u>Size</u>	<u>Maximum Demand (gpm)</u>
5/8" x 3/4" disc	20
Full 3/4" disc	30
1" disc	50
1-1/2" disc	100
2" disc	160
1-1/2" turbo	120
2"	160
3"	350
4"	1,000
6"	2,000
8"	3,500
10"	5,500

- E. All fees will be determined by the District for each water service installation by District personnel. These costs will be provided to the applicant so that the fees can be paid before the application is released for installation.

2.4.6 Utility Plans Signed by District

Three (3) sets of fully approved water and recycled water plans, as applicable, shall be furnished to District at least two (2) working days prior to the pre-construction conference and commencement of work. Fully approved plans for the proposed improvements must be signed by the General Manager.

2.4.7 Plan Approval Expiration Time Limit

Plans will be valid for a period of one (1) year from the date of the District approval. If construction has not begun within that one year period, the approval of the plans becomes null and void. In this event, the District will require that the plans be re-checked and reserves the right to charge additional plan check fees and/or connection fees, at its sole discretion. No modifications will be allowed to the development which increases the number of units to be served by the system without additional approval by the District.

2.5 Inspection

All work shall be subject to inspection by the District and shall be left uncovered until approved by the District's designated representative. The Contractor shall not proceed with any subsequent phases of work until the previous phase has been inspected and approved by the District.

2.5.1 Notice to Start Construction

Notice and signed utility plans shall be given to the General Manager or his designated representative at least 96 hours before the contractor will be allowed to start construction.

2.5.2 Pre-Construction Conference

A pre-construction conference must be held at least two (2) working days before the start of construction. The contractor's job foreman and/or superintendent, the Developer's engineer and the District's designated representative must be present. The purpose of this meeting will be to answer any questions on the District's specification requirements, to obtain the contractor's construction schedule and emergency phone numbers, and to discuss any circumstances which may affect job installation.

2.5.3 Water and/or Recycled Water System Inspections

During construction, the District's designated representative will inspect the following:

- A. Trench excavation and bedding.
- B. Placing pipe, fittings, and structures.
- C. Pouring all concrete anchors and kicker blocks.

- D. Placing and compacting the pipe zone backfill.
- E. Backfilling balance of trench to grade. Initial compaction tests shall be performed by the District's soils engineer at District's expense. Any additional compaction tests that may be required, due to contractor's failure to achieve required compaction, shall be performed by the District's soils engineer, at the sole expense of the contractor.
- F. Pressure testing all mains and services.
- G. Disinfecting of domestic systems and flushing of all water systems.
- H. Re-paving trench cuts.
- I. Raising valve box covers to finish grade and painting to District standards.
- J. Fire hydrants painted and pads poured.
- K. Installation of service lines, meter boxes, and water meters.

2.5.4 District Authority

The District shall have access to the work at all times during construction and shall be furnished with every reasonable facility for ascertaining full knowledge of the progress, workmanship, and character of materials used and employed in the work. No pipe, fittings, or other materials shall be installed or backfilled until inspected and approved by the General Manager or his designated representative. The contractor shall give due notice in advance of backfilling to the District's designated representative so that proper inspection may be provided.

Inspection of the work shall not relieve the contractor of any obligations to complete the work as prescribed by the standard specifications. Any known defective work shall be corrected before testing or final inspection will be permitted. Unsuitable materials may be rejected even if these materials have been previously overlooked by the District's designated representative.

The District's designated representative shall have the authority to suspend the work completely or in part for such time as it may deem necessary if the contractor fails to carry out instructions given by the District's designated representative, or to perform any required provisions of the plans and comply with a written order of the District's designated representative to suspend the work completely or in part. The work shall resume when improper methods or defective work has been corrected as ordered and approved in writing by the District's designated representative.

2.5.5 Water, Recycled Water in Service Prior to Acceptance

The General Manager may approve putting newly installed water and recycled water into service after compaction has been approved by the District and the portions have been pressure tested, chlorinated, flushed and potable water mains have passed the bacteriological test. This partial acceptance shall be granted only upon written request from the Developer and subsequent approval by the District's designated representative. However, nothing in this section shall be construed as relieving the Developer of full responsibility for completing the work in its entirety, for making good any defective work and materials, for protecting the work from damage, and for being responsible for damage and for work as set forth in any agreement with the District and other contractual documents; nor shall such action by the District be deemed completion and acceptance, and such action shall not relieve the Developer of the guarantee provisions of his agreement with the District.

2.5.6 Final Water and Recycled Water Facilities Inspection

Before final acceptance, the District's designated representative will make a final inspection of all work, accompanied by the contractor's superintendent or foreman, to verify that:

- A. All phases of the job are complete in accordance with plans and specifications.
- B. Valve boxes are raised to finish grade and that all repairs are complete.
- C. Valves are referenced and the inspector has been given all reference measurements.
- D. Right-angle meter stops, meters, and customer service valves are properly positioned and all meter boxes are positioned and raised to proper grade and meters installed.
- E. Fire hydrants are raised to proper grade, are in a vertical position, painted, and concrete pads are poured.
- F. Backfill has passed all compaction testing.
- G. System valves are turned and left open (except those specifically required to be normally closed), turns required for complete open/close cycle are recorded on the record drawings.
- H. Domestic water lines have been chlorinated.
- I. Line pressure testing and flushing have been completed.
- J. The job site is clean and cleared of all the contractor's equipment and materials.

2.5.7 Interpretation of Specifications and Detail Drawings

Figured dimensions of the drawings shall govern, but work not dimensioned shall be as directed. Work not particularly shown or specified shall be the same as similar parts that are shown or specified or as directed. Full size details shall take precedence over scale drawings as to shape and details of construction. Specifications shall govern as to material. Scale drawings, full-size details, and specifications are intended to be fully cooperative and to agree; but should any discrepancy or apparent difference occur between plans and specifications, or should errors occur in projects being constructed by others affecting the work, and the contractor proceeds with work affected without instruction from the District, he shall be fully responsible for any resulting damage or defect.

2.5.8 Release Given to Cognizant Authority

After final inspection requirements have been fulfilled, along with the requirements outlined in Sub-section 2.2.5, the District may provide notifications of its final acceptance to the cognizant building authority.

2.6 District's Regulation Regarding Cross-Connections

The District Cross-Connection Control Program is included in Appendix "C". Cross connections of any type that permit a backflow condition from any source or systems other than that of District's potable water mains to the potable water system are prohibited. A connection constituting a potential or actual backflow hazard will not be permitted unless a backflow device or air gap, which is approved by the District and complies with Title 17 of the California Code of Regulations, is installed. Such an installation shall at times be subject to inspection and regulation by the District for the purpose of avoiding a potential backflow condition. The District shall be contacted for any questions regarding cross-connections. The District will not provide water service to any premises unless the public water supply is protected as required by State, County, and District regulations. Besides special situations, backflow devices are required for the following instances:

- A. All domestic water irrigation services.
- B. All commercial domestic water services.
- C. All industrial domestic water services.
- D. All fire lines where the commercial or industrial buildings are over two stories in height.
- E. All private domestic systems or fire line systems having two or more points of connection to District Mains.

Backflow prevention devices shall be approved by the District and shall be installed by, and at the expense of, the customer. The customer shall have the device tested at least once a year by a tester certified by the Los Angeles County Health Department and service such devices to maintain them in a satisfactory

operating condition and shall overhaul or replace such devices if they are found defective. Records of such annual tests, repairs, and overhauling shall be kept by the customer and copies forwarded to the District.

Water service to any premises may be discontinued by the District, after notice: (i) if a backflow prevention device required by the District is not installed, tested, and maintained; (ii) if any defect is found in an installed backflow prevention device; (iii) if it is found that the backflow prevention device has been removed or bypassed; or (iv) if unprotected cross-connections exist on the premises. Service will be restored only when such conditions or defects are corrected to the satisfaction of the District.

District's Cross-Connection Control Program (Appendix "C") further defines how water lines must be marked where multiple water systems are in use, and outlines the duties and responsibilities of a property's water supervisor. Additional references for guidelines as to when, why, and what types of backflow and cross-connection control devices are approved may be found in:

- A. Regulations Relating to Cross-Connections, California Administrative Code of Regulations - Title 17- Public Health.
- B. Manual of Cross-Connection Control, published by Foundation for Cross-Connection Control and Hydraulic Research, University of Southern California, University Park, Los Angeles, California 90007.

2.7 Backflow Device Locations

Any commercial or industrial domestic water service will require that a Reduced Pressure Principle backflow device (RPPD) be installed immediately downstream of the water meter. The device must be installed in accordance with District Standard Drawing W-34 and W-35. The assembly must be above ground and cannot be installed in an underground vault.

A fire service must have a Double Check (DC) backflow assembly with bypass meter as shown on District Standard Drawing W-34. These assemblies can be installed in such a manner as to be screened from view, but must be accessible to District personnel at all times. There must be a 5 foot clearance on all sides of the DC assembly installed above ground. In addition a 10 foot wide easement must be dedicated to the District from the public right-of-way to the DC assembly.

FIGURE 1

PICO WATER DISTRICT	
APPROVAL OF WATER FACILITIES	
APPROVED BY: GENERAL MANAGER	DATE

FIGURE 2

<p>NOTICE TO CONTRACTOR</p> <p>PURSUANT TO ASSEMBLY BILL 3019, NO EXCAVATION PERMIT IS VALID UNLESS THE FOLLOWING IS PERFORMED:</p> <ol style="list-style-type: none">1. UNDERGROUND SERVICE ALERT HAS BEEN CONTACTED AND HAS PROVIDED INQUIRY I.D. #2. THE UNDERSIGNED AGREES TO CONTACT AND OBTAIN AN INQUIRY I.D. # FROM UNDERGROUND SERVICE ALERT (811) AT LEAST TWO (2) WORKING DAYS PRIOR TO THE COMMENCEMENT OF EXCAVATION <p>SIGNED _____ DATE _____</p>

FIGURE 3

<p>REQUIRED FORMAT FOR VICINITY MAPS</p> <p>The project location must be clearly shown on the map and described in words. The verbal description of project location should include:</p> <ol style="list-style-type: none">1) The Tract Map Number and Lot Number(s) or Parcel Map Number and Parcel Number (s) is applicable.2) Official address if known, or location as described in terms of cross-streets.3) City/Postal Zone, State and zip code.4) If project is in unincorporated Los Angeles, state below in parentheses.

FIGURE 4

DATE: _____
W.O _____
TRACT: _____
I/D #: _____

**APPLICATION FOR SERVICE AND AGREEMENT WITH
THE PICO WATER DISTRICT**

The undersigned, hereinafter referred to as “Applicant”, hereby requests the extension of the following types of water service:

- Residential
- Commercial/Industrial
- Backbone
- Potable Water and Recycled water Service
- Potable Water Service only
- (*) If permitted by District

by the Pico Water District (hereinafter referred to as “District”) in accordance with all of the terms and conditions of this agreement, as follow, and District’s “Standards & Specifications” as amended from time to time, incorporated herein by this reference and made a part hereof as though fully set forth.

Applicant hereby applies for that service which can be provided by the facilities described below, to that certain real property located within District, in the County of Los Angeles, State of California, located at _____ (consisting of approximately _____ acres), and described as follows (metes and bounds description or as acceptable to District) the “Property”:

Said property is to be used for the purpose(s) of:

Applicant hereby represents that applicant is the _____ of said real property. Applicant estimates that the total service to be required of District upon ultimate development of said real property is as follows:

Potable Water: _____ / cubic-feet/second
Recycled Water: _____ / cubic-feet/second

Upon acceptance of this application executed by the applicant, together with all fees and charges, plans and specifications, bonds, conveyance of necessary easements, and other items as may be in accordance with and subject to the terms and conditions herein set forth. District shall deliver to applicant an executed copy hereof.

**Terms and Conditions to Application for Service
and Agreement with the Pico Water District**

Section 1 Applicant agrees to comply with the requirements of any and all applicable Federal, State and local statutes, ordinances, regulations and other requirements. District may, in its discretion, require specific prior approval of this application by any Federal, State or local agency having jurisdiction over, or an interest in the operation of District's facilities.

Section 2 Applicant shall adhere to the requirements prescribed by the District's Standards & Specifications and to any additional requirements prescribed from time to time by the General Manager or Board of Directors of the District, or both, to insure compliance with the District's Standards & Specifications.

Applicant and its successors may be required to use recycled water based upon requirements of California law, as determined in the sole discretion of District and shall meet all the requirements of the District's Standards & Specifications.

Section 3 Applicant hereby agrees to build or cause to be built the following described facilities (herein after collectively referred to as ("FACILITIES")) and agrees to pay all costs of installation of same, including, but not limited to, cost of labor, materials, equipment, contractors expense and profit, environmental studies, design, engineering, surveying, inspection, testing, plan check, land and easement acquisition, condemnation, attorney's fees, insurance and bond premiums.

- (a) Water System Facilities
- (b) Recycled water System Facilities

Section 4 Applicant agrees that facilities shall be constructed in accordance with plans and specifications which shall comply with all applicable requirements of District's Standards & Specifications, latest edition, including, but not limited to, requirements as to information to be shown on the plans. Said documents are on file at the office of District and are by this reference incorporated herein. Such plans and specifications shall be approved by the District prior to construction of the Facilities. Such approval of the plans and specifications by the District shall not constitute approval of this application. The Facilities shall be constructed by a contractor licensed by the State of California in good standing, to install said Facilities.

Section 5 Applicant guarantees Facilities constructed under this agreement against defects in workmanship and materials for a period of one (1) year after date of acceptance of the Bill of Sale for the Facilities by District is filed with the County recorder, as provided in Section 8. It is further agreed that the Facilities shall be restored to specifications described in Section 4, including any test requirements, if during said one (1) year period the facilities or any portion thereof are found not to be in

conformance with provisions of said plans and specifications. This guarantee is in addition to any and all other warranties, express or implied, with respect to the Facilities.

- Section 6** Applicant agrees to grant, or cause to be granted to District, without cost to District, all necessary easements for construction, installation, maintenance and access to the Facilities, across all privately owned lands to be traversed by the Facilities, which easements shall be in a location mutually acceptable to District and Applicant and in a form and condition of title satisfactory to District and shall be executed by all necessary parties having an interest in said lands. Any such agreement shall be granted on the District's standard Easement Deed (Appendix "E" to the District's Standards & Specifications).
- Section 7** Applicant agrees to provide to District, prior to acceptance of the Facilities, a complete set of reproducible Mylars of the approved as-built plans and approved specifications for the Facilities.
- Section 8** Upon completion of the Facilities, Applicant agrees to execute and deliver to District a proper Bill of Sale, including a report of the actual costs of the Facilities on the standard form of District, which form is on file at the office of the District and is by this reference incorporated herein, and to substantiate such report with invoices and receipts acceptable to District. Applicant further agrees that such Facilities will become the property of District when said Bill of Sale is accepted by its General Manager, evidencing acceptance of the Facilities. However, Applicant hereby disclaims in favor of District all right, title and interest in and to said systems, appurtenances and easements; and Applicant hereby covenants and agrees to execute and deliver to District any documents required to complete the transfer of the Facilities concurrently with the acceptance thereof by District; and Applicant hereby agrees that Applicant is holding any title to said Facilities, pending acceptance thereof by District, as trustee, acknowledging Applicant's obligation to complete said Facilities and transfer the same debt-free to District.
- Section 9** It is agreed that the above provisions shall not preclude the use of the Facilities by property owners within the developed area or outside of said development prior to such delivery of Bill of Sale to District, as long as the quantity and quality of said water is acceptable to District and written permission has been obtained from District by such property owners to connect to the Facilities or to existing Facilities. Applicant agrees that the use of the Facilities by the Applicant, transferee or assignee of the Applicant, or others within District will not constitute acceptance of the Facilities by District.
- Section 10** Applicant agrees to indemnify and hold District, its agents, employees, officers, and representatives, free and harmless from and against any and all liabilities for death, injury, loss, damages, and expense, including reasonable attorney's fees (collectively, the "Claims") to persons and/or property which may arise from the construction, installation or repair of the Facilities and which is proximately

caused by any negligence of Applicant, its employees, agents or independent contractors, or by any act or omission for which Applicant its employees, agents or independent contractors, are liable without fault, except to the extent that such claims are proximately caused by any grossly negligent act, or willful omission of District or the agents, employees, officers and representatives thereof.

Section 11 Applicant shall submit, concurrently with this Application, payment and performance bonds on the standard forms of District, which forms are on file at the office of District and are by this reference incorporated herein, or as acceptable to District, in connection with the Facilities to be constructed, and for an amount to be determined by District.

Section 12 Applicant hereby agrees to pay all administration and engineering fees (including inspection and plan check costs) calculated per District Rule 11.11 (Appendix “B”) as estimated by District, as well as all of the following which may be applicable: potable water connection fees, interim potable water service line charges, and any other charges of District as provided for in District Rule 11.11 (Appendix “B”) The amount of such fees and charges shall be based on the latest edition of District Rule 11.11 in effect on the date when Applicant has submitted to District its completed application, payment of all fees and charges, plan and specifications, bonds, conveyance of necessary easements, and other items which may be required herein prior to execution of this Application. Such fees and charges shall be set forth on Exhibit “A” hereto by District, which Exhibit is by this reference incorporated herein, and is subject to revision pursuant to any changes in District Rule 11.11 prior to the date the Application and all accompanying materials and payment are completed and submitted to District. Other than as provided herein, fees and charges are not subject to adjustment or refund.

Section 13 Applicant agrees to accept such conditions of pressure and service as are provided for by District’s system(s) at the location of all proposed connections thereto and to hold District harmless from and against any and all damages, liability and expense arising out of high or low pressure conditions with respect thereto or from interruptions of service.

Section 14 Applicant agrees, if District employs an attorney to enforce this Agreement, to pay District for all attorneys’ fees so incurred.

Section 15 Applicant agrees that the District’s General Manager or his authorized representative may enter upon the hereinabove described property during reasonable hours for the purpose of ascertaining whether the provisions of this agreement are being performed. Applicant shall not be responsible in any way for the failure of its successors or assigns to comply with any of the provisions of this Agreement.

Section 16 Applicant agrees that service shall be commenced only after the Facilities have been completed and transferred to District and all required testing and inspection have been accomplished by District. Applicant is aware that contracts may not have been let for all necessary facilities of District in order that Applicant can actually receive service. Applicant further agrees that District shall not be obligated to Applicant or the successors of Applicant for service until such time as the necessary District Facilities are actually completed.

Section 17 Special conditions for service, if any:

(a) The terms and conditions of the below-designated addenda are made a part here of as though fully set forth herein and applicant hereby acknowledge receipt of copies thereof:

Addendum No. 1 – Residential Potable Water and Recycled Water

Addendum No. 2 – Residential Potable Water Only

Addendum No. 3 – Commercial/Industrial Potable Water Recycled Water Only

Addendum No. 4 – Backbone Facilities Only

Addendum No. 5 – Connection Fees Paid by Unit

(b) Other

Section 18 This application and agreement shall inure to the benefit of, and be binding upon District, Applicant, the property owner named below (if different from Applicant) and their respective successors and assigns. Applicant agrees to make this Application and Agreement known to all Developers, builders and ground lessees of residential, commercial and/or industrial improvements on the “Property”.

IN WITNESS THEREOF, the parties have duly caused their authorized signatures to be affix hereto. SIGNATURES MUST BE PROPERLY NOTARIZED AND ACKNOWLEDGE.

APPLICANT

**PROPERTY OWNER:
(If different from Applicant)**

By: _____

By: _____

By: _____

By: _____

Date: _____

Date: _____

(Seal)

PICO WATER DISTRICT

By: _____

Date: _____

STATE OF CALIFORNIA)
) ss.
COUNTY OF LOS ANGELES)

On _____, 20__, before me, _____, a Notary Public in and for said County and State, personally appeared _____, who proved to me on the basis of satisfactory evidence to be the person whose name is subscribed to the within instrument and acknowledged to me that he/she executed the same in his/her authorized capacity, and that by his/her signature on the instrument the person, or the entity upon behalf of which the persons acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Notary Public in and for said State

SECTION 3
DESIGN CRITERIA

3.1 Water Main Pressures, Capacities, and Sizes

3.1.1 Quantity of Domestic Flow

Water use shall be determined from the maximum potential population and land use of the area to be served. For design purposes, the design domestic flow shall equal the peak hour demand or the maximum duty demand plus fire flow. In order to determine the average daily flow, the following criteria shall be used for residential design flows unless otherwise approved by the Manager:

- a. 3.5 persons per residential unit;
- b. 220 gallons per capita per day;
- c. Peaking factors:

	<u>% of Average Daily Flow</u>
Maximum Day Demand	200
Peak Hour Demand	400

Commercial/Industrial design flows shall be calculated based on the Developer's estimated water demands for the proposed development.

3.1.2 Quantity of Fire Flow

Fire flow shall be determined by the local fire authority. Criteria for applying fire flows for system design demand that the system pressures at the point of delivery should be at least 20 pounds per square inch (psi) under flow conditions of average hours flow during the maximum day demand.

3.1.3 Pressure

Water mains shall be designed so that service pressures range between 40 and 100 psi, except under fire flow conditions when a residual pressure of 20 psi is allowable.

3.1.4 Velocity

Water mains shall be designed to provide a mean velocity of not more than five (5) feet per second under Maximum Daily Demand.

3.1.5 Head Loss

Water mains shall be designed to provide a mean head loss of not more than five (5) feet per thousand feet of pipe under Maximum Daily Demand.

3.1.6 Hazen-Williams “C”

Pipe analysis shall be performed by assuming the following values for the Hazen-Williams co-efficient “C” for the various types of pipe involved.

Hazen-Williams Discharge Coefficient “C”	
Type of Pipe	“C”
Extremely Smooth and Straight	140
Very Smooth	130
New Riveted Steel	110
Old Riveted Steels	100
Old Cast Iron	95
Old Pipe in Poor Condition	60-80

3.1.7 Minimum Water Main Size

Water mains shall have an inside diameter of eight (8) inches or more, where fire flow is to be transported. Six (6) inch mains may be permitted by the General Manager for cul-de-sacs when no fire hydrant is connected to the main, provided the main length does not exceed 600 feet.

3.2 Over-sizing

Over-sizing of local system improvements and water main extensions shall be in accordance with the District’s 2008 Water System Master Plan, and/or as directed by the General Manager.

3.3 Location of Air and Vacuum Valve Assemblies

Air and vacuum valve assemblies shall be located at all high points where air pockets may form, as necessary to prevent vacuums during draining operations, and as directed by the General Manager.

3.4 Location of Air Release

Air release assemblies shall be located at low points, dead ends and cul-de-sacs, and as directed by the General Manager or his designated representative.

3.5 Fire Hydrant Assemblies

Location of and fire flow rate at fire hydrant assemblies shall be approved by the Los Angeles County Fire Department. Any plan submitted for second plan check must have been reviewed and approved by the Los Angeles County Fire Marshal, or his or her designee. The signature of the Los Angeles County Fire Marshal, or his or her designee, on the plans shall constitute the only form of accepted approval of the fire protection system provided.

3.6 Water Main Location, Easements and Valves

3.6.1 Water Main Location in Roads or Streets.

Wherever practicable, water lines shall be laid five (5) feet north of the south curb or east of the west curb.

3.6.2 Curved Water Main Requirements.

In curved streets the water main shall follow the street curvature.

3.6.3 Joint Deflections for Curved Water Main.

The maximum deflection of a curved water main shall not exceed that recommended by the pipe manufacturer.

3.6.4 Water-Sewer Separation Ordinance.

The provisions of Pico Water District and the State of California, Department of Public Health shall be met in locating water mains. See District Standard Drawing Nos. W-3A and W-3B.

3.6.5 Easements.

- A.** Easements: The minimum width of a water main easement shall be 20 feet, unless otherwise approved by the General Manager.
- B.** Water Main Location in Easement: The water main shall be located at the centerline of the easement except where otherwise approved by the General Manager.
- C.** Where Easements Follow Common Lot Lines: The full easement width shall be on one lot, in such a manner that access to lines will not be obstructed by walls, trees or permanent improvements. Where this requirement cannot be met without interfering with existing buildings, easements may straddle lot lines, but the water line shall not be located on the lot lines.
- D.** Deeds for Easements: Deeds for easements shall provide for restrictions of permanent construction within the easement to provide ingress and egress for

maintenance. A recent title report will be required prior to acceptance of the easement.

E. Dedication of Easements: Easements shall be provided as follows:

i. For subdivision tracts the owners of land included within the subdivision shall offer to dedicate for public use the water main easements so designated on the final map. The form of dedication shall be as follows:

“The Pico Water District hereby accepts for public use all water main easements delineated and designated on the map, when said map is approved and recorded.”

PICO WATER DISTRICT

Signature-President of Board of Directors

ii. For other than subdivision tracts, dedication of water main easements shall occur by means of deeds of conveyance to the District for all dedications other than those dedications created by subdivision tract maps on the District’s Easement Deed (Appendix “E”), as approved by the General Manager.

3.6.6 Valves.

Valve Spacing: Valves shall be located so that not more than two adjacent fire hydrants will be out of water due to one break in the distribution system. Distance between valves shall not exceed 600 feet without approval from the General Manager.

3.7 Depth of Water Mains

3.7.1 Basic Requirements.

Water mains shall be installed at a 42-inch minimum depth to the top of pipe and in accordance with the District Standard Drawings No. W-3A and State of California, Department of Public Health regulations. State of California, Department of Public Health regulations require a 10-foot minimum horizontal separation between water and recycled water or sewer lines, and between recycled water and sewer lines. There are special construction methods which may be used where this separation cannot be achieved and they are shown in District Standard Drawings W-3A and W-3B. Separation other than the State of California, Department of Public Health minimums must be approved by the General Manager. Water and recycled water lines are typically located vertically from the street surface down in order of decreasing quality. Water will be the shallowest and recycled water will be the deepest. District Standard Drawing No. W-3A shows the clearances required for construction of water, recycled water and sewer lines. Concrete encasement may be required if the clearances indicated in

Drawing W-3B cannot be achieved. Continuous steel casing of either a water line or a sewer line may also be allowed in accordance with District Standard Drawing No.W-4. The length of casing shall be sufficient to extend a minimum of ten (10) feet on either side of the crossing to provide the required horizontal separation.

3.7.2 Standard Depths.

Where the natural ground above the pipeline trench has been over excavated and/or the pipeline is to be placed in the new embankment, embankment material shall be placed and compacted to an elevation of not less than 2 feet above the top of pipe prior to the trench excavation.

3.7.3 Exceptions.

Designs not in accordance with District requirements shall not be allowed, unless otherwise approved by the General Manager.

3.8 Elbows

Elbows shall be placed at locations where coupling deflection would exceed the allowable, as directed by the General Manager or his designated representative.

3.9 Structural Requirements

3.9.1 Buried Facilities

All structures and pipe placed underground shall be of sufficient strength to support with an adequate factor of safety the following applicable loads: the backfill, road surfacing, H-20 truck loading with impact, high loading to be specified by the Engineer or as required by good design. Calculations showing factor of safety may be required by the General Manager.

3.9.2 Other Pipes and Structures.

Water lines designed to cross under other pipes or structures shall be protected from damage and shall be constructed so as not to endanger the other pipe or structure. Minimum clearance between outside of pipes or between pipes and other structures is 12 inches unless otherwise approved by the General Manager.

3.10 Flexible Joints.

Flexible joints, which allow for differential settlements or other movement of water pipe, facilities, adjacent pipe and adjacent structures, shall be provided where waterlines enter encasements or other structures. The flexible joints shall be placed between one (1) foot and three (3) feet of such structures. Any deviations from these requirements shall require approval of the General Manager.

3.11 Thrust Blocks.

Thrust blocks are required as shown on District Standard Drawings W-17.

3.12 Design Criteria for Water Meters

3.12.1 General

The minimum meter size for a single-family residential unit is 5/8" x 3/4". The Developer shall submit calculations showing expected maximum and average daily water demand rate for all other building types and landscaping requirements.

A. Apartment/Condominium Conversions:

Prior to obtaining zone clearance, the Developer shall agree to, at his option, one of the following:

1. Redesign and reconstruct the existing onsite water system eliminating the master meter system and installing individual water meters to each single-family unit.
2. Retain the existing master meter system with the understanding that all domestic water billings will be based on rates appropriate to individually metered single-family living units.

B. New Condominium/Townhouse Construction:

The Developer shall design the onsite water system to provide individual water meters to each single family living unit. Master meters will not be allowed.

C. Individual Commercial Occupancies:

Each individually occupied commercial office, store, repair shop, etc., shall be metered individually. Master meters will not be allowed.

SECTION 4

STANDARD SPECIFICATIONS

4.1 Excavation

4.1.1 Trenches

The excavation for pipes shall be carried 4 inches below the bottom of the pipe or when approved by the District, the trench may be excavated around the bells.

4.1.2 Excess Excavation

In the event of excess excavation in the bottom of the trench, prior to pipe laying the trench shall be backfilled to 4 inches below the bottom of the pipe with select backfill. This material shall be placed in 4-inch layers, moistened and tamped to a relative density of 90 percent using Test Method No. 216, State of California, Division of Highways Standard Specifications.

4.1.3 Pipe Depth

All water mains shall be installed so that the top of the pipe is not less than 42 inches below the surface of the street, unless a deeper depth is specified in the excavation and/or encroachment permit. All water service connections shall be installed with a minimum of 42-inches cover. Shallower covers may be allowed if approved by the General Manager.

4.1.4 Protection of Existing Structures

Whenever existing sewer lines, water lines, gas mains, culverts, or other pipe or structures are encountered in or near the lines of trenches being excavated, the Developer and/or Contractor shall use proper care in preserving the same intact and will be held responsible for any damage done to the existing facilities during the progress of the work.

4.1.5 Excavation in Poor Soil

Where the sub grade is soft and cannot support the pipe, the bottom of the trench shall be over-excavated to a depth as directed by the General Manager or his designated representative, and shall be backfilled with imported sand or other select backfill material as directed by the General Manager or his designated representative.

4.1.6 Replacement of Sewer Lines

Wherever it is necessary for a water main to be installed deeper than a sewer main or lateral which crosses said water main or a sewer main or lateral should be broken during the construction, the Developer and/or Contractor shall provide ductile iron pressure pipe, couplings, and such other required material and labor to replace the sewer main or lateral as required by the District Engineer. Sewer lines must maintain at least 6-inches vertical separation at crossings. Where a sewer line crosses over a water line, the sewer line shall be encased 10 feet each

direction of said crossing per District Standard Plan No. W-3A. Sewer lines must maintain a 10-foot separation where lines run parallel. If spacing is less than 10 feet, the sewer line shall be encased for the entire distance or length that is closer than 10 feet. Before repairs are covered, they shall be approved by the General Manager.

4.1.7 Basic Separation Standard: Parallel Construction

The horizontal distance shall be one (1) foot above non-pressurized sanitary mains where the lines cross. Where the pressure potable water main crosses a pressurized sanitary sewer main or recycled pressure water main, the sewer or recycled lines must be encased with concrete or one continuous steel casing for 10 feet on both sides of the potable water main.

All crossing of potable water mains and sanitary sewer mains shall conform to the requirements of the State of California Department of Public Health, and District Standard Drawings W-3A and W-3B.

4.2 Distribution System Water Pipe

4.2.1 Potable Material

All water pipes and fittings used in distribution water mains shall be ductile iron pipe designed for the pressure Class 350 pipe. All diameters shall be full nominal inside diameters; the actual diameters may not be less than the nominal by more than 5.0 percent when measured approximately 3-inches from the ends of the pipe. All ductile iron pipe shall be manufactured in accordance with AWWA/ANSI 151/A21.51.

4.2.2 Hand Holes

All hand holes on potable or recycled water mains will be installed in accordance with Standard Drawing W-23.

4.2.3 Potable Installation

The initial backfill shall be by hand. Unless otherwise specified or shown on the plans, the pipe base and pipe zone backfill material shall be imported sand. The pipe base is defined as a layer of material immediately below the pipe zone and extending over the full trench width. The pipe zone shall include the full width of trench from the bottom of the pipe to a horizontal level 12-inch above the top of the pipe. The trench width shall be a minimum of 8 inches on each side of the pipe. Relative compaction for the pipe base and pipe zone shall be 90 percent. Depressions shall be dug into pipe base material to accommodate the pipe bell and external joint filler form, and to permit removal of the pipe-handling sling. Pipe shall be lowered onto the bedding and installed to line and grade its full length on firm bearing, except at the bell and at sling depressions. When pipe laying is not in progress, including lunch hour, the ends of the pipe shall be closed using vermin-proof plug constructed in a manner to also prevent entry by children.

All ductile iron pipe and fittings shall be polyethylene encased (8 mil thick) in accordance with AWWA/ANSA C105/A21.5. Encasement can also be achieved through the use of continuous polyethylene sleeve material fastened to each pipe length by plastic adhesive “pipe wrap” tape banded around the pipe at each end. Sleeve color shall be blue, 8-mil thick with 1-inch black letters indicating “POTABLE WATER.” See Sections 4.3.3-G for polyethylene encasement details and requirements.

4.3 Fitting and Valves

4.3.1 Ductile-Iron Fittings

Ductile-iron fittings shall be manufactured in accordance with AWWA/ANSI C110/A21.10. Ductile-iron compact body fittings may be used for fitting sizes 4-inches through 12-inches in diameter and shall be manufactured in accordance with AWWA/ANSI C-153/A21.53. All fittings shall be made with push-on joints designed for use with the type of pipe to be joined unless otherwise noted on the plans. Mechanical joint fittings will be allowed only in areas specifically approved by the District as a substitute for other types of fittings. Retaining glands shall be EBAA Iron Mega Lug® or FORD UNI-Flange Series 1400 with cleat style restraint lugs or approved equal. Bell ends shall be compatible with the pipe ends so as to provide confinement of the rubber rings and prevent damage to the ends of the pipe. Ring grooves and interior surfaces of the bell shall be smooth and free from ridges, notches, or uneven surfaces. Field lock style gaskets will be required when deemed necessary by the General Manager or his designated representative. All fittings with flanged ends shall comply with AWWA. ANSI C110.A21.10, with a pressure rating of 150 psi. The gasket surface shall have a serrated finish of approximately 16 serrations per inch, approximately 1/32-inch deep, with serrations in either a concentric or spiral pattern. The interior of all fittings shall be coated in accordance with Section 4.3.3-C. Ductile iron fittings shall be Tyler/Union or approved equal.

4.3.2 Valves

A. Potable Main Resilient Seat Gate Valves: 4-inch to 10-inch.

All main line resilient seated gate valves shall conform to AWWA C509, and shall also be UL listed and FM approved. The valves shall be tested and certified to ANSI/NSF 61 and the following requirements:

Valves shall be designed for a minimum working pressure of 200 psi and shall be bubble-tight at that pressure. Valves shall have non-rising stems. Stem nuts shall be independent of the gate and shall be made of solid bronze. All internal working parts, including the stem shall be all bronze containing not more than 2 percent aluminum or not more than 7 percent zinc. Bronze shall be ASTM B62 (85-5-5-5) bronze, except that stem bronze shall have a minimum tensile strength of 60,000 psi, a minimum yield strength of 30,000 and a minimum of 10 percent elongation in 2-inches.

Materials of construction shall be as follows:

Component	Material	Reference Standard
Body Operating Nut, Bonnet, Seal Plate	Cast Iron	ASTM A126, Class B
Gate	Ductile Iron	ASTM A126, Class B ASTM A536, Grade 65-45-12
Bonnet and Seal Plate Nuts and Bolts	Stainless Steel	ASTM A276, Type 316
O-Rings	Synthetic Rubber	ASTM A126 D2000

Low friction, torque reduction thrust bearings shall be provided both above and below the stem collar. Stuffing boxes shall be O-ring seal type with two rings located in stem above thrust collar. Each valve shall have a smooth unobstructed waterway free from any sediment pockets. Gates shall be encapsulated in Buna-S rubber or nitrile elastomer. Valves shall have all internal and external ferrous surfaces coated with a fusion bonded thermo setting power epoxy coating of 10 mils normal thickness. The coating shall conform to AWWA C550. Valves shall have all internal and external ferrous surfaces coated with a fusion bonded thermosetting powder epoxy coating of 10 mil nominal thickness. The coating shall conform to AWWA C550. Valves shall open in a counter-clockwise direction. Valves shall have a 2-inch operating nut, in lieu of a hand wheel, with an operating shaft extension to a level not deeper than 2-feet below existing street grade or natural ground. The push-on joint ends shall conform to AWWA/ANSI-C111/A21.11. **Valves shall be warranted by the manufacturer against defects in materials or workmanship for a period of 10 YEARS from the date of manufacture.** Valves shall be Mueller or approved equal. Valves shall be anchored as shown on Standard Drawing No. W-8.

B. Recycled Main Line Resilient Gate Valves: 2-inch to 12 12-inch.

All main line resilient seated gate valves shall conform to AWWA C515, and shall also be UL listed and FM approved. The valves shall be tested and certified to ANSI/NSF 61 and the following requirements:

Valves shall be designed for a minimum working pressure of 250 psi W.O.G. and shall be bubble-tight at that pressure. Valves shall have non-rising stems and hydrostatically tested to 750 psi (maximum) for irrigation application. Valves shall be suitable for use in recycled/ recycled water applications, capable of withstanding high-chlorine residuals, high turbidity, and corrosive water environments.

Component	Material	Reference Standard
Body	Cast Iron	ASTM A536
Discs	Ductile Iron	ASTM A536, ASTM D429
Thrust Collar, Stem Guide	Nickel Plated Bronze	AWWA C-800, ASTM B62
Stem, Casing and Bonnet Bolts	316 Stainless Steel	ASTM 3166SS
O-Rings, Gaskets, and Seals	EPDM	ASTM A126 D429

Low friction, torque reduction thrust bearings shall be provided both above and below the stem collar. Stuffing boxes shall be EPDM O-ring seal type with here rings located in stem above thrust collar. Each valve shall have a smooth unobstructed waterway free from any sediment pockets. Wedges shall have peroxide-cured EPDM. Valves shall have all internal and external ferrous surfaces coated with ISO9001 DuPont 4406 fusion bonded thermosetting epoxy coating of 16 mils nominal thickness. The coating shall conform to AWWA C550. Valves shall open in a counter-clockwise direction. Valves shall have a 2-inch operating nut, in lieu of a hand wheel, with a valve extension to a level not deeper than 2-feet below existing street grade or natural ground. The push-on joint ends shall conform to AWWA/ANSI-C111. Valves shall be warranted by the manufacturer against defects in materials or workmanship for a period of 10 years from the date of manufacture. Valves shall be Matco-Noca 300RW approved equal. Valves, valve boxes, and associated appurtenances shall be installed as shown on Standard Drawing No. W-8.

C. Valve Stem Extensions

All valve stems that are installed more than 4 feet below existing surface shall have a standard valve stem extension fastened to the operating nut, and brought to within 2 feet below existing surface. The extensions shall be manufactured and fastened to the operating nut to meet District’s approval. Valve stem extensions shall be steel, and shall be complete with a 2” square operating nut. Stem shall be provided with a 1/8” centerguide to keep stem centered per Standard Drawing W-31 and RW-10.

D. Potable Valve Boxes

All valve boxes shall be firmly supported and shall be kept centered and plumb over the operating nut of valve. Beveled sections of pipe will not be allowed at the top of the valve extension pipe. The top cut shall be square and machine made. The final valve box elevation shall be 1/8-inch above the finished pavement surface.

The valve box assembly shall be in accordance with Standard Drawing W-8. All valve box risers (flu pipe) shall be 8-inch SDR35 PVC pipe.

A valve box shall be provided for every valve installed below the street pavement. All valve boxes placed in the street pavement or any location where there is vehicular traffic shall be metallic and reinforced concrete and rated for h20 loads. Valve box shall be Brooks 4TT or approved equal.

All valve boxes, covers, and caps for gate valves placed in the street parkway or any location where there is no vehicular traffic, shall be metallic and reinforced concrete. Valve box shall be Brooks 4TT or equal.

All valve box covers shall be of metallic construction and shall be marked with the word "WATER" cast into the cover.

E. Recycled Valve Boxes

Same as potable valve box installation except the following:

All valve box covers shall be of metallic construction and shall be marked with the word "RECLAIMED or RECYCLED" cast into the cover.

The valve box shall be Brooks 1CR or approved equal. The recycled valve box assembly shall be in accordance with Standard Drawing RW-10

4.3.3 Coatings for Ferrous Surfaces

A. General

All piping, valves, fittings, and other metal surfaces which are not made of brass, bronze, or copper shall be lined and coated as described below.

B. Surface Preparation

All ferrous surfaces to receive protective coatings shall be sandblasted to a uniform gray metal appearance prior to the application of coatings. All surface irregularities, such as weld spatter, sharp corners, rough welds, etc shall be ground smooth. All surfaces shall be completely free of grease, oil, and other foreign material. All surface preparation shall be in accordance with Standard Specifications for Public Works Construction "Greenbook."

C. Interior Cast Iron or Ductile Iron Surfaces

Interior surfaces of pipe, valves and fittings shall be lined with either a smooth coat of cement mortar or a powder epoxy coating. The cement mortar lining shall conform to ANSI/AWWA C104/A21.4. Lining shall be the double thickness listed in AWWA C104, Section 4.8. Lining materials shall conform to ASTM C150, Type II. Powder epoxy coating shall be thermosetting powdered epoxy coating as described in section 4.3.3 E below. Total minimum required dry film thickness in all cases will be 12 mils, except for flange faces, which shall have a minimum thickness of 5 mils and a maximum thickness of 6 mils.

D. Buried Exterior Surfaces

All buried exterior ferrous surfaces shall be coated with a coal-tar epoxy having minimum volume solids of 78 percent and complying with MIL-P-23236. All coatings shall be applied in accordance with the coating manufacturer's recommendations or as approved by the District. Items to be coated shall include, but not be limited to, metal flanges, bolts and nuts, fittings, flexible pipe couplings, and structural steel.

Prime Coat: Apply to a dry-film thickness of 8 mils:

- Kop-coat 300-M, Ameron Amercoat 78 HB or approved equal.

Finish Coat: Apply two coats of 8 mils dry-film thickness for each coat:

- Kop-coat 300-M, Ameron Amercoat 78 HB or approved equal.

E. Dry Powder Epoxy

All items shall be prepared according to the manufacturer's surface preparation specifications. All items to be dry powder epoxy lined shall be preheated uniformly in a suitable oven. The epoxy shall then be fused uniformly to the ferrous surfaces to a total dry film thickness of not less than .008 inch, and the items shall be post cured in the oven, all in strict accordance with the epoxy manufacturer's recommendations as applied by the Fusedcote Company, 9658 Alpaca Street, South El Monte, California or approved equal.

Damaged epoxy surfaces and field welds shall be coated in the field with a solvent less two component 100 percent epoxy supplied by the coating manufacturer.

All epoxy linings shall be free of runs, bare or thin spots and pinholes. A check for coating integrity shall be made by the Contractor, using a tinker Razor 67 ½-volt wet sponge holiday detector. A check may also be performed by the District.

Coating thickness shall be confirmed with a DeFelsko Series 6000 gage. A 600-volt AC hi-pot Arc test shall be performed with no appearance of bright white Arc evidence. A Rock Island Arsenal (190 lbs-in) impact test shall be performed and be in evidence on accompanying test panel with no chipping or other coating damage visible. The Contractor shall correct any defects to the satisfaction of the District.

F. Nuts, Bolts, and Washers

All nuts, bolts, and washers shall be 304 or 316 stainless steel. Bolts shall conform to ASTM A 193 (Grade B8M). Nuts shall conform to ASTM A 194 (Grade 8N). Both shall conform to AWWA C111. This includes nuts and bolts on flex and transition couplings. An anti-seize compound shall be applied to all stainless steel threads.

G. Polyethylene Encasement

Unless otherwise specified, all water fittings and pipes must be encased by sheet or continuous polyethylene sleeve material and secured with plastic pipe wrap tape. Polyethylene sheet or sleeve encasement shall be a minimum of 8 mil thick and conform with ANSI/AWWA C105/A21.5. Encasement can also be achieved through the use of continuous polyethylene sleeve material fastened to each pipe length by plastic adhesive “pipe wrap” tape banded around the pipe at each end

- Potable installation: Sleeve color shall be blue, 8 mil thick with 1-inch black letters indicating “CAUTION POTABLE WATER.”
- Recycled installation: Sleeve color shall be purple, 8 mil thick with 1-inch, black letters indicating “CAUTION: RECYCLED WATER-DO NOT DRINK.”

H. Pipe Wrap Tape

Adhesive backed tape for securing polyethylene sheet, sleeve material, and warning/identification tape will be required. Tape shall be a minimum of 2 inches wide and 10 mil thick, such as Winmore UPC, Polyken 900, Scotchwrap 5, or approved equal.

4.4 Thrust Blocks

4.4.1 Location

Thrust restraint and anchor blocks shall be provided on all pressure pipelines, and shall be installed as shown on the plans and at all rubber gasketed fittings that are not otherwise restrained. Thrust restraint blocks or anchor blocks shall be installed at all valves, tees, crosses, end of degrees, and at all changes of direction

of the pipeline greater than 10 degrees deflection either vertically or horizontally when joints are not otherwise restrained.

4.4.2 General Requirements

Thrust restraint and anchor blocks shall be of not less than 2,000 psi concrete (Class C), and shall provide a thrust bearing area to resist horizontal or downward movement; and shall be of sufficient gross weight and area to give bearing against undistributed vertical earth banks sufficient to absorb the thrust, allowing an earth bearing of 1,500 pounds per square foot maximum.

4.4.3 Concrete Placement

Concrete shall be placed against wetted and undistributed soil, and the exterior of the fitting shall be cleaned and wetted to provide a good bond with the concrete. The concrete interface with the fitting shall be an area not less than the projected area of the fitting normal to the thrust resultant and centered on the resultant.

4.4.4 Harness and Tie-Rods

Metal harness or tie-rods and pipe clamps shall be used to prevent movement if shown on the plans or directed by the District. The rods and clamp harnessing arrangement shall be installed utilizing flanged harness hold-downs or lugged fittings and pipe with the saddle clamps placed to bear against the pipe bells. Saddle clamps around the barrel of pipe, which depend on friction or setscrews to prevent sliding of the clamp, are not acceptable. All surfaces of exposed and buried steel rods, reinforcing steel, bolts, clamps, and other metal work shall be coated before installation and touched up after assembly as specified in Section 4.4.4.

4.5 Concrete and Cement Grout

4.5.1 Cement

All cement shall conform to ASTM C 150-61, Type II or Type V, with maximum tricalcium aluminate not-to-exceed 6 percent. The maximum percent alkalis shall not exceed 0.6 percent.

4.5.2 Sand

All sand shall be fine granular material resulting from the natural disintegration of rock and shall be free from injurious amounts of oil, mica, clay and other deleterious substances. Sand, when tested in accordance with Standard Method of Test, ASTM C117, as latest revised, shall not exceed 3 percent by weight of clay and silt. All sand shall conform to the applicable Los Angeles County DPW and City of Pico Rivera, or other jurisdictional agency's specifications as required for similar use, except as noted herein.

4.5.3 Rock and Gravel

All rock and gravel for use in concrete shall be mechanically washed. It shall consist of gravel or a combination of gravel and sound crushed rock, having clean, hard, tough, durable, and uncoated pieces, free from injurious amounts of soft, friable, thin, elongated, or laminated pieces, alkali, oil, organic, or other deleterious substances. The aggregates shall comply with ASTM C33 and shall be free from any substances that will react with cement alkalis.

4.5.4 Water

Water that is clean and free from objectionable quantities of organic matter, alkali, salts, and any other impurities, which might reduce the strength, durability, and quality of the concrete, shall be used in the concrete mix.

4.5.5 Concrete

All concrete used for thrust blocks and pads shall develop an ultimate compressive strength of 2,000 psi at 28 days, in accordance with ASTM C39, as latest revised. All ready-mix concrete shall comply with ASTM C94, as latest revised.

4.5.6 Cement Mortar

All cement mortar used for lining pipe and fittings shall develop an ultimate compressive strength of 3,000 psi at 28 days, in accordance with ASTM C39, as latest revised.

4.6 Pressure Tests

4.6.1 Hydrostatic Tests

Hydrostatic testing shall be successfully completed before any new pipelines, potable or recycled, are connected to any existing District facilities, unless otherwise approved by the General Manager.

- A.** Prior to applying the specified test pressure, care shall be taken to ensure the expulsion through hydrants, air and vacuum valve assemblies, and services or by other suitable means, of all air within the pipe and appurtenances to be tested. If there are no air release valves, hydrants or other outlets available at the downstream end of the pipeline and at high points, taps shall be installed to expel the air. These taps shall be capped, and after testing is completed, plugged.
- B.** Prior to testing, isolation between existing pipelines or mains must be insured. Pressure tests shall be conducted between valves or against temporary bulkheads

in the pipe. During the test, no temporary blocking will be permitted. All valves, fire hydrants, service connections, fittings, collars, joints and other appurtenances shall be exposed until after successful completion of the test, unless otherwise directed by the District or his authorized representative.

- C. A test pressure based upon the elevation of the highest point in the line or section under test and corrected to the elevation of the test gage shall be applied by means of an approved pump and gallon water meter connected to the pipe in the manner satisfactory to the General Manager or his designated representative. The test shall be made on all sections of the pipeline in such a manner that all valves, fire hydrants, service connections, fittings, collars or joints, and other appurtenances shall have successfully withstood, for a period of 2 hours a pressure of 150 psi.

All defective joints, cracked or defective pipe, fittings, valves, fire hydrants, or service connections shall be removed and replaced by the Contractor. The test shall be repeated until results satisfactory to the General Manager or his designated representative are obtained.

Removal and replacement of defective joints, cracked or defective pipe, fittings, valves, fire hydrants, or service connections shall not take place prior to notification or without approval of the General Manager or his authorized representative. The aforementioned test shall be performed by the Contractor, including all work of tapping and connecting. The Contractor shall repeat the test until results satisfactory to General Manager or his designated representative are obtained.

The aforementioned test shall be performed by the Contractor at Contractor's sole expense. The Contractor shall provide all tools, fittings, and equipment necessary to accomplish said work. The test shall be performed only in the presence of the District's designated representative. During the period of testing, the joints and taps shall be exposed and any material sweating or showing dampness will not be accepted unless otherwise approved by the General Manager or his designated representative.

When it is necessary to cover the ditch as soon as the water main is laid, the authorized representative of the District may permit the backfilling to be completed prior to testing and disinfecting. If the pipe then tested exceeds the allowable leakage, the pipe must be uncovered, repaired and tested until it meets the allowable leakage.

4.7 Chlorination

4.7.1 General

A. Description

This section describes the disinfection of potable water mains, services, appurtenances, and connections by chlorination, in accordance with AWWA C651 and as specified herein.

B. Job Conditions

1. Discharge of chlorinated water into watercourses or surface waters is regulated by the National Pollutant Discharge Elimination System (NPDES).
2. The rate of flow and locations of discharges shall be scheduled in advance to permit review and coordination with the District's designated representative.
3. Potable water shall be used for chlorination.
4. Requests for use of water from District water lines shall be submitted 72 hours in advance.
5. Chlorination shall be performed prior to hydrostatic testing for pipelines having a diameter of 12-inches and larger.

4.7.2 Materials

A. Liquid Chlorine Solution

Liquid chlorine solution shall be in accordance with the requirements of ANSI/AWWA B301, and shall be injected with a solution feed chlorinator and a water booster pump.

B. Sodium Hypochlorite Solution

Sodium Hypochlorite shall be in accordance with the requirements of ANSI/AWWA B300, shall be diluted in water to desired concentration of approximately 100 ppm, or that concentration which will provide a minimum of 50 ppm in all parts of the line after 24 hours has elapsed. The solution shall be pumped into the pipeline at a measured rate.

C. Chlorine Gas Solution

Chlorine gas shall be in accordance with the requirements of ANSI/AWWA B300, shall be injected into the water filled pipeline to desired concentration of approximately 100 ppm, or that concentration which will provide a minimum of 50 ppm in all parts of the line after 24 hours has elapsed.

D. Chlorine Residual Test Kit

For measuring chlorine concentration, a medium range, drop count, titration kit shall be used. The kit shall be capable of determining chlorine concentration in the range 1.0 to 50.0 mg/l. Test kits shall be Hach Chemical or approved equal. An adequate number of kits shall be maintained by the Contractor in good working order and available for immediate test of chlorine residuals at points of sampling.

4.7.3 Execution

A. Pipelines

1. General: Before being placed into service, all pipelines and appurtenances shall be chlorinated. Pipelines with a diameter of 10 inches or less shall be disinfected by either liquid chlorine solution injection, Calcium Hypochlorite solution injection or by use of chlorine gas solution. The type or method of chlorination will be at the discretion of the General Manager. Pipelines with a diameter of 12-inches and larger shall be disinfected by direct chlorine solution injection. Steel pipelines shall be disinfected by direct chlorine solution injection. Bacteriological testing after disinfection shall be performed by the District.
2. Chlorination Contractor: In the case of 12 inches and larger mains, chlorination shall be performed by a certified chlorination and testing contractor. Chlorination shall be in accordance with the instructions of the chlorinator manufacturer.
3. Groundwater: In the event groundwater is encountered and it is impossible to prevent its entrance into the mains, or the mains are not free from dirt, they shall be thoroughly flushed prior to disinfection. Disinfection shall be by direct chlorine solution injection.
4. Services: Every service connection served by a main being disinfected shall be tightly shutoff at the angle meter stop before water is applied to the main. Care shall be taken to expel all air from the main and services during the filling operation.

- 5. Chlorine Solution Injection by the Continuous Feed Method:**

 - a.** Chlorine solution shall be applied at the beginning of the section to be chlorinated and shall be injected through a corporation stop, a hydrant, or other approved connection to ensure treatment of the entire system being disinfected. All required corporation stops and other plumbing materials necessary for chlorination or flushing of the main shall be installed by the Contractor.
 - b.** Potable water shall be introduced into the pipeline at a constant measured rate. Chlorine solution shall be injected into the potable feed water at a measured rate. The two rates shall be injected proportioned so that the chlorine concentration in the pipeline is maintained at a minimum concentration of 50 mg/l and 25mg/l after 24 hours in the pipe. The concentration at points downstream shall be checked periodically during the filling to ascertain that sufficient chlorine is being added.
- 6. Disinfection of Valves and Appurtenances:** During the period that the chlorine is in the section of pipeline, valves shall be opened and closed to obtain a chlorine residual at hydrants and other pipeline appurtenances. Care shall be taken to ensure that no chlorinated water enters any active pipeline.
- 7. Concurrent Testing (for pipelines with Diameter of 10-inches or less):** Disinfecting mains and appurtenances, and hydrostatic testing may run concurrently for the required 24-hour test period. In the event there is a leakage and repairs are necessary, disinfection of the pipeline shall be repeated by injection of the chlorine solution into the line as provided in the section.
- 8. Confirmation of Residual:** After the chlorine solution applied by the continuous feed method has been retained in the pipeline for 24 hours, samples shall be taken at air valves and other points of access to confirm that a chlorine residual of 25 mg/l minimum exists along the pipeline.
- 9. Pipeline Flushing:** After confirming the chlorine residual, excess chlorine solution shall be flushed from the pipeline until the chlorine concentration in the water leaving the pipe is within 0.5 mg/l of the replacement water. Water must be dechlorinated as soon as practical after leaving the line being flushed.
- 10. Bacteriologic Tests:** One sample shall be collected at each air release valve or for each mile where valve intervals are greater, and delivered to the District's designated representative within six (6) hours. A

bacteriologic quality test will be performed by the District to demonstrate the absence of Coliform organisms in each separate section of the pipeline after chlorination and refilling.

11. Repetition of Procedure: If the initial chlorination fails to produce required chlorine residuals and bacteriologic tests, chlorination and testing shall be repeated until satisfactory results are obtained at no cost or liability to the District.
12. Test Facility Removal: After satisfactory disinfection, air valves shall be replaced, the pipe coating restored, and temporary disinfection and test facilities removed.

B. Wells and Well-Head Pump Stations

1. General: The well and wellhead piping shall be disinfected as a complete unit. Adequate bracing shall be provided to resist thrust.
2. Depth of disinfection: The well shall be disinfected to its full depth. The General Manager or his designated representative will determine the chlorine residual and method for disinfection.
3. Pump Column Disinfection: The pump column shall be washed with a chlorine solution, containing at least 12 percent chlorine, as the pump column is lowered into the well or pump can.
4. Mixing: After the well pump has been placed into position, it shall be turned on and off several times so to thoroughly mix the disinfectant with the water in the well. The pump shall be run until the water discharged has the odor of chlorine. This procedure shall be repeated several times at 1-hour intervals.
5. Disinfection Time: After mixing, the well shall be allowed to stand without pumping for 24 hours.
6. Flushing: Well water shall be pumped to waste in conformance with all applicable NPDES requirements, until the presence of chlorine is no longer detectable. While pumping to waste, the water will need to be de-chlorinated. The chlorine residual shall be determined by testing for available chlorine using a test kit.
7. Bacteriological Tests: One bacteriological sample shall be taken, unless more are required by the General Manager. Samples shall be submitted to the District's laboratory for examination. Samples shall be tested by the District's laboratory for Coliform bacteria and heterotrophic plate count.

All Coliform test results must be negative and heterotrophic plate counts must be less than 500 colonies/ml prior to placing the well into service.

8. Repetition of Procedure: If the Laboratory analyses indicate the water is not free of bacterial contamination, the disinfection procedure shall be repeated. Depending on the level of contamination, it may be necessary to use a higher concentration chlorine solution. The water shall be then re-tested. Two consecutive samples must pass the bacteriological test before the well can placed into service.

C. Reservoirs

1. General: The Contractor shall make all necessary provisions for conveying water from the District designated supply source to the points of use.
2. Facilities to be disinfected: All hydraulic structures and appurtenant pressure piping shall be tested; those for potable water shall also be disinfected. In case of a reservoir, testing and disinfecting operations shall be combined. All chlorination and testing operations shall be done in the presence of the District's representative.
3. Scheduling: Disinfection operations shall be scheduled by the Contractor as late as possible during the contract time period so as to assure the maximum degree of sterility of the facilities at the time the work is accepted by the District.
4. Bacteriological Testing: Bacteriological testing shall be performed by the District's designated laboratory. Results of the bacteriological testing shall be satisfactory to the State of California Public Health Department. All Coliform test results must be negative and heterotrophic plate counts must be less 500 colonies/ml, prior to placing the reservoir into services.
5. Release of Disinfection Water: After testing and disinfecting have been completed, release of water from structures shall be acceptable to the District and in conformance with all applicable NPDES requirements. The released water must be de-chlorinated prior to release.
6. Preliminary Cleaning and Flushing: Prior to both testing and disinfecting, all hydraulic structures shall be cleaned by thoroughly hosing down all surfaces with a high-pressure hose and nozzle of sufficient size to deliver a minimum flow of 50 gpm. All water, dirt, and foreign material accumulated in this cleaning operation shall be discharged from the structure or otherwise removed.
7. Disinfection of Hydraulic Structures and Appurtenant Pipelines: All hydraulic structures which store or convey potable water shall be

disinfected by chlorination. Chlorination of hydraulic structures shall be performed in accordance with the requirements of ANSI/AWWA C652.

- a.** Chlorination: A strong chlorine solution (about 200 mg/l) shall be sprayed on all interior surfaces of the structure. Following this, the structure shall be partially filled with water to a depth of approximately one foot. During the partial filling operation, a chlorine-water mixture shall be injected by means of a solution feed chlorinating device in such a way as to give a uniform chlorine concentration during the entire filling operation. The point of application shall be such that the chlorine solution will mix readily with the in-flowing water. The dosage applied to the water shall be sufficient to provide a chlorine residual of at least 50 mg/l upon completion of the partial filling operation. Precautions shall be taken to prevent the strong chlorine solution from flowing back into the lines supplying the water. After the partial filling has been completed, sufficient water shall be drained from the lowered ends of appurtenant piping to ensure filling the lines with the heavily chlorinated water.
- b.** Retention Period: Chlorinated water shall be retained in the partially filled structure and appurtenant piping long enough to destroy all non-spore-forming bacteria, and in any event for at least 24 hours. After the chlorine-treated water has been retained for the required time, the free chlorine residual in the structure and appurtenant piping shall be at least 25 mg/l. All valves shall be operated while the lines are filled with the heavily chlorinated water.
- c.** Final Filling of Structure: After the free chlorine residual has been checked and found to satisfy the above requirement, the water level in the structure shall be raised to its final elevation by the addition of potable water. Before final filling is commenced, the concentration of heavily-chlorinated water remaining in the structure and piping shall, unless otherwise acceptable to the General Manager or his designated representative, be sufficient to produce a free chlorine residual of between 1 and 2 mg/l when the water level is raised to its final elevation. After the structures have been filled, the strength of the chlorinated water shall be determined. If the free chlorine residual is greater than 2 mg/l, the structure shall be partially emptied and additional potable water added. In no case shall water be released prior to the expiration of the required retention period. If chlorinated water has to be drained from the structure, this water will have to be de-chlorinated per all applicable NPDES and District requirements.

8. Connections to Existing System: Where connections are to be made to an existing potable water system, the interior surfaces of all pipe and fittings used in making the connections shall be swabbed or sprayed with a one percent Hypochlorite solution before they are installed. Thorough flushing shall be started as soon as the connection is completed and shall be continued until all discolored water is eliminated.

4.8 Backfill

4.8.1 General

A. Description

This section describes excavation, backfilling, materials, testing, and shoring for underground structures.

B. Protection of Existing Utilities and Facilities

1. General: The Contractor shall be responsible for the care and protection of all existing sewer pipelines, water pipelines, gas mains, storm drains, culverts, or other facilities and structures that may be encountered in or near the area of work.
2. Notification: It shall be the duty of the Contractor to notify “Dig Alert” or each affected agency of jurisdiction and make arrangements for locating each agency’s facilities prior to beginning construction.
3. Damage: In the event of damage to any existing facilities during the progress of the work due to the failure of the Contractor to exercise the proper precautions, the Contractor shall be responsible for the cost of all repairs and protection to said facilities. The Contractor’s work may be stopped until repair operations are complete.

C. Protection of Landscaping

The Contractor shall be responsible for the protection of all trees, shrubs, turf, fences, and other landscape appurtenances adjacent to or within the work area, unless directed otherwise on the plans. In the event of damage to landscape appurtenances, the Contractor shall replace the damaged appurtenances in a manner satisfactory to the General Manager.

4.8.2 Placing Backfill

In the event of excavation in an existing paved street, the backfill shall meet the following requirements:

- Trenching for the water line shall include over-excavation below the pipe no less than 4 inches in depth or $\frac{1}{8}$ " the diameter of the pipe being installed, whichever is greater. This over-excavated depth shall be replaced with clean imported sand as pipe bedding material. Compaction of this bedding shall result in 95 percent relative compaction.
- That portion of the backfill for trenches between the top of the sand bedding and the bottom of the existing structural section of the street or paved area, shall consist of native materials, suitable for backfill. If native materials are unsuitable for backfill, as determined by the District's designated representative, backfill shall consist of crushed aggregate base material per District Std. Drawing No. S-25. Compaction of this backfill shall result in 95 percent relative compaction.

In the event of excavation not in an existing or future paved street, the backfill shall be as follows:

- That portion of the backfill for trenches between the top of the sand bedding and a line 16 inches below existing grade shall consist of native materials, suitable for backfill, and compacted to 95% relative compaction.
- The backfill material shall be placed in layers not exceeding 6 inches in thickness, moistened, as required, for maximum compaction, and thoroughly compacted with hand-operated, pneumatic tampers or by other means approved by the District to a relative density of 95 percent as determined by the compaction test. This method will be at the discretion of the General Manager.

In the event the methods used by the Contractor do not accomplish the required compaction, the District may require that the backfill be removed and replaced in 4-inch layers and that each layer be moistened, tamped, rolled, or otherwise compacted until the required compaction is obtained, as determined by an independent compaction test by a Soils Engineer.

4.8.3 Pavement Repair in Streets

Pavement repair in City of Pico Rivera streets shall be in accordance with City of Pico Rivera Engineering Division Standards and City Encroachment Permit requirements.

4.9 Water Services

4.9.1 Location and Size

Only single service installations will be permitted with minimum size being 1 inch. Each service will be shown on the standard drawings. Services shall be located within 5 feet of the center of the lot, unless otherwise approved by the General Manager, at as near right angles to the main as possible and shall be spaced a minimum of 10 feet from the sewer lateral (see Standard Drawing W-18). Services will not be permitted in the driveway areas. The service shall terminate in a meter box located where concrete curbs and/or sidewalks are to be constructed as part of the improvement plans, contiguously or not, 9-inches from top of curb to vertical centerline of the meter stop and 6 inches from back of curb to vertical centerline of the service stop. Actual size shall be determined by total water flow requirements in order to minimize the pressure drop and provide the quality of service required by the customers in the water system. In no case shall the diameter of the water service connection be less than required by the Plumbing Code. On service connections, a corporation stop shall be directly connected to the service saddle at the water main. Where property will be served by two or more water service connections from different street water mains, but from one source of supply, each service connection shall be equipped with an above ground reduced pressure principal device to prevent inter-street flow.

If any existing water services cannot be utilized for the project in their current location that would impact the existing service location, the service shall properly be abandoned at the main. Conditions that would require abandonment are as follows, but not limited to: driveway additions, curb and gutter alignment changes, stamped concrete street surfaces, age and condition of existing service or any other change that impacts the existing service. Final determination and abandonment requirements shall be made by the General Manager or his designated representative.

One (1") inch and 2-inch (2") service connections shall be installed as shown in Standard Drawing W-19 or W-20 as appropriate. The water service line shall be copper pressure pipe water tubing "K" ANSI/AWWA C800.

Water services 3 inches (3") and larger shall be installed as shown in Standard Drawing W-21A or RW-15. Four-inch (4") ductile iron pipe shall be required for 3-inch services and reduced from 4 inch to 3 inch at the meter or detector assembly.

4.9.2 Location of Service Taps

Service taps shall be made as shown on the Standard Drawings, and not less than 24 inches from couplings, joint, or fitting, not less than 2 feet apart, and service saddles shall be required. Water mains shall only be tapped with a Mueller tapping machine or approved equal.

4.9.3 Service Saddles

1. Service saddle bodies shall be manufactured of bronze and shall be tapped for an iron pipe thread. The seal with the pipe shall a rubber gasket or an O-ring. Service saddles shall be as manufactured by James Jones, Mueller, Ford or approved equal. See Standard Drawing W-19 and W-20.
2. One-inch (1") service saddles shall be double-strap type for all sizes of asbestos-cement or ductile iron pipe. Two-inch (2") size service saddles shall be of the double-strap type for all sizes of asbestos-cement or ductile iron pipe. The straps (or bails) shall be flat and shall be manufactured of Everdur or Silnic Bronze. Service saddles shall be a James Jones J-979, Mueller BR 2 B, Ford F2020B or approved equal.
3. Service saddles for C900 PVC pipe shall be manufactured of bronze or Type 316 stainless steel, and shall be cast in two sections for pipe up to and including 8-inches in diameter. Service saddles for use on 10-inch and 12-inch diameter C900 PVC pipe may be cast in two or three sections. Each saddle shall accurately fit the contour of the pipe O.D. without causing distortion of the pipe. The sections shall be securely held in place with stainless steel nuts and bolts. Casting sections may be hinged and secured with stainless steel pins. The casting sections shall be tapped to receive the screws or bolts. Service saddles shall be a James Jones J-969, Mueller BR 2 S, Ford 202BS or approved equal.

4.9.4 Tapping Valves and Sleeves

1. Tapping valves shall conform to the requirements for gate valves 4-inch and larger. Valve ends shall be flange by mechanical joint. The mechanical end shall have slotted bolt holes to fit standard tapping machines. Seat rings shall be oversized to permit the use of full-size cutters. Tapping valves shall be Mueller RS, or approved equal.
2. Tapping sleeves shall be installed in accordance with the manufacturer's instructions. The pipe barrel shall be thoroughly cleaned with a wire brush to provide a smooth, hard surface for the sleeve. The sleeve shall be supported independent of the pipe during the taping operation. The sleeve shall be pressure tested in the presence of the District designated inspector prior to tapping. Thrust blocks per District Standard Drawing No. W-17 shall be provided at the tapping sleeve. Tapping sleeves shall have 304 stainless steel bodies with a Flexi Blue epoxy coated flange. Gaskets shall be Grade 60 concave wedge gasket with a wide cross-section. Bolts, nuts, and washers shall be 304 stainless steel. Stainless steel nuts shall be Teflon coated to prevent galling. Tapping sleeves shall be a stainless steel Smith Blair CC-662, Mueller H-304 or approved equal.

4.9.5 Corporation Stops

Corporation stops shall be manufactured of bronze. The inlet fitting shall be a male iron pipe thread when used with saddle and the outlet connection shall be a compression type. One inch (1") and 2-inch (2") corporation stops shall be a Mueller 110 H-15013, Ford FB1100-4Q, and FB1100-7Q as appropriate or approved equal. See Standard Drawing W-19 or W-20A.

4.9.6 Angle Meter Stops

Angle meter stops shall be manufactured of bronze. The inlet connection shall be a compression type and the outlet fitting shall be a meter flange or meter coupling. The angle meter stops shall be of two sizes, 1 inch and 2 inch. If a 5/8" x 3/4" meter is installed, then two 1" x 3/4" bronze meter bushing shall be supplied. The meter bushings shall be attached to the inlet and outlet of the 5/8" x 3/4" meter. The inlet and outlet shall form an angle of 90 degrees on a vertical plane through the centerline of the meter stop. A rectangular lug and lock wing shall be provided on the top of the fitting to operate the shutoff mechanism. Angle meter stops shall be ground key style. One inch (1") shall be Mueller 110 H 14258, Ford KV43-444WQ or approved equal. Two inch (2") shall be Mueller 110 H-14277. See Standard Drawing W-19 or W-20.

4.9.7 Compression Fittings

Compression fittings shall be manufactured of bronze. Splices and 90-degree fittings shall be compression type. Compression fittings shall be Mueller 110, Ford Quick Joint or approved equal.

4.9.8 Meter Service Inspection

No portion of the meter service connection shall be backfilled or covered until flushed and pressure tested and authorized by the General Manager or his authorized representative.

4.9.9 Meter Installation

The Developer or Contractor shall furnish and install meter couplings, bushing, washers, meter spacers and meter boxes. Only the water meters shall be furnished and installed by the District at Developer's or Contractor's expense, unless otherwise authorized by the General Manager.

In some cases where uninterrupted water supply is required, the installation will require a bypass around the meter. See Standard Drawing W-20A and W-21B.

4.9.10 Water Meter Boxes

Water meter boxes shall be furnished and installed true to line and grade by the Developer and/or Contractor and shall be flush with the top of concrete curb.

All meter boxes and covers shall be precast of either concrete, reinforced polymer/plastic, or high-density polyethylene. All concrete used for meter boxes for 1½ inch and larger meters shall be reinforced. One and one-half inch (1½”) and 2-inch (2”) meter boxes shall have reading lids. See Standard Drawing W-25 through W-31.

Meter box covers within roadways shall be cast-iron or steel designed to withstand H-20 highway loading, with reading lid.

Meter boxes shall not be installed until after curbs and sidewalks are in and the area between has been graded.

All vaults for 3, 4, 6-inch and larger meter installations with bypass assemblies shall have double vault doors that are spring or pneumatic assist with reading lids. Vault doors shall be appropriately sized to the vault type and size specified on the plans or as directed by the General Manager or his authorized representative. The vault doors shall consist of ¼-inch thick aluminum diamond plate reinforced for 300-p.s.f. live load. The frame shall consist of extruded aluminum with integral anchor flange and door seat on all four sides. The floor access door shall be equipped with a drop handle that does not protrude above the cover and 316 stainless steel hold open arms with red vinyl covers that automatically lock the doors in the 90-degree upright position. One door shall have a hinged 6-inch by 6-inch square aluminum reading insert lid in the center of the door. The hinge and hardware shall be 316 stainless steel. The doors shall have 316 stainless steel hinges, assist springs, and tamper resistant bolts/locknuts. The vault doors shall also be equipped with a 316 stainless steel slam lock and removable handle key. The vault door and frame assembly shall be an APD 300 manufactured by U.S.F. Fabrication, INC., or an approved equal. Manufacturer shall guarantee the door against defects in materials and workmanship for a period of 10 years.

Reading lids shall be required on all vaults for 3-inch, 4-inch, and 6-inch turbine and compound meters.

4.9.11 Spacers

Permission from the General Manager may be obtained to install spacers in meter boxes in tracts in lieu of meters during construction of houses. See Standard Drawing W-19 and W-20. The charge for water usage shall be paid in advance of receiving service. A meter must be installed before landscaping is installed or the building is occupied.

4.9.12 Repair Clamps

Repair clamps shall be 304 stainless steel with high strength ductile iron lugs ASTM A536. The gasket material shall be Nitrile NSF 61 listed. The bridge plate shall be 304 stainless steel recessed flush and bonded into the gasket. Bolts, nuts, and washers shall be 304 stainless steel. Stainless steel nuts shall be Teflon coated and prevent galling. Repair clamps for pipe 4 inch through 10 inch shall be Smith-Blair Full Circle Double Band 227 or approved equal. Repair clamps for pipe 12 inch and larger shall be Smith-Blair Full Circle Triple Band 228 or approved equal.

4.9.13 Transition and Pipe Couplings

Transition and repair couplings shall be long barreled ductile iron sleeves meeting ASTM A-536. Ends shall have a smooth taper for uniform gasket seating. Follower to be determined by coupling size. Gasket material shall be Nitirle (Buna N) Grade 60, NSF 61 listed. Nuts and bolts shall be 304 stainless steel. An anti-seize compound shall be applied to all stainless steel threads. Finish of coupling and followers shall be a fusion bonded epoxy coating. Standard shop coats are not permitted. Transition and repair couplings shall be Smith-Blair long sleeve 442 omni-coupling or Quantum, or Romac XR501 or 501 long barrel. Ford FC2A-ESH is acceptable only if supplied with factory fusion bonded epoxy coatings.

4.9.14 Cross Connections

Cross connections of any type which permit a backflow of water from a supply other than that of the District into the District mains are prohibited. A cross connection constituting a potential backflow hazard is permissible only when approved by the General Manager and shall be protected by a reduced pressure principal device, subject to the District inspection and regulations at all times for the purpose of avoiding the possibility of backflow. All installations shall comply with the requirements of the latest edition of AWWA C506 and the "Manual of Cross-Connection Control," Foundation for Cross-Connection Control and Hydraulic Research, University of Southern California, School of Engineering. See Appendix "C" and Standard Drawing W-35.

4.9.15 Temporary Water Service

Application shall be made to the District for temporary service desired, such as water used in construction for compaction, flooding of ditches, sprinkling, etc. Depending on the location of the construction and subject to the availability of recycled water, the General Manager may require recycled water to be used. Upon the deposit of such sum as the General Manager may require, the Developer and/or Contractor shall furnish and install an Eddy Valve on the fire hydrant. If potable or recycled water is to be used in a water truck, it must be certified by the District's designated representative prior to use. Service is to be rendered out of existing District fire hydrants only in the nearest tract or development. The use of pipe wrenches to open fire hydrants shall not be permitted.

Only spanner type fire hydrant wrenches, or approved Fire Department wrench shall be used.

The General Manager will stop all irrigation that might affect the use of water or fire hydrants.

4.10 Miscellaneous Valves

4.10.1 Reduced Pressure Detector Check Assembly

The reduced pressure detector check assembly with by-pass meter shall be installed above ground in compliance with Standard Drawing W-9. The reduce pressure detector check assembly shall be installed as close to the street as possible. The function of the by-pass meter is to detect possible leakage or unauthorized use of water from fire or automatic sprinkler systems; prevent loss of water from fire services or “wet pipe” sprinkler systems. The reduced pressure detector check assembly shall be from the list of approved backflow prevention assemblies supplied by the District. Upon completion of the installation of the device, a test shall be performed and a certificate of the adequacy and operational compliance shall be furnished by the District. The test shall be performed by a testing company approved by the District.

For some installations where an uninterrupted water supply is required, dual parallel backflow devices may be required as determined by the General Manager.

See Standard Drawing W-9

4.10.2 Double Detector Check Assembly

The double detector check assembly with by-pass meter shall be installed above ground in compliance with Standard Drawing W-9. The double check detector assembly shall be installed as close to the street as possible. The function of the by-pass meter is to detect possible leakage or unauthorized use of water from fire or automatic sprinkler systems; prevent loss of water from fire services or “wet pipe” sprinkler systems. The double check detector assembly shall be from the list of approved backflow prevention assemblies supplied by the District. Upon completion of the installation of the device, a test shall be performed and a certificate of the adequacy and operational compliance shall be furnished by the Contractor to the District. The test shall be performed by a testing company approved by the District.

For some installations where an uninterrupted water supply is required, dual parallel backflow devices may be required as determined by the General Manager or his designated representative.

See Standard Drawing W-9

4.10.3 Air and Vacuum Release Valves

All air and vacuum release valves shall be installed in the water system at all points where it is indicated that air pockets may form. The design shall be such so as to ensure the release of air from the water main when the pressure inside the line is below atmospheric pressure. All valves shall be designed for a minimum of 150 psi operating pressure. The Type K copper piping from the water main shall terminate in an angle meter stop in a number three meter box next to the air vacuum release valve. Type K copper pipe and brass pipe shall be plumbed from the angle meter stop to the air vacuum release valve. See Standard Drawing W-14.

4.11 Blow-Off Assemblies

A blow-off shall be provided to facilitate draining and flushing of the line wherever a pipeline dead-ends and at low points as required by the General Manager or his designated representative.

Permanent type blow-offs shall be 4-inch located in the parkway as shown in Standard Drawing W-12 or RW-20.

Temporary blow-offs shall be 2-inch located in the parkway complete with meter box as shown in Standard Drawing W-13.

4.12 Fire Hydrant Assemblies

4.12.1 Location and Elevation

Fire hydrant assemblies shall be located as shown on approved plans in accordance with the Los Angeles County Fire Department. The fire hydrant shall be installed as shown on Standard Drawing W-10.

4.12.2 Bury Section

The bury section shall be cast iron and shall be cement lined. Inlet connection shall be mechanical joint and be sized to be a 6-inch ring-grooved connection. The bury depth will normally be 48-inches, but different depth buries on fire hydrants may be required to fit abnormal pipe depths depending upon field conditions. Flanged end shall be 6 hole. A minimum of 6 inch by 6 inch, 6-hole breakaway spool will also be required. See Standard Drawing W-10.

4.12.3 Break-Off Bolts

Break-off bolts shall be used in connecting the fire hydrant to the hydrant buries. Bolts shall be installed nut side up with the bolts filled and covered with silicone caulking. Clearance shall be made for removal of all bolts. Bolt size shall be $\frac{5}{8}$ inch by 3 inches. See Standard Drawing W-10.

4.12.4 Fire Hydrants

Unless otherwise approved by the General Manager, residential fire hydrants shall be 6 inch by 4 inch by 2½ inch James Jones 3710, 6-hole flange. Industrial fire hydrants shall be 6 inch by 4 inch by 2½ inch James Jones 3775, 6-hole flange. Upon completion of installation, all parts of facilities above ground, with the exception of the stems and threads, shall be painted with two coats of primer, and two finish coats of waterproof PWD Yellow. This paint will be made available to the Contractor from the District at the Contractor's expense. See Standard Drawing W-10. All on-site private fire hydrants must be painted red.

4.13 Backflow Prevention Devices and Cross Connection

4.13.1 Cross Connection Control

To comply with the regulations of the State of California Department of Public Health, which prohibits unprotected cross connections between the public water supply and any unapproved source or connection, the District shall require the installation of approved backflow prevention devices by and at the customer's expense. Maintenance and testing of the device shall comply with District Cross Connection Control Program requirements (Appendix "C") at the customer's expense.

The degree of hazard and the type of backflow prevention device required to abate the cross connection shall be per District Cross Connection Control Program requirements (Appendix "C") as determined by the General Manager.

If potable and recycled water are located on the same property, a "Reduced Pressure Principal Backflow Prevention Assembly (RP)" shall be installed downstream of the water meter to protect the potable water service.

4.13.2 Testing

Upon completion of the installation of the device, a test shall be performed and a certificate of the adequacy and operational compliance shall be furnished to the District. After the initial test at installation, the device shall be tested at least one time each year but can be required by the General Manager to be tested at more frequent intervals. All tests shall be performed by persons having a valid Certificate of Competence issued by Los Angeles County Department of Health Services, and approved by the General Manager.

4.13.3 Installation

Installation shall comply with the requirements of the State of California Department of Public Health and the Los Angeles Department of Health Services, the latest edition of the Manual of Cross Connection Control and with the latest plumbing codes and applicable local agency requirements. See Standard Drawing W-35 and W-36.

****Appendices to follow**