STANDARD SPECIFICATIONS FOR WATER AND SEWER SYSTEM IMPROVEMENTS

Nipomo Community Services District

Nipomo Community Services District

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Master Table of Contents

General Conditions & Forms

Contents
General Conditions

Appendix

Forms

- **Engineer's Certification**
- **Owner's Offer of Dedication**

GENERAL CONDITIONS

SECTION 1 DEFINITIONS, TERMS, AND ABBREVIATIONS

1-1 DEFINITIONS

Whenever the following terms or abbreviations occur in these specifications, the meaning shall be interpreted as follows:

ACCEPTANCE – That formal action by the Board accepting the Project as completed by the General Manager.

BOARD OF DIRECTORS OR BOARD – The Board of Directors of the Nipomo Community Services District.

CONTRACT – The agreement executed between the Owner and the District covering the water, sewer, and/or other system improvements to be constructed and to become a part of the District's facilities.

CONTRACTOR – The person, firm or corporation constructing the water, sewer, and/or other system improvements for the Owner, or the District.

DAYS – When used to designate a period of time, shall be in reference to consecutive calendar days.

DISTRICT – Nipomo Community Services District, San Luis Obispo County, California. Where the word "District" is used in a sense requiring action, such as, approving, inspecting, make a decision, etc., the "GENERAL MANAGER" shall be understood as the person having the authority to take the required action.

DISTRICT ENGINEER – As appointed by the District from time to time.

DISTRICT INSPECTOR – The Inspector employed by the District to perform inspection during construction of the work undertaken by the Owner.

GENERAL MANAGER – The Manager of Nipomo Community Services District, the Manager's authorized representative, or other such person as may be designated by the District.

IMPROVEMENTS OR WORK – Facilities to be constructed by the Owner and dedicated to the District including water, sewer and other facilities; sometimes referred to as, , the project, or the facilities.

LABORATORY – The laboratory approved by the District to test materials and work involved in the Contract.

LEGAL ADDRESS OF OWNER – The address shown as the Owner's in Article IX of the Contract as the place to which all notices, letters or other communications to the OWNER shall be mailed or delivered.

NOTICE TO PROCEED – Authorization by the District in writing allowing the Owner to begin work on the specified project.

OWNER'S ENGINEER – Any person or persons, firm, partnership or corporation legally authorized and licensed to practice Civil Engineering in the State of California, who prepares or submits improvement plans and specifications on behalf of the Owner. The Owner's Engineer shall also be responsible for inspection and certification of the work. The Owner's Engineer is sometimes referred to as the Project Engineer.

OWNER'S INSPECTOR – The Inspector employed by the Owner's Engineer and/or Owner to assure the improvements are constructed in accordance with the District Standards and the approved plans and specifications.

PLANS – The Owner's Engineer's plans, profiles, typical cross-sections, working drawings, detail drawings and supplemental drawings, or exact reproduction thereof, approved by the District, which show the locations, character, dimensions and details of the work to be done.

PROJECT – The improvements to be constructed pursuant to the Contract.

RULES AND REGULATIONS – Nipomo Community Services District General Resolutions and Ordinances adopted by the District and as amended from time to time.

SPECIFICATIONS – The directions, provisions and requirements of the District, pertaining to the method and manner of performing the work shown on the Plans. The Specifications include these Standard Specifications for Water and Sewer Improvements.

STATE SPECIFICATIONS – The Standard Specifications, State of California, Department of Transportation, latest edition.

SUBCONTRACTOR – A person, firm or corporation supplying labor, or labor and materials for the Project as a part of the Construction Contractor's obligation to the Owner.

SURETY – The party or parties who guarantee the completion of the Project or a portion of the Project, by bonds, and whose signatures are attached to the bond.

1-2 TERMS

Whenever in the Specifications or upon the Plans the words directed, required, permitted, ordered, designated, prescribed or terms of like import are used, it shall be understood that the requirements, permission, order, designations, or prescription of the District is intended. Similarly, the terms approved, acceptable, satisfactory, or equal, or terms of like import, shall mean approved by, acceptable to or satisfactory to the District, unless otherwise expressly stated. The word "provide" shall be understood to mean furnish and install.

1-3 ABBREVIATIONS

Wherever the following abbreviations are used, they shall have the meanings indicated:

ACI	American Concrete Institute
ASTM	American Society for Testing and Materials
AWWA	American Water Works Association

1-4 APPLICABILITY

In those cases when, in the opinion of the District, circumstances require the design and construction of any water and/or sewer system improvements not adequately covered by these specifications, the District may set different design criteria, require use of other materials, and/or special construction techniques.

SECTION 2 PLAN PREPARATION AND EASEMENTS

2-1 PRELIMINARY INVESTIGATION

The Owner shall meet with the District at the earliest possible date to determine whether the property to be developed is within the District boundaries. At that time, the availability of existing water and/or sewer lines can also be reviewed. In some areas, a preliminary feasibility investigation and report may be necessary to establish that the District can serve the proposed development. All costs for such an investigation and report shall be borne solely by the Owner. Advance deposits in amounts to be determined by the District may be required.

2-2 PLAN PREPARATION

The Plans must be prepared under the direct supervision of a registered civil engineer licensed to practice in the State of California. The Plans will be prepared in the latest version of AutoCADD, with a set being submitted on bond paper (24" x 36") and on CD. The density of the grid on profiles (plan and profile drawings are required by the District) shall be such that the Plans shall be easily interpreted. The minimum scale shall be 1-inch equals 50 feet, with a plan to profile scale ratio of 5 to 1. Any deviation from these scale requirements shall be approved by the District. The Plans shall have sufficient detail so that it can be easily determined that there will be adequate cover over pipelines and services and that where water system improvements cross other improvements, such as sewer, storm drains, etc., there will be no conflicts.

2-3 RECORD DRAWINGS

During construction of the improvements, the Owner shall note District Approved deviations from the Plans on a set of the Plans specifically set aside for this purpose at the Project site. Any changes shall be made on the originals of the Plans with a suitable note on each sheet stating that the originals are the "Record Drawings". The record drawings shall be filed with and become the property of the District prior to Acceptance by the District of the Project. Record Drawings shall be submitted in a reproducible state on mylar sheets.

(NOTE: Two sets of "original" record drawings will be required in many cases; one set for the County and one set for the District. A CD copy shall also be provided to the District.)

2-4 EASEMENTS

In case an easement(s) or other right of way document is required for construction and/or maintenance of water and/or sewer improvements, the minimum width shall be 20 feet unless otherwise agreed to in writing by the District. However, there may be instances where easements of a greater width are required as determined by the District. Easements shall be granted and executed prior to District final approval of the Plans. The form of the grant of easement, or other right of way document to be used shall be approved by the District. Easements and Rights of Way shall be shown on the Plans.

SECTION 3 CONSTRUCTION AND INSPECTION

3-1 GENERAL

The Owner may be required to enter a Plan Check and Inspection Agreement and provide a deposit. Improvements shall be constructed to the ends of all streets in the subdivision. The Owner and/or Contractor shall provide all transportation, materials, equipment, labor and supplies to complete excavation, backfill, street repairing and other work incidental to the construction of the Project

3-2 GOVERNING SPECIFICATIONS

All improvements to be dedicated to the District shall be constructed in accordance with the Standard Specifications and the Rules and Regulations of the District. The Rules and Regulations, as adopted from time to time, are hereby made a part of these specifications.

3-3 EXCAVATION PLANS FOR WORKER PROTECTION

The Owner shall submit to the District, in advance of excavation, a detailed plan showing the design of shoring, bracing, sloping, or other provisions to be made for worker protection from the hazard of caving ground during the excavation of any trench or trenches 5 feet or more in depth. The plan shall be prepared by a registered civil or structural engineer. As a part of the plan, a note shall be included certifying that the plan complies with the CAL/OSHA Construction Safety Orders, or that the registered civil or structural engineer certifies that the plan is not less effective than the shoring, bracing, sloping, or other provisions of the Safety Orders.

The detailed plan showing the design of shoring, etc., shall include surcharge loads for nearby embankments and structures, for spoil banks, and for construction equipment and other construction loadings. The plan shall indicate for all trench conditions the minimum horizontal distances from the side of the trench at its top to the near side of the surcharge loads.

Nothing contained in this article shall be construed as relieving the Owner of the full responsibility for providing shoring, bracing, sloping, or other provisions which are adequate for worker protection.

3-4 NOTICE TO PROCEED

The Owner shall not commence construction until the Notice to Proceed is issued by the District. The Notice to Proceed shall not be issued until after approval by the District of the Plans and Specifications, bond and insurance forms, grant of easement(s), if any, and until after payment of the initial deposit of estimated capacity fees , if any, and the Inspection Fee Deposit.

3-5 CONNECTION TO EXISTING FACILITIES

No connection shall be made to existing facilities of the District without prior approval and inspection by representatives of the District.

3-6 NOTICE OF BEGINNING CONSTRUCTION

Notice shall be given to the District at least seven working days in advance of commencement of work, and a preconstruction meeting shall be scheduled at that time. Prior to commencing work, the Owner shall hold a pre-construction meeting. At a minimum, the Owner, Owner's Engineer, District Inspector, Contractor, County Inspector, and other utilities effected by the work shall attend. Prior to any excavation, the Owner shall notify all owners of existing utilities and facilities in the proposed project area, and Underground Service Alert.

3-7 OTHER PERMITS

Prior to commencing construction the Owner shall secure all permits, including an encroachment permit, and all licenses, pay all charges and fees, and give all notices as necessary and required for the Project by other agencies having jurisdiction. These shall be made available to the District upon demand.

3-8 CONSTRUCTION WATER

Water used for construction, testing and dust control shall be arranged for and furnished by the Owner and/or Contractor at the expense of the Owner and/or Contractor. The Owner shall comply with all regulations of the District relative to connection to fire hydrants or standpipes and secure prior written permission from the District if water from a District owned source is to be used.

3-9 INSPECTION BY THE DISTRICT

All work shall be subject to inspection by the District. Owner or Owner's representative shall provide the District with a minimum of 72-hours notice prior to backfill. When requested by the District the improvements shall be left open and uncovered until the installation is inspected by the District. District inspections will occur during normal working hours, Monday through Friday, except legal holidays.

The District shall at all times have access to the work during construction and shall be furnished with every reasonable facility for ascertaining full knowledge respecting the progress, workmanship and character of materials used and employed in the work.

The inspection of the work by District shall not relieve the Owner, the Owner's Engineer, and/or Owner's Contractor of any obligations to construct and inspect the Improvements as prescribed by the District's Specifications and Agreements. Defective work shall be made good, and unsuitable materials may be rejected notwithstanding the fact that such defective work and unsuitable materials have been previously overlooked by the District. The installation and inspection of unsuitable improvements shall not be construed as acceptance and modification to these specifications.

The Owner shall bear the costs of District inspections.

3-10 INSPECTION BY THE OWNER'S ENGINEER

The Owner's Engineer shall have the responsibility for performing regular inspection during the construction of all work. The Owner's Engineer shall be responsible for inspecting the work on a regular basis, and shall be present for testing of improvements. The Owner's Engineer shall be responsible for compaction testing and inspection of trench bedding and backfill. Results of compaction testing shall be made available to the District. Additional inspections may be required as determined by the District.

All Improvements, including pipe fittings, which are to be backfilled shall be inspected by the Owner's Engineer prior to backfilling, and the Owner and/or Owner's Contractor shall give due notice in advance of backfilling to the District so that the District Inspector may have opportunity to inspect the Improvements in accordance with Section 3-9.

The Owner's Engineer shall certify that the improvements have been constructed in accordance with the approved plans and specifications. Any deviations from the plans shall be pre-approved by the District Engineer in writing prior to installation of the improvements. Any work installed which is not in accordance with the approved plans shall be deemed defective and will be subject to rejection.

SECTION 4 CONTROL OF MATERIAL

4-1 QUALITY OF MATERIALS

All equipment, materials and supplies to be incorporated in the Project shall be new unless otherwise specified and shall conform to the requirements stated in the Plans and Specifications approved by the District.

4-2 DEFECTIVE MATERIALS

All materials not conforming to the requirements of the approved Plans and Specifications shall be considered as defective and all such materials, whether in place or not, shall be rejected and shall be removed immediately from the site of the work unless otherwise permitted in writing by the District. No rejected material, the defects of which have been subsequently corrected, shall be used until approved in writing by the District. Upon failure on the part of the Owner to comply with any order of the District made under the provisions of this article, the District shall have authority to remove and replace defective material at the expense of the Owner and/or Contractor.

4-3 STORAGE OF MATERIALS

All materials for use in the Project shall be stored by the Owner and/or Contractor in such a manner as to prevent damage from exposure to the elements, admixture of foreign materials, or from any other cause. The Owner and/or Contractor shall be fully responsible for any damage incurred to the materials for the Project while being stored, including damage resulting from storing of material in public right-of-way and District acquired easements. The Owner and/or Contractor shall also be fully responsible for the preservation of public and private property while storing materials for the Project.

SECTION 5 LEGAL RELATIONS AND RESPONSIBILITIES

5-1 OBSERVING LAWS AND ORDINANCES

The Owner and/or Contractor shall keep themselves fully informed of all laws, ordinances and regulations which in any manner affect those engaged or employed in the work or the materials used in the Project or which in any way affect the conduct of the work and of all such orders and decrees of bodies or tribunals having any jurisdiction or authority over same.

The Owner and/or Contractor shall at all times observe and comply with and shall cause all of the Owner's agents, employees, Contractor, subcontractors, and suppliers to observe and comply with all laws, ordinances, regulations, orders and decrees, and shall hold harmless, indemnify and defend the District, the District's Engineer, and their consultants, and each of their directors, officers, employees and agents from and against all claims, damages, losses, expenses, and other costs, including costs of defense and attorneys' fees, arising out of or resulting from the violation of any such law, ordinance, regulation, order or decree by the Owner, Contractor, employees, agents, subcontractors, or suppliers.

5-2 PERMITS AND LICENSES

The Owner and/or Contractor shall procure all permits and licenses, pay all charges and fees, and give all notices necessary and incidental to the due and lawful prosecution of the work.

5-3 INVENTIONS, PATENTS AND COPYRIGHTS

The Owner shall pay all royalties and assume all costs arising form the use of any invention, design, process, materials, equipment, product or device which is the subject of patent rights or copyrights.

The Owner and/or Contractor shall hold harmless, indemnify and defend the District, the District's Engineer, and their consultants, and each of their directors, officers, employees and agents from and against all claims, damages, losses, expenses and other costs, including costs of defense and attorney's fees, arising out of any infringement of patent rights or copyrights incident to the use in the performance of the work or resulting form the incorporation in the Project of any invention, design, process, materials, equipment, product or device and shall defend all such claims in connection with any alleged infringement of such rights.

5-4 PUBLIC CONVENIENCE AND SAFETY

The Owner and/or Contractor shall so perform construction as to offer the least possible obstruction and inconvenience to the public, and the Contractor shall have under construction no greater length or amount of work than can be prosecuted properly with due regard to the rights of the public.

Convenient access to driveways, houses and buildings along the line of work shall be maintained and temporary crossings shall be provided and maintained in good condition. Not more than one crossing or intersecting street or road shall be closed at any one time.

The Owner and/or Contractor shall provide and maintain such fences, barriers, directional signs, lights and flagmen as are necessary to give adequate warning to the public at all times of any dangerous conditions to be encountered as a result of the construction work and to give directions to the public.

All construction shall be performed in compliance with the standards as established by the Occupational Health and Safety Act (OSHA) and appropriate State of California regulation.

The Owner shall also bear the cost of traffic regulations lawfully exacted by the Federal Government, the State of California, or County or during the time of performing work affecting the property of said Government, State, or County.

5-5 RESPONSIBILITY FOR LOSS, DAMAGE OR INJURIES

The Owner and/or Contractor shall be responsible for all claims, demands, or liability from any cause arising out of or resulting from or in connection with the performance of the work, excepting only those as may be caused solely and exclusively by the fault or negligence of the District, the District's Engineer, or their consultants, or their directors, officers, employees and agents. Such responsibility shall extend to claims, demands, or liability for loss, damage or injuries occurring after completion of the Project as well as during the progress of the work.

5-6 OWNER'S RESPONSIBILITY FOR THE PROJECT

Until acceptance of the project, the Owner shall have the responsible charge and care of the Project and of the materials to be used therein (including materials which have been furnished by the District) and shall bear

the risk of injury, loss or damage to any part thereof by the action of the elements or from any other cause, whether arising from the execution or from the nonexecution of the Project.

The Owner shall rebuild, repair, restore and make good all injuries, losses or damages to any portion of the Project or the materials occasioned by any cause before its completion and acceptance and shall bear the expense thereof. Where necessary to protect the Project or materials from damage, the Owner shall bear the expense of providing suitable drainage and erecting such temporary structures as are necessary to protect the Project or materials from damage. The suspension of the work or the granting of an extension of time from any cause whatever shall not relieve the Owner of responsibility for the work and materials as herein specified.

5-7 PRESERVATION OF PROPERTY

The Owner shall exercise due care to avoid injury to existing improvements or facilities, utilities, adjacent property, and trees and shrubbery that are not to be removed.

All trees, shrubbery and landscaping that are not to be removed, and pole lines, fences, signs, survey markers and monuments, buildings and structures, conduits, pipelines under or above ground, sewer and waterlines, all highway or street facilities, and any other improvements or facilities within or adjacent to the Project shall be protected from injury or damage, and the Owner shall provide and install suitable safeguards to protect such objects from injury or damage, and the Contractor shall provide and install suitable safeguards to protect such objects from injury or damage. If such objects are injured or damaged by reason of the Owner's operation, they shall be replaced or restored at the Owner's expense to a condition as good as required by the Plans and Specifications if any such objects are a part of the work being performed.

The fact that any such pipe or other underground facility is not shown on the Plans shall not relieve the Owner of responsibility under this article.

In addition to any requirements imposed by law, the Owner shall shore up, brace, underpin and protect as may be necessary, all foundations and other parts of all existing structures adjacent to and adjoining the site of the work which are in any way affected by the excavations or other operations connected with the performance of the work. Whenever any notice is required to be given by the Owner to any adjacent or adjoining landowner or other party before commencement of any work, such notice shall be given the Owner.

5-8 SAFETY

The Owner and/or Contractor shall be solely and completely responsible for conditions of the jobsite, including safety of all persons and property during performance of the work, and the Owner and the Contractor shall fully comply with all state, federal and other laws, rules, regulations and orders relating to safety of the public and workers.

The right of the District to conduct construction review or observation of the work will not include review or observation of the adequacy of the Owner's and/or Contractor's safety measures in, on or near the construction site.

SECTION 6 FINAL ACCEPTANCE OF THE PROJECT BY THE DISTRICT

6-1 FINAL INSPECTION

Final Inspection shall be conducted in the presence of the District upon reasonable notice.

6-2 CERTIFICATION OF THE WORK BY THE OWNER'S ENGINEER

The work shall be subject to final inspection and testing under the supervision and in the presence of Owner's Engineer. If, in the Owner's Engineer's judgment, the work has been duly inspected during construction and has satisfactorily passes final inspection and testing and is ready for acceptance the Owner's Engineer shall certify the same to the Board on a form approved by the District.

6-3 WARRANTY

All work shall be warranted by Owner against defective workmanship and materials for a period of 1 year from the date the work is accepted by the District. Owner, at Owner's expense shall replace or repair any such defective work in a manner satisfactory to the Owner's Engineer and the District,

ENGINEER'S IMPROVEMENT CERTIFICATION

I, _____R.C.E.No. _____, hereby certify that:

A. I have regularly inspected, during construction, the water and sewer improvements ("Improvements") as shown on the Improvement Plans prepared by me_ and approved by the Nipomo Community Services District ("District") on _____, 200 , and with those approved changes shown on the record drawings prepared by me on _____, 200 , and approved by the District on _____, 200 .

B. That said Improvements have been constructed at the horizontal and vertical alignment and in substantial conformance with the above referenced Improvement Plans.

C. That said Improvements have been tested and meet District requirements, Standards and Specifications.

_____
Signed

_____
Print Name

Seal:

OFFER OF DEDICATION

TO: NIPOMO COMMUNITY SERVICES DISTRICT
P O BOX 326,
NIPOMO, CA 93444

The undersigned Owner(s) of _____
(Tract or Project No.)
in the County of San Luis Obispo, hereby offers, and DEDICATES to the Nipomo Community Services District absolute and unencumbered ownership of the water and sewer improvements shown on the improvement plans for _Tract/Project No.: _____ approved by Nipomo Community Services District on _____.

_____.
(DATE)

(Owner/s)

By: _____
(Name and Title)

_____
(Print Name)

_____
(Name and Title)

_____
(Print Name)

[Document requires notarization]

Water & Sewer System Design Criteria

WATER SYSTEM
DESIGN CRITERIA

WATER DEMANDS

The water systems shall be designed based on the following domestic plus fire flow demands:

Domestic Demands	Description
Residential – Domestic (3.2 persons per dwelling unit)	
Average Day	160 gpd per capita
Maximum Day	257% of average day demand
Peak Hour	515% of average day demand
Commercial (non-residential) and Industrial	Developer to submit design flows to District for review. Minimum shall be equivalent to five (5) residential connections per acre.

Fire Flow

The California Department of Forestry/ San Luis Obispo County Fire Department (CDF) shall determine the fire flow requirements.

PIPELINE SYSTEM DESIGN CRITERIA

The minimum pipe size for water mains shall be 8-inches in diameter. All line sizing shall be based on maximum day demand plus fire flow demand or peak hour demand, whichever is greater. Pipeline pressure losses will be calculated using the Hazen-Williams formula with C=130.

Minimum cover over the top of pipe shall be three feet below finish grade. The District may require more than this minimum cover if, in the opinion of the District, three feet is insufficient.

As a general rule, there shall be three valves on tees and four valves on crosses. On long blocks, intermediate valves should be installed so that not more than 500 feet of line will have to be shut off at any one time. Valves shall be joined to fittings by flanges. When water mains are in easements outside traveled streets, a valve shall be located at each end of the easement. The final determination of the number of valves and their locations shall be approved by the District.

Combination air and vacuum release valves shall be installed at all high points in a line. The inlet to each valve shall be provided with a gate valve or corporation stop to provide a positive closure between the main pipeline and the air and vacuum release valve. The air and vacuum release valve vent shall be installed above ground in such a manner as to preclude backflow (see Standard Detail W-10).

Blowoffs shall be installed at ends of mains and low points.

Water system improvements shall have at least two connections to waterlines in different streets to form a looped water system. Non-looped systems will be permitted only with the written permission of the District.

Water pipelines shall be constructed of PVC pipe or, with the District's approval, ductile iron pipe. Fittings shall be ductile iron conforming to AWWA C-100 and cement mortar lined per AWWA C-104.

Except for connection to a single-family residence, a separate service connection with backflow prevention device shall be provided to each parcel of property for landscape irrigation. (District Ordinance 3.04.030)

FIRE HYDRANTS

Hydrants shall conform to AWWA C-503 (wet barrel) with frangible section near ground, with two 2-1/2-inch and one 4-inch national standard threaded connections, and be painted safety yellow. Fire hydrants shall be James Jones 4060C or AVK Series 2490. Bury for hydrant shall conform to AWWA standard specifications C-503, height shall be 36-inches. Bury to be coated with coal tar enamel or coal tar epoxy (see Standard Detail W-6). CDF has final approval on fire hydrant installations, Owner to coordinate with CDF.

The system shall be provided with valves and hydrants so that no point on any lot at the street right-of-way shall be more than one and one-half times the maximum hydrant spacing from a working hydrant as a result of any single break or shutdown for repairs, except where impractical as determined by CDF.

A hydrant shall be placed at each intersection except where this would provide excessive hydrant coverage as determined by CDF. Fire hydrant spacing shall be computed separately for each side of roadways with a right-of-way greater than 60 feet.

Any connection between a building's fire sprinkler system and the District's mains shall be via a dedicated fire sprinkler connection and shall be protected from backflow in accordance with the District Standards (refer to Technical Specification for Connections to Domestic Water Systems).

Bollards shall be installed where considered necessary by CDF to protect fire hydrants. Fire hydrant bollards/barricades shall not obstruct the outlets and shall be consistent with Standard Detail W-6.

SEPARATION OF WATER MAINS AND SANITARY SEWERS

All crossings of water mains and sanitary sewers shall conform to the requirements of the State of California Department of Health Services. (Refer to "Guidance Memo No. 3003-02: Guidance Criteria for the Separation of Water Mains and Non-Potable Pipelines", by the Department of Health Services, included in these standards.)

SAMPLING STATIONS

One sampling station will be required for every 1,000-ft of water distribution main installed. Coordinate the location of the sampling station(s) with the District prior to approval of construction plans. Additional sampling stations may be required by the District.

POTABLE WATER BOOSTER STATIONS AND WELLS

Design requirements for potable water booster stations and wells will vary from project to project depending on the size and nature of the facilities. All facilities shall be equipped and capable of interfacing with the District's existing SCADA system, final requirements for the SCADA system shall be determined in coordination with the District during the design phase. Typical minimum requirements are listed below:

1. Inlet/suction pressure and/or well level
2. Flow Rate
3. Pump Status (on/off/hand)
4. Alarms: seal failure, high temp, phase, circuit trip, high pressure, low pressure, lag pump call
5. Run time in hours for each pump
6. Amperage draw
7. Magnetic flow meter with a flow totalizer and rate of flow in gallons per minute.

Projects that anticipate the need for these facilities should initiate discussions with the District early in the design phase to determine the requirements for each project individually.

SEWER SYSTEM
DESIGN CRITERIA

ACCEPTABLE FLOWS

The District shall accept flows from the following plumbing fixtures, unless unusual circumstances prevent the District from doing so:

Toilets, urinals, bidets, sinks for domestic faucets, showers, bathtubs, connections for dishwashers, drinking fountains, domestic washing machines and garbage disposals.

Flows which are not acceptable to the District are flows other than sewage, and include, but are not limited to, any and all liquid or processing, commercial, or institutional operation of whatever nature. Plumbing fixtures or sources hereafter set forth shall not be discharged into the District's sewer system without specific written permission from the General Manager. District Ordinance 4.08.130 list additional prohibited waste flows.

All piping from commercial and industrial processing to the sewers.

All floor or stall drains, other than domestic showers.

Swimming pools, ponds, etc., which empty into the sewer system.

Establishments included under the above requirements include, but are not limited to:

Gas stations, car washes, garages, laundromats, etc.

Restaurants, hotels, motels, shopping areas, breweries, and microbreweries

The District may require traps, interceptors, pretreatment or other devices on all outlets which may discharge grease, oil, sand or waste material of any kind of a composition or quality deemed harmful by the District (District Ordinance 4.08.131).

PIPELINE SYSTEM DESIGN

Pipeline design shall be based on peak flows and on Manning's formula. Use a coefficient of "n" = 0.011 for plastic pipe and "n" = 0.013 for all other pipe. Flows shall be based upon an average of 3.2 persons per single family residential unit at an average disposal rate of 60 gallons per person per day. For commercial and industrial land use the District shall determine flows based on the proposed project.

"Peaking factor" for sewer design shall be not less than 3.0 and shall be approved by the District.

Design peak flows in pipelines 12 inches in diameter and smaller shall be limited to an approximate liquid depth to pipe diameter ratio of 0.50.

Design peak flow in pipelines 15 inches in diameter and larger to be limited to an approximate liquid depth to pipe diameter ratio of 0.75.

Minimum pipeline diameter shall be 8 inches.

Minimum pipeline grades:

Pipe Diameter (inch)	Minimum Slope (ft/100 ft) Plastic Pipe (n=0.011)	Other Pipe (n=0.013)
8	0.24	0.35
10	0.18	0.24
12	0.14	0.19
15	0.10	0.14
18	0.08	0.11
21	0.07	0.09
24	0.06	0.08
27	0.05	0.07
30	0.04	0.06
33	0.04	0.05

As a general rule, sewers shall run in a straight line between manholes. All sewer alignments shall be approved by the District. Minimum pipeline grades are discouraged and must be preapproved in writing by the District and will only be approved in the District Engineer's discretion upon a finding of physical site constraints.

Minimum depth from finish street grade to top of sewer main pipe shall be six (6) feet. All sanitary sewers and appurtenant structures shall be a minimum of five (5) feet from the roadway center line. In no case shall a sanitary sewer line be located closer than two (2) feet from an existing or proposed gutter lip.

The entire sanitary system shall be located as mentioned above and shall be designed to clear all other existing or proposed utilities by a minimum of twelve (12) inches. Special structures, such as pump stations, pressure lines and sags, etc. shall be subject to the approval of the District.

Sewer manholes are required at:

Changes of direction of sewers.

Changes in slope of sewers.

Junctions of sewers.

Junction of sewer and lateral if lateral is same size as sewer.

Termination of sewer with a run greater than 100-ft.

Change of pipe size in sewers.

Other locations specified by the District.

Maximum manhole spacing shall be 400 feet.

Whenever the vertical distance between the inverts of sewer line connections of a manhole exceeds thirty (30) inches, a standard Drop Manhole shall be constructed with the District's Approval. Drop manholes discouraged and must be preapproved in writing by the District and will only be approved in the District Engineer's discretion upon a finding of physical site constraints.

Allowable head losses in manholes:

Straight run through manholes based on 0.00 foot loss.

Right angle turn in manholes based on 0.5 velocity head loss, or 0.10 foot, whichever is greater.

No change of flow direction within a manhole shall exceed 90 degrees.

Invert elevation at manholes shall be calculated and shown projected to the centerline of the manhole. Should there be any drop in elevation, the invert elevation "IN" and the direction, N, S, E, or W, and invert elevation "OUT" and the direction shall be shown. Should a pipeline be joining a sewer of larger diameter, the smaller pipe shall have its crown elevation equal to or higher than the crown elevation of the larger sewer.

There will be no shared sewer laterals; all connections to the sewer system shall be separate and independent (District Ordinance 4.08.090).

WATER AND SEWER MAIN SEPARATION REQUIREMENTS

The District, in accordance with State of California, Department of Health Services regulations requires a 10-foot minimum horizontal separation between sewer and water mains.

All crossings of water mains and sanitary sewers shall conform to the requirements of the State of California Department of Health Services. (Refer to "Guidance Memo No. 3003-02: Guidance Criteria for the Separation of Water Mains and Non-Potable Pipelines", by the Department of Health Services, included in these standards.)

SEWAGE LIFT STATIONS

If the Project Engineer determines, and the District agrees, that a lift station is required for a project, the lift station shall meet the following minimum design criteria, and shall be subject to preapproval by the District. The District discourages construction of new sewage lift stations. Lift stations will only be allowed under certain specific circumstances. The items discussed in this section and depicted in the drawing are minimum requirements; the District may have additional requirements depending on the specific application.

Each pump shall be a submersible raw sewage pump designed to operate in a wet well under submerged conditions and shall be of the nonclog, single-suction, centrifugal type and shall be suitable for pumping unscreened raw sewage. The District standard raw sewage pump shall be manufactured by ITT Flygt, or approved equivalent.

Capacity: Pumps shall be capable of delivering the average daily flow in an efficient and economical manner. The pump(s) should be designed to operate between 70% and 120% of the best efficiency point. The lift station shall be capable of delivering the peak hour demand with redundancy.

Motors: The electric motor shall be of a high efficiency design, NEMA Premium Efficiency or equivalent, and shall be nonoverloading throughout the pump operating range.

Level Sensing: The lift station shall be controlled by a submersible level transducer US Filter A1000 or equivalent. High and low water level back up shall be provided by float US Filter B100 or equivalent.

Monitoring: The lift station shall be equipped and capable of interfacing with the District's existing SCADA system, and shall monitor at a minimum the following items:

1. Wet Well Level
2. Flow Rate
3. Pump Status (on/off/hand)
4. Alarms: seal failure, high temp, phase, circuit trip, high water level, low water level, lag pump call
5. Run time in hours for each pump
6. Amperage draw
7. Magnetic flow meter with a flow totalizer and rate of flow in gallons per minute.

Guidance Memo No. 3003-02: Guidance Criteria for the Separation of Water Mains and Non-Potable Pipelines

State of California Department of Health Services

Memorandum

Date: April 14, 2003 **(Revised Date: October 16, 2003)**

To: Regional and District Engineers

From: David P. Spath, Ph.D., Chief *(Original signed by Dave)*
Drinking Water and Environmental Management
601 North 7th Street, MS 216
Sacramento, CA 95814
(916) 322-2308

Subject: **GUIDANCE MEMO NO. 2003-02: GUIDANCE CRITERIA FOR THE SEPARATION OF WATER MAINS AND NON-POTABLE PIPELINES**

The purpose of this memo is to update guidance dated April 5, 1983 for consistency with proposed 2003 regulations. Should there be any modification to the proposed Water Works Standards that may impact the content of this guidance, the guidance will be amended accordingly.

GUIDANCE: CRITERIA FOR THE SEPARATION OF WATER MAINS AND NON-POTABLE PIPELINES

BACKGROUND

When buried water mains are in close proximity to non-potable pipelines, the water mains are vulnerable to contamination that can pose a risk of waterborne disease outbreaks. For example, sewers (sanitary sewer mains and sewage force mains) frequently leak and saturate the surrounding soil with sewage due to structural failure, improperly constructed joints, and/or subsidence or upheaval of the soil encasing the sewer. If a nearby water main is depressurized and no pressure or negative pressure occurs, that situation is a public health hazard that is compounded if an existing sewer is broken during the installation or repair of the water main. Further, failure of a water main in close proximity to other pipelines may disturb their bedding and cause them to fail. In the event of an earthquake or other disaster, simultaneous failure of all pipelines could occur.

The most effective protection against this type of drinking water contamination is adequate construction and separation of non-potable pipelines and water mains. The Waterworks Standards (Title 22, Chapter 16, Section 64572) provide separation criteria for new construction. However, when these criteria cannot be met, the risk of contamination can be reduced by increasing the structural integrity of pipe materials and joints, and ensuring minimum separation requirements are met. Therefore, the following guidance details construction criteria for the installation of water mains and non-potable pipelines to minimize the risk of contamination of drinking water.

DEFINITIONS

- COMPRESSION JOINT - A push-on joint that seals by means of the compression of a rubber ring or gasket between the pipe and a bell or coupling.

- CONTINUOUS SLEEVE - A protective tube of high-density-polyethylene (HDPE) pipe with heat fusion joints or other non-potable metallic casing without joints into which a pipe is inserted.

- DISINFECTED TERTIARY RECYCLED WATER - Wastewater that has been filtered and subsequently disinfected in accordance with Section 60301.230, Chapter 3 (Water Recycling Criteria), Title 22, California Code of Regulations.

- HOUSE LATERAL - A sewer line connecting the building drain and the sanitary sewer main serving the street.

- SUPPLY LINE - Pipelines conveying raw water to be treated for drinking purposes in accordance with Section 64572 ©, **proposed** Water Works Standards.

- WATER MAIN – Means any pipeline, except for user service lines, within the distribution system in accordance with Section 64551.70, **proposed** Water Works Standards.

- RATED WORKING WATER PRESSURE - A pipe classification system based on internal working pressure of the fluid in the pipe, type of pipe material, and the thickness of the pipe wall.

- SANITARY SEWER MAIN - A gravity sewer conveying untreated municipal wastewater.

- SEWAGE FORCE MAIN - A pressurized sewer conveying untreated municipal wastewater.

APPLICABILITY

Note that the construction criteria presented in this document apply to house laterals that cross above a water main, but not to those house laterals that cross below a water main.

Water mains or non-potable pipelines that are 24-inches in diameter or larger may pose a higher degree of public health concern because of the large volumes of flow involved. Therefore, installation of water mains or non-potable pipelines 24-inches in diameter or larger should be reviewed and approved in writing by the Department on a case-by-case basis prior to construction.

In no case, should water mains and non-potable pipelines conveying sewage or other liquids be installed in the same trench.

REGULATORY REQUIREMENTS

Any new development project in which all the underground facilities are being constructed for the first time must comply with the following regulatory requirements:

Existing requirements:

Section 64630.(Title 22 CA Code of Regulations) Water Main Installation"

(c) Water mains shall be installed at least:

(1) Ten feet (3 meters) horizontally from and 1 foot (0.3 meters) higher than sanitary sewer mains located parallel to the main.

(2) One foot (0.3 meters) higher than sanitary sewer mains crossing the main.

(3) Ten feet (3 meters), and preferably 25 feet (7.5 meters), horizontally from sewage leach fields, cesspools, seepage pits and septic tanks.

(d) Separation distances specified in (c) shall be measured from the nearest outside edges of the facilities.

(e) Where the requirements of (c) and (d) cannot be met due to topography, inadequate right-of-way easements, or conflicts with other provisions of these regulations, lesser separation is permissible if:

(1) The water main and the sewer are located as far apart as feasible within the conditions listed above.

(2) The water main and the sewer are not installed within the same trench.

(3) The water main is appropriately constructed to prevent contamination of the water in the main by sewer leakage.

(f) Water mains shall be disinfected according to AWWA Standard C601-81 before being placed in service.

(g) Installation of water mains near the following sources of potential contamination shall be subject to written approval by the Department on a case-by-case basis:

(1) Storage ponds or land disposal sites for wastewater or industrial process water containing toxic materials or pathogenic organisms.

(2) Solid waste disposal sites.

(3) Facilities such as storage tanks and pipe mains where malfunction of the facility would subject the water in the main to toxic or pathogenic contamination.

Although the following requirements have not yet been adopted, they should be within the next two years and should be used as guidance for future construction.

Proposed requirements as of the date of this document:

Section 64572. Water Main Separation

(a) New water mains and new supply lines shall not be installed in the same trench as, and shall be at least 10 feet horizontally from, and one foot vertically above, any parallel pipeline conveying:

(1) Untreated sewage,
(2) Primary or secondary treated sewage,
(3) Disinfected secondary-2.2 recycled water (defined in section 60301.220),
(4) Disinfected secondary-23 recycled water (defined in section 60301.225), and
(5) Hazardous fluids such as fuels, industrial wastes, and wastewater sludge.

(b) New water mains and new supply lines shall be installed at least 4 feet horizontally from, and one foot vertically above, any parallel pipeline conveying:

(1) Disinfected tertiary recycled water (defined in section 60301.230), and
(2) Storm drainage.

(c) New supply lines conveying raw water to be treated for drinking purposes shall be installed at least 4 feet horizontally from, and one foot vertically below, any water main.

(d) If crossing a pipeline conveying a fluid listed in subsection (a) or (b), a new water main shall be constructed perpendicular to and at least one foot above that pipeline. No connection joints shall be made in the water main within eight horizontal feet of fluid pipeline.

(e) The vertical separation specified in subsections (a), (b), and (c) is required only when the horizontal distance between a water main and pipeline is ten feet or less.

(f) New water mains shall not be installed within 100 horizontal feet of any sanitary landfill, wastewater disposal pond, or hazardous waste disposal site, or within 25 feet of any cesspool, septic tank, sewage leach field, seepage pit, or groundwater recharge project site.

(g) The minimum separation distances set forth in this section shall be measured from the nearest outside edge of each pipe barrel.

ALTERNATIVE CRITERIA FOR CONSTRUCTION

Water Mains, and Sewers and Other Non-potable Fluid-carrying Pipelines

When new water mains, new sanitary sewer mains, or other non-potable fluid-carrying pipelines are being installed in existing developed areas, local conditions (e.g., available space, limited slope, existing structures) may create a situation in which there is no alternative but to install water mains, sanitary sewer mains, or other non-potable pipelines at a distance less than that required by the regulations [existing Section 64630 (proposed Section 64572)]. In such cases, through permit action, the Department may approve

alternative construction criteria. The alternative approach is allowed under the proposed regulation Section 64551(c):

> "A water system that proposes to use an alternative to the requirements in this chapter shall demonstrate to the Department how it will institute additional mitigation measures to ensure that the proposed alternative would not result in an increased risk to public health."

Appropriate alternative construction criteria for two different cases in which the regulatory criteria for sanitary sewer main and water main separation cannot be met are shown in **Figures 1 and 2**.

- **Case 1** - New sanitary sewer main and a new or existing water main; alternative construction criteria apply to the sanitary sewer main.

- **Case 2** - New water main and an existing sanitary sewer main; alternative construction criteria may apply to either or both the water main and sanitary sewer main.

Case 1: New Sanitary Sewer Main Installation (Figures 1 and 2)

Zone ***Special Construction Required for Sanitary Sewer Main***

A Sanitary sewer mains parallel to water mains shall not be permitted in this zone without prior written approval from the Department and public water system.

B If the water main paralleling the sanitary sewer main does not meet the Case 2 Zone B requirements, the sanitary sewer main should be constructed of one of the following:

1. High-density-polyethylene (HDPE) pipe with fusion welded joints (per AWWA C906-99);
2. Spirally-reinforced HDPE pipe with gasketed joints (per ASTM F-894);
3. Extra strength vitrified clay pipe with compression joints;
4. Class 4000, Type II, asbestos-cement pipe with rubber gasket joints;
5. PVC sewer pipe with rubber ring joints (per ASTM D3034) or equivalent;
6. Cast or ductile iron pipe with compression joints; or
7. Reinforced concrete pressure pipe with compression joints (per AWWA C302-95).

C If the water main crossing below the sanitary sewer main does not meet the requirements for Case 2 Zone C, the sanitary sewer main should have no joints within ten feet from either side of the water main (in Zone C) and should be constructed of one of the following:

1. A continuous section of ductile iron pipe with hot dip bituminous coating; or

2. One of the Zone D options 1, 3, 4, or 5 below.

D If the water main crossing above the sanitary sewer main does not meet the Case 2 Zone D requirements, the sanitary sewer main should have no joints within four feet from either side of the water main (in Zone D) and be constructed of one of the following:

1. HDPE pipe with fusion-welded joints (per AWWA C906-99);

2. Ductile iron pipe with hot dip bituminous coating and mechanical joints (gasketed, bolted joints);

3. A continuous section of Class 200 (DR 14 per AWWA C900-97) PVC pipe or equivalent, centered over the pipe being crossed;

4. A continuous section of reinforced concrete pressure pipe (per AWWA C302-95) centered over the pipe being crossed; or

5. Any sanitary sewer main within a continuous sleeve.

Case 2: New water mains Installation (Figures 1 and 2)

Zone Special Construction Required for Water Main

A No water mains parallel to sanitary sewer mains shall be constructed without prior written approval from the Department.

B If the sanitary sewer main paralleling the water main does not meet the Case 1 Zone B requirements, the water main should be constructed of one of the following:

1. HDPE pipe with fusion welded joints (per AWWA C906-99);

2. Ductile iron pipe with hot dip bituminous coating;

3. Dipped and wrapped one-fourth-inch-thick welded steel pipe;

4. Class 200, Type II, asbestos-cement pressure pipe;

5. Class 200 pressure rated PVC water pipe (DR 14 per AWWA C900-97 & C905-97) or equivalent; or

6. Reinforced concrete pressure pipe, steel cylinder type, per AWWA (C300-97 or C302-99 or C303-95).

C If the sanitary sewer main crossing above the water main does not meet the Case 1 Zone C requirements, the water main should have no joints within ten feet from either side of the sanitary sewer main (in Zone C) and be constructed of one of the following:

1. HDPE pipe with fusion-welded joints (per AWWA C906-99);

2. Ductile iron pipe with hot dip bituminous coating;

3. Dipped and wrapped one-fourth-inch-thick welded steel pipe;

4. Class 200 pressure rated PVC water pipe (DR 14 per AWWA C900-97 & C905-97); or

5. Reinforced concrete pressure pipe, steel cylinder type, per AWWA (C300-97 or C301-99 or C303-95).

D If the sanitary sewer main crossing below the water main does not meet the requirements for Case 1 Zone D, the water main should have no joints within eight feet from either side of the sanitary sewer main (in Zone D) and should be constructed as for Zone C.

Water Mains and Pipelines Conveying Non-potable Fluids

When the basic separation criteria cannot be met between water mains and pipelines conveying non-potable fluids, the requirements described above for sanitary sewer mains should apply. This includes the requirements for selecting special construction materials and the separation requirements shown in Figures 1 and 2. Note that not all construction materials allowed for sanitary sewer mains will be appropriate for other non-potable fluid lines. For example, certain plastic lines may not be appropriate for the transport of some fuel products. The selection of compatible materials of construction for non-potable fluids is a decision to be made by the project engineer.

Water Mains and Sewage Force Mains

- Sewage force mains shall not be installed within ten feet (horizontally) of a water main.

- When a sewage force main must cross a water main, the crossing should be as close as practical to the perpendicular. The sewage force main should be at least one foot below the water main.

- When a new sewage force main crosses under an existing water main, and a one-foot vertical separation cannot be provided, all portions of the sewage force main within eight feet (horizontally) of the outside walls of the water main should be enclosed in a continuous sleeve. In these cases, a minimum vertical separation distance of 4 inches should be maintained between the outside edge of the bottom of the water main and the top of the continuous sleeve.

- When a new water main crosses over an existing sewage force main, the water main should be constructed of pipe materials with a minimum rated working pressure of 200 psig or the equivalent.

Water Mains and Tertiary Treated Recycled Water or Storm Drainage

The basic separation criteria for water mains and pipelines conveying tertiary treated recycled water or storm drainage lines are a 4-foot horizontal separation where lines are running parallel and a 1-foot vertical separation (water line above recycled or storm drainage) where the lines cross each other.

When these criteria cannot be met, the Zone A criteria apply where lines are running parallel, and the Zone C and Zone D criteria apply where the lines cross each other as shown on Figures 1 and 2. For these situations, the Zone "P" criteria are in effect and prohibit construction less than 1 foot in parallel installations and less than 4 inches in vertical (crossing) situations.

For tertiary treated recycled water and storm drainage lines, the Zone B criteria (requirements for special pipe) do not apply as the basic separation criteria is a four-foot horizontal separation criteria for parallel lines. The tertiary treated recycled water lines should be constructed in accordance with the color-coding, and labeling requirements per Section 116815, California Health and Safety Code of Regulations.

MISCELLANEOUS GUIDANCE

- More stringent requirements may be necessary if conditions such as high groundwater exist. HDPE or similar pipe may be required to provide flexibility to move without potential joint leaks.

- Sanitary sewer mains should not be installed within 25 feet horizontally of a low head (5 psig or less pressure) water main.

- New water mains and sanitary sewer mains should be pressure tested in accordance with manufacturer's specifications.

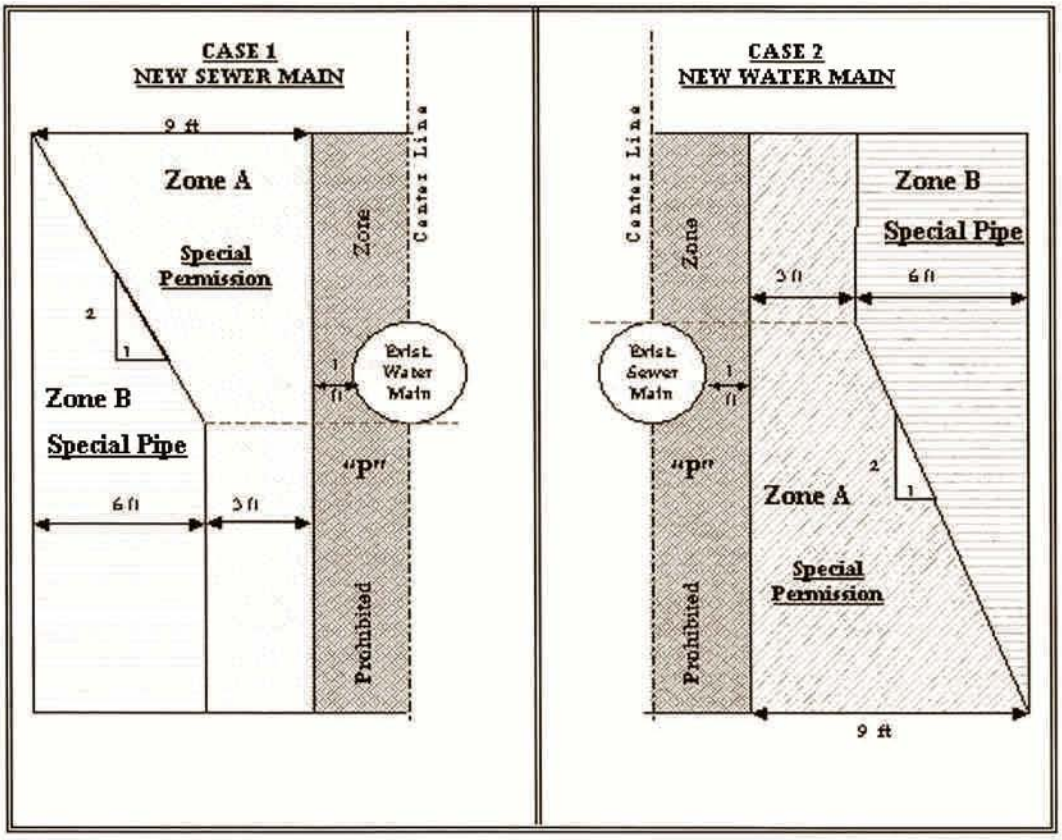
- When installing water mains, sewers, or other pipelines, measures should be taken to prevent or minimize disturbances of existing pipelines. Disturbance of the conduit's supporting base could eventually result in pipeline failure.

- Special consideration should be given to the selection of pipe materials if corrosive conditions are likely to exist. These conditions may be due to soil type and/or the nature of the fluid conveyed in the conduit, such as a septic sewage producing corrosive hydrogen sulfide.

NOTE: Dimensions are from the outside of the water main to the outside of the other pipeline, manhole, or sleeve.

FIGURE 1 PARALLEL CONSTRUCTION

Not To Scale



Note: Zones identical on either side of center lines.

Zones "P" is a prohibited zone. Section 64630 (e) (2) California Code of Regulations, Title 22 (Current); or Section 64572 (a) California Code of Regulations, Title 22 (Proposed).

FIGURE 2 CROSSINGS
Not To Scale