DESIGN GUIDELINES

AND

STANDARD DRAWINGS

FOR

WATER AND SEWER FACILITIES

NOVEMBER 2020

CITY OF SANTA ANA

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DOCUMENT REVISION LOG

The following is a summary of revisions that have been made to this document.

Revision No.	Section	Description	Date Revised	By
0.0	All	Document creation		

CITY OF SANTA ANA

PART 1

PROCEDURAL GUIDE AND DESIGN GUIDELINES

FOR

WATER AND SEWER FACILITIES

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PART 1

PROCEDURAL GUIDE AND DESIGN GUIDELINES

SECTION 100

DEVELOPMENT PLAN AND PERMIT PROCESS PROCEDURES

100.1 PURPOSE

The purpose of these Procedural Guide and Design Guidelines is to provide Applicants (developer/builder) with a general understanding of the procedural guidelines and design criteria for the City of Santa Ana water and sewer facilities for new development or re-development projects. These Procedural Guide and Design Guidelines are to be used in conjunction with, and as a supplement to, the City of Santa Ana Municipal Code, the City of Santa Ana Standard Plans and Specifications, and the Standard Specifications for Public Works Construction.

100.2 PROCEDURAL GUIDELINES AND STANDARD PLANS

The procedural guidelines for processing water and sewer improvement plans for development and re-development projects are described within the City's Municipal Code and shall be in conformity with the procedures established by the Planning Department and the Director of Public Works.

All water and sewer improvements shall be designed and constructed in accordance with the City of Santa Ana Standard Plans and Specifications, these Design Guidelines, and the Standard Specifications for Public Works Construction, 2012 edition.

All facilities to be operated and maintained by the City shall be located in public right-of-way (streets or recorded easements).

100.3 AVAILABILITY OF SERVICE

The City of Santa Ana provides domestic water and sewer service to all properties within its service area boundaries. The service area includes the City of Santa Ana and a small neighborhood in the City of Orange, near Tustin Avenue and Fairhaven by the northeast corner of Santa Ana. The Applicant (developer/builder) shall check with the City of Santa Ana Public Works Agency, Water Resources Division to determine the current City's service area and the availability of service prior to preparing any water or sewer improvement plans.

100.4 PRELIMINARY FEASIBILITY INVESTIGATION

In some areas, and/or for larger projects, a feasibility investigation study may be necessary to determine whether the existing City water or sewer facilities are adequate to service the needs of the proposed development (or redevelopment) or if new water or sewer facilities are required to be constructed to handle the additional demands. In these cases, the Applicant (developer/builder) will be responsible for the full cost of the study, if required by the City. The City reserves the right to perform the study.

100.5 VERIFICATION OF SERVICE AVAILABILITY

If service verification is requested by the Applicant (developer/builder), the service verification request shall be addressed to the City of Santa Ana Public Works Agency, Water Resources Division, and must be accompanied by an 8-½ inches by 11 inches vicinity map and two (2) copies of the tentative tract map showing the proposed services and their points of connection to the existing City water and sewer facilities.

Conceptual sizing of the water and sewer systems shall be shown along with dwelling unit densities, the estimated water and sewer demands, and the fire flow requirements from the Fire Department. The normal information required on tentative tract maps is also required.

A "Will Serve Letter" will be prepared by the City of Santa Ana upon the Applicant's (developer/builder) request for development within the service area boundaries. This document may be required by the City or other local jurisdictional agencies for processing tentative maps or development reviews.

Some larger development or redevelopment projects may require the City to perform a hydraulic distribution network analysis. In these cases, the Applicant (developer/builder) will be responsible for the full cost of this analysis.

In accordance with California Water Code Section 10912, Water Supply Assessments and water service verifications will need to be prepared by the Applicant (developer/builder) for: developments of 500 dwelling units or more; a shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor; a commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space; a hotel or motel, or both, having more than 500 rooms; industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area; a mixed-use project that includes one or more of the projects specified above; or a project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit project.

The Water Supply Assessment must be approved by the City of Santa Ana no later than the approval of the EIR.

100.6 CONSTRUCTION PROJECTS AND SERVICE REQUIREMENTS

Any and all proposed water and sewer improvements to serve a property/parcel or development must be reviewed and approved by the City of Santa Ana before these improvements can be constructed or modified.

Development or re-development projects generally include residential housing tracts, local and regional retail centers, and business and industrial parks where the Applicant (developer/builder) furnishes all the labor, equipment, and materials to construct the new water and sewer facilities within the project site.

A new water service will be required if one does not currently exist at the property/parcel. An additional service may be needed or modifications to the existing services if:

- Existing meter is too small or too large for the amount of water needed for the project.
- The project wants to add or remove a water service.
- Fire services will be modified or constructed as part of the project.
- Irrigation services will be modified or constructed as part of the project. All planting, irrigation and landscape-related improvements shall be subject to the requirements of the City of Santa Ana's Municipal Code Section 41-1501.
- The existing service line has been out of service for ten (10) years or more as required by the City of Santa Ana's Municipal Code Section 39-25 (m).
- The existing site is being fully torn down and redeveloped.

If new or modified water services are needed, the following are the procedures that will need to be followed:

1. Applicant shall submit a New Water Service & Meter Application.

2. Project plans must be submitted for the City's approval, for the domestic water for meter sizing and service sizing including plumbing plans, showing all external and internal water fixtures, fire sprinkler system, as well as irrigation plans. The submittal shall include the total number of fixture units to be served by the new or modified water service, the fire sprinkler system design criteria, and the future expected flow rates of the irrigation system.

3. Project plans must be approved and signed by the City of Santa Ana.

If an existing customer is requesting to upsize or downsize its existing water meter size, the following procedures will need to be performed:

1. Confirm the need based on twelve (12) months of water consumption history.

2. Customer must allow the City Water Resources staff to perform a site audit to confirm potential demand based on existing landscape, plumbing fixtures, specific site uses, etc.

3. Meter sizing to follow the Meter Sizing requirements in Section 200.3 of these Procedural Guide and Design Guidelines.

4. Submit a New Water Service & Meter Application.

There are some restrictions to being able to downsize the existing water meter:

- Customer must have a one-inch service on the City side in order to reduce down to ¾" or 5/8" meter.
- If a customer is requesting to reduce a 2-inch meter down to a 1-1/2" meter, the existing City valve must be slotted.
- If a customer is requesting to reduce a 1-1/2" or 2-inch meter down to 1-inch meter, the customer may need to provide new service piping within the meter due to the smaller size of the new meters.
- Combination residential fire meters will not be downsized without the review and approval by the Fire Department.

It should be noted that any change in the existing meter size will result in changes to the flow and minor changes in the water pressure at the site.

When a sewer connection is required, and a lateral to the property/parcel does not exist, the Applicant (developer/builder) will be responsible to prepare a plan for its construction, showing size, location, depth, slope and the location of the sewer clean-out. In addition, a new sewer lateral to a property/parcel shall be needed if:

- Existing lateral is a break-in connection and not a wye connection.
- Existing lateral is too small or too large for the amount of sewer generated by the project.
- Condition of the existing lateral is structurally deficient.
- Existing lateral has been out of service for ten (10) years or more.
- The existing site is being fully torn down and redeveloped.

When the applicant is simply adding a small water service or sewer lateral for the purpose of an accessory dwelling unit (or wanting to meter a duplex building individually), an engineered, full-size, plan set of drawings will not be required. Instead, a 8-1/2" by 11" plan can be submitted to the City (see Appendix 5 for a sample residential service installation plan).

100.7 SPECIAL CONDITIONS FOR LAND SUBDIVISIONS AND CONDOMINIUMS

All projects must conform to the requirement that each dwelling unit or building under separate ownership must be provided with its own public service connection and meter as well as sewer lateral. The City reserves the right to limit the number of houses or buildings, or area of land under one ownership, to be supplied by one public service connection and meter as well as one sewer lateral.

- *Land Subdivisions* – When property with an existing meter is subdivided, the service connection and meter shall be considered as belonging to the lot or parcel of land, which it directly enters.
  A meter shall not be used to supply adjoining property of the same or a different owner. The City of Santa Ana will require a separate public service and meter for each lot at the time of subdivision.

  This is the same for the sewer lateral. No shared sewer laterals will be allowed.

- *Condominiums* – Require a separate meter for each condominium (except in unusual cases).

100.8 REMODELS / TENANT IMPROVEMENT PROCEDURES

If the project will include the installation of new plumbing fixtures, the City of Santa Ana requires that the adequacy of the existing meter be evaluated and that the meter be upgraded if the addition of new plumbing fixtures and/or landscaping will cause water flow rates to exceed the capacity of the existing meter. The Applicant (developer/builder) shall submit a plumbing plan showing all future plumbing fixtures including existing plumbing fixtures to remain and landscape plans showing the future expected flow rates of the irrigation system. A listing of plumbing fixtures can be supplied in place of a plumbing plan. The City of Santa Ana will calculate the required meter size and determine if a meter upgrade is required.

In accordance with Section 39-27(c) of the City of Santa Ana Municipal Code, any non-residential tenant improvement project that requires a permit, plan check, and/or City design review and the estimated project cost is more than $50,000, the backflow preventer on the existing private fire service will be required to meet the City's Municipal Code.

If the existing backflow prevention device does not meet the City's current code (for example the device is located within a vault), the existing device will need to be removed along with the existing vault and a new approved above ground backflow device, at a location approved by the Orange County Fire Authority, be installed on the existing non-residential private fire service.

If the Applicant (developer/builder) is unsure of the suitability of the existing fire protection service backflow device, the Applicant shall provide a detailed description and photos of the existing device with the plan submittal. The City plan checker will respond if a new fire protection service backflow device is required to be installed.

100.9 SPECIAL CONDITIONS FOR MULTI-FAMILY DWELLINGS

In an effort to promote water conservation and accountability, and to limit future customer service disruptions, it is the policy of the City to require that all new developments have individual public meters serving multi-family dwellings (such as: apartments, condominiums, townhomes, mobile home parks, multi-tenant industrial and commercial centers, and mixed use developments).

In addition, one sewer lateral shall be provided per unit or building as applicable.

Such public water metering will be required regardless of whether the onsite water distribution system is publicly or privately owned and maintained.

All public meters shall be located within public right-of-way or within an easement. At no time shall the public water service and/or meter be located within a building or within private property.

For multi-family residential dwelling units within multi-story building, the Applicant (developer/builder) may request a public water master meter serving the multi-story building as long as the Applicant (developer/builder) will be responsible for sub-metering of each individual residential units (apartments or condominiums) within the multi-family property. Provisions for the ongoing maintenance and operation of the private sub-meters shall be the responsibility of the Applicant (developer/builder) and not the City.

As a minimum, each multi-story building shall be provided with at least one public water master meter.

END OF SECTION

SECTION 200

DESIGN AND INSPECTION PROCEDURES

200.1 IMPROVEMENT PLAN REQUIREMENTS

All plans submitted to the City of Santa Ana for plan checking and approval of water and sewer facilities shall be submitted on standard 24" x 36", maximum overall size sheets, with the City of Santa Ana Title Block. These plans shall conform to the "City of Santa Ana Public Works Agency Engineered CAD Standards". These standards have been implemented to promote exchangeability and reusability by creating a uniform set of procedures to be used within the City's Public Works Agency (PWA) but also for consultants submitting plans and other CADD documents intended for PWA storage and reuse.

All water and sewer improvements shall be designed in accordance with the City of Santa Ana Standard Plans and Specifications, these Design Guidelines, and the Standard Specifications for Public Works Construction, 2012 edition.

200.1.1 Specific Improvement Plan Requirements:

1. Title Sheet

    A. Project Title, Tract/Parcel Map Development Number, or Project Name.

    B. Location Map showing general area with project noted.

    C. Index Map is required and must contain all of the following information:

        1. Scale: 1" = 100 feet.

        2. All existing and proposed water and sewer mains, fire hydrants, water valves, meters/services, manholes and clean-outs.

        3. The size and material for all mains.

        4. The direction of flow for all sewer mains, the number of manholes and clean-outs.

        5. Lot lines for the proposed development, footprints of buildings, total square footage, number of stories, and service stub locations for each lot.

        6. North arrow and street names.

        7. Legend of symbols and lines.

        8. All proposed easements for City of Santa Ana water and sewer facilities.

    D. Signature block – City's approval of water and sewer facilities. Indicate which facilities are included on the water and sewer improvement plans. Provide signature block for City of Santa Ana Water Resources Manager.

    E. Orange County Fire Authority approval.

    F. Bench Mark, description and latest elevations, and survey horizontal control. Bench mark shall reference the City's MSL datum, available at Public Works Agency.

    G. Name, address, and phone number of engineering firm; name, address, and phone no. of developer; and legal description of property (Tract/Lot, Parcel Map No.)

H. Quantity estimates, categorized by water, sewer and non-domestic water facilities may appear on Title Sheet.

I. Index of sheets.

J. Underground Service Alert Notification Block per Section 4212/5217 of the Government Code.

K. Revision block.

2. Second Sheet

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

A. Quantity estimates (if not shown on Title Sheet).

B. General Notes.

C. Utility, addresses, and phone numbers, including but not limited to: gas, telephone, power, cable TV, water, sewer, recycled water, and storm drain.

D. City's Standard Water and Sewer Construction Notes (See Appendix 5 for typical notes)

E. Typical street cross sections showing street widths to right-of-way, location of sidewalks and curbs, all utilities, including gas, telephone, cable TV, and electrical facilities, storm drains, and proposed water and sewer facilities.

3. Plan and Profile Sheets

Separate plan and profile sheets are required for all water and sewer pipelines, as follows:

A. Scale: 1-inch = 20-feet (minimum) horizontal and 1-inch = 2-feet vertical. The vertical scale can be changed to 1-inch = 4-feet vertical when grades are steep, but this will need specific approval by the City's Water Resources Division.

B. The plan and profile should be on same sheet and aligned (with profiles shown on the top of the sheet). Sewer lateral profiles, if required, shall be shown on separate sheets.

C. Each sheet shall list the construction notes needed for that sheet.

D. Existing water, sewer and storm drain facilities adjacent to development must be shown. Size and material of these facilities must be indicated.

E. Easements dedicated to the City of Santa Ana for water and sewer facilities must appear on plans.

F. Proposed building or dwelling unit pad elevations must be shown.

G. Drawings shall show on the plan and profile sheets the position of all other existing or proposed underground facilities. This shall include water, sewer, and storm drain crossing elevations.

H. Storm drain alignment shall be indicated in the plan view and all crossings of 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.

I. All water and sewer facilities to be operated and maintained by the City shall be located in public right-of-way (streets or recorded easements) which shall be clearly shown and fully dimensioned on the improvement plans.

J. All proposed manholes shall have a specific detail prepared depicting the manhole channel and inlet and outlet piping and elevations.

200.1.2 Signatures

Each sheet of the improvement plans submitted shall be signed by the Civil Engineer responsible for that design, except that a sheet of complex structural, mechanical or electrical plans shall be designed by the Professional Engineer responsible for that design. Each sheet shall also be stamped or sealed by the Professional Engineer and shall include the expiration date of their Registration Certificate noted.

Civil and Professional Engineers signing improvement plans shall be registered by the State of California.

Plan revisions subsequent to the City's approval shall be resigned prior to resubmittal for the City's re-approval.

200.2 SUBMITTAL REQUIREMENTS

Any and all proposed water and sewer improvements to serve a property/parcel or development must be reviewed and approved by the City of Santa Ana before these improvements can be constructed or modified. The water and sewer improvements must be reflected on civil engineering plans and reviewed and approved through the City's plan approval process. Plans submitted for approval shall be accompanied by a letter of transmittal addressed to the City. Plans shall be checked by the Applicant for consistency, accuracy, meeting of City's CAD Standards, and conformance with the City's Standard Plans and Specifications, these Design Guidelines, and the Standard Specifications for Public Works Construction prior to submission for the City's approval. **If plans have obviously not been checked by the Applicant, they will be returned not reviewed by the City.** The Checklist for Plan Checking that will be used in the approval process is included in Appendix 1.

Check prints shall accompany revised plans which are resubmitted for approval. Resubmitted plans shall be accompanied by a letter of transmittal addressed to the City.

200.2.1 Individual Tract Improvement Plans:

In addition to the requirements described in Section 200.1, the Applicant (developer/builder) shall submit the following items for first review of residential, commercial, and industrial developments:

1. Water and sewer improvements plans including the site plans, plumbing plans and the irrigation plans. Water, sewer, and structural design calculations shall accompany the plans, if appropriate. In addition to submitting the plans, submit one (1) set of the plans in electronic (PDF file) format on CD, flash drive or other acceptable media.

2. Tract/parcel map showing gross acreage, street names, and any City of Santa Ana easements. In addition to submitting copies of the tract/parcel map, submit one (1) set of the tract/parcel map in electronic (PDF file) format on CD, flash drive or other acceptable media.

3. Grading plans. In addition to the submitting the plans, submit one (1) set of the plans in electronic (PDF file) format on CD, flash drive or other acceptable media.

4. Engineer's quantity estimate for water and sewer facilities, including the total number of fixture units, estimated water and sewer flow rates, and expected flow rates of the irrigation system.

200.2.2 Non-Residential Plans:

In addition to the requirements described in Section 200.2.1, the Applicant (developer/builder) shall submit the following items for first review of all commercial or industrial developments:

1. Site utility plans showing:
    A. Property lines.
    B. "Footprint" of buildings.
    C. All on-site public and private fire hydrants.
    D. All backflow devices.
    E. Plans stamped and signed by Orange County Fire Authority.
    F. Fire services will require a backflow prevention device (minimum double check valve assembly), as determined by the City and as required by the City's Municipal Code.
    G. Non-residential water service will be required to have a reduced pressure principal backflow assembly, as determined by the City and as required by the City's Municipal Code.
2. Plumbing plans including the number of fixture units, and calculated water and sewer demand.
3. Irrigation plans including the expected flow rates of the irrigation system and all calculations required by City's Municipal Code Section 41-1501.

200.2.3 Fire Service Requirements

All 3-inch diameter and larger fire service connections will require, at a minimum, a "N-style" double check detector assembly with a by-pass meter. For all fire services with a contaminant control hazard, a reduced pressure principle backflow assembly (or a reduced pressure detector assembly) will be required, as determined by the City and as required by the City's Municipal Code.

All fire service connections smaller than 2-inches in diameter, required by either NFPA 13D (one & two family residential fire sprinkler systems) or NFPA 13R (multi-family residential fire sprinkler systems), shall be provided with the following:

- Closed fire sprinkler systems will require a double check valve backflow device.
- Open (flow-through) fire sprinkler systems will not require a backflow device as long as the ends of these systems are connected to a fixture that is regularly used. This prevents the water in the fire system from becoming stagnant.

The required backflow device shall be located adjacent to the building but upstream of the residential building valve, and shall be testable, and accessible for maintenance and repairs.

A "domestic water shutoff valve" may be used to effectively negate the need for any additional water demand by the home in the event of a fire. The design of the "domestic water shutoff valve" is such that if there is a fire sprinkler operation/activation during domestic usage, the valve will automatically shut off the flow to the domestic system and divert the available water supply to the sprinkler system, thereby eliminating the lower flow into the sprinkler system that might otherwise be caused by possible significant domestic water usage.

The use of a domestic valve can eliminate the need to combine the domestic and sprinkler demand (gallons per minute) when performing the hydraulic design calculation.

200.2.4 Irrigation Service Requirements

Facilities for irrigation of new and existing parks, medians, landscaped public area or landscaped areas, lawns, or gardens surrounding condominiums, townhouses, apartments, and industrial parks shall be designed and installed in such a way as to conserve water. Rate and extent of application of water shall be controlled by the owner so as to minimize the water usage.

All planting, irrigation and landscape-related improvements shall meet the requirements of the City of Santa Ana's Municipal Code Section 41-1501.

Landscape and irrigation plans must be reviewed by the City of Santa Ana. Irrigation plans shall include any calculations required per Santa Ana's Municipal Code Section 41-1501.

200.3 METER REQUIREMENTS

All meters will be furnished and installed by the City of Santa Ana upon completion of a water service application, account activation and payment of all applicable fees. The City will be responsible for the sizing of the meters but the following is a general guideline for the meter sizes.

200.3.1 Meter Sizing

1. Sizing of water meters for domestic applications shall be per the following general guideline:

GPM Demand	*Meter Size*
1-20 gpm	5/8" Displacement
21-30 gpm	¾" Displacement
31-50 gpm	1" Displacement
51-100 gpm	1-1/2" Displacement
101-120 gpm	2" Displacement
101-160 gpm	2" Compound
161-320 gpm	3" Compound
321-500 gpm	4" Compound
501-1,000 gpm	6" Compound

2. Sizing of water meters for irrigation applications shall be per the following general guideline:

GPM Demand	*Meter Size*
1-10 gpm	5/8" Displacement
11-15 gpm	¾" Displacement
16-25 gpm	1" Displacement
26-50 gpm	1-1/2" Displacement

51-160 gpm	2” turbine
161-350 gpm	3” turbine
351-1,000 gpm	4” turbine
1,001-2,000 gpm	6” turbine

The City of Santa Ana reserves the right to size the meters.

200.3.2 Type of Meter

A turbine meter and strainer shall be used on all irrigation services 2-inches and larger or as determined by the City of Santa Ana.

A compound meter shall be used on all master metered multi-unit developments or as determined by the City of Santa Ana.

200.4 EASEMENTS

All water and sewer facilities to be operated and maintained by the City shall be located in public right-of-way (streets or recorded easements). The Applicant (developer/builder) shall grant, or cause to be granted to the City of Santa Ana, without cost to the City, all necessary easements for construction, installation, maintenance and access to the water and sewer facilities, across all privately-owned lands to be traversed by the facilities, which easements shall be in a form and condition of title satisfactory to the City of Santa Ana and shall be executed by all necessary parties having an interest in said lands.

All easement documents and plat map and legal descriptions shall be submitted to the County of Orange for recording. A copy shall be mailed to the property owner(s) after recording.

If an easement outside of the public right-of-way is required for construction and/or maintenance of water or sewer facilities, including but not limited to, water mains, sewer mains, manholes, hydrants, meter vaults, backflow assemblies, and any other water appurtenances; its minimum width shall be twenty (20) feet for water and sewer mains; and a minimum of five (5) feet on all sides for meters, fire hydrants, meter vaults, backflow assemblies, and other appurtenances, unless otherwise determined by the City of Santa Ana. Means of maintaining access to the easement must be provided and an all-weather surface constructed.

An easement running parallel with a lot line shall not be split so as to occur on two lots but shall be laid out so that the easement is located all on one lot.

In multi-family residential complexes or business parks, the Applicant may dedicate a “blanket easement” over all internal paved areas to the City as long as it covers the minimum area noted above.

Along public streets, a three (3) or five (5) foot wide utility parallel easement on private property for City of Santa Ana may be required depending upon public right-of-way widths and sidewalk locations.

The easement, title report, and legal descriptions with accompanying sketch and plans shall be prepared by the Applicant's engineer, and two copies of which shall be sent to the City, or easements shall be shown on a tract or parcel map.

NOTE: Approval by the City of Santa Ana of water and sewer improvement plans will not be given for the tract water and sewer systems until all easements have been obtained.

200.5 SEPARATION REQUIREMENTS

200.5.1 Horizontal Separation

Division of Drinking Water (DDW) regulations require that new water mains shall be installed at least ten (10) feet horizontally from and one (1) foot above, any parallel pipeline conveying:

- Untreated sewage;
- Primary or secondary treated sewage;
- Disinfected secondary recycled water; and
- Hazardous fluids such as fuels, industrial wastes, and wastewater sludge.

New water mains shall be installed at least four (4) feet horizontally from, and one (1) foot vertically above, any parallel pipeline conveying:

- Disinfected tertiary recycled water (Title 22);
- Storm drainage.

The minimum separation distances noted above shall be measured from the nearest outside edge of each pipe barrel.

If crossing a pipeline containing sewage, recycled water, or storm drainage, a new water main shall be constructed no less than 45-degrees to and at least one (1) foot above that pipeline. No connection joints shall be made in the water main within eight (8) horizontal feet of the other pipeline.

The vertical separation noted above is required only when the horizontal distance between a water main and the pipeline carrying the above fluids is less than ten (10) feet.

With State Board's approval, newly installed water mains may be exempt from the separation distances noted above if the newly installed main is:

- Less than 1,320 linear feet in length;
- Replacing an existing main, installed in the same location, and has a diameter no greater than six (6) inches more than the diameter of the main it is replacing; and
- Installed in a manner that minimizes the potential for contamination, including, but not limited to: sleeving the newly installed main; or utilizing upgraded piping material.

The above separation requirements shall be met, whenever feasible for all new construction. If the City agrees that it is not feasible to meet these requirements, the City will be required to propose an alternative to these requirements to DDW.

The waiver and alternative proposed shall: demonstrate to the State Board that the proposed alternative would provide at least the same level of protection to public health; and obtain written approval from the State Board prior to implementation of the alternative. The Applicant shall be responsible to provide a draft of the waiver request. DDW has prepared an application checklist that may be used in proposing an alternative to the Waterworks Standards. This checklist is available from the City of Santa Ana Water Resources Division. The City will review, revise and finally submit the waiver request to the State Board.

200.5.2 Vertical Separation

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

Whenever a crossing must occur where a sewer main passes within one (1) foot of a domestic water main, special construction will be required. Encasement may be required if vertical separation requirements cannot be met or as required by the City. One of the following types of encasement may be required:

1. Reinforced concrete encasement, a minimum thickness of 6 inches.
2. Piping within a continuous steel casing which shall have a thickness of not less than 1/4 inch.

If a sewer is above a water main, the special construction shall extend a minimum of eight (8) feet of horizontal clearance on both sides, or if not feasible, center the piece of new water pipe under the crossing to maximize this horizontal clearance.

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

200.5.3 Separation from New and Existing Utilities

Construction of new utilities or structures shall maintain a minimum of five (5) foot parallel separation and a minimum of one (1) foot vertical separation from all City of Santa Ana water and sewer pipelines unless written authorization is obtained from the City of Santa Ana Public Works Executive Director of Public Works. Construction of new water and sewer facilities shall maintain a minimum of five (5) foot parallel separation and one (1) foot minimum vertical separation from all existing utilities and structures unless written authorization is obtained from the City's Water Resources Manager.

200.6 PROTECTION OF PUBLIC WATER SUPPLY

All water services shall be subject to the provisions of the City of Santa Ana's Municipal Code Section 39-29, "Protection of Public Water Supply. The following summarizes the cross-connection provisions included within the City's Municipal Code.

The purpose of Section 39-29 of the Municipal Code is to protect the public water supply: against actual or potential cross-connections by isolating within the premises contamination that may occur because of some undiscovered or unauthorized cross-connection on the premises; to eliminate existing connections between drinking water systems and other sources of water that are not approved as safe and potable for human consumption; and to eliminate cross-connections in the future.

The City of Santa Ana recognizes that the water purveyor has a responsibility to take all reasonable precautions to protect the integrity of the public water supply. Thus, in the exercise of this responsibility, the City of Santa Ana may need to conduct a cross-connection control survey of the Applicant's plumbing system. The City will not address internal protection requirements. The City recommends that the Applicant or his engineer contact the local health agency (Orange County Health Care Agency) to ensure the on-site water system complies with current plumbing codes, and requirements of the local health agency.

The City has a cross-connection specialist who is available for consulting on any questions regarding cross-connections.

The City of Santa Ana will not provide any water service to any premises unless the public domestic water supply is protected as required by State, County and City of Santa Ana regulations.

Except in special situations, it is now required to have back-flow devices installed for:

- All commercial domestic water services.
- All industrial domestic water services.
- All fire service connections except as noted in Section 200.2.3.
- All private domestic systems or fire line systems having two, or more, points of connection to the City's water mains.
- All irrigation services on the domestic water system.
- All domestic services to sites where there is recycled water on-site.

Back-flow prevention devices shall be approved by the U.S.C. Foundation for Cross-Connection Control and shall be installed by and at the expense of the customer.

The customer shall have the device: tested annually by a tester certified by the Orange County Health Care Agency; service such devices to maintain them in satisfactory operating condition; and shall overhaul or replace such devices if they are found defective. Test results shall be provided before the City will accept service as complete. Records of such annual tests, repairs, and overhauling shall be kept by the customer and copies forwarded to the City of Santa Ana's cross-connection specialist and local health agency within ten (10) working days after testing.

Additional reference for guidelines to when, why, and what types of back-flow and cross-connection control devices are approved may be found in:

A. Section 39-29 of the City of Santa Ana Municipal Code.

B. "Regulations Relating to Cross-Connections", California Administrative Code - Title 17 - Public Health (Sections 7583 through 7605).

C. "Manual of Cross-Connection Control", published by Foundation for Cross-Connection Control and Hydraulic Research, University of Southern California, School of Engineering.

D. EPA Cross-Connection Control Manual.

200.6.1 Backflow Device Location

All commercial and industrial domestic water services, and domestic services to sites where there is recycled water on-site, will require that a Reduced Pressure Principle backflow assembly be installed immediately downstream of the water meter.

The device must be installed in accordance with the City of Santa Ana's Standard Plans. The assembly must be installed above ground and cannot be installed in an underground vault. These assemblies can be installed in such a manner as to be screened from view, but must be easily accessible to City's personnel to facilitate testing and servicing.

There must be a minimum of five (5) feet of clearance on all sides of the backflow assembly.

All fire services requiring a backflow assembly as specified in Section 200.2.3 (Fire Service Requirements) must be installed in accordance with City of Santa Ana's Standard Plans. The required backflow assemblies must be on private property and shall be located adjacent to the building but upstream of the residential building valve, and shall be testable and easily accessible for maintenance and repairs.

The Orange County Fire Authority will determine the final placement of all fire services backflow assemblies. A ten (10) foot wide easement must be dedicated to the City of Santa Ana from the public right-of-way to the backflow assembly.

200.7 FIRE DEPARTMENT APPROVAL

Applicant (developer/builder) shall obtain approval from the Orange County Fire Authority for fire hydrant spacing, the required fire flows for the development, and the final placement of all fire services backflow assemblies. Fire Department's approval shall be coordinated by the Applicant (developer/builder) and will be required prior to the City's approval of the water improvement plans.

200.8 USE OF CITY'S SEWAGE FACILITIES

Article III of the City of Santa Ana's Municipal Code, Chapter 39, deals with the City of Santa Ana's sewer regulations. The City of Santa Ana sewers transport the sewage to the Orange County Sanitation Districts treatment facilities. Orange County Sanitation District has regulations on the types of wastes that are allowed to be discharged into its treatment facilities to meet its discharge requirements. Commercial or industrial Applicants shall contact Orange County Sanitation District for these regulations and any special discharge permit requirements and fees. If only domestic wastewater is to be discharged from the project, only the regulations stipulated within the City's Municipal Code will govern.

200.9 FATS, OILS AND GREASE CONTROL

Section 39-56 of the City of Santa Ana's Municipal Code specifies the City's regulations regarding fats, oils and grease control. The purpose of these regulations is to allow the maximum beneficial public use of the City's sewer services and facilities while preventing blockages of the public sewer lines resulting from discharges of fats, oils and grease (FOG) to the sewer facilities and to specify appropriate FOG discharge requirements for food service establishments (FSE). These regulations will allow the City to comply with federal, state and local policies regarding sanitary sewer overflows (SSO) and to allow the City to meet applicable standards and provisions for the regulations of wastewater or waste containing FOG discharges to the sewer facilities.

Section 39-56 of the City's Municipal Code includes:

- Prohibitions that apply to all food service establishments (FSEs).
- All FSEs shall implement best management practices in their operation to minimize the discharge of FOG to the sewer systems.
- The FOG pretreatment that is required for waste, which contains FOG, to be discharged into the sewer system.
- Requirements for grease interceptors and maintenance requirements.
- FSE monitoring requirements for compliance, and record keeping requirements.

- Inspection and sampling conditions and emergency notification requirements.

200.10 FINAL PLANS

Any and all proposed water and sewer improvements to serve a property/parcel or development must be reviewed and approved by the City of Santa Ana and approved by the Water Resources Manager before these improvements can be constructed or modified.

200.10.1 Final Quantities

The Applicant (developer/builder) shall provide the final quantities to allow the City of Santa Ana to estimate the project costs for the water and sewer facilities. The items listed will include, but will not be limited to pipes, valves, meters, appurtenances, hydrants, backflow devices, connections, hot taps, sewer mains, manholes, cleanouts, laterals, and any other water or sewer facilities to be constructed.

200.10.2 Final Plan Approval

Water and sewer improvement plans must be approved by the City of Santa Ana before any construction can start. Approval by the City will be contingent upon satisfying the following requirements:

1. All required corrections from previous plan check submittal responses have been made on the water and sewer improvement plans.
2. The New Water Meter Application has been executed and returned to the City.
3. All required easement documents have been executed and delivered to the City. Tract/parcel maps must be signed by the City prior to plan approval.
4. All plan submission requirements have been met (mylars, prints and CD, or other approved media).

When the plans have been approved, the Applicant (developer/builder) will be notified by the City.

200.10.3 Signed Plans

Once the plans have been signed by the City, the Applicant (developer/builder) must submit the required signed plans to the City along with the one (1) compact disk (CD) or other approved media. The CD, or other approved media, will contain a single PDF file of the entire approved plan set, i.e. reflecting the City's approval signatures. The PDF file will be of a quality high resolution.

The signed plans will be valid for one (1) year from the date of the City's approval. If construction has not started within one year from the date of approval, the signed plans shall become "null and void". The City of Santa Ana will require rechecking of the plans.

200.11 ORDER OF PRECEDENCE

In the case of conflict between the construction plans, specifications, standards, and permit requirements, with regard to construction of facilities, the following order of precedence will apply:

1. Permit requirements, as approved by the agency having jurisdiction.
2. Special details, as approved by the City.
3. Improvement Plans, as approved by the City.

4. Special Conditions for the specific project and incorporated into the project contract documents as approved by the City.
5. City's Standard Drawings.
6. City's Special Provisions.
7. Standard Specifications for Public Works Construction

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. 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 the plans and specifications, or should errors occur in projects being constructed by others affecting the work, and the contractor proceeds with the work affected without instruction from the City of Santa Ana, the contractor shall be fully responsible for any resultant damage or defect.

200.12 CONSTRUCTION OF WATER AND SEWER IMPROVEMENTS

The Applicant (developer/builder) is responsible for the installation of all water and sewer facilities within and/or adjacent to his development to serve his development or re-development. All water and sewer improvements shall be constructed in accordance with the City's Standard Plans and Specifications, these Design Guidelines, and the Standard Specifications for Public Works Construction, 2012 edition.

Prior to the onset of construction activities for water and sewer improvements, the City of Santa Ana will strictly enforce the following two requirements:

1. The project will only be released for construction after the Applicant makes the submittal of the approved water and sewer plans and provided four (4) copies of the approved construction plans;
2. The Applicant's contractor has scheduled a pre-construction meeting with the City's Construction Inspection Group after receiving the City permit.

The Applicant's contractor constructing the water and sewer improvements shall have a Class A or C-34 license as well as have a business license to operate within the City of Santa Ana.

Water mains shall be staked for line and grade or shall be installed subsequent to the installation of the curbs but prior to paving of the streets. The curbs act as a positive grade control for setting services, meter boxes, and fire hydrants.

The Applicant's contractor shall pothole all the utility crossings prior to the beginning of construction. In addition, the Applicant's contractor shall field verify the exact location, size, depth, and material of all existing utilities and interferences situated along the route of the proposed pipeline prior to commencement of excavation, fabrication, and installation.

If any field conditions differ from what is shown on the plans and require design changes, the construction shall be placed on hold while the revised design plans are prepared and submitted for review and approval by the City. Construction activity shall not be restarted until the revised plans are approved by the City and once approved the construction can then proceed based on the revised design plans.

The Applicant's contractor shall, at his expense and cost, construct all improvements in such a manner as will protect all existing underground utilities and, in the event of any conflicts, shall notify the City immediately.

When construction has been successfully completed and the project's final inspection has been performed, the City will issue a notice to the Applicant declaring the start of the one-year warranty period (see Section 200.18).

200.13 CONSTRUCTION AND INSPECTION REQUIREMENTS

200.13.1 Notification/Pre-construction Meeting

Prior to the onset of construction activities, the Applicant shall submit the approved water and sewer plans and provide four (4) copies of the approved construction plans to the City and the Applicant's contractor shall schedule a pre-construction meeting with the City's Construction Inspection Group after receiving the City permit. Notice shall be given to the City's Construction Inspection Group at least 48 hours before starting construction.

A pre-construction meeting is to be held before the starting of the construction, at which will be present the Applicant's contractor's working foremen and/or job superintendent, the Applicant's engineer and the City's assigned inspector. The purpose of the meeting will be to answer any questions on project requirements, to obtain the contractor's construction schedule and to discuss any known circumstances that might affect job installation.

200.13.2 Water for Construction Purposes

Applicant's contractor which desires to obtain water from the City-owned fire hydrants for construction or any other purpose shall first obtain and pay for a permit from the Corporate Yard of the City of Santa Ana, at 215 S. Center Street. Information concerning costs and conditions may be obtained from the City by calling (714) 647-3320. Use of private water from a hose bib is not allowed.

Construction water shall be taken through a meter delivery and any additional costs of water used, pumping costs, loading, hauling and use thereof is the responsibility of the Applicant's contractor. The Applicant's contractor shall make all arrangements for transporting the water to the construction site.

200.13.3 Inspection of Work

All work shall be subject to inspection by the City's Construction Inspection Group and shall be left uncovered until approved by the City's assigned inspector. The contractor shall not proceed with any subsequent phase of the work until the previous phase has been inspected and approved by the City.

All materials and equipment that would be in direct contact with the potable water supply shall be NSF 61 compliant.

200.13.3.1 Access

The City of Santa 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, quality of labor, 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 City's Construction Inspection Group. The contractor shall give due notice in advance of backfilling so that proper inspection may be provided.

200.13.3.2 Obligation

Inspection of the work shall not relieve the contractor of any obligations to complete the work as prescribed by the approved construction improvement plans, Standard Drawings, or the Standard Specifications. Any known defective work shall be corrected before testing or final inspection will be permitted. Unsuitable materials may be rejected, even though they may have been previously overlooked by the inspector.

200.13.3.3 Domestic Water System Inspections

The Applicant's contractor shall not proceed with any subsequent phase of work until the previous phase has been inspected and approved by the City's Construction Inspection Group. Inspection shall be made at the following intervals of work:

1. Delivery of materials to job site.
2. Trench excavation and bedding.
3. Placing of pipe, fittings, and structures, including notification/warning tape on potable mains and recycled irrigation water main and service lines.
4. Pouring all concrete anchors and thrust blocks.
5. Placing and compacting the pipe zone back fill.
6. Backfilling balance of trench to grade. Compaction tests are to be performed by private soils consultant retained by the Applicant. Copies of test results shall be given to the City's Construction Inspection Group by the applicant for approval before final acceptance of the work. Backfilling and repaving shall be in accordance with the City's requirements. Approval of backfill testing must be obtained prior to paving.
7. Installation of highline and/or temporary services when needed.
8. Pressure testing all mains and services.
9. Disinfecting and flushing (Chlorination and bacteriological testing).
10. Health samples.
11. Repaving trench cuts.
12. Raising valve box covers to finish grade per City's Standards.
13. Fire hydrants painted and pads poured.
14. Installation of service lines, appurtenances meter boxes, and customer service valves.
15. Connection to the existing system.
16. Removal of highline and/or temporary services when needed.

200.13.3.4 Sewer Inspections

The Applicant's contractor shall not proceed with any subsequent phase of work until the previous phase has been inspected and approved by the City's Construction Inspection Group. Inspection shall be made at the following intervals of work:

1. Delivery of materials to job site.
2. Trench excavation and bedding.
3. Placing of pipe, fittings, and structures.
4. Placing and compacting the pipe zone back fill.
5. Backfilling balance of trench to grade. Compaction tests are to be performed by private soils consultant retained by the Applicant. Copies of test results shall be given to the City's Construction Inspection Group by the applicant for approval before final acceptance of the work. Backfilling and repaving shall be in accordance with the City's requirements. Approval of backfill testing must be obtained prior to paving.
6. Inspection of sewer bypass equipment.
7. Air testing all mains and laterals.
8. When manholes and mainline are being cleaned and flushed. In addition, all newly construction sewer mains, laterals and manholes must be inspected via closed circuit television camera. (see below for requirements)
9. Repaving trench cuts.
10. Raising manholes to finish grade per City's Standards.
11. Installation of laterals and cleanouts.
12. Connection to the existing system.

200.13.3.5 Final Domestic Water Facilities Inspection

Before final acceptance, the City's Construction Inspection Group will make a final inspection of all work, accompanied by the Applicant's contractor's superintendent or representative, to verify that:

1. All phases of the job are complete in accordance with plans and specifications.
2. All valve boxes are raised to finish grade and that all repairs are completed.
3. All curb stops, and the meters, are properly positioned and all meter boxes are positioned and raised to proper grade.
4. Fire hydrants are raised to proper grade, are in a vertical position, painted; and its concrete pad is poured.
5. Backfill has passed all compaction testing.
6. All 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.
7. Domestic water lines have been chlorinated and have passed the required bacteriological tests.
8. Water line pressure testing and flushing have been completed.

9. The job site is clean and cleared of all the contractor's equipment and materials.
10. All service lateral locations have been marked on curbs.
11. Certified test results have been provided for all backflow prevention devices.
12. A mylar and a blue line copy of the water facility plans labeled "RECORD DRAWINGS" with the "As-Built" revisions have been delivered to the City.
13. Digital submittal of plan information in a format acceptable to the City.

200.13.3.6 Final Sewer Inspection

All sewer mains shall have passed the City's closed-circuit television inspection. Before final acceptance, the City's Construction Inspection Group reserves the option of requiring that the contractor flush and clean the sewer mains again even though the sewer may have been previously flushed and cleaned. The City's inspector will require the Applicant's contractor's superintendent or representative to be present during final inspection of the sewer facilities. The City's inspector may check, but is not necessarily limited to, that:

1. All phases of the job are complete in accordance with plans and specifications.
2. Mirroring of sewer mains show all bulkheads and plugs have been removed.
3. Manhole interiors are clean of all debris and excess concrete mortar.
4. All manhole concrete grade rings are adequately grouted and properly set.
5. Pavement around manhole cover has been properly joined at correct grades.
6. Required field tests have been made on all sewer main sections and manholes, particularly when sections of manholes had to be repaired.
7. Backfill has passed all compaction testing.
8. Lateral locations have been marked on curbs.
9. Manholes are raised to grade per City Standards.
10. The job site is clean and cleared of all the contractor's equipment and materials.
11. A mylar and a blue line copy of the water facility plans labeled "RECORD DRAWINGS" with the "As-Built" revisions have been delivered to the City.
12. Digital submittal of plan information in a format acceptable to the City.

200.14 DISINFECTION GUIDELINES

The purpose of these Disinfection Guidelines is to provide the City Water Resources Division Operation Staff, the City's Construction Division, and any contractors constructing new water mains/services, or repairing existing water mains, a general understanding of the disinfection requirements for new and repaired potable water facilities constructed within the City of Santa Ana.

These Disinfection Guidelines apply to the construction of: all new water mains; fire hydrant assemblies; service laterals; appurtenances; individual services (no matter the size); new services off existing water mains; and the repairing of existing water mains.

200.14.1 City of Santa Ana Disinfection Requirements

Per the City of Santa Ana Water Improvements, Special Provisions: "All new pipelines and appurtenances shall be chlorinated and disinfected in accordance with AWWA Standard C651-14 "Disinfecting Water Main" and shall meet all health department standards. After disinfection, the lines shall be flushed by the Contractor and water samples taken by an approved laboratory representative for bacterial analysis in accordance with AWWA Standard. Connection to existing water main facilities shall be made only after the successful completion of pressure test, disinfection and flushing procedures."

200.14.2 Disinfection and Flushing Plan

Per the City of Santa Ana Water Improvements, Special Provisions: "Prior to the start of construction, the Contractor shall submit to the City for review and approval "Disinfection and Flushing Plan" prepared by a D3 or T3 Operator Certified with California Department of Health Services, or a Registered Civil Engineer practicing in the field of water resources, … Discharge from flushing of pipelines shall be routed to the sanitary sewer system. Disinfection and Flushing shall be performed under the supervision of D3 or T3 Certified Operator and/or a Registered Civil Engineer practicing in the field of water resources."

See the Water Improvements Special Provisions for the description of the minimum requirements of the "Disinfection and Flushing Plan".

200.14.3 AWWA Standard C651 "Disinfecting Water Mains"

AWWA Standard C651, latest revision, describes the essential procedures for the disinfection of new and repaired potable water mains and services. New water mains, including services, shall be disinfected before they are placed in service. Water mains taken out of service for inspection, repair or other activities may or may not require disinfection and sampling, depending on the risk of contamination. The purpose of this AWWA Standard is to define the minimum requirements for the disinfection of water mains and services, including the preparation of water mains, application of chlorine, and sampling and testing for the presence of coliform bacteria. All chlorine products shall be NSF 60 certified.

Specific City of Santa Ana requirements include:

- All new fire hydrants, appurtenances and services (including 1" and 2" services) shall be completely installed, flushed, pressure tested, disinfected and satisfactory bacteriological samples taken along with the construction of the new water main;
- If the new fire hydrants, appurtenances and services (no matter the size) are not disinfected with the new water main, these facilities shall be disinfected per the requirements of Section 200.14.7 (Final Connections to Existing Mains).
- Disinfection of water mains, appurtenances, and services shall be performed prior to hydrostatic testing for new water mains having a diameter of 12-inches and larger; and
- For new water mains having a diameter of 10-inches or smaller, disinfection of water mains, appurtenances, and services may run concurrently with hydrostatic testing.

200.14.4 Forms of Chlorine for Disinfection

As stated in AWWA C651 Section 4.1, the forms of chlorine that may be used in the water main disinfection operations are liquid chlorine (gas), sodium hypochlorite solution, and calcium hypo-chlorite granules or tablets.

(1) ***Liquid Chlorine Solution***: shall be injected with a solution feed chlorinator and a water booster pump or a sufficiently pressurized source of water to provide adequate flow to inject and disperse the chlorine solution.

(2) ***Calcium Hypochlorite (Dry)***: shall be dissolved in water to a known concentration in a container and pumped into the pipeline at a measured rate.

(3) ***Sodium Hypochlorite (Solution)***: shall be diluted in water to desired concentration and pumped into the pipeline at a measured rate.

(4) ***Calcium Hypochlorite Tablets and Adhesive***: Calcium hypochlorite is available in granular form or in 5-gram tablets and shall contain approximately 65% available chlorine by weight. The adhesive shall be a type that will not impart taste, odor, or detrimental compounds to the water supply and shall comply with NSF 61. It should be noted that tablets dissolve in approximately seven (7) hours and must be give adequate contact time. Do not use calcium hypochlorite intended for swimming pool disinfection.

200.14.5 Methods of Chlorination

Four methods of chlorination are described in AWWA Standard C651 Section 4.2 through Section 4.6: tablet; continuous-feed; slug; and spray.

New water mains with a diameter of 10-inches or smaller shall be disinfected by either direct chlorine solution injection or by use of calcium hypochlorite tablets.

Pipelines with a diameter of 12-inches and larger shall be disinfected by direct chlorine solution injection only.

In the event groundwater is encountered, only disinfection by continuous feed chlorine solution injection is allowed (regardless of the size of the new water main).

(1) ***Tablet/Granule Method***: The use of calcium hypochlorite tablets will be permitted in pipe sizes 4- through 10-inches in diameter. This method may be used only if the pipes and appurtenances are kept clean and dry during construction. Tablets shall be placed in the upstream end of each section of pipe, including branch and service lines, per the number specified within the AWWA Standard C651 Section 4.3.

When installation has been completed, the main shall be filled with water such that the full pipe velocity is no greater than 1 foot/second and all air pockets are eliminated. The chlorinated water shall remain in the pipe for at least 24 hours. The tablet method gives an initial chlorine dose of 25 mg/L. A detectable free chlorine residual (≥0.2 mg/L) shall be found at each sampling point after 24-hour period.

(2) ***Continuous-Feed Method*:** The continuous-feed method consists of completely filling the main with potable water, removing air pockets, then flushing the completed main to remove particulates, and refilling the main with potable water that has been chlorinated to 25 mg/L. The chlorinated water shall be retained in the main, branches and services, for at least 24 hours, during which time valves, hydrants and services shall be operated to ensure disinfection of the appurtenances. After a 24-hour holding period in the main there shall be a free chlorine residual of not less than 10 mg/L.

Chlorine solution shall be applied by means of a vacuum-operated chlorinator and a booster pump or a sufficiently pressurized source of water to provide an adequate flow to operate the educator system and properly disperse the chlorine solution. Direct-feed chlorinators, which operate from gas pressure in the chlorine cylinder, without a vacuum regulator, shall not be used for application of a chlorine solution. Hypochlorite solutions may be applied to the water main with a chemical-feed pump designed for feeding chlorine solutions.

(3) ***Slug Method***: The slug method consists of completely filling the main to eliminate air pockets; flushing the main to remove particulates; then slowly flowing through the main a slug of water dosed with chlorine to a concentration of 100 mg/L.

The slow rate of flow ensures that all parts of the main, its appurtenances and services will be exposed to the highly chlorinated water for a period of not less than three (3) hours. As chlorinated water flows past fittings and valves, related valves, hydrants and services shall be operated so as to disinfect appurtenances and pipe branches.

(4) ***Spray Method***: For very large transmission mains (where personnel or equipment may safely enter the pipe), spray disinfection may be an appropriate and efficient means of achieving disinfection. In general, once pipe is cleaned, spray a 200-mg/L free chlorine solution on all surfaces. After 30 minutes, fill line and sample.

200.14.6 Basic Disinfection Procedure for New Mains

All new fire hydrants, appurtenances, and services (no matter the size) shall be completely installed, flushed, pressure tested, disinfected and satisfactory bacteriological samples taken along with the construction of the new main.

The following is the basic disinfection procedure for new water mains.

a. Implement preventive measures during construction.
b. Perform preliminary flushing to remove particulates and materials that may have entered the main.
c. Perform hydrostatic pressure tests and disinfect the water main. Every service connection served by a main being disinfected shall be tightly shutoff at the curb 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.
d. Flush the chlorinated water and perform dechlorination, if required.
e. Determine the bacteriological quality of water samples collected from the pipe after disinfection.
f. Final connection of newly disinfected water main to the active distribution system.

200.14.7 Final Connections to Existing Mains

Per AWWA Standard C651 Section 4.10, water mains, appurtenances and services must be completely installed, flushed, disinfected and satisfactory bacteriological sample results prior to permanent connections being made to the active distribution system.

Length of Connection equal to or less than 20 Feet
The new pipe, fittings and valve(s) required for the connection may be spray disinfected or swabbed with a minimum 1 percent solution of chlorine just before being installed, if the total length of the connection from the end of a new water main to the existing main is equal to or less than 20 feet.

Length of Connection greater than 20 Feet
If the total length of the connection from the end of a new water main to the existing main is greater than 20 feet, the pipe required for the connection must be set up aboveground, disinfected, and bacteriological samples taken prior to installation.

After satisfactory bacteriological sample results have been received for the pre-disinfected pipe, the pipe can be used in connecting the new main to the active distribution system.

200.14.8 Disinfection Procedures for Repairing Existing Pipe

Per AWWA Standard C651 Section 4.11, all repair work shall be performed to prevent contaminants from entering the existing pipe during the repair and shall be accomplished using sanitary and safe procedures by well-trained crews with proper supervision and guidance. All repair work shall be inspected, cleaned, followed by disinfection of spraying or swabbing with a minimum 1 percent chlorine solution of all exposed portions of existing pipe interior surfaces, pipe materials used in the repair, and all handheld materials and tools used to make the repair.

The disinfection procedure should be determined by the conditions and severity of the main break. Many leaks or breaks can be repaired under controlled conditions without depressurizing the water main (e.g. applying a clamp to a small crack or hole). In most other situations, the water main can be maintained pressurized until the break site is secured and the pipe is fully exposed. Some circumstances that impact public safety may require that water pressure be substantially reduced prior to exposing the pipe in the area of the leak. In some cases, situations become catastrophic where there is a pipe blow-out and a loss of water pressure prior to shutdown, requiring disinfection procedures equivalent to those of a new main installation.

Controlled Pipe Repair without Depressurization: In this situation, a full shutdown is not needed, thus maintaining positive pressure to the area of the shutdown and around the break site at all times. Once the repair site is exposed, trench adequately dewatered, the repair site shall be cleaned and disinfected by spraying or swabbing with a minimum 1 percent chlorine solution. The water main is then returned to service with flushing to obtain three volumes of water turnover, making sure that the flushed water is visually clear. No bacteriological testing is necessary. Check for a typical system chlorine residual.

***Controlled Pipe Repair with Depressurization after Shutdown*:** In this situation, after the repair site has been exposed and secured from trench soil/water contamination, the water main is depressurized by a shutdown to complete the repair. The repair site shall be cleaned and disinfected by spraying or swabbing with a minimum 1 percent chlorine solution. The water mains is then returned to service with flushing to scour the pipe and obtain three volumes of water turnover, making sure that the flushed water is visually clear. Check for a typical system chlorine residual.

When the existing pipe has to be opened and the interior surfaces of the water system exposed to the environment, additional procedures need to be followed. The existing pipe shall be inspected and cleaned with the help of flushing water into the trench, where possible, until the flush water runs visually clear. The repair site shall be cleaned and disinfected by spraying or swabbing with a minimum 1 percent chlorine solution. Additionally, any accessible upstream and downstream interior of the existing pipe should be disinfected by swabbing or spraying as well.

If the repair requires a full pipe section replacement, the new pipe shall be inspected, cleaned, and disinfected from both ends by swabbing with a minimum 1 percent chlorine solution. The water main may then be returned to service after flushing to scour the pipe and obtain three volumes of water turnover. The flushed water should run visually clear, having a measurable chlorine residual and be checked with bacteriological testing. The pipeline may be returned to service prior to obtaining bacteriological results.

***Uncontrolled Pipe Break*:** In situations in which the existing main to be repaired could not be protected and kept free of contamination and there are obvious signs of contamination (e.g., muddy trench water flowing into the broken pipe, leaking sewer pipe in the trench, or catastrophic pipe failure where pipe is open and there is likelihood that contamination was drawn into the active distribution system) or when a controlled repair situation turns into a situation in which the internal pipe and water have become contaminated, the typical procedures for disinfecting new water mains shall be followed where practical.

It should be noted that the typical procedures for disinfection of new water mains specify chlorine doses of 25-300 mg/L; however, such levels may present greater harm if the line or services cannot be reliably isolated or shut down and exposure of customers to high concentrations of chlorine cannot be controlled. For these situations, free chlorine residuals up to 4 mg/L should be the minimum to be maintained for at least 16 hours in conjunction with flushing, coliform sampling, and associated customer education. Such situations require careful review by the Water Resources Division and will need to balance the public health risks of the pipeline failure as well as the repair process.

Where practical and appropriate considering the risks of public exposure to high concentrations of chlorine, the section of pipe in which the break is located shall be isolated, all service connections shut off, and the section flushed and disinfected. If the slug chlorination method is employed, the dose may be increased to as much as 300 mg/L and the contact time reduced to as little as 15 minutes. After chlorination and repair, perform scour flushing at 3 feet per second or greater for a minimum of three pipe volumes and continue until discolored water is not observed and the chlorine residual is restored to the levels maintained in the distribution system.

After following the appropriate methods included within AWWA Standard C651 Section 4.11, prior to returning the pipe to service, the efficacy of the disinfection procedure shall be verified by testing for the absence of coliform bacteria.

Temporary Service Lines: Temporary water service lines to customers during water main repair activities shall be disinfected prior to use. All materials shall meet the NSF/ANSI 61 certification for potable water use. Disinfection procedures shall be followed by scour flushing for a minimum of three pipe volumes or until the water runs visually clear and a measurable chlorine residual is restored.

200.14.9 Preventive Measures during Construction

The preventive measures specified within the AWWA Standard C651 Section 4.8 must be observed to ensure that a water main, its appurtenances and services have been thoroughly cleaned for the final disinfection by chlorination. The new water main must be isolated until bacteriological tests are satisfactorily completed. In addition, for repair work, if the existing water main is depressurized or opened to the environment prior to or during repair, the sanitary integrity of the pipe is compromised and it is critical to follow sanitary procedures throughout the repair, not just as it is being returned to service.

200.14.10 Pipeline Flushing

***Preliminary Flushing*:** Before the new water main is disinfected, it shall be filled with potable water to eliminate air pockets and flushed to remove particulates, dirt and debris. The flushing velocity in the main shall not be less than 3 feet/second.

Below is a summary of the rates of flow required to produce a velocity of 3 feet/second in various sizes of pipe.

Pipe Diameter	Flow Required to Produce 3 feet/sec
4-inches	120 gpm
6-inches	260 gpm
8-inches	470 gpm
10-inches	730 gpm
12-inches	1,060 gpm

Flushing the mains shall be performed for a minimum of the time period in seconds calculated from multiplying 2/3 times the pipe length in feet. It should be noted that flushing is not a substitute for the preventative measures during construction noted above.

For 24-inch and larger diameter mains, an acceptable alternative to flushing is to broom-sweep the main, carefully removing the sweepings prior to filling and chlorinating the main.

***Final Flushing*:** After the applicable retention period as specified for the chlorination method used, heavily chlorinated water should not remain in prolonged contact with pipe, and shall be flushed from the main fittings, valves, and branches until chlorine measurements show that the concentration in the water leaving the main is no higher than that generally prevailing in the distribution system or source water.

200.14.11 Dechlorination

If there is any possibility that the chlorinated discharge water will cause damage to the environment or to the sewer facilities, a neutralizing chemical shall be applied to the water to be wasted to thoroughly neutralize the residual chlorine as specified within AWWA Standard C655 “Field Dechlorination”.

200.14.12 Bacteriological Tests

Typically, for new water mains, an initial set of samples and then resample again after a minimum of 16 hours or two sets of samples collected 15 minutes apart after at least a 16-hour rest period using the sampling site procedures included within the AWWA Standard C651 Section 5.1. Both sets of samples must pass for the main to be approved for release.

A set of samples includes all samples collected along the length of the pipeline. A set of samples shall be collected every 1,200 feet of the new water main, plus one set from the end of the line and at least one from each branch, greater than one pipe length (this includes service lines).

The following is a summary of number of sets of samples required for various lengths of new water mains:

Length of New Water Main	Number of Sets of Samples
Branch less than one pipe length	None
Each branch greater than one pipe length	One
Less than 1,200 feet in length	Two (one at each end)
More than 1,200 feet but less than 2,400 feet	Three
More than 2,400 feet but less than 3,600 feet	Four
More than 3,600 feet but less than 4,800 feet	Five
More than 4,800 feet but less than 6,000 feet	Six

If trench water has entered the new water main during construction or if, excessive quantities of dirt or debris have entered the new main, bacteriological samples shall be taken at intervals of approximately 200 feet as specified within the AWWA Standard C651 Section 5.1.

For repaired mains that were depressurized and/or wholly or partially dewatered, one set of samples may be required and depending upon the sanitary condition, the line may be reactivated prior to the completion of the biological testing. Samples shall be collected downstream of the repair site and intervals of approximately 200 feet within the length of pipe that was shut down. If direction of flow is not known, samples shall be collected on either side of the repair site.

For repaired mains that were maintained under pressurized conditions at all times, disinfection and/or testing may not be required. However, under either main repair scenario, it is advisable where possible to provide a scour flush to clear before the release of the repaired section.

Sampling procedure, sample results, record of compliance and re-disinfection are specified within the AWWA Standard C651 Section 5.1.3 to Section 5.1.6.

200.15 SEWER LINE CLOSED-CIRCUIT TELEVISION INSPECTION

All newly constructed sewer mains, laterals, and manholes must be inspected via closed circuit television camera by a National Association of Sewer Service Companies (NASSCO) certified technician. Video, database and report shall be provided per NASSCO Pipeline Assessment and Certification Program (PACP) Standards and shall be submitted in a digital format to the Water Resources Division for review and final acceptance of work.

200.16 EASEMENT VERIFICATION

The Applicant's engineer or Professional Land Surveyor will verify in writing that the facilities to be accepted by the City were constructed within the easements as listed in the easement documents.

200.17 RECORD DRAWINGS

Record drawings shall be based on an "as built" review and shall show all changes in the work constituting departures from the original contract drawings. See City of Santa Ana Standard Plans for the typical dimensions practice for the preparation of the "As-Built" drawings.

Upon completion of each increment of work, all required information and dimensions shall be transferred to the record drawings. Facilities and items to be located and verified on the record drawings shall include the following:

1. Point of connection;
2. Location and elevation of all valves, bends and tees;
3. Location of all services;
4. Type, manufacturer, and model of valves and fire hydrant. Turns required for complete open/close cycle shall be provided for all valves.
5. Location of all manholes and cleanouts;
6. Items located and constructed as called out in the plans need not be noted as such.

Prior to submission of the record drawings on mylar and the corresponding digital file, two sets of drawings will be submitted for review by the City's Inspector. One set will be returned with comments if necessary. Final 4-mil mylar record drawings and the corresponding digital file will be submitted only upon incorporation of the City's Inspector comments.

200.18 WARRANTY/GUARANTEES

The Applicant guarantees the water and sewer facilities against defects in workmanship (improper contractor's installation) and material defects for a period of one (1) year after the date of acceptance of the facilities by the City of Santa Ana.

It is further agreed that the facilities shall be restored to full compliance with the requirements of the City of Santa Ana's Design Guidelines, Specifications and Plans, including any test requirements, if during said one (1) year period the facilities or any portion thereof are found not be in conformance with any provisions of said Specifications and Plans. This guarantee is in addition to any and all other warranties, express or implied, with respect to the facilities.

END OF SECTION

SECTION 300

DESIGN CRITERIA, WATER FACILITIES

300.1 GENERAL

The following sections are general design criteria to be used in the design of water facilities for the City of Santa Ana. The Applicant (developer/builder) and his engineer shall be responsible to ensure that designs submitted are in accordance with the City's Municipal Code, these Design Guidelines and the City's Standard Plans and Specifications. Where the Standard Plans and Specifications are silent, the design, and installation of the water mains and appurtenances shall conform to the American Water Works Association (AWWA) Standards and the Standard Specifications for Public Works Construction, 2012 edition.

All water system design shall be done to safely deliver water to its customers in sufficient volume and at adequate pressure and to maintain the City's Insurance Services Office Fire Rating. All products in contact with drinking water shall be tested and certified to meet NSF Standards 60 and 61. All materials coming in contact with potable water shall be lead free per California Health & Safety Code Section 116875.

300.2 MINIMUM SIZE MAINS

The normal minimum size distribution main pipe shall be 8-inch diameter looped line unless otherwise noted and approved. On short cul-de-sac dead-end mains 4-inch (with a maximum of ten (10) each, 1-inch services) or 6-inch (with more than ten (10) each, 1-inch service lines) lines may be allowed, however, 8-inch size main must be used to the last fire hydrant. These smaller mains may be individually approved by the City on dead-end mains without fire hydrants and shall be sized so that sufficient water is regularly drawn to prevent stagnation.

300.3 DESIGN FLOW AND PIPE VELOCITY CRITERIA

300.3.1 Water Demands

All design flows shall be based on the Applicant's (developer/builder) estimated water demands for the proposed use, application, establishment, commercial, industry or development or re-development project. The following water consumption factors, listed in gallons per day (gpd), can be used as a guide to estimate the water demands for some of the more common land uses:

Land Use Classification	Average Water Demand
Single Family	130 gpd/capita
Multiple Family	120 gpd/capita
High-Rise Residential	110 gpd/capita
Commercial Recreational (hotels/motels)	180 gpd/room
Commercial	2,500 gpd/acre
Industrial	3,500 gpd/acre
Open Space / Parks / Landscape Areas	3,000 gpd/acre

The average day demand (ADD) for a given project will consist of the cumulative total of the various units, components, and land uses. The maximum day demand (MDD) is defined as 2.0 times the average day demand (ADD). The peak hour demand (PHD) is defined as 3.5 times the average day demand (ADD).

The Applicant (developer/builder) shall provide the City with an estimate of the average day, maximum day, and peak hour demands for the project. This information will be used by the City to determine the adequacy of the existing water system, or to determine specific water system improvements required, to provide the estimated domestic water demands.

300.3.2 Distribution System Pressure Requirements

All new water mains and service connections shall satisfy the following pressure requirements. The City's water distribution system is sized to provide the following minimum pressures during different demand conditions:

- Maximum static pressure shall be 100 psi.
- Minimum residual pressure shall be 40 psi at peak hour demands.
- Minimum residual pressure of 20 psi at maximum day plus fire demands.

Maximum distribution system pressures shall be based on static operating conditions. In accordance with the Uniform Plumbing code, individual pressure regulating valves shall be installed on all services where the static pressure exceeds 80 psi. Pressure regulators shall be installed and maintained by property owner.

300.3.3 Velocity Criteria

The criteria for velocity shall be as described in this section. The maximum velocity in a line shall not exceed 5 fps (feet per second) during the peak hour condition. The maximum velocity in a line shall not exceed 7 fps during the maximum day plus fire demand condition.

300.3.4 Submittal Requirements

The Applicant (developer/builder) shall submit to the City, along with the improvement plans, substantiating engineering calculations for demand, velocity and pressure. For larger development or redevelopment projects, the City of Santa Ana may need to perform a hydraulic distribution network analysis of the project to determine the capability of the existing water system to serve the proposed project. In these cases, the Applicant (developer/builder) will be responsible for the full cost of this analysis.

300.4 FIRE FLOW REQUIREMENTS

The design criteria to be used for determining fire flow requirements shall be the actual fire flow requirements as determined by the Orange County Fire Authority. Before designing the domestic water system for a project, the Applicant shall obtain the Orange County Fire Department's fire flow requirements for the project. These requirements, plus indication of the Fire Authority's approval, are required to be on the improvement plans prior to the City of Santa Ana's approval.

All existing fire flow tests shall be performed by an approved contractor, hired by the Applicant, and done in the presence of the City of Santa Ana water staff. The City of Santa Ana will charge a fee, per the City of Santa Ana Miscellaneous Fee Schedule, to witness this fire flow test.

For general planning purposes, the following fire flow demands can be used, as the minimum:

300.4.1 Residential Dwelling Units

The water system shall be capable of providing a single-family residential fire flow minimum of 1,500 gpm, combined flow, for a 4-hour duration from any two adjacent hydrants at a minimum 20 pounds of residual pressure (psi) at the main.

For residences 3,600 square feet and under and not contiguous with open space areas, the minimum requirement shall be 1,000 gpm per hydrant at 20 psi (for a total flow of 2,000 gpm). For residences 3,600 square feet and under which are contiguous with open space areas, the minimum requirement shall be 1,000 gpm per hydrant at 30 psi (for a total flow of 2,000 gpm). For residences over 3,600 square feet, the Fire Authority shall be consulted. The open space area is defined as any area bordering an undeveloped open space with no fire control mechanism.

For multi-family residential, the minimum requirement shall be 1,500 gpm per hydrant at 20 psi (for a total flow of 3,000 gpm).

New residential dwelling units may be constructed with residential fire sprinkler systems (if required by NFPA 13D or NFPA 13R) which will reduce the minimum fire flow requirements.

300.4.2 Schools and Commercial Areas

The system shall be capable of providing a fire flow of at least 4,000 gpm for 3 hours duration (or as required by the Fire Authority) out of any two adjacent hydrants at a minimum 20 pounds of residual pressure at the main. Most schools and commercial areas will have built-in sprinkler protection for the buildings which will reduce the minimum fire flow requirements.

300.4.3 Industrial Areas

In industrial developments requiring a high fire flow, the applicant shall consult with the Fire Authority to discuss options for upgrading the domestic water system to deliver the fire flow or provide built-in sprinkler protection for the structures.

300.5 TYPE OF MAIN PIPE

Distribution Mains. All distribution mains, 4-inches thru 12-inches in diameter shall be AWWA C-900 P.V.C. pipe, DR-14 or AWWA C-151 Ductile Iron Pipe, Class 350. All other pipe materials require special review and approval from the Water Resources Division.

Transmission Mains. For transmission mains, 16-inch thru 20-inch diameters, pipe shall be ductile-iron pipe, Class 250, or AWWA C-905 P.V.C. pipe, DR-18 or CML&C steel pipe. For pipe, 24 inches and larger in diameter, only CML&C steel pipe will be allowed.

Critical Crossings/Locations. At specific channel, railroad or other critical crossings, the Water Resource Division may decide to use earthquake-resistant ductile iron pipe (ERDIP). The City will provide specific specifications and requirements for these critical crossing/locations on a case by case basis.

All ductile iron pipe and fittings shall be polyethylene encased in accordance with AWWA C-105.

All PVC pipe shall be installed with tracer wire and detectable warning tape in accordance with the City's Standard Plans.

300.6 MINIMUM DEPTH TO TOP OF WATER MAIN PIPE

300.6.1 12" and Smaller Mains

The top of the pipe is to be a minimum of 36-inches below the finished street grade, unless indicated otherwise on the improvement plans because of unusual field conditions.

For PVC pipe, the top of pipe is to be a minimum of 30-inches below the street subgrade or 30 inches below the undercut, whichever is greater.

The top of pipe is to be a minimum of 48 inches below finish grade in unpaved areas.

300.6.2 Larger than 12" Mains

The top of the pipe is to be a minimum of 42-inches below the finished street grade, unless indicated otherwise on the improvement plans because of unusual field conditions.

For PVC pipe, the top of the pipe is to be a minimum of 36 inches below the street subgrade or 36 inches below the undercut, whichever is greater

The top of pipe is to be a minimum of 54 inches below finish grade in unpaved areas.

300.7 STANDARD LOCATION

Water main center-lines shall normally be located six (6) feet from the curb face for all pipelines 12-inches in diameter and smaller. For pipelines 16-inches in diameter and larger, the water main center-line shall be located eight (8) feet from the curb face. Alignments may need to be deflected to avoid cross gutters, concrete bus lanes or other interferences as directed by the City of Santa Ana.

Where water pipelines are designed to cross perpendicular beneath retaining walls or other structures (specific written permission required for each instance), the pipeline shall be constructed in a steel pipe casing of sufficient size and thickness and with a minimum vertical clearance of at least eighteen (18) inches from the footing or structure itself.

300.8 WATER VALVE SPACING AND ARRANGEMENTS

Resilient wedge gate valves shall be used on all water mains 12-inches in diameter and smaller. Butterfly valves shall be used on all water mains 14-inches in diameter and larger.

Valves shall be adequately spaced to permit pipeline isolation for repair and maintenance activities and to minimize the quantity of customer shutdowns during these repair activities. As a general rule, valves shall be spaced at: about 800 feet in residential areas; about 500 feet in commercial and industrial areas; and 1,300 feet on transmission mains.

In general, there shall be a minimum of two (2) valves at each tee intersection of two distribution mains. If the two distribution mains cross, there shall be a minimum of three (3) valves and, at major distribution points, there shall be four (4) valves. Valves shall be flanged when attached to a tee or a cross.

On long blocks, intermediate valves should be installed so that no more than twenty-eight (28) dwelling units, six hundred (600) feet of main, or two (2) fire hydrants will be out of service at any time.
Additional looping of the main lines may be necessary to satisfy this condition and the arrangement of valves within the distribution system will be reviewed to identify the optimum network layout.

A valve is required on the water main between redundant services/meters serving a large multi-family development, a large commercial/mixed used development, or a private water system.

In most cases where water mains pass through easements outside traveled streets, a valve shall be located at each end of the easement.

The final determination of the quantity of valves and their locations shall be as directed and approved by the City of Santa Ana.

300.9 SEPARATION REQUIREMENTS

Separation requirements are specified within Section 200.5 of these Design Guidelines.

The following is a brief summary of the Department of Drinking Water (DDW) regulations:

New water mains shall be installed at least ten (10) feet horizontally from and one (1) foot above, any parallel sewer pipeline. New water mains shall be installed at least four (4) feet horizontally from, and one (1) foot vertically above, any parallel recycled or storm drain pipelines.

If crossing a pipeline containing sewage, recycled water, or storm drainage, a new water main shall be constructed no less than 45-degrees to and at least one (1) foot above the pipeline. No connection joints shall be made in the water main within eight (8) horizontal feet of the other pipeline.

The minimum separation distances noted above shall be measured from the nearest outside edge of each pipe barrel.

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

Whenever a crossing must occur where an existing sewer main is within one (1) foot of a new domestic water main, special construction will be required. Encasement may be required if vertical separation requirements cannot be met.

If a sewer is above a water main, the special construction shall extend a minimum of eight (8) feet of horizontal clearance on both sides, or if not feasible, center the piece of new water pipe under the crossing to maximize this horizontal clearance.

300.10 FIRE HYDRANTS

300.10.1 Fire Hydrant Locations

The location of fire hydrants shall be as determined by the Orange County Fire Authority. The exact location with respect to the curb and sidewalk shall be as shown in the City of Santa Ana's Standard Plans. Hydrants shall be located in such a manner to provide complete accessibility and to minimize the possibility of damage from vehicles or injury to pedestrians. Hydrants shall never be located within an ADA pedestrian ramp.

Where practical, fire hydrants shall be located on the same side of the street as the water main, near intersections, corners, or on residential lot lines. No fire hydrant shall be located within 3 feet of a driveway, or closer than 30 feet to any combustible structure and 36-inches from any aboveground structure. For all cases, the location of the fire hydrant shall meet Americans with Disabilities Act (ADA) requirement that a minimum of 48-inch clearance be maintained from any obstruction in the pedestrian walkway.

300.10.2 Fire Hydrant Spacing

The maximum fire hydrant separation shall be 300 feet from fire hydrant to fire hydrant. The actual spacing will be determined by the Orange County Fire Authority.

300.10.3 Types of Hydrants

Wet barrel type hydrants with check valve and break away spool as shown in the City of Santa Ana's Standard Plans are to be used at all locations.

In situations where the fire hydrant lateral run is over 50 feet, the size of the hydrant lateral shall be 8-inches in diameter instead of 6-inches.

300.10.4 Plan Requirements

Fire hydrants shall be shown on the plans where the hydrant is to be located with respect to the property line, and what easements will be provided. The building footprints or building pad areas are also to be shown.

300.11 RESIDENTIAL FIRE SPRINKLER SYSTEMS

All residential fire sprinkler systems shall be designed, fabricated, and installed in accordance with NFPA 13R or 13D and amendments as adopted by the Orange County Fire Authority. At least one water pressure gauge shall be installed on the riser assembly for multi-family residential units. All valves shall have permanently affixed signs that designate their function.

The water flow switch shall be connected to the service panel on an uninterruptible house circuit. Underground mains and lead-in connections shall be flushed before connection is made to the sprinkler piping.

All new sprinkler systems and additions or modifications to existing piping shall be hydrostatically tested in accordance with NFPA 13R or NFPA 13D. All FDC, wall PIVs, and exposed exterior riser valves shall be painted OSHA safety red. Other fire sprinkler or supply pipe exposed or susceptible to wet conditions shall be painted (any color) or otherwise coated to inhibit corrosion. Stainless steel assemblies and piping may be left unpainted provided that any hose connections, valves, or other components operated by the Fire Department are painted OSHA safety red.

300.12 MULTI-FAMILY DWELLINGS

As a minimum, each multi-story building housing multi-family dwellings shall be provided with at least one public water master meter as required per Section 100.9 of these Design Guidelines.

For buildings and other structures designated as essential facilities and categorized as Risk Category IV Structures per the California Building Code (such as hospitals and emergency treatment facilities) a second public water master meter shall be provided. A line valve is required on the water main between these redundant services/meters. This redundant public service and meter will allow service to the building to be maintained if one of the master meters require to be shut-down for maintenance or repair activities.

300.13 SERVICE MATERIALS AND MINIMUM SERVICE SIZE

300.13.1 General

Approved materials and manufacturers for various service material tubing and connections are shown on the City of Santa Ana's Standard Plans.

300.13.2 Minimum Domestic Service Size

Minimum domestic service line size shall be 1-inch in diameter. The sizing of the service shall be specified on the plans designated by lot numbers. Services for private-street residential, commercial or industrial developments are to be as shown on the approved improvement plans and may require a detail on the plans of the location of the proposed service.

300.13.3 Type of Service Line

Acceptable service line material is as described below:

- 1-inch and 2-inch service lines shall be Type “K” soft copper tubing.
- 4- inch and larger service lines shall use PVC pipe or Ductile Iron Piping per Section 300.5.

300.13.4 Meters

All meters will be furnished and installed by the City of Santa Ana upon completion of a water service application, account activation and payment of all applicable fees.

300.13.5 Pressure Reducing Valves

Individual pressure regulators are required by the Uniform Plumbing Code if the average static pressure in the public water main is 80 psi or more. Where required, the water service shall be provided with approved pressure regulators set at 80 psi and shall be installed per City of Santa Ana's Standard Plans or appropriate governing agency's standards. Pressure regulators shall be installed on private property and shall be maintained by the property owner.

300.14 STANDARD WATER NOTES

The following Standard Water Notes shall be included on all improvement plans or water system construction plans:

1. Construction and installation of all water mains and appurtenances shall be in accordance with the City of Santa Ana Standard Plans and Specifications. Where the Standard Plans are silent, construction and installation of water mains and appurtenances shall conform to the American Water Works Association (AWWA) Standards and the Standard Specifications for Public Works Construction, 2012 edition.
2. Construction of water mains and appurtenances shall only be performed by qualified contractors with a valid California Contractor A or C34 license.
3. No person, other than City of Santa Ana Water Resources Division staff certified by the State of California as a Water Distribution Operator, shall be allowed to operate the City's water system valves.
4. No person, other than City of Santa Ana Water Resources Division staff certified by the State of California as a Water Distribution Operator, shall shut water service off to any customer.
5. Prior to the start of construction, the contractor shall submit to the City for review and approval "Disinfection and Flushing Plan" per the City of Santa Ana Design Guidelines and Standard Drawings.
6. All newly constructed water mains and appurtenances shall be disinfected and tested in accordance with AWWA Standard C600's, prior to connecting to the City's water distribution system. Disinfection testing results shall be submitted to the Water Resources Division for review and approval prior to connecting to the City's water distribution system.
7. Water mains will be hydrostatic tested at 200 psi for 2 hours. New water mains cannot be tested against an existing valve but can be tested using a test plate.
8. Requests to shut-down the water distribution system for tie-ins or other purposes shall be coordinated with the Water Resources Division staff at least 2 weeks in advance through the City Inspector. All customers affected by the proposed shut down shall be noticed in writing 48 hours in advance by the contractor.
9. The City of Santa Ana Water Resources Division cannot guarantee a complete shutdown of existing mains. The contractor shall be responsible for dewatering and isolation of construction for testing or any other purposes.
10. All fire hydrants which are out of service or new fire hydrants which have not been accepted for service shall be covered with a sack indicating that the hydrants are not in service.

11. Maintaining water service shall be the responsibility of the contractor for any shutdown lasting longer than four (4) hours. Method of providing temporary service must be approved by the Water Resources Division. The water shall be safe for drinking in accordance with State of California Water Resources Control Board (SWRCB) Drinking Water Program (DWP).
12. Water meter will not be installed nor water turned on until the backflow devices required for the building and irrigation systems have been installed, tested, approved, and certified, and approved and signed off by the City. Contact Water Resources Division at (714) 647-3320.
13. All water mains shall be AWWA C-900, DR 14 pipe or AWWA C-151 Ductile Iron Pipe. All other pipe materials require special review and approval from the Water Resources Division.
14. Water mains shall have 36-inches minimum cover to finished grade. Any deviation from this requirement requires approval from the Water Resources Division.
15. Contractor to verify depth and location of all utilities and points of connection prior to trenching.
16. Private water appurtenances such as backflow preventers, fire hydrants and standpipes, and valves shall be painted as follows:
    a. Domestic Water — Blue
    b. Potable Irrigation — Green
    c. Recycled Irrigation — Purple
    d. Fire Protection — OSHA Safety Red
17. Do not cut or snap cut or mill asbestos cement pipe. Where joining existing asbestos cement pipe, expose six feet in each direction, looking for the nearest joint and join to new pipe with a properly dimensioned adapter per Standard Plan Number 1443.
18. Do not tap existing water mains without the presence of a certified Public Works inspector. Pressure test tapping sleeve in the presence of a certified Public Works inspector before tapping existing main.
19. Final acceptance will not occur until original record drawings on mylar and digital file are delivered to and accepted by the City's Inspector. Show all field changes on record drawings.
20. Trench plates shall be flush with pavement and shall be non-skid.
21. When public water facilities are located on private property, easement documents are to be submitted to City for approval prior to a permit being issued.
22. All recycled water projects require review and approval by the Water Resource Division.
23. Remove from the field upper and lower fire hydrant dry barrel and 24" x 36" iron vault lid covers and deliver undamaged to the City Water Resource Division Yard located at 215 S. Center Street. Prior notification of the delivery is required at (714) 647-3320.
24. Water main fittings shall be flange or mechanical joints only, no push-on joint fittings allowed.
25. Contractor shall not remove or dispose of water meters. Contractor shall apply for Abandon Water Meter Application. Contractor shall contact Water Resources Division at 714-647-3320 for existing meter removals.

26. Installation of new water meter service curb stop shall be done after installation of new curb and gutter or after contractor has established the proposed curb grade by staking of the proposed curb.

300.15 MISCELLANOUS STANDARD GUIDELINES

1. The Applicant's contractor shall have a copy of the City's Standard Plans and Specifications, and the approved improvement plans on the job site at all times.
2. Water mains shall be staked for line and grade or shall be installed subsequent to the installation of the curbs but prior to paving of the streets.
3. Any survey work necessary to ensure correct horizontal and vertical alignment shall be provided by the Applicant.
4. All valve box and water service box or manhole frame and cover shall be adjusted to finished pavement grade by the Applicant's contractor. This is to be done prior to placing seal coat.
5. No facility is to be backfilled until inspected by the City.
6. All valve vaults and covers shall be designed and specified per current accepted engineering practice and the manufacturer's recommendations, provided that they: support HS20-44 loads, plus impact and earth pressures when situated in an existing or future roadway; support 300psf plus earth pressure for non-roadway installations; and all metal parts shall be provided in brass, cast iron, aluminum and stainless steel materials.
7. Thrust blocks shall be installed in accordance with the City's Standard Plans at all pipe deflections (greater than 5 degrees), all angle points (both horizontal and vertical), and at all fittings.
8. Maximum deflection at pipe joints allowable on curved alignments shall be in accordance with the manufacturer's recommendations. PVC pipe sections shall not be bent to achieve a curve. Pipe deflections for short radius curves and angle points shall be accomplished by means of standard fittings. The location of all fittings shall be detailed on the plans.
9. Water meters shall not be located within three (3) feet of a driveway.
10. All water service laterals shall be constructed perpendicular to the water main without bends or angles from the connection point on the mains.
11. A valve anchor shall be installed on all valves in accordance with City's Standard Plans.
12. All water main line valves shall be maintained so as to be accessible during tract development and construction.
13. Curbs shall be inscribed with a "W" indicating locations of all domestic water services. Letter inscription shall be made using a 4-inch power tool wheel grinder.
14. Curbs shall be inscribed with tie downs for all valve locations. Letter inscription shall be made using a 4-inch power tool wheel grinder.
15. At intersections and bus stops with concrete pads, the main line shall be roped to avoid cross gutter conflict.
16. Separate quantity estimates, for the domestic water systems, are to be included on the plans indicating quantity of pipe, valves, fire hydrants, domestic water services, etc.

17. The plans shall show, in plan and profile views, the position of all other known existing underground utilities as well as proposed underground utilities. Vertical clearance at crossings shall be indicated by showing top of pipe and bottom pipe elevation at point of intersection.
18. Blow-off assemblies shall be installed at the end of all mains, except if there is a fire hydrant, in accordance with the City's Standard Plans. Temporary blow-offs shall be installed at service stub-outs for testing and flushing purposes.
19. Combination air valves are to be installed at all high points of water mains in accordance with the City's Standard Plans.
20. Water sample stations shall be provided as required by the Water Resources Division.
21. All unused water facilities shall be abandoned at the water main as directed by the City. Prior to any abandonment of services, the contractor shall ensure the service line valve is closed and restrained to the main.
22. The service line shall be cut and plugged at the service line valve, a thrust block installed and valve boxes removed. Meter boxes and water valve boxes for abandoned services shall be removed and the surface improvements shall be restored as directed by the City.

END OF SECTION

SECTION 400

DESIGN CRITERIA, SEWER FACILITIES

400.1 GENERAL

The following sections are design criteria to be used in the design of sewer facilities for the City of Santa Ana. The Applicant (developer/builder) and his engineer shall be responsible to ensure that designs submitted are in accordance with the City's Municipal Code, these Design Guidelines, and the City's Standard Plans and Specifications. Where the Standard Plans and Specifications are silent, the design and installation of the sewer mains and manholes shall conform to the Standard Specifications for Public Works Construction, 2012 edition.

400.2 MINIMUM SIZE

The City of Santa Ana will not accept for maintenance any sewer main smaller than 8 inches in diameter.

400.3 MINIMUM AND MAXIMUM SLOPE DESIGN

All sewers shall be designed and constructed to provide a mean velocity of not less than two (2) feet per second (fps) when flowing half-full at the estimated peak flow. Peak flows shall be calculated using Manning's formula with an "n" value of 0.013. The following are minimum slopes by pipe size:

Sewer Size (inches)	Minimum Slope in Feet per 100 Feet
8	0.40
10	0.28
12	0.22

These are absolute minimum slopes. Sewers shall be designed to provide steeper slopes whenever possible up to the stated maximum slope.

The maximum allowable slope shall be the slope which generates a maximum flow velocity of eight (8) fps at the peak flow rate.

The maximum slope for sewer laterals is forty (40%) percent. The desirable maximum is ten (10%) percent.

The maximum slope for sewer main lines is 20 (20%) percent. The desirable maximum is ten (10%) percent.

Under special conditions, the Applicant may request slopes of less than the minimums stated. The Applicant must submit this request along with back-up data and calculations to show that the depth of flow at the design average flow will be 0.3 of the pipe diameter or greater. The Applicant must also submit computations to show the depths of flow at minimum and average rates of flow. The request shall also detail the reasons why the normal minimum slopes cannot be achieved. The request and supporting data will be reviewed by the City.

400.4 FLOW DESIGN CRITERIA

400.4.1 Sewerage Flows

All design flows shall be based on the Applicant's (developer/builder) estimated sewerage generation rates for the proposed use, application, establishment, commercial, industry or development or re-development project. The following average sewage flow coefficients can be used as a guide to estimate the sewerage generation for some of the more common land uses:

Land Use Classification	Average Sewage Flow Coefficient
Low Density Residential (8 du/ac max)	0.0032 cfs/acre
Medium Density Residential (15 du/ac max)	0.0045 cfs/acre
Med/High Density Residential (35 du/ac max)	0.0105 cfs/acre
Med. Urban Center Residential (60 du/ac max)	0.0180 cfs/acre
Urban Center Residential (90 du/ac max)	0.0270 cfs/acre
Mixed Use Corridor (130 du/ac max)	0.0400 cfs/acre
Commercial	0.0050 cfs/acre
Industrial	0.0060 cfs/acre
Schools	25 gals/day per student
Medical Center	0.0250 cfs/acre
Hospital	1,000 gals/day per bed

400.4.2 Peak Flows

The peak flow is assumed to be 3.0 times the average sewage flow.

400.4.3 Design Criteria

Design peak flows in pipelines 12 inches in diameter and smaller are to be limited to approximately d/D = 0.5 (½ of full depth). Pipes over 12 inches in diameter are to be limited to approximately d/D = 0.75 (3/4 of full depth) at design peak flows.

400.5 TYPE OF PIPE

The minimum size of any sewer main shall be 8 inches in diameter. Sewer mains, 12-inches in diameter and smaller, shall be vitrified clay pipe (VCP) or PVC SDR-26 pipe. For pipe sizes greater than 12-inches in diameter, the sewer main shall be VCP only, PVC pipe is not acceptable for these sizes. All other pipe materials require special review and approval from the Water Resources Division. Sewer pipe material shall remain constant (continuous) between manholes. Transitioning between pipe material types (such as VCP to PVC), and size changes, may only be done at manholes.

All sewer laterals shall be either extra strength VCP or SDR-26 PVC pipe. The material used for construction of sewer laterals shall match the materials of construction for the adjacent sewer main to which they are connected.

All VCP pipe and fittings shall be extra strength vitrified clay pipe with compression joints conforming to Subsection 207-8 of the Standard Specifications for Public Works Construction.

All PVC pipe, fittings, couplings and joints shall be in conformance with the size, material and performance requirements of ASTM D3034, SDR 26 and shall have gasket joints. Rubber gaskets, for PVC pipe, shall be factory installed and conform to ASTM F477. All PVC sewer pipe shall conform to Subsection 207-17 of the Standard Specifications for Public Works Construction.

400.6 STANDARD LOCATION AND ALIGNMENT

400.6.1 Location

Wherever possible, in local, residential, industrial, and secondary streets, the sewer main is to be located five (5) feet south or five (5) west of the street centerline. Where there is a center median, the sewer main is to be located in the center of the driving lane nearest to the center of the street. Sewers shall not be located in landscape median strips or parking lanes. Within alleys, the sewer main shall be offset three (3) feet from the centerline to clear the concrete gutter.

On curvilinear streets, the sewer main shall be designed generally parallel with the centerline of the street by the use of straight chord segments of sewer between manholes. Where curve radii for horizontal curves are so short that the resulting sewer manhole spacing is less than 300 feet, curved sewers will be considered by the City. A pre-design meeting with the City should occur to discuss acceptable alignments for the curved sewer as well as a concurrent review of the other underground utility locations which might be affected by straight sewer segments on the proposed curved roadway.

A maximum horizontal separation between sewer and domestic water mains shall be achieved as required by Section 200.5 of these Design Guidelines. Typically, water mains shall be installed on the opposite side of the centerline from the sewer mains.

Sewer mains that are constructed in a common trench with another utility will not be accepted by the City. Adequate horizontal and vertical spacing shall be maintained in accordance with Section 200.5 of these Design Guidelines.

400.6.2 Radius of Curvature

Where curved sewers are allowed, the following minimum radius of curvature in feet per type of pipe:

VCP	Minimum Radius of Curvature	
Nominal Pipe Size (inches)	(5’ joints)	(6’ joints)
8-12	150’	175’

PVC	Minimum Radius of Curvature
Nominal Pipe Size (inches)	(For Standard Joint Length)
8	280’
10	350’
12	420’

400.7 STATIONING

Centerline stations for sewer mains shall be shown (example: 0+00) and will be independent of street stationing. All manholes are to be numbered (example: MH No. 1). Sewer stations start at 0+00.00 at the downstream point of connection and increases upstream to the last manhole on the sewer main. Intersecting sewer lines shall be independently stationed from their downstream point of connection and increase to the last manhole or terminal clean-out. Each line shall be independently labeled for identification as "Sewer Line A", "Sewer Line B", etc.

400.8 MINIMUM DEPTH

When downstream connections or existing conditions allow, the minimum cover from finish street grade to top of sewer main pipe is to be seven (7) feet. Four inch (4") and six inch (6") diameter sewer laterals shall be installed so that there is a minimum of five (5) feet of cover as measured from the grade at the top of the curb to the top of the pipe where it crosses the curb line. At the time of construction, stakes shall be provided for location and grade of each sewer lateral.

400.9 MANHOLES

400.9.1 Manhole Location and Spacing

A manhole will be required at all:

A. Changes of direction or alignment;

B. Changes in grade or slope;

C. Changes in pipe size;

D. Ends of each sewer main;

E. Intersection of sewer laterals larger than six inches (6") in diameter;

F. Intersection of two (2) or more sewer mains (match crown lines); and

G. Ends of sewer laterals, at the property (or easement) line where the lateral is eight inches (8") or larger.

Manholes spacing shall be 400 feet for 8", 10" and 12" sewer mains. If sewer is curved, closer spacing of manholes will be required. Only one curve (horizontal or vertical) shall be allowed between any two manholes.

Extend all temporary dead ends to a point not to exceed 200 feet beyond the last manhole. Install a cleanout per the City's Standard Plans. All terminations over 200 feet beyond the last manhole shall terminate with a standard manhole.

Manholes shall have stubs placed if future extensions are possible.

Laterals in manholes shall enter manhole with spring line of the lateral at the same elevation as the top of the shelf. The channel shall be cut in the shelf.

400.9.2 Manhole Size and Depth

Manholes shall be precast reinforced concrete with eccentric cone in accordance with the City's Standard Plans. Minimum manhole diameter shall be 48-inches. The manhole necking and the frame and cover shall be 24-inches in diameter.

Manhole depth is calculated from finish grade to lowest pipe invert. Minimum manhole depth is to be eight (8) feet, unless otherwise approved by the City.

There are additional requirements for larger diameter manholes where the sewer main is at greater depths.

The diameter requirements for manholes at greater depths are as follows:

Depth of Manhole	Manhole Shaft Diameter	Frame and Cover Diameter
4 feet to 15 feet	48-inches	24-inches
15 feet to 22 feet	60-inches	30-inches
Greater than 22 feet	72-inches	36-inches

Manholes deeper than twenty (20') feet shall have steel-reinforced concrete bases. Reinforcement shall be provided for the specific soils conditions at each deep manhole location. The reinforcement design shall be submitted to the City under the signature and stamp of a Licensed California Civil Engineer.

For larger sized sewer mains or special circumstances, the manhole size will be as shown on plans. For sewer mains 24-inches in diameter, the minimum diameter size of the manhole shaft shall be 60-inches.

400.9.3 Allowable Head Loses

Allowable head loss in manholes shall be as follows:

1. Straight run through manholes based on 0.10 foot loss

2. Right angle turn in manholes based on 0.5 velocity head loss or 0.20 foot, whichever is greater.

400.9.4 Manhole Frame and Covers

Manhole frame and covers shall be cast-iron and shall be 24 inches in diameter with the word "SEWER" cast in the cover in accordance with the City's Standard Plans. Larger size covers may be specified for special conditions on plans. Frame and covers shall be provided by the contractor as a "set", such that they are matched for a snug and proper fit that will minimize movement and noise caused by traffic.

Temporary covers may be necessary in streets under construction. In these cases, the manhole shaft shall be left six (6) inches, minimum, below subgrade. A heavy metal plate shall be provided to cover the manhole opening. Cleats shall be provided in at least four (4) points for the underside of the temporary cover to prevent the temporary cover from moving. These cleats shall extend a minimum of 3-inches from the cover plate and shall be welded to the plate.

Plywood shall be cut to the shape and size of the manhole base and placed on top of the base before the temporary cover is placed on the shaft.

At the completion of final paving, each manhole shall be raised to final grade by the installation of the necessary sized grade rings and the installation of the permanent frame and cover assembly. The plywood shall be removed prior to occupancy.

Whenever manholes are constructed in unpaved areas, they shall be set 0.2 feet above the adjacent finished grade and shall have a concrete pad built around the manhole cover in accordance with the City's Standard Plans.

400.9.5 Paved Access to Manholes

All sewer manholes shall be designed and constructed with a direct paved access to them.

400.10 TERMINAL CLEANOUTS AND CLEANOUTS

Using of terminal cleanouts shall be limited to the following instances with Water Resources Division review and approval:

A. At the end of short sections of sewer main, less than 200 feet long, which will be extended in the near future.

B. At the end of end of all 6-inch commercial and industrial sewer lateral installation at the property line. All laterals which are 8-inch and larger shall have manholes, not terminal cleanouts, at the property line or easement boundary.

C. Cleanouts shall be provided at property line in accordance with the City's Standard Plans.

400.11 GRAVITY GREASE INTERCEPTOR

Section 39-56 of the City of Santa Ana's Municipal Code specifies the City's regulations regarding fats, oils and grease control. All gravity grease interceptors shall be constructed in accordance with the City's Standard Drawing for Gravity Grease Interceptors.

400.11.1 Required Fixture Connections

The following table summarizes the required fixture connections:

Fixture	***Typical Location***	***Typical DFU Per CPC***	***Potential for FOG***	***Pretreatment Connection***
3- compartment sink	Dish wash area	3-6	High	Required
Pre-rinse sink	Dish wash area	2-4	High	Required
Floor sinks/floor drains/trench drains	Dish wash area	2-4	Moderate	Required
Trench drain	Cooking Area (Kettles)	2-4	High	Required
Floor sinks	Cooking Area (Woks)	2-3	High	Required
Mop sinks	Anywhere	3-6	Moderate	Required
Commercial Dishwasher	Dish wash area	3-6	Moderate or Low	Not Recommended
Prep-sinks	Food prep/ cooking area	2-4	Moderate or Low	Optional

Fixture	*Typical Location*	*Typical DFU Per CPC*	*Potential for FOG*	*Pretreatment Connection*
Floor sinks/Floor drains	Food prep/ cooking area	2-3	Moderate or Low	Optional
Hand sinks	Anywhere	2-3	Low	Not Necessary
Drains for ice machines	Anywhere	1-2	Low	Not Necessary
Toilets and hand sinks	Restrooms	N/A	N/A	Never

The following is a summary of the CPC Table 1014.3.6

DFUs (Max)	*GGI Volume (Gallons)*
8	500
21	750
35	1,000
90	1,250
172	1,500
216	2,000
307	2,500
342	3,000
428	4,000

400.11.2 Installation Requirements

The following are the installation requirements for a gravity grease interceptor:

A. For new construction or remodel/change in operation;
B. Under-slab plumbing;
C. Causing or contributing to an accelerated line maintenance location;
D. Interceptors are not intended for the introduction of domestic sewage;
E. Sample box is required;
F. Manhole lid access over each baffle tube required;
G. Interceptor located in an area subject to traffic must be HS-20 traffic rated;
H. Alternative materials considered (e.g. HDPE or fiberglass);
I. Interceptor must have IAPMO approval;
J. Use of cast iron pipe for grease interceptor applications is prohibited; and
K. Installed on exterior of building
    - avoid drive-thru lanes;
    - accessible for inspection and maintenance; and
    - minimum 2% gravity flow).

400.11.3 Maintenance Requirements

The following are the maintenance requirements for a gravity grease interceptor:

A. At a frequency to meet the 25% Rule;

B. Quarterly pump-out (more frequently/less frequently when appropriate);

C. Full pump-out of 100% of the contents required; and

D. Additives that supplement pumping requirements are prohibited.

400.12 SEPARATION BETWEEN WATERLINES AND SEWERLINES

Horizontal and vertical separation between sewer mains and water mains shall be provided in accordance with Section 200.5 of these Design Guidelines.

Similar consideration for pipeline separation shall be given to other adjacent underground utility conduits with a goal of minimizing future impacts to the City pipelines because of future construction or repair activity in accordance with Section 200.5 of these Design Guidelines.

400.13 SEWER LATERALS

All sewer laterals shall be located by the Applicant and shown (with stationing) on the improvement plans. The sewer laterals shall be at right angles or radial to street centerline. Typically, the sewer lateral shall be located at the center of the lot or five (5) feet above the downstream lot line.

Sewer laterals shall be constructed to the property line from the main sewer line. There shall be a separate lateral with cleanout for each individually owned building and each individually owned occupancy.

Sewer laterals shall have a minimum four inches (4”) in diameter for single-family residential occupancy. Apartment, condominium and commercial developments shall have at least one (1) six-inch (6”), or one (1) eight-inch (8”) lateral to serve each building in the development which contains more than one dwelling unit. Sewer laterals to any master-meter facility shall have a lateral which is a minimum of six inches (6”) in diameter.

A sewer lateral from its connection to a building on the property to its point of connection with the sewer main shall remain the responsibility of the property owner or user with regard to maintenance, repair and upkeep as stated within the City’s Municipal Code Section 39-50.

400.14 SEWER LINE CLOSED-CIRCUIT TELEVISION INSPECTION

All newly constructed sewer mains, laterals, and manholes must be inspected via closed circuit television camera by a National Association of Sewer Service Companies (NASSCO) certified technician. Video and database shall be provided per NASSCO Pipeline Assessment and Certification Program (PCAP) Standards and shall be submitted in a digital format to the Water Resources Division for review and final acceptance of work. Any deficiencies or violation of the City’s Standard Plans and Specifications found during the TV inspections or any TV inspections during the warranty period shall be corrected immediately by the Applicant and/or his contractor at the sole expense of the Applicant (developer/builder).

The following work must be completed prior to television inspection: all sewer mains installed and backfilled; all manholes constructed and all channeling completed; pipeline to be inspected has been balled and flushed; final air test has been completed and PVC lines have been mandrelled; and the contractor has pre-pulled a tag line through each section of pipeline to be videoed and has secured it at each manhole.

Closed circuit television inspection (CCTV) shall also include cleaning of the sewer main prior to videoing in accordance with Section 500-1.1.4 of the Standard Specifications for Public Works Construction. All CCTV work shall conform to the current NASSCO-PACP Standards for sewer main and sewer laterals.

400.15 STANDARD SEWER NOTES

The following Standard Sewer Notes shall be included on all street improvement plans or sewer system construction plans:

1. Construction and installation of all sewer mains and appurtenances shall be in accordance with the City of Santa Ana Standard Plans and Specifications. Where the Standard Plans are silent, construction and installation of sewer mains and appurtenances shall conform to the Standard Specifications for Public Works Construction, 2012 edition.
2. Construction of sewer mains and appurtenances shall only be performed by qualified contractors with a valid California Contractor A or C34 license.
3. All newly constructed sewer mains and appurtenances shall be tested in accordance with the Standard Specifications for Public Works Construction. All newly constructed sewer mains, laterals and manholes must be inspected via closed circuit television camera by a National Association of Sewer Services Companies (NASSCO) certified technician and video submitted in a digital format to the Water Resources Division for review and final acceptance of work.
4. All sewer mains shall be vitrified clay pipe (VCP) or PVC SDR-26 pipe. All other pipe materials require special review and approval from the Water Resources Division.
5. Trench plates shall be flush with pavement and shall be non-skid.
6. Contractor to verify depth and location of all utilities and points of connection prior to trenching.
7. When public sewer facilities are located on private property, easement documents are to be submitted to City for approval prior to a permit being issued.
8. Final acceptance will not occur until original record drawings on mylar and digital format are delivered to and accepted by the City's Inspector. Show all field changes on record drawings.
9. All sewer repairs shall be accomplished using stainless steel double banded couplings.

400.16 MISCELLANOUS STANDARD GUIDELINES

1. The Applicant's contractor shall have a copy of the City's Standard Plans and Specifications, and the approved improvement plans on the job site at all times.
2. Sewer lengths are calculated horizontal distances along the centerline of the sewer.
3. All manholes and other important points shall have an equation showing the equivalent street stationing.
4. Sewer mains, manholes, and sewer laterals shall be installed prior to paving of the streets.

5. All sewer mains, manholes, and sewer lateral fittings shall be staked by a licensed surveyor, and complete set of cut sheets shall be supplied to the City Inspector. All residential laterals not normal to sewer shall have end of lateral at property line staked and tied to a property corner as shown on the plans.
6. No facility is to be backfilled until inspected by the City.
7. All manhole frame and cover shall be adjusted to finished pavement grade by the Applicant's contractor. This is to be done prior to placing seal coat.
8. Use of drop manholes requires approval from the Water Resources Division.
9. In order to prevent accidental use of the new sewer prior to completion and acceptance, the outlet or inlet to existing tie-in manhole(s) shall be sealed with broken brick and mortar. Installation of these plugs shall be approved by the City. Plugs shall be removed at the time of final acceptance.
10. Any work to be performed inside a live manhole shall be done in accordance with Cal OSHA "Confined Spaces" and City of Santa Ana manhole entry regulations. Manhole entry without City personnel present is not allowed.
11. Curbs shall be inscribed with an "S" indicating location of all sewer laterals. Letter inscription shall be made using a 4-inch power tool wheel grinder.
12. Separate quantity estimates for sewer systems are to be included on the plans indicating quantity of pipe, manholes, and laterals.
13. The plans shall show, in plan and profile views, the position of all other known existing underground utilities, as well as proposed underground utilities. Vertical clearance at crossing shall be indicated by showing the top of pipe and the bottom pipe elevations at point of intersection.

END OF SECTION

SECTION 500

DESIGN CRITERIA, RECYCLED WATER FACILITIES

The City of Santa Ana currently provides Orange County Water District (OCWD) recycled water to the southern part of the City. The recycled water being provided to the City by OCWD is produced from the Green Acres Project (GAP), a water recycling system that supplies Title 22 recycled water for irrigation and industrial uses. The City maintains an agreement with OCWD to supply GAP recycled water to customers where available. OCWD is limited in the GAP plant capacity, so each new user will need to be approved by OCWD and the City. Design of any new off-site recycled water facilities will need to be done in accordance with the City's Recycled Water Agreement with OCWD and the City's Rules and Regulations for Users of Recycled Water. These documents can be made available upon request from the City for those Applicants (developer/builder) who are interested in performing a preliminary feasibility investigation into using recycled water for irrigation and industrial uses. Within Appendix 6 is a copy of the Recycled Water Service Application.

The following sections are the general design criteria to be used in the design of off-site recycled water facilities.

500.1 GENERAL

Design of all off-site recycled water facilities shall be as set forth in the City's Recycled Water Agreement with OCWD and the City's Rules and Regulations for Users of Recycled Water. In addition, the design shall be in accordance with the "Design Criteria, Water Facilities", herein, except as modified or expanded upon in the following sections.

500.2 MINIMUN DEPTH TO TOP OF RECYCLED WATER MAIN

As stated in Section 200.5.2 (Vertical Separation), the domestic water shall be located above the recycled water main and the recycled water main shall be located above the sewer. Therefore, the top of the recycled water pipe is to be a minimum of 48-inches below the finished street grade, unless indicated otherwise on the improvement plans because of unusual field conditions.

500.3 STANDARD LOCATION

The recycled water main shall be located within the street as necessary to maintain the horizontal separation from existing or new water mains or sewers as required within Section 200.5.1 (Horizontal Separation).

500.4 SEPARATION REQUIREMENTS

The separation requirements for recycled water mains is specified within Section 200.5 (Separation Requirements). The recycled water is designated as Disinfected Tertiary Recycled Water (Title 22).

The Regional Water Quality Control Board regulations require a 10-foot minimum separation between recycled water and sewer mains. However, in situations where there is no alternative but to install the mains with less than the required separation, special construction (specific materials and joints) will be required and accepted on an individual basis by the City's Water Resources Division.

500.5 RECYCLED WATER IDENTIFICATION

All recycled water facilities including pipe, valves, valve boxes, and other pipeline appurtenances shall have recycled water identification installed. In addition, sites where there is recycled water available will require the domestic water facilities to be installed with domestic water identification. The requirements for the recycled water and domestic water identification will be provided by the City upon request by the Applicant once recycled water has been approved for the development/project.

500.6 RECYCLED WATER USE SITE PROCEDURES

The City of Santa Ana is participating with local agencies in the preparation of the "Recycled Water Use Site Procedures in Orange County, California". Once this document is completed, a copy would be available from the City. This document will provide the minimum for inspection of customer sites, defining periodic cross-connection testing frequencies and method/types, and the development of onsite recycled water retrofit plans. Once completed, these guidelines will serve as the minimum and the City may choose to implement more stringent requirements in accordance with the City's approved recycled water rules and regulations. These requirements will be determined by the Water Resources Division on a site by site basis.

In addition, these procedure guidelines will guide the use of recycled water in Orange County as permitted by State DDW and Orange County Health Care Agency (OCHCA) and is intended to identify recycled water use types, site inspections and cross-connection testing methods.

END OF SECTION

APPENDIX 1

CHECKLIST FOR PLAN CHECKING

DEVELOPER PERMIT OR PERMIT NO.: _____

STREET ADDRESS: _____

DESCRIPTION: _____

PLAN CHECKER ASSIGNED: _____

The purpose of this checklist for plan checking is to provide Applicants (developer/builder) with a general checklist of the procedure guidelines for the City of Santa Ana water and sewer facilities for new development or re-development projects.

Legend for colors used on the plan checks:

- Red = Corrections (done by plan checker)
- Green = Comments/Questions from City (done by plan checker)
- Applicant to highlight in yellow the red/green items addressed in resubmittal
- Applicant to use blue pen to note any comments/answers back to the City

The satisfied items, where applicable, are indicated by checkmarks. Items not applicable, or not required, are indicated by "N/A" or "N/R". Unmarked items denote existing deficiencies which must yet be satisfied.

PART A: PROCEDURAL REQUIREMENTS

____ A-01 Service Verification: _____ Requested?

____ A-02 Will Serve Letter: _____ Requested? _____ Issued?

____ A-03 Preliminary Feasibility Investigation Needed. If so, performed by _____

____ A-04 Water Supply Assessment Needed.

____ A-05 Water Hydraulic Model Evaluation Study Needed.

____ A-06 Sewer Capacity Study Needed.

____ A-07 OCSD Line is in vicinity of project.

____ A-08 Special Meter Requirements (individual meters per DU/building per SAMC §39-23; dedicated irrigation and/or common area public meters).

____ A-09 Replace/install an approved double check valve assembly on existing fire service lines.

____ A-10 New water service is required.

____ A-11 New Water Meter Application submitted

____ A-12 New sewer connection is required

____ A-13 Remodels/Tenant Improvements: submit plumbing plan and landscape plans

PART B: PLAN REQUIREMENTS

____ B-01 Plans submitted on standard 24" x 36", maximum size sheets with City Title Block.

____ B-02 Plans conform to City's Engineered CAD Standards.

____ B-03 Title Sheet meet requirements of 200.1.1.

____ B-04 Second Sheet meet the requirements of 200.1.2.

____ B-05 Plan and Profile Sheets meet the requirements of 200.1.3.

____ B-06 Each sheet signed by Professional Engineer and include the expiration date noted.

____ B-07 Plan revisions subsequent to City's approval shall be resigned prior to resubmittal.

____ B-08 Check prints shall accompany revised plans which are resubmitted for approval.

____ B-09 For residential, commercial and industrial developments, submit items listed in 200.2.1.

____ B-10 For non-residential plans, submit items listed in 200.2.2.

____ B-11 Fire service requirements (200.2.3) have been met.

____ B-12 All planting, irrigation and landscape improvements have met Municipal Code 41-1501.

____ B-13 Easements shall be provided as required in 200.4. All easement documents and plat map and legal descriptions shall be submitted to County of Orange for recording.

____ B-14 Easement, title report, and legal descriptions with accompanying sketch and plans prepared by Applicant's engineer, and two copies sent to the City or shown on tract or parcel map.

____ B-15 Separation Requirements (200.5.1) have been met.

____ B-16 Backflow Protection has been provided in compliance with 200.6.

____ B-17 Orange County Fire Authority approval has been obtained.

____ B-18 Commercial or industrial applicants contacted OCSD for discharge permit requirements.

____ B-19 Met requirements of Fats, Oils and Grease Control (200.9).

____ B-20 Final quantities submitted per 200.10.1.

____ B-21 All required corrections from previous plan checks completed.

____ B-22 New Water Meter Application executed and returned to the Water Resources Division.

____ B-23 All required easement documents executed and delivered to the City.

____ B-24 Tract/parcel maps signed by the City.

____ B-25 All plan submission requirements met (mylars, prints, CD, or other approved media).

____ B-26 Final plans and revisions approved by the City and by the Water Resources Manager.

____ B-27 Once signed by City, submit required signed plans to City (200.10.3).

PART C: REQUIREMENTS FOR WATER FACILITIES

____ C-01 Mains and water service laterals sized correctly.

____ C-02 "Public" and "Private" water systems are clearly delineated.
State whether the domestic water system within the project is "public" (City owned and maintained) or "private" (property owner owned and maintained).

____ C-03 Applicant submitted engineering calculations for demand, velocity and pressure.

____ C-04 Obtained Orange County Fire Department's fire flow requirements.
Submitted fire flow requirements to Water Resources Division.

____ C-05 Existing fire flow tests performed by an approved contractor and done in presence of City.

____ C-06 Fire Authority's approval.

____ C-07 Main and water service laterals pipe material correct.

____ C-08 Minimum depth to top of water main correct.

____ C-09 Standard location meets City's design requirements.

____ C-10 Type of valves, water valve spacing and arrangements correct.

____ C-11 Horizontal and Vertical Clearance Requirements met.

____ C-12 Type of Fire Hydrant correct.

____ C-13 Residential Fire Sprinkler Systems approved by Orange County Fire Authority.

____ C-14 City Standard Water Notes included on all improvement/construction plans.

____ C-15 City's Miscellaneous Standard Guidelines (300.15) have been met.

____ C-16 Invert elevations are provided when a water main crosses another pipeline.

____ C-17 All water mains crossing a sewer main are shown in the profile view.

____ C-18 Street station numbers shown for services/appurtenances coming of main line.

____ C-19 Service laterals for fire hydrants shall be straight (no bends or curves).

____ C-20 All existing and proposed points of connection are properly depicted.

____ C-21 All existing main, size, material and location shown and labeled.

____ C-22 All water service abandonments done at the main.

____ C-23 Water service laterals are dimensioned from the property line or by street stations. (Single-family residences)

____ C-22 Water service laterals not located under driveway approaches (Single-family residences)

____ C-23 Consistent with Typical Construction Notes.

PART D: REQUIREMENTS FOR SEWER FACILITIES

____ D-01 Sewer mains and laterals sized correctly.

____ D-02 Applicant submitted back-up data and calculations for slopes less than minimum.

____ D-03 Applicant submitted estimated sewage generation rates and main sizing.

____ D-04 Sewer main and laterals pipe material correct.

____ D-05 Standard location meets City's design requirements.

____ D-06 Radius of curvature is acceptable.

____ D-07 Centerline stationing meets 400.7.

____ D-08 Minimum depth is acceptable.

____ D-09 Manhole location, spacing size, depth and frame and cover meets 400.9.

____ D-10 Terminal cleanouts and cleanouts require Water Resources review and approval.

____ D-11 Gravity Grease Interceptor in accordance with 400.11.

____ D-12 Separation between waterlines and sewerlines per 400.12.

____ D-13 Sewer Main and Laterals Closed-Circuit Television Inspection.

____ D-14 City's Standard Sewer Notes included on all improvement/construction plans.

____ D-15 City's Miscellaneous Standard Guidelines (400.16) have been met.

____ D-16 "Public" and "Private" sewer systems are clearly delineated.

____ D-17 Invert elevations are provided when a sewer main crosses another pipeline.

____ D-18 All sewer mains crossing a water main are shown in the profile view.

____ D-19 Sewer station numbers shown for all laterals.

____ D-20 All existing and proposed points of connection are properly depicted.

____ D-21 No trees and buildings allowed over sewer easements.

____ D-22 No block walls over sewer easements.

____ D-23 Consistent with Typical Construction Notes.

APPENDIX 2

SAMPLE NEW WATER SERVICE & METER APPLICATION FORM

City of Santa Ana
Public Works Agency

New Water Service & Meter Application

(Not a water account application)

Account No.: _____ Work Order No.: _____

Payment Validation (Cashier)

☐ **Owner** ☐ **Agent**

Proof of ownership is required to establish service

APPLICATION NO.: W_____

Address to be served: _____

Billing Name & Address: _____

Owner Name & Address: _____

Tract/Parcel No.: _____ Lot No.: _____ Lot Size: _____

Total Irrigated Landscape area: _____

The undersigned hereby applies to the City of Santa Ana for the installation of a water service meter at the above location, and in consideration of the installation of such service meter, agrees to pay for all charges incurred.

Applicant Name: _____ **Signature:** _____ **Date:** _____
(Please Print)

Site Information and Project Details – City Use

(Check one box only)

Type of premises: ☐ Residential Single Family ☐ Residential Multi-Family ☐ Common Area amenities ☐ Mixed Use
☐ Commercial Single Unit ☐ Commercial Multi-Unit ☐ Institutional ☐ Municipal ☐ Industrial

Number of units (all units must be individually metered by the City or sub-metered by the owner SAMC 39-23(b) &(c)): _____

Type of Use: ☐ Domestic ☐ Fire Protection ☐ Irrigation ☐ Industrial ☐ Recycled Water
☐ Combination Domestic & Fire (13D Fire Sprinkler System)

Service Size (inch): ☐ 3/4 ☐ 1 ☐ 1 ½ ☐ 2 ☐ 3 ☐ 4 ☐ 6 ☐ 8 ☐ 10

Meter Size (inch): ☐ 5/8 ☐ ¾ ☐ 1 ☐ 1-RFM ☐ 1 ½ ☐ 2 ☐ 3 ☐ 4 ☐ 6

Backflow Protection Required: ☐ DC ☐ DCDA ☐ RPPD ☐ None

Associated Water Service Installation Permit – City Use

Contractor Name & Address: _____ General Contractors License No.: _____

Contractor Phone: _____ Contractor's Emergency Phone: _____ Email Address: _____

Issued By: _____ Date: _____ Street Work Permit No.: _____
(PWA Development Engineering Application Approver) (Attach a copy of the street work permit to white)

Fees as Stated in Miscellaneous Fee Schedule – City Use

New Water Service Application Fee: 060-17002-53725 $ _____

Meter and Meter installation Fee: 060-17002-53725 $ _____

Other Charges: $ _____

Total Amount: $ _____

Inspections & Field Data – City Use

Location: _____ Feet N S E W of _____ line of _____ Street on _____ Street

Please attach drawing if field installation not identical to plans. Owner's engineer must reflect changes on the as-built plans as a condition of final approval.

Water Service & Meter Location Diagram
(Must be provided by PWA Inspector)

Meter Dimension (Face to Face)	
5/8x3/4	7.5"
3/4x1	9"
1"	10 ¾"
1" Combo RFM	9"
1.5"	13"
2"	17"

Final Service Line Approval: _____ Date: _____
(Curb Stop must be certified as locked and not to be unlocked until a meter is installed.)

Approving Water Quality Inspector: _____ Date: _____

Installed Meter No.: _____ Make & Size: _____ Date: _____ Meter Reading: _____

Remarks: _____ Final Water Resources Approval: _____
(Meter Shop Supervisor)

White to Construction (M-22), Green to Municipal Utility (M-14), Canary to Treasury (M-13), Pink to Water (M-85), Blue to Development (M-93), Gold to Applicant

APPENDIX 3

SAMPLE WITNESS FIRE FLOW TEST APPLICATION FORM

City of Santa Ana
Public Works Agency
Fire Flow Test Witness Application
(Test to be performed by private tester)

Fire Flow Test No.: _____

Payment Validation (Cashier)

☐ **Owner** ☐ **Agent**

APPLICANT INFORMATION

Request Date: _____

Contact Name: _____

Company Name: _____

Mailing Address: _____

_____

Contact Phone Number: _____

E-Mail: _____

Signature: _____ **Date:** _____

FIRE FLOW TEST LOCATION

Address of Fire Flow Test Location: _____

_____

Fees as Stated in Miscellaneous Fee Schedule – City Use

Fire Flow Test Application Fee:	060-17002-53720	$ _____
Fire Flow Test Witness Fee:	060-17002-53720	$ _____
Other Charges:		$ _____
Total Amount:		$ _____

INFORMATION FOR APPLICANT

- This is an application for access to operate the City's public fire hydrants for purpose of performing a fire flow test and can only be performed under the supervision and witness of State Certified City of Santa Ana water distribution operator.
- The owner/applicant must hire an independent tester to perform the required test.
- The owner/applicant's tester must coordinate test date, time and location with the City of Santa Ana Water Resources Division at 714-647-3320
- No fire flow test may be performed without the notification and presence of City's water distribution operator.
- A copy of the test results shall be submitted to the City's Water Resources Division:
    - Mail to: Water Resources Division, Attention Water Quality Coordinator, 220 S. Daisy Ave. (M-85), Santa Ana, CA 92703
    - Fax to: 714-647-3345
    - Email to: conservewater@santa-ana.org

APPENDIX 4

STANDARD LIST OF TYPICAL CONSTRUCTION NOTES

Typical Construction Notes for use on development projects:

- Construct 1" water service with ___" meter per Standard Plan No. 1401 for domestic use. Water meter to be installed by City Forces after submission of a water meter application and payment of fees. Contact the Water Resources Division at 714-647-3320 for assistance. Pavement restoration per Standard Plan No. 1150.

- Construct ___" public water meter on private water service per Standard Plan No. 1442 for domestic use. Water meter to be installed by City Forces after submission of a water meter application and payment of fees. Contact the Water Resources Division at 714-647-3320 for assistance. Pavement restoration per Standard Plan No. 1150.

- Construct 1" water service with 1" residential fire meter per Standard Plan No. 1404 for domestic use. Water meter to be installed by City Forces after submission of a water meter application and payment of fees. Contact the Water Resources Division at 714-647-3320 for assistance. Pavement restoration per Standard Plan No. 1150.

- Construct 2" water service with ___" meter per Standard Plan No. 1402 for domestic use. Water meter to be installed by City Forces after submission of a water meter application and payment of fees. Contact the Water Resources Division at 714-647-3320 for assistance. Pavement restoration per Standard Plan No. 1150.

- Construct 1" water service with ___" meter per Standard Plan No. 1401 for irrigation use. Water meter to be installed by City Forces after submission of a water meter application and payment of fees. Contact the Water Resources Division at 714-647-3320 for assistance. Pavement restoration per Standard Plan No. 1150.

- Construct ___" public water meter on private water service per Standard Plan No. 1442 for irrigation use. Water meter to be installed by City Forces after submission of a water meter application and payment of fees. Contact the Water Resources Division at 714-647-3320 for assistance. Pavement restoration per Standard Plan No. 1150.

- Construct 2" water service with ___" meter per Standard Plan No. 1402 for irrigation use. Water meter to be installed by City Forces after submission of a water meter application and payment of fees. Contact the Water Resources Division at 714-647-3320 for assistance. Pavement restoration per Standard Plan No. 1150.

- Construct 4" water service and vault with 3" meter per Standard Plan Nos. 1403A and 1403D. Water meter to be installed by City Forces after submission of a water meter application and payment of fees.

Contact the Water Resources Division at 714-647-3320 for assistance. Pavement restoration per Standard Plan No. 1150.

- Construct 4" water service and vault with 4" meter per Standard Plan Nos. 1403B and 1403D. Water meter to be installed by City Forces after submission of a water meter application and payment of fees. Contact the Water Resources Division at 714-647-3320 for assistance. Pavement restoration per Standard Plan No. 1150.

- Construct 6" water service and vault with 6" meter per Standard Plan Nos. 1403C and 1403D. Water meter to be installed by City Forces after submission of a water meter application and payment of fees. Contact the Water Resources Division at 714-647-3320 for assistance. Pavement restoration per Standard Plan No. 1150.

- Install ___" backflow prevention device for <u>domestic, irrigation, industrial or fire</u> (select one) purposes per Standard Plan No. _____.

- Abandon existing ___" water service at the main per Standard Plan No. 1430. The meter is to be protected in place until removed by City Forces. Owner shall close the existing meter account prior to the meter removal. Contact the City's Municipal Utility Services at 714-647-5454 to close account. Pavement restoration per Standard Plan No. 1150.

- Construct _____" AWWA C900, DR-14, PVC Water Main per City of Santa Ana Special Provisions. Pavement restoration per Standard Plan No. 1150.

- Construct ____" Resilient Wedge Gate Valve per Standard Plan No. 1410 and the City of Santa Ana Special Provisions.

- Construct Wet Barrel Fire Hydrant Assembly per Standard Plan No. 1405 and the City of Santa Ana Special Provisions. Pavement restoration per Standard Plan No. 1150.

- Construct ___" sewer lateral per Standard Plan No. 1204. Pavement restoration per Standard Plan No. 1150.

- Abandon existing sewer lateral at the main per Standard Plan No. 1212. Pavement restoration per Standard Plan No. 1150.

- Construct ____ " _____ Sewer Main per the City of Santa Ana Special Provisions. Pavement restoration per Standard Plan No. 1150.

- Construct 48-inch diameter Sewer Manhole per Standard Plan No. 1201. Pavement restoration per Standard Plan No. 1150.

- Construct Gravity Grease Interceptor per Standard Plan No. 1210.

APPENDIX 5

SAMPLE RESIDENTIAL SERVICE INSTALLATION PLAN

REQUIREMENTS:

(A) IDENTIFY AND CALL OUT APPLICABLE WATER SERVICE STANDARD PLAN

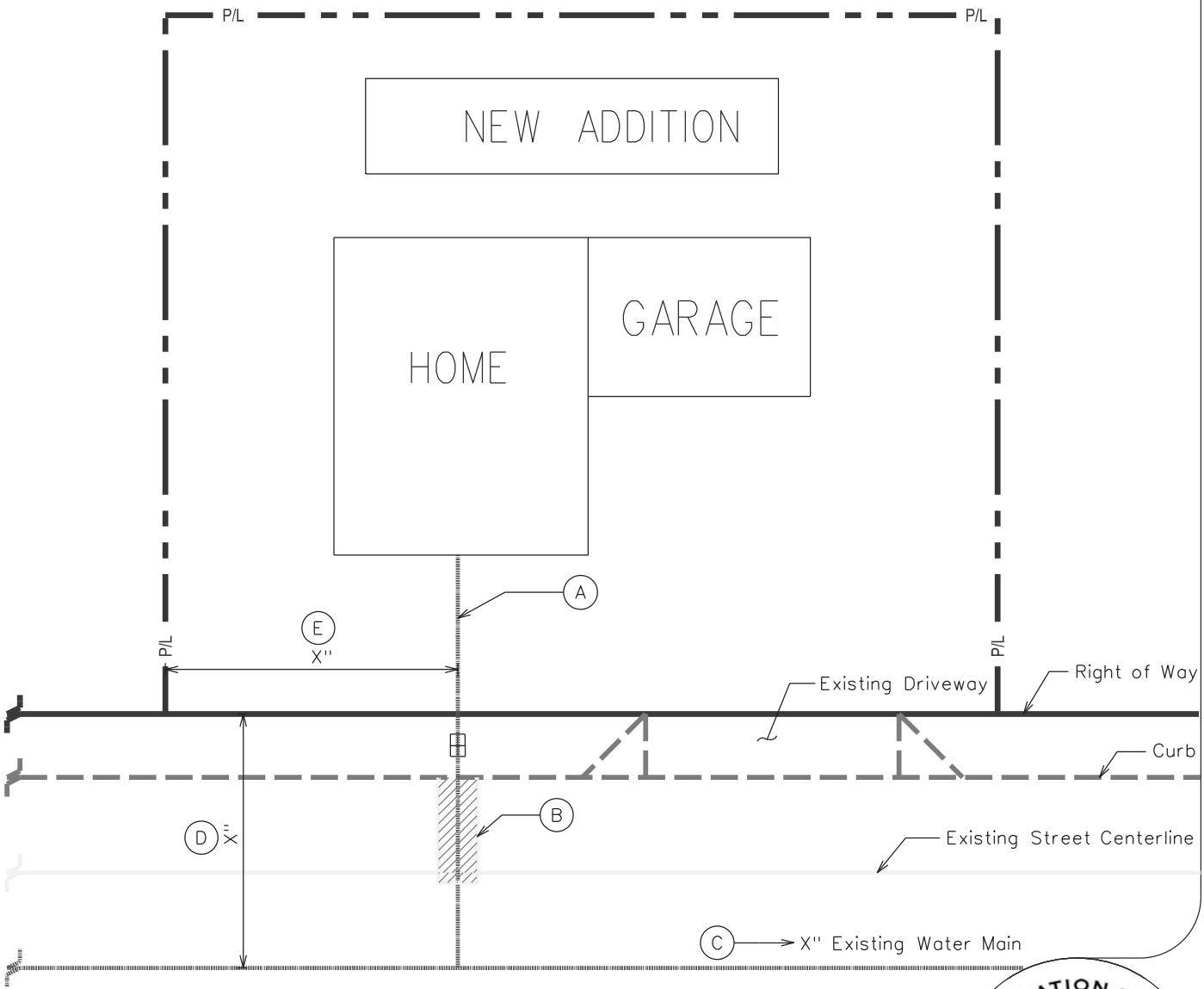
(B) IDENTIFY PAVEMENT IMPACT/RESTORATION LIMITS

(C) IDENTIFY EXISTING WATER MAIN SIZE AND MATERIAL
CONTACT CITY FOR INFO @ (714) 647-3320

(D) IDENTIFY DIMENSION FROM EXISTING WATER MAIN TO RIGHT AWAY

(E) IDENTIFY DIMENSION FROM PROPOSED CONNECTION TO PROPERTY LINE

(F) ADD TO PLAN ALL NOTES ON STANDARD 1400



CITY OF SANTA ANA

PUBLIC WORKS AGENCY

SAMPLE RESIDENTIAL
WATER SERVICE CONNECTION
PLAN

APPENDIX 6

SAMPLE RECYCLED WATER SERVICE APPLICATION FORM

CITY OF SANTA ANA RECYCLED WATER SERVICE APPLICATION

PLEASE SUBMIT 3 SETS OF THE SITE PLANS WITH ALL METER LOCATIONS MARKED.

CITY USE	
	TAP NUMBER
	FILING ADDRESS
	CITY

APPLICANT NAME		DATE	OWNER/BILLING		DATE
ADDRESS		PHONE #	ADDRESS		PHONE #
CITY	ZIP CODE	WORK PHONE #	CITY	ZIP CODE	WORK PHONE #
E-MAIL ADDRESS OF APPLICANT			E-MAIL ADDRESS OF OWNER		

NEW METER REQUEST	NO. OF METERS	SIZE/GPM	TOTAL AREA TO BE SERVED	ASSESSORS PARCEL NO.

PROPERTY LOCATION	ADDRESS	CITY	ZIP CODE

SERVICE TYPE		
	☐ New Recycled Water Service (New Construction) ☐ Retrofit of Existing Service (Existing Site) ☐ Other _____	USE ☐ Irrigation ☐ Other *(Please Specify)*

PLUMBER/ CONTRACTOR	NAME		PHONE NO.
	ADDRESS	CITY	ZIP CODE
	BUILDING PERMIT NO. OR GRADING NO.		DATE

NOTE:
PARCEL OWNER'S SIGNATURE IS REQUIRED ON PAGE TWO (2) OF THIS FORM UNDER *RECYCLED WATER SERVICE REQUIREMENTS.*

APPLICANT _____ _____
SIGNATURE DATE

CITY OF SANTA ANA USE ONLY

RECYCLED WATER SERVICE

☐ Is available with installation of service connections.

☐ May be available after the City of Santa Ana reviews service conditions and facilities are installed as required.

☐ Is not currently available because parcel is outside of the City of Santa Ana's recycled water service area.

ORDERS PREPARED BY	DATE

CHARGES/CREDITS:

Due at time of plan submittal:

Recycled Water Application Fee..... _____

Due upon approval of plans:

Meter Installation Fee (based on size)..... _____

Cross Connection Test Fee..... _____

Unmetered Usage..... _____
_____units @ $____/unit

Account Credit..... _____

Total Amount Due..... _____

Account Number: _____

Agreement Number: _____

CITY OF SANTA ANA RECYCLED WATER SERVICE REQUIREMENTS

ACKNOWLEDGEMENT BY CUSTOMER

The customer understands and acknowledges that specific requirements must be met before the customer's site can be supplied with recycled water, including the following:

1. Trenching for the irrigation system is not to be covered with soil until after the City of Santa Ana inspects to ensure that the irrigation system has not been connected to the domestic water system.
2. After recycled water system construction is complete, the City of Santa Ana will conduct a cross-connection test to ensure complete separation of the domestic and recycled water systems.
3. The customer must designate a Recycled Water Site Supervisor (RWSS) and a key contact (customer's agent or representative) and must provide these names and contact information to the City of Santa Ana.
4. Customer (or customer's agent) and customer's RWSS must be trained in the safe and effective use of recycled water. Training to be provided by the City of Santa Ana (training costs included in permit fee).
5. City of Santa Ana must issue a customer use permit for the recycled water site.

SPECIAL NOTE: Recycled water has a higher salt content than domestic water. The customer understands that it is advisable to select plants and landscape materials that are moderately-to-highly salt tolerant.

My signature indicates I have read and understand these requirements.

OWNER _____ _____

CUSTOMER'S SIGNATURE DATE

RECYCLED WATER APPLICATION INSTRUCTIONS

QUESTIONS? CALL 714-647-5039

1. Recycled water service is restricted to non-consumable uses. The City of Santa Ana will determine if the proposed use of recycled water is appropriate and feasible. If you are applying for domestic (potable) water service, please complete the City of Santa Ana 's standard Water Service Application.
2. Customers may apply for new recycled water service at the City of Santa Ana 's Public Works Counter located on the 1st floor of City Hall at 20 Civic Center Plaza. Applications must include 3 sets of site plumbing plans to be reviewed by the Water Resources Division.
3. The site plumbing plans should show the entire site, street frontage, and the location(s) of any domestic water meter(s) on the site and the proposed location(s) of the recycled water meter(s).
4. No meters are to be installed in driveways. Meters are to be installed behind curbline or sidewalk, depending on local code, and accessible to the City of Santa Ana at all times.
5. An application for recycled water will be considered complete after the required application form, site plans, and signed recycled water user agreement are received by the City of Santa Ana.
6. Lead-time for meter installation is approximately two weeks after full payment is received.
7. Fees apply, which are active and adopted by Council Resolution during fiscal year when permit is acquired.
8. Before recycled water service is initiated, the City of Santa Ana staff will perform a cross connection test to certify that the site's domestic water plumbing is completely separate from the site's recycled water plumbing. A backflow prevention device must be installed on the site's domestic water service. A backflow prevention device may also be required on the recycled water service, de- pending upon the site condition.
9. The City of Santa Ana may provide a temporary domestic water supply if recycled water is not immediately available.
10. To discuss the requirements for recycled water service, please call the City of Santa Ana **(714) 647-5039**. (See Recycled Water Service Requirements above.)
11. Submit application and 3 sets of site plans in person to:
    Public Works Agency
    City of Santa Ana
    20 Civic Center Plaza
    Santa Ana, CA 92701

PART II

GENERAL PROVISIONS

FOR

WATER AND SEWER FACILITIES

CITY OF SANTA ANA

PART II – GENERAL PROVISIONS

TABLE OF CONTENTS

FORWARD

The Standard Specifications is the 2012 edition, including all supplements, at time of bid of the Standard Specifications for Public Works Construction, including supplements and accompanying Standard Plans, written and promulgated by Public Works Standards, Inc. These Standard Specifications shall control the general provisions, construction materials, and construction methods for this contract, except as amended by the Contract Documents and these Design Guidelines and Standard Drawings.

The following General Provisions are supplementary and in addition to the provisions of the Standard Specifications, unless otherwise noted. The section and subsection numbering system used in these General Provisions corresponds to that used in the Standard Specifications.

The State of California Department of Transportation Standard Specifications, Standard Plans, and Manual on Uniform Traffic Control Devices, latest edition at time of bid of each, are incorporated herein by reference and are hereby accepted as Reference Specifications. These Reference Specifications are intended to govern certain construction materials, methods, and details except as modified herein or are inconsistent with the provisions herein.

Section 1 - Terms, Definitions, Abbreviations, Units of Measure and Symbols

1-2 TERMS & DEFINITIONS

Add the following to this subsection:

Acceptance – The formal written acceptance by the Agency of the completed project.

Agency – City of Santa Ana

Approved Equal –material or product that has been reviewed and approved by the Engineer as similar and equal in all respects and acceptable for use in lieu of that specified.

Approved, Required, Directed – or words of similar import, refer to and indicate that the work or materials shall be "approved," "required," or "directed" by the City of Santa Ana or its duly authorized representative.

Board – City Council of the City of Santa Ana

City – City of Santa Ana

City Council – The body constituting the awarding authority of the City, namely the City Council of the City of Santa Ana.

Contract Documents – In addition to items specified in the Design Guidelines, Standard Specifications, Contract Documents shall also include all Appendices as referenced and/or included.

Contractor – The person or persons, co-partnership or corporation, private or municipal, who have entered into contract for this work as parties or party of the second part of his or her legal representatives.

Department – City of Santa Ana Public Works Agency.

Due Notice – A written notification, given in due time, of a proposed action where such notification is required by the contract to be given a specified interval of time (usually 48 hours or two working days) prior to the commencement of the contemplated action. Notification may be from City to Contractor or from Contractor to City.

Engineer – The Executive Director of the Public Works Agency of the City of Santa Ana or his/her authorized representative

Laboratory – Any laboratory of a public agency or a recognized commercial testing laboratory.

Owner – City of Santa Ana

Prompt – The briefest interval of time required for a considered reply, including time required for approval by a governing body.

1-3 ABBREVIATIONS

1-3.2 Common Usage

Add the following to this subsection:

Abbreviation	Word or Words
CA MUTCD	California Manual on Uniform Traffic Control Devices
CCPR	Cold Central Plant Recycling
CIR	Cold In-Place Recycling
CIREAM	Cold In-Place Recycling Expanded Asphalt Mix
DCP	Dynamic Cone Penetrometer
EAS	Emulsion-Aggregate Slurry
HDB	Hydrostatic Design Basis
JITT	Just-In-Time Training
NPDES	National Pollutant Discharge Elimination System
PACP	Pipe Assessment & Certification Program
REAP	Rain Event Action Plan
REAS	Rubberized Emulsion Aggregate Slurry
SSPWC	Standard Specifications for Public Works Construction
TEES	Transportation Electrical Equipment Specifications

1-3.3 Institutions

Add the following to this subsection:

Abbreviation	Word or Words
AGC	Associated General Contractors of America
APWA	American Public Works Association
ASA	American Standards Association
CALTRANS	California Department of Transportation
FHWA	Federal Highway Administration
FRA	Federal Rail Administration
FTA	Federal Transit Authority
NASSCO	National Association of Sewer Service Companies
OCSD	Orange County Sanitation District
OCTA	Orange County Transportation Authority

Abbreviation	Word or Words
SCG	Southern California Gas Company
SCE	Southern California Edison Company

Section 2 - Scope and Control of Work

2-5. PLANS AND SPECIFICATIONS

2-5.1 General

Add the following to this subsection:

The Contractor shall maintain a control set of plans and specifications on the project site at all times throughout the construction period.

As approved by the Engineer, all final locations determined in the field and any deviations from the plans and specifications shall be marked in red on this control set to show the As-Built conditions. Upon completion of all work, the Contractor shall submit the control set As-Built Plans and report to the Engineer. Additionally, the Contractor shall provide the following:

Sewer Improvements: Any deviations from the contract plans such as: alignments, elevations, modifications to pipe/structures sizing/material. Contractor shall also provide CCTV inspection recordings/videos in format required by Engineer.

Water Improvements: Any deviations from the contract plans such as: alignments, elevations, and appurtenance locations shall be noted (drawing sketch) on the control plan and a copy submitted to the Engineer no later than (5) working days from the occurrence.

Within (15) days of completion of all work, the Contractor shall submit the control set of as-built plans to the Engineer. **Final payment will not be made until this requirement is met.**

2-6 WORK TO BE DONE

Add the following to this subsection:

Where the manufacturer of any material or equipment provides written recommendations or instructions for its use or method or installation (including labels, tags, manuals or trade literature), such recommendations or instructions shall be compiled and delivered to the City prior to project acceptance.

2-8 RIGHT-OF-WAY

Add the following to this subsection:

When the Contractor arranges for temporary use of private property for additional work areas and facilities required for the Contractor's convenience, to meet requirements, or other reason(s), the Contractor shall provide the City with written agreement authorizing use of said property.

2-9 SURVEYING

2-9.2 Survey Service

The following supersedes the provisions of this subsection:

The Contractor shall be responsible for directly obtaining the services of a California Licensed Land Surveyor to be in responsible charge of all survey work performed under this contract.

The Contractor shall be responsible for the scheduling of all survey requests.

The Contractor's surveyor shall provide construction staking for project improvements. A copy of the cut sheets shall be provided to the AGENCY for verification. Also a copy of all updated control set by the Contractor's surveyor; showing coordinates, elevation, and description shall be submitted, for quality management (as-built checks by Agency).

Construction stakes shall be set per the provided plans and specifications. The Contractor's surveyor shall notify the AGENCY immediately of any discrepancy or design errors discovered on the plans during staking or when verifying join points.

The Contractor's surveyor shall research existing County and City records for centerline survey monuments within the project area. Prior to construction, all monuments shall be tied-out and a Corner Record shall be recorded with the County Surveyor per Section 8771 of the Business and Professions Code of the State of California. After completion of construction, any monument disturbed or lost during construction shall be reset, in conformance with Section 8771. Each centerline intersection shall be drawn on a single Corner Record. A copy of all Corner Records shall be submitted to the AGENCY prior to a Notice of Completion being filed.

The Contractor is responsible for maintaining a safe and orderly job site per Occupational Safety and Health Administration (OSHA) standards.

The Contractor shall furnish traffic control as needed to provide a work area free of public and construction traffic for construction staking. Traffic control shall conform to the requirements of the "Watch Area Traffic Control Handbook" (WATCH).

2-11 INSPECTION

Add the following to this subsection:

City inspection occurs during construction working hours. Inspection work requested by the Contractor outside of the prescribed working hours shall be paid by the contractor at the City's overtime rate.

2-12 SPECIAL NOTICES

Add the following to this subsection:

Per Section 1771.4(a)(2) of the California Labor Code, Contractors are required to post job site notices, as prescribed by regulation.

Section 4 - Control of Materials

4-1 MATERIALS AND WORKMANSHIP

4-1.1 General

Should the Contractor fail to correct deficiencies or public nuisances that have been created because of his/her operation, then these will be considered to be of an emergency nature, and will call for the AGENCY to move in on the project to take corrective action. Such work will be done on a force account basis with an additional callout charge. There is a minimum two-hour charge for labor on any callout plus an additional callout charge of $300.

4-1.4 Test of Materials

Add the following to this subsection:

Material testing will be performed by the Orange County EMA Materials Laboratory or a private laboratory engaged by the Contractor for the construction of this project. The Contractor will bear the cost of testing material which meets the requirements indicated in these General Provisions. The cost of retesting of material that fails to pass the first test shall be borne by the Contractor as well.

Section 5 - Utilities

5-1 LOCATION

Add the following to this subsection:

The Contractor is responsible to determine the exact location and depth of utilities and its service connections during construction. The Contractor shall notify the City of the exact location of any utility or service connection which is not shown or is incorrectly shown on the plans.

In addition to calling Dig Alert, the Contractor shall be expected to maintain liaison with the affected utility company representatives, and shall notify them prior to beginning of the job and each time the particular utility is or could possibly be affected at least 24 hours in advance.

All existing utility access frames and covers, both private and public, shall be located and marked with paint on the pavement surface by the Contractor.

Upon completion of the project, the Contractor shall remove all painted utility markings done by him/her or the respective utility owners from the surfaces of sidewalks, driveway approaches, curbs and gutters using the removal method acceptable to the Engineer. Any damage to sidewalks, driveway approaches, curbs and gutters due to the Contractor's removal operation shall be repaired at the Contractor's expense and to the satisfaction of the Engineer.

If utility construction work within the area is required during the construction of this project, the Contractor is directed to cooperate with the utility company(s) and their workers to assure proper installation of the utilities with a minimum of conflict.

The last paragraph of Subsection 5-1 shall be revised to read as follows:

> "The Contractor shall determine the location and depth of all utilities including service connections, which may affect or be affected by its operation."

Section 6 - Prosecution, Progress and Acceptance of the Work

6-1 CONSTRUCTION SCHEDULE AND COMMENTMENT OF THE WORK

6-1.1 Construction Schedule

Add the following to this subsection:

A working day shall be defined as outlined below, and the Contractor's activities shall be confined accordingly:

1. From 9:00 a.m. to 3:00 p.m., Monday through Friday, for work requiring temporary lane closures, i.e. those having less than a 24-hour duration, and for work at major intersections. As an alternative, construction at major intersections may be permitted on Fridays, at night or on weekends, at the discretion of the Engineer.
2. From 7:00 a.m. to 5:00 p.m., Monday through Friday, within work areas having either no lane closures or having continuous lane closures, i.e. 24-hour closures lasting more than one day.

Deviation from these hours/days shall not be permitted without the prior consent of the Engineer, except in emergencies involving immediate hazard to persons or property, or as specified otherwise.

Holidays as herein referred to shall be deemed to be:

New Year's Day	Labor Day
Martin Luther King Day	Veteran's Day
President's Day	Thanksgiving Day and day after
Memorial Day	Christmas Eve
Independence Day	Christmas Day

Section 7 - Responsibilities of the Contractor

7-1 CONTRACTOR'S EQUIPMENT AND FACILITIES

Add the following to this subsection:

Pursuant to the authority contained in Section 591 of the Vehicle Code, the Department has determined that, such areas as are within the limits of the project and are open to public traffic, the Contractor shall comply with all the requirements set forth in Divisions 11, 12, 13, 14 and 15 of the Vehicle Code. Attention is directed to the statement in Section 591 that this Section shall not relieve him or any person from the duty of exercising due care. The Contractor shall take all necessary precautions for safe operation of his/her equipment and the protection of the public from injury and damage from such equipment.

7-5 PERMITS

Add the following to this subsection:

The Contractor shall comply with all Federal, State or local laws, ordinances, or rules and regulations related to the performance of the work, which include but are not limited to the following:

Business License. Each Prime Contractor and Subcontractor shall obtain and pay for a Santa Ana Business License. Detailed information concerning business license may be obtained from the Finance and Management Services Agency, (714) 647-5447, City Hall.

Construction Water Permit. Each Prime Contractor or Subcontractor which desires to obtain water from AGENCY-owned fire hydrants for construction or any other purpose shall first obtain and pay for a permit from the Corporate Yard of the City of Santa Ana, at 220 South Daisy Avenue. Information concerning costs and conditions may be obtained from the AGENCY by calling (714) 647-3320. Use of private water from a hose bib is not allowed. For safety reasons, the AGENCY will not allow Contractor to stretch construction water hoses across open traffic lanes. Where required, Contractor shall use water truck.

Disposal Permit. In accordance with the procedures of the Orange County General Services Administration (GSA), the cost for the disposal of all materials at County landfill sites shall be borne by the Contractor.

Building and Electrical Permits. For projects involving building, structural construction, traffic signal or irrigation controller installation, the Prime Contractor shall obtain the necessary building and electrical permits from the Planning & Building Agency.

State Division of Industrial Safety Permits. In accordance with Section 6500 of the State Labor Code, permits are required for all excavations, which are five feet or deeper, or for all structures being built or demolished, which are more than three stories high.

All permits and fees required by all other Agencies having jurisdiction over any part of the work shall be obtained and paid for by the Contractor, unless otherwise noted on the Plans or in the General Provisions.

7-8 WORK SITE MAINTENANCE

7-8.1 General

Add the following to this subsection:

The Contractor shall keep the work site clean and free from rubbish and debris at the end of every working day. In addition, the Contractor shall be fully responsible for removing any graffiti placed on new improvements or Contractor's equipment daily immediately at the start of the work day.

The City of Santa Ana has adopted an ordinance to assist the City in complying with the State of California's Assembly Bill 939 law which requires that all cities and counties in the State reduce the amount of trash disposed of in landfills by 50%. Failure to comply with State law could result in a fine to the City of $10,000 per day.

Santa Ana Municipal Code Section 16-30 (f) will ensure that construction and demolition waste generated within the City can be accounted for and recycled. The ordinance states the following, *"Any person with whom the City has an agreement for the collection, transportation and disposal of construction and demolition solid waste which has accumulated and/or been generated at a temporary construction site may haul such waste during the term of such agreement."*

The only companies approved by the City Council to haul temporary construction and demolition material in the City of Santa Ana are:

Ware Disposal Company, Inc.	**Waste Management**
1018 N. Lincoln Avenue	1800 South Grand
Santa Ana, CA 92701	Santa Ana, Ca 92705
Phone Number: (714) 834-0234	Phone Number: (714) 558-7761

Contractors shall contact one of the above companies to arrange for the collection and recycling of construction debris.

Persons who generate solid waste on the premises may personally collect, transport, and dispose of their own solid waste providing that they do so in accordance with all governing laws and regulations and dispose of such solid waste at a site permitted by the California Integrated Waste Management Board.

7-8.2 Air Pollution Control
Add the following to this subsection:

All organic solvents used must comply with the rules, regulations and orders of the South Coast Air Quality Management District (SCAQMD) relating to organic solvents.

7-8.3 Noise Control

The Contractor shall comply with all local sound control and noise level rules, regulations and ordinances which apply to any work performed pursuant to the contract. Each internal combustion engine, used for any purpose on the job or related to the job, shall be equipped with a muffler of a type recommended by the Manufacturer. The noise level from the Contractor's operations shall not exceed 95 dba at a distance of 50 feet. This requirement in no way relieves the Contractor from responsibility for complying with local ordinances regulating noise level.

The said noise level requirements shall apply to all equipment on the job or related to the job, including but not limited to trucks, transit mixers, or transient equipment that may or may not be owned the Contractor. The use of loud signals shall be avoided in favor of light warnings, except those required by safety laws for the protection of personnel.

7-8.4.2 Storage in Public Streets
Add the following to this subsection:

Storage of equipment and materials on City residential streets or in the public right of way during non-working hours shall not be permitted, and may only be placed in the public right of way for purposes of use that day.

Overnight stockpiling of construction debris or excavated materials is not allowed. Contractor must obtain written approval from the Engineer prior to storage of construction materials and equipment on the street where improvements are planned, but at minimum, adequate flashing barricades shall be provided.

No area is available within the contract limits for the exclusive use of the Contractor. However, temporary storage of equipment and materials on City of Santa Ana property may be arranged with the Engineer, subject to the prior demands of the City of Santa Ana. Use of the Contractor’s work areas and other City of Santa Ana-owned property shall be at the Contractor’s own risk, and the City of Santa Ana shall not be held liable for damage to or loss of materials or equipment located within such areas.

The Contractor shall remove equipment, materials, and rubbish from the work areas and other City of Santa Ana – owned property that the Contractor occupies at the conclusion of each working day.

7-8.6.2 Best Management Practices (BMPs)
Add the following to this subsection:

If project has LESS than one-acre of disturbed soil, the following shall apply:

After award of the contract and prior to Contractor commencing work, the Contractor shall submit an Erosion and Sediment Control Plan, hereinafter referred to as ESCP, for review by the Engineer. The ESCP shall include erosion and sediment control BMPs for all activities occurring on the construction site and at any temporary storage yards that hold equipment and/or materials. The ESCP, at a minimum, shall be prepared per the applicable guidelines outlined in the California Storm Water Quality Association (CASQA) Best Management Practices Handbook. The Contractor shall make any necessary revisions to the ESCP as directed by the Engineer and the contractor shall not commence work until the ESCP has been approved by the Engineer. The ESCP must be prepared by a licensed Civil Engineer; however the AGENCY may waive the requirement of licensed Civil Engineer if the Contractor can satisfactorily prove to the Engineer that the person preparing the ESCP is qualified in the field of erosion and sediment control.

The Contractor shall keep a copy of the ESCP at the construction site at all times, for the duration of the contract, and the Contractor shall implement all BMPs as shown in the ESCP, unless granted approval by the Engineer. Failure to implement BMPs properly may result in enforcement actions taken against the Contractor, by the AGENCY. The ESCP shall remain in effect until project completion and final stabilization of the construction site.

Extra erosion and sediment control BMPs shall be available on-site in order to replace failed BMPs or to be implemented during storm events. The Contractor shall mitigate ALL non-stormwater discharges from the construction site, unless granted approval by the AGENCY. The area adjacent to the construction site shall remain free of sediment and shall be swept regularly to be kept clean.

7-10 PUBLIC CONVENIENCE AND SAFETY

7-10.1 Access
Add the following to this subsection:

Intersections shall be kept open until work takes place within the intersection. Local vehicular and pedestrian access, including access to driveways and businesses, shall be maintained at all times. Pedestrian access across both streets in an intersection must be maintained at all times with a minimum 4-foot width.

7-10.1.1 General
Add the following to this subsection:

Notifications:
Prior to the start of construction operations, the Contractor shall notify the Police and Fire Departments of the AGENCY, giving the approximate starting date, completion date, and the name and telephone number of responsible persons who may be contacted at any hour in the event of a critical condition requiring immediate correction.

At least two weeks prior to starting work, the Contractor shall notify the Orange County Transportation Authority (OCTA) bus service of the approximate starting date and completion date.

Construction Notices:
At least two weeks prior to starting work, the Contractor shall deliver notices supplied by the AGENCY to the residents and businesses in the area affected by the construction. At least 48 hours before working on a street, the contractor shall contact the residents and businesses of that street by written notice to provide information as to the type of work, closure, type of inconvenience and the expected duration. The written notice shall be hung on door knobs and all parked vehicles on the street. In the event of a delay after the notice has been delivered, the Contractor shall provide an updated notice to the residents and businesses. After construction completion on the street, the Contractor shall collect any notices that are not picked up by the resident or business.

Temporary Construction Signs:
Contractor shall furnish, install and maintain temporary construction signs as requested by the City. The signs shall be mounted on Type II barricades and secured with sandbags to prevent overturning. The Contractor shall install the temporary construction signs during construction at locations approved by the Engineer. The maintenance includes, but is not limited to the relocation for the different construction phases, replacement (if damaged due to the operations of the Contractor) and graffiti removal.

Temporary Parking Removal Signs:
The signs for temporary parking removal during construction shall be a minimum of 12" x 18" as shown in the Appendix of the Contract Documents. The signs shall be posted 48 hours prior to the temporary parking removal. A sign shall be posted at the beginning of the parking removal area, the beginning of every block, and every 100 -150 feet thereafter.

7-10.2 Work Area Traffic Control

7-10.2.1 General
Add the following to this subsection:

All signs used for traffic control shall be illuminated or reflectorized when they are used during hours of darkness. All cones, pylons, barricades, or posts used in the diversion of traffic shall be reflectorized. All shall be maintained in a like new condition at all times. All signing, barricading and diversion of traffic shall be subject to the approval of the Engineer. The Contractor shall provide a telephone number at which the Contractor's representatives can be reached in case an emergency which requires replacement or relocation of the required traffic control devices should occur.

7-10.5.3 Steel Plate Covers
Add the following to this subsection:

When backfilling operation of an excavation in the travel way, whether transverse or longitudinal cannot be properly completed within a work day, steel plate bridging with a non-skid surface and shoring may be required to preserve unobstructed traffic flow. In such cases, the following shall apply:

1. Steel plate installation shall be recessed by milling existing pavement to set flush with finish grade.

2. Steel plate shall fit snug and installed to operate with minimum noise. Bridging shall be secured against displacement.

3. Steel plate used for bridging must extend a minimum of twelve (12") inches beyond the edge of the trench.

4. The pavement shall be cold planned a depth equal to the thickness of the plate and to a width and length equal to the dimensions of the plate.

Multiple steel plates shall be butted and tack welded as needed to secure plates 6" minimum. The trench shall be adequate to support the bridging and the traffic load. Contractor shall be responsible for determining whether shoring is necessary. The Contractor shall be responsible for the appropriate selection and maintenance of the steel plates, and shoring.

Unless specified, steel plate bridging at any given location shall not exceed four (4) consecutive working days in any given week. Backfilling of excavation shall be covered with a minimum of three (3) inches of temporary layer of cold asphalt concrete.

The following table shows the required minimal thickness of steel plate bridging for a given trench width:

Trench Width	Minimum Plate Thickness
1 foot-11 inches	¾ inch
2 feet-7 inches	$^{7}/_{8}$ inch
3 feet-5 inches	1 inch
5 feet-3 inches	1 ¾ inch

For spans greater than five (5) feet-three (3) inches, a structural design for the steel plate bridging shall be prepared by a California registered civil engineer and approved by the Engineer. Steel plate bridging shall be designed for HS20-44 truck loading per Caltrans Bridge Design Specifications Manual. The Contractor shall maintain steel plates with a non-skid surface having a minimum coefficient of friction equivalent to 0.35 as determined by California Test Method 342. The Contractor may use standard steel plate with known coefficient of friction equal or exceeding 0.35.

A Rough Road sign (W8-8) with black lettering on an orange background shall be used in advanced of steel plate bridging. This is to be used along with any other required construction signing.

7-12 ADVERTISING

Add the following to this subsection:

Contractor shall furnish, install and maintain a project sign when directed by the City. The Contractor shall install the project sign during construction in the location approved by the Engineer. The maintenance includes replacement (if damaged due to the operations of the Contractor) and graffiti removal.

END OF SECTION

PART III

SPECIAL PROVISIONS

FOR

WATER AND SEWER FACILITIES

CITY OF SANTA ANA

PART III – SPECIAL PROVISIONS

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6.01 Open Trench Operations, Excavation, Bedding, and Backfill

Open trench operations, excavation, bedding and backfill shall conform to the applicable provisions of Section 306 of the Standard Specifications and these Special Provisions.

All trenches shall be base paved with hot mix or covered with steel traffic plates recessed and flushed with existing pavement at the end of each working day. No temporary pavement will be allowed.

Trenching operations shall not be allowed on more than one street at any time. Work shall not be allowed in more than one intersection at any one time.

The third paragraph of Subsection 306-1.1.1 of the Standard Specifications is hereby deleted and replaced as follows:

> Excavation shall include the removal of all excess excavated materials and all water and materials of any nature which interfere with the construction work.

All pavement removals shall be sawcut unless, approved otherwise by the Engineer prior to commencement of work.

All removed pavement and excess excavated material shall be immediately disposed of off the project site at a legal dumpsite at the Contractor's expense.

Pipe bedding and trench backfill shall be accomplished in accordance with the City of Santa Ana Standard Plan No. 1150, these Special Provisions, and the trench details on the construction drawings. For VCP sewers, the pipe zone and bedding material shall be ¾-inch crushed rock. For VCP sewers in high groundwater conditions, the pipe zone and bedding material shall be ½" crushed rock wrapped in geofabric (Mirafi 140N or approved equal). For PVC pipe and ductile iron pipe sewers, the pipe zone and bedding material shall be imported SE-30 sand. The trench zone backfill shall be Class II aggregate base.

All material tickets (i.e. Sand, Class II Base, Crushed Rock, Asphalt, Concrete, etc.) shall be given to the City Inspector on a daily basis.

No backfill shall be placed until the sewer pipe laid has been approved by the City Inspector.

Crushed rock products shall be in accordance with subsection 200-1.2 and Table 200-1.2(A) of the Standard Specifications.

The seventh and eighth paragraphs of Subsection 306-1.3.1 of the Standard Specifications are hereby deleted and replaced with the following:

> Rocks greater than 4 inches in any dimension will not be permitted in backfill placed between 1-foot above the top of any pipe and 1-foot below pavement subgrade.
>
> Backfill around sewer manhole and structures shall be sand placed a minimum of 2' laterally around structure and backfilled to subgrade.

The following test methods shall be used for determining relative compaction:

California Test 216	(Sand Cone Method)
California Test 231	(Nuclear Gauge Method)

The Contractor will be provided with compaction test at locations deemed necessary by the Engineer.

If compaction fails to meet the Contract Specifications, then the Contractor shall make the necessary adjustments and is responsible for the cost of additional compaction tests until compaction per the specifications is met.

All trench and structure backfill sand and native material shall be compacted to 90% of maximum density at optimum moisture.

If any trench, through the neglect of the Contractor, is excavated below the grade required by the plans and these Special Provisions, it shall be refilled to grade with additional bedding.

6.02 Import Backfill Material

Imported backfill shall conform to the applicable provisions of Section 306-1.3.7 of the Standard Specifications and these Special Provisions

Imported backfill shall be clean soil, free from organic material, trash, debris, rubbish, broken portland cement concrete, bituminous materials, or other objectionable substances.

The Contractor shall dispose unsuitable material to an approved facility.

6.03 Existing Utilities and Adjustments in Grade

All existing utilities shall be protected in place, unless otherwise noted on the plans. The Contractor shall be responsible for any damage to existing utilities as a result of his operations.

The location of existing utilities as shown on the plans was obtained from a search of available records. It shall be the Contractor's responsibility to notify the respective utility owners and Underground Service Alert (811) to determine the exact field location of all utilities shown or not shown on the plans, which may conflict with his operations. Potholing of existing utilities, points of connection and service connections to determine exact depth and field locations shall be the responsibility of the Contractor.

The Contractor shall determine the location and depth of all utilities including service connections and points of connection, which may affect or be affected by its operation, three (3) weeks in advance. In the event of any conflicts the Engineer shall be immediately notified.

City owned utility frames and covers for survey monuments, water meter, water valves, traffic signal and street light pull boxes, and manholes within the area to be paved or graded, shall be set to finish grade by Contractor after construction of new pavement. In Portland cement concrete pavement and sidewalk areas, City utility frames and covers shall be adjusted to grade prior to placement of concrete. Contractor shall supply new sewer manhole frame and covers, sewer cleanout frame and covers, concrete rings and water valve pot frame, canister and lids per City of Santa Ana Standard Plans.

Prior to paving, an "I.D. Locator" shall be attached to each valve box or manhole cover. An "ID Locator" is a rubberized marker approximately 4" high that adheres to the utility cover and pops-up after paving for easy identification and location of the respective valve box or manhole. Contractor shall measure and tie-out locations of manholes and water valves prior to paving.

6.04 Landscaping and Irrigation Repair

This section shall conform to Sections 212 and 308 of the Standard Specifications and these Special Provisions.

All lawn and landscaped areas disturbed by the Contractor as part of or as a result of the work shall be prepared/brought to adjacent grade and restored to match existing landscaping. If there are any existing sprinkler heads and irrigation lines in the construction areas, whether on public or private property, they shall be replaced or relocated by the Contractor.

6.05 Portland Cement Concrete (PCC) Cross Gutter

This work shall consist of replacing PCC cross-gutter from the spandrel to street centerline (cold joint to cold joint) to facilitate water main construction. All work shall be accomplished in accordance with City of Santa Ana Standard Plan No. 1109. The replacement areas are clearly indicated on the construction plans.

Concrete shall be high early strength concrete, treated in accordance with section 201-1 to obtain (7) day compressive strength in (3) days.

6.06 Temporary Paving (When Trenching in PCC Streets)

In PCC streets, all trenches shall be backfilled and have temporary pavement installed or covered with steel traffic plates at the end of each working day. All steel plates shall be set flush with adjacent pavement.

Within four consecutive calendar days following installation of the conduit, or after compaction is approved by the Engineer, whichever comes first, steel traffic plates shall be removed and three inches of temporary pavement installed.

Cross streets are to be paved with temporary pavement on the same day that excavation and backfill are completed. Temporary pavement shall be maintained so that a smooth traversable surface is available at all times for vehicular traffic, free from ruts, depressions, and holes and loose gravel. Temporary paving shall be removed and disposed of by the Contractor before the permanent resurfacing is placed.

The Contractor shall construct temporary asphalt concrete with a slope of 1:1 at the edge of open excavation (remove and reconstruct section) if all the following occur:

1. Clearance between travel lane and open excavation is less than five (5) feet

2. Excavation depth is four (4) inches or deeper, and

3. If open excavation will last more than 24 hours.

6.07 Permanent Asphalt Concrete Trench Pavement Replacement

This work shall consist of constructing permanent asphalt concrete pavement replacement and shall be accomplished in accordance with the details shown on the Plans, these Special Provisions and the street work permit.

Asphalt concrete construction shall conform to Section 400, 200, 203, and 302 of the Standard Specifications and these Special Provisions.

Tack coat is required and shall be applied and conform to Section 302 of the Standard Specifications. The Contractor shall prevent the tack coat to be applied outside the pavement area. Course aggregate shall consist of material with at least 75% by weight be crushed particles in lieu of the requirements of Section 400-2.3.

The asphalt concrete trench pavement replacement for each street shall consist of an asphalt concrete base course and a 2" thick asphalt concrete surface course. The asphalt concrete trench pavement replacement shall be adjusted to match existing street section. Recommendations are as follows:

Arterial Streets:

Deep lift asphalt concrete pavement consisting of an asphalt concrete Base Course and 2" asphalt concrete Surface Course. Thickness of entire section and base course shall be as shown on plans. In the absence of a detail on the plans, a 12" thick deep lift asphalt concrete pavement consisting of 10" thick asphalt concrete Base Course and 2" asphalt concrete Surface Course shall be constructed

Local Streets:

Deep lift asphalt concrete pavement consisting of an asphalt concrete Base Course and 2" asphalt concrete Surface Course. Thickness of entire section and base course shall be as shown on plans. In the absence of a detail on the plans, a 6" thick deep lift asphalt concrete pavement consisting of 4" thick asphalt concrete Base Course and 2" asphalt concrete Surface Course shall be constructed.

The required asphalt concrete mix designs shall be as follows:

Base Course	III-B3-AR-4000 or PG 64-10
Overlay/Surface Course	III-C3-AR-4000 or PG 64-10
Crack Filler	III-F-AR-4000 or PG 64-10

6.08 Permanent Portland Cement Concrete (PCC) Trench Pavement and Bus Pad Replacement

PCC pavement replacement shall be at least 6 inches thick and shall be 1 inch thicker than the existing pavement.

Existing concrete pavement adjacent to trench operations shall be sawcut and drilled with #4 dowel bars epoxy coated and or approved.

Construction and installation of dowels shall be per City of Santa Ana Standard Plan No. 1150, the construction plans, and these specifications.

Construction of the bus pad replacement shall be per City of Santa Ana Standard Plan No. 1108, the construction plans, and these specifications.

PCC pavement replacement and bus pad replacement shall conform to Sections, 400, 200, 201, and 302 of the Standard Specifications and these Special Provisions.

PCC used for street pavement and bus pad construction shall be minimum class 560-A-3250. In addition to these minimum requirements, the concrete shall possess the following characteristics:

- Flexural strength at 28 days: 550 p.s.i. min.
- Flexural strength at 7 days: 430 p.s.i. min.
- Compressive strength at 7 days: 2500 p.s.i. min.

All cement to be used or furnished on this Project shall be Type II low alkaline Portland cement conforming to ASTM C150.

Prior to the start of construction, the Contractor shall furnish to the Engineer laboratory test data for the particular mix design he will use. The data will include the following:

A. A detailed concrete mix design including the type and amount of cement used; complete gradation and source of the aggregate used; the amount of water used; and any proposed admixtures.

B. Flexural strength test data for the same batch of concrete used in A above showing the compressive strength of the concrete at 3, 7, and 28 days.

Section 302-6.4.2 entitled "Tamping" of the Standard Specifications shall be modified by adding the following:

> The outer edge of the gutter shall <u>not</u> be used as a side form for the mechanical tamper except where existing gutter is to remain as shown on the construction plans.
>
> Concrete pavement for bus pads shall be installed monolithic with the curb and gutter and shall be accomplished in accordance with City of Santa Ana Standard Plan No. 1108.

Section 302-6.4.4 entitled "Final Finishing" of the Standard Specifications shall be modified as follows:

> Delete all reference to wetted burlap. Final finish of the surface shall be textured by stiff broom process that will produce scoring perpendicular to the centerline of the street, performed at a time and in a manner to produce a hardened surface have a coefficient of friction of not less than 0.38 as determined by California Test 342. Curing to be applied immediately following broom process.

Joints in the concrete pavement shall be constructed as described in Section 302-6.5 of the Standard Specifications except as modified herein.

Sawing of the joints shall begin as soon as the concrete has hardened sufficiently to permit sawing without excessive raveling, usually 4 to 24 hours per Engineer's directions. If necessary, the sawing operations shall be carried on both day and night, regardless of weather conditions.

All joints shall be sawed before uncontrolled shrinkage cracking occurs. A standby saw shall be available in the event of breakdown. All weakened plane joints shall be saw cut to a depth equal to one fourth of the pavement thickness. Longitudinal joint spacing shall be at 10' minimum and 15' maximum on either side of centerline joint. Transverse joint spacing shall be at 10' minimum and 15' maximum for pavement, curb and gutter.

Longitudinal joints shall be aligned such that they will cross manholes and water valves at centerline if possible. Transverse construction joints within 1' shall cross all manholes and water valves. Provide a weakened plane joint around the perimeter of all utility vaults.

The Cleanness Value requirement of Section 200-1.4 shall be replaced with the following:

Tests	Test Method	Requirements
Cleanness Value	California 227	
Individual Test		70 min
Moving Average		75 min

The Sand Equivalent requirement of Section 200-1.5.3 shall be replaced with the following:

Tests	Test Method	Requirements
Sand Equivalent	California 227	
Individual Test		70 min
Moving Average		75 min

Evaluation of Sand Equivalent and Cleanness Value results shall conform to the provisions of Standard Specifications Subsection 400-1.4.

Concrete shall be high early strength concrete, treated in accordance with section 201-1 to obtain (7) day compressive strength in (3) days.

Traverse joints shall match those of the adjacent pavement. The concrete pavement shall be immediately barricaded upon its installation and no vehicular traffic will be permitted until and after 3-days of placement and with the approval of the Engineer.

6.09 Vitrified Clay Pipe (VCP) Sewer Main

Where indicated on the plans, sanitary sewer pipe shall be extra strength vitrified clay pipe (VCP) with compression joints conforming to Subsection 207-8 of the Standard Specifications.

Underground conduit construction shall conform to all applicable Subsections of Section 306 of the Standard Specifications, the Standard Plans and these Special Provisions.

Potholing shall be considered as part of the excavation necessary for the work. The Engineer shall be given the opportunity to inspect the existing improvement when it is exposed.

Any adjustments in line or grade which will be necessary to accomplish the intent of the plans shall be made. In the event obstructions are encountered during the progress of the work which will require alterations to the plans, the Engineer shall have the authority to change the plans and order the necessary deviation from the line or grade. Contractor shall not make any deviation from the specified line or grade without approval by the Engineer.

Pipe sections shall not be deflected at any joint, either vertically or horizontally, beyond the limits specified by the manufacturer.

The pipe and fittings shall be lowered into the trench. Do not throw the pipe or fittings into the trench.

If it is determined that bypassing of sewer flow will be required, the bypass pumping system shall have sufficient capacity to pump the peak flow. Sewer bypassing shall conform to Section 6-21 of these Special Provisions. The Contractor shall provide bypass piping for the effluent during the construction of the sewer main between manholes. The inlet of the downstream manhole and the outlet of the upstream manhole shall be plugged. A portable pump shall be installed in the upstream manhole to discharge the effluent from the upstream manhole to the downstream manhole through the bypass piping. Pump and bypass piping shall be of adequate size and capacity to handle the flow without sewage backup occurring to facilities connected to the sewer.

For sewers 12-inches in diameter and larger, or where deemed necessary by the City, the following shall apply:

All pumps used shall be fully automatic self-priming units. All pumps used must be constructed to allow dry running for long periods of time to accommodate the cyclical nature of effluent flows. The Contractor shall provide the necessary stop/start controls for each pump. The Contractor shall have adequate standby equipment available and ready for immediate operation and use in the event of an emergency or breakdown. One standby pump for each size pump utilized shall be installed at the mainline flow bypassing locations, ready for use in the event of primary pump failure. The Contractor shall continually monitor all pumping equipment. The Contractor shall perform leakage and pressure tests of the bypass pumping discharge piping suing clean water prior to the actual operation. The Water Resources Division shall be given 24 hours notice prior to testing.

The Contractor shall be required to flow monitor for a two week period to assist in sizing the pumps necessary for the sewer work and shall be considered included as part of the work. The Contractor shall prepare, with the vendor, a flow monitoring map for key manholes that will provide adequate data for the work subject to review and approval from the Water Resources Division. Flow monitoring shall capture accurate instantaneous depth, velocity and flow data in 15-minute increments or less, or as otherwise approved by the Water Resources Division. The Contractor shall prepare with the vendor a specific, detailed description of the proposed pumping system and submit it and the vendor's references to the City. The Contractor shall submit to the City detailed descriptions outlining all provisions and precautions to be taken by the Contractor regarding handling of existing sewage flows. The submittal must be specific and complete, including such items as schedules, capacities of equipment, materials, and all other incidental protection of the access and bypass pumping locations from damage due to the discharge flows.

The submittal shall include but not be limited to the following:

1. Sewer plugging method and types of plug.
2. Number, size, material, location and method of installation of suction piping.
3. Number, size, material, location and method of installation of discharge piping.
4. Bypass pump sizes, capacity, number of each size to be on-site and power requirements.
5. Calculations of static lift, friction losses, and flow velocity (pump curves showing pump operating range shall be submitted).
6. Standby power generator size.
7. Method of protecting discharge manholes or structures from erosion and damage.
8. Thrust block sizes and restraining lengths of pipes and locations (if necessary).
9. Method of noise control for each pump and/or generator.
10. Any temporary pipe supports and anchoring requirements.
11. Design plans and computations for access to bypass pumping locations indicated on the drawings.
12. Calculations for selection of bypass pumping pipe size.
13. Schedule for installation of and maintenance of bypass pumping piping.
14. Submit a sewer overflow emergency response plan. The plan will dictate backup pumping plans, spill containment procedures, spill recovery procedures and emergency call out phone numbers.

Provision shall be made by the Contractor for the collection of sewage from cutoff lateral sewers. Lateral sewers shall be reconnected to the main before the termination of every working day.

The text of Subsection 306-1.6 of the Standard Specifications is hereby deleted and replaced with the following:

> Pipe shall be measured along the longitudinal axis between the ends as laid and shall include the actual pipe in place.

6.10 Polyvinyl Chloride (PVC) Sewer Pipe

Installation and construction of PVC sewer main shall conform to all applicable provisions of the ASTM D2321-05 (or later) "Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity Flow Applications," Standard Specifications and these Special Provisions and the construction plans.

Where indicated on the plans, sanitary sewer pipe shall be Polyvinyl Chloride (PVC) sewer pipe with compression joints conforming to Subsection 207-8 of the Standard Specifications.

Underground conduit construction shall conform to all applicable Subsections of Section 306 of the Standard Specifications, the Standard Plans and these Special Provisions.

PVC sewer pipe shall be manufactured by JM Eagle or approved equivalent.

PVC gravity sewer pipe and fittings shall conform to ASTM D3034 for diameters from 4" - 15", and ASTM F679 for 18" - 24", with integral bell gasket joints. Rubber gaskets shall be factory installed and conform to ASTM F477.

Pipe shall be made of PVC plastic having a cell classification of 12454B or 12364B as defined in ASTM D1784 and shall have SDR of 26 and minimum pipe stiffness of 115 psi according to ASTM Test D2412.

Pipe shall be installed in compliance with ASTM D2321. Bedding material shall provide adequate and uniform support under the pipe.

Pipe shall not be stored in direct sunlight. Pipe stored outdoors shall be protected from the natural elements by covering it with opaque material such as canvas. The covering shall be placed in such a way as to allow adequate air circulation between the cover and the pipe.

Discolored pipe will not be allowed.

Individual pipe sections shall not be stacked in piles higher than five feet. The pipe shall not be stored next to heat sources or engine exhausts. All gaskets should be protected from heat, oil and grease.

Field cutting of PVC pipe shall be square cut and bevel the end with a beveling tool. Remove all burrs and raised edges prior to assembly.

Potholing shall be considered as part of the excavation necessary for the work. The Engineer shall be given the opportunity to inspect the existing improvement when it is exposed.

Any adjustments in line or grade which will be necessary to accomplish the intent of the plans shall be made. In the event obstructions are encountered during the progress of the work which will require alterations to the plans, the Engineer shall have the authority to change the plans and order the necessary deviation from the line or grade. Contractor shall not make any deviation from the specified line or grade without approval by the Engineer.

Pipe sections shall not be deflected at any joint, either vertically or horizontally, beyond the limits specified by the manufacturer.

The pipe and fittings shall be lowered into the trench. Do not throw the pipe or fittings into the trench.

If it is determined that bypassing of sewer flow will be required, the bypass pumping system shall have sufficient capacity to pump the peak flow. Sewer bypassing shall conform to Section 6-21 of these Special Provisions. The Contractor shall provide bypass piping for the effluent during the construction of the sewer main between manholes. The inlet of the downstream manhole and the outlet of the upstream manhole shall be plugged. A portable pump shall be installed in the upstream manhole to discharge the effluent from the upstream manhole to the downstream manhole through the bypass piping. Pump and bypass piping shall be of adequate size and capacity to handle the flow without sewage backup occurring to facilities connected to the sewer.

For sewers 12-inches in diameter and larger, or where deemed necessary by the City, the following shall apply:

All pumps used shall be fully automatic self-priming units. All pumps used must be constructed to allow dry running for long periods of time to accommodate the cyclical nature of effluent flows. The Contractor shall provide the necessary stop/start controls for each pump. The Contractor shall have adequate standby equipment available and ready for immediate operation and use in the event of an emergency or breakdown. One standby pump for each size pump utilized shall be installed at the mainline flow bypassing locations, ready for use in the event of primary pump failure. The Contractor shall continually monitor all pumping equipment.

The Contractor shall perform leakage and pressure tests of the bypass pumping discharge piping suing clean water prior to the actual operation. The Water Resources Division shall be given 24 hours notice prior to testing.

The Contractor shall be required to flow monitor for a two week period to assist in sizing the pumps necessary for the sewer work and shall be considered included as part of the work. The Contractor shall prepare, with the vendor, a flow monitoring map for key manholes that will provide adequate data for the work subject to review and approval from the Water Resources Division. Flow monitoring shall capture accurate instantaneous depth, velocity and flow data in 15-minute increments or less, or as otherwise approved by the Water Resources Division. The Contractor shall prepare with the vendor a specific, detailed description of the proposed pumping system and submit it and the vendor's references to the City. The Contractor shall submit to the City detailed descriptions outlining all provisions and precautions to be taken by the Contractor regarding handling of existing sewage flows. The submittal must be specific and complete, including such items as schedules, capacities of equipment, materials, and all other incidental protection of the access and bypass pumping locations from damage due to the discharge flows.

The submittal shall include but not be limited to the following:

1. Sewer plugging method and types of plug.
2. Number, size, material, location and method of installation of suction piping.
3. Number, size, material, location and method of installation of discharge piping.
4. Bypass pump sizes, capacity, number of each size to be on-site and power requirements.
5. Calculations of static lift, friction losses, and flow velocity (pump curves showing pump operating range shall be submitted).
6. Standby power generator size.
7. Method of protecting discharge manholes or structures from erosion and damage.
8. Thrust block sizes and restraining lengths of pipes and locations (if necessary).
9. Method of noise control for each pump and/or generator.
10. Any temporary pipe supports and anchoring requirements.
11. Design plans and computations for access to bypass pumping locations indicated on the drawings.
12. Calculations for selection of bypass pumping pipe size.
13. Schedule for installation of and maintenance of bypass pumping piping.
14. Submit a sewer overflow emergency response plan. The plan will dictate backup pumping plans, spill containment procedures, spill recovery procedures and emergency call out phone numbers.

Provision shall be made by the Contractor for the collection of sewage from cutoff lateral sewers. Lateral sewers shall be reconnected to the main before the termination of every working day.

The text of Subsection 306-1.6 of the Standard Specifications is hereby deleted and replaced with the following:

> Pipe shall be measured along the longitudinal axis between the ends as laid and shall include the actual pipe in place.

Following placement and compaction of backfill and prior to the placement of permanent pavement, all newly constructed PVC sewer mains shall be cleaned and tested for deflection and ovality by either using: a rigid mandrel for smaller diameter pipe; or laser profile technology and/or with an electronic deflect-o-meter for larger diameter piping.

The deflection and or ovality shall not exceed (5%) of the inside diameter of the pipe. If the pipe exceeds this tolerance, it is the responsibility of the contractor to replace and re-test the newly constructed pipe for deflection and ovality.

If the pipe is to be tested by mandrel, the rigid mandrel shall have a circular cross section having a diameter of at least 95 percent of the specified inside pipe diameter and shall be pulled through the pipe by hand. The minimum length of the circular portion of the mandrel shall be equal to the nominal diameter of the pipe. A ¼-inch diameter nylon line shall be pulled from manhole to manhole and shall be left for use in conducting the CCTV inspection. Obstructions encountered by the mandrel shall be repaired and the pipeline section shall be retested.

All labor and equipment necessary to conduct these tests shall be furnished by the contractor.

The contractor shall submit all laser profile documents to the Engineer for review and approval no later than (10) days after the test.

6.11 New Manhole Structures

Construction of new concrete manhole structures shall be done in accordance with City of Santa Ana Standard No. 1201, details as shown on the plans, the applicable provisions of Sections 201, 303, and 306 of the Standard Specifications and these Special Provisions. This work shall also include the removal and/or modification of any interfering portions of existing sewer pipes, drop inlets, PCC encasements, etc., necessary to construct each manhole structure complete in place.

Concrete for manhole structures shall be Class 560-C-3250. All reinforcing steel used in these structures shall be Grade 40 minimum. Fly ash additives and/or substitutes shall not be permitted.

The following is hereby added to Subsection 201-4.1, of the Standard Specification:

> Concrete curing compound shall be Type 2.

The following is hereby added to Subsection 303-1.1, of the Standard Specification:

> Once any excavation for the construction of a manhole structure is commenced, the Contractor must diligently pursue the completion of the structure, including structure backfill, compaction, and restoration of surface improvements and temporary paving. Open excavations shall be properly barricaded, backfilled or covered with steel traffic plates to the satisfaction of the Engineer at the end of each workday.

For new manholes on large sewer mains, or for manholes with extreme depths of cover, a larger diameter manhole will be required. The design of these larger manholes shall be reviewed with and approved by the Water Resources Division. The larger manhole cover shall be in accordance with Standard Plan No. 1211 and these Special Provisions.

For larger manhole frames and covers, the Water Resources Division may require frames and covers fabricated of fiber reinforced polymer (FRP). These larger FRP manhole frame and cover sets shall be manufactured by GMI Composites, Inc., no equal.

The FRP frame and cover system shall meet the following requirements: contain 45 percent to 70 percent fiber reinforcement; thermoset resin with UV inhibitors to prevent photo degredation; minimum strength to weight ratio of 750:1; integrated gasket to minimize traffic shock, abate noise and orders and prevent water entry into manhole; skid slip resistance greater than 0.6 as described in ASTM C1028 Standard; and dimensional tolerance of 1/16-inch.

The FRP frame and cover shall be designed to exceed AASHTO H-20 loading by a factor of 2.5 (125,000 pounds) and shall meet AASHTO EN124 D400 loading (89,924 pound which exceeds AASHTO Proof Load of 50,000 pounds for severe traffic service) proof load on a 250 mm round plate for 30 seconds. Documentation of certified testing results shall be submitted including complete Fatigue Loading Test with no loss of carrying performance and no visible damage (apply 16,000 pound point load for 2,000,000 cycles). The FRP frame and cover shall be provided with a five (5) year guarantee.

6.12 Remove Existing Manhole Structures

Removal of existing manholes shall be accomplished in accordance with the project plans, City of Santa Ana Standards and Design Criteria, the applicable provisions of Section 306 of the Standard Specifications, and these Special Provisions.

The following is added to the third paragraph of Subsection 306-5 of the Standard Specifications:

> The top six inches of backfilled subgrade shall be compacted to a relative compaction of 90%.

6.13 Abandon Existing Sewer Main

The Contactor shall abandon existing pipes per Section 306-5 of the Standard Specifications, as specified herein, and as shown on the construction plans.

The Contractor shall provide traffic control as required and approved by the agency having jurisdiction. Under no circumstances shall the abandonment take place before existing sewers and manholes are out of service and all flow directed to the new or alternate pipes.

The abandon pipes shall be filled with sand cement slurry 1-sack (941bs) of concrete. In lieu of slurry, the contractor may use low density cellular concrete, Elastizell (EF) or approved equal.

The Contractor shall demonstrate that the pipe to be abandoned has been completely filled, without voids, by providing volume calculations for each placement of grout and materials strength tests as required by the City.

The Contractor is responsible for the selection methods and material to be used. Pipe abandonment shall be coordinated with the construction sequence. Appropriate plugs shall be installed by the Contractor, and grout shall be injected in an upslope manner to remove trapped air. Samples of the outgoing water (at the exit end) shall be made until the existing grout mix is observed to be similar to the grout being injected at the inlet end. The grouting plan, and grout mix design shall be submitted to the Engineer for review and approval prior to commencement of work.

6.14 Abandon Existing Manhole Structures

The Contractor shall abandon existing manhole structures in conformance to the Standard Specifications Section 306-5, as specified herein, and as shown on the construction plans and per City of Santa Ana Standard Plan No. 1209.

The Contractor shall provide traffic control as required and approved by the agency having jurisdiction. Under no circumstances shall the abandonment take place before existing sewers and manholes are out of service and all flow directed to the new or alternate pipes.

The manhole wall shall be removed to 18-inches below finished surface and be completely removed and properly disposed of, unless otherwise shown.

The manhole base shall be perforated or cored through and filled with sand (SE 30 minimum).

Existing pipe ends within manholes to be abandoned shall be plugged with concrete and bricks per section 306-5. Concrete shall be Class C and bricks shall be a manhole brick as specified in Section 202-1 of the Standard Specifications.

The Contractor shall remove and replace all asphalt, concrete pavement, earthwork, landscaping, or other surface damaged by the abandonment operations per an in conformance with these provisions.

6.15 Construct 4" or 6" High Density Polyethylene (HDPE) Sewer Laterals and Cleanouts (Pipe Burst)

This work involves the installation of HDPE Pipe. Method of construction shall be via trenchless pipe replacement installations.

The Contractor shall connect to the new sewer main and to the existing sewer lateral pipe at the property line. The existing sewer lateral shall be depicted on the construction plans based on the best information available. **It is the Contractor's responsibility to "locate all points of connection for each new sewer lateral at both ends: the wye at the public sewer main and the private connection point at property line where lateral cleanout will be constructed."** The Contractor shall insert a push camera with sounder/locator up the lateral from the main (insertion pit) to mark and locate the point of connection at the property line. All locations points shall be marked in the field prior to installation and construction of new sewer lateral.

Underground conduit construction shall conform to all applicable Subsections of Section 306 and Section 500 of the Standard Specifications, the Standard Plans and these Special Provisions.

High density polyethylene pipe in accordance with these specifications shall be used in pipe bursting or trenchless pipe replacement installations.

All piping system components shall be the products of one manufacturer and shall conform to the latest edition of ASTM D1248, ASTM D3350, and ASTM F714.

The HDPE pipe shall be a minimum of SDR 17 or as specified on the plans.

The HDPE pipe shall provide a structurally sound, impermeable, jointless pipe. It shall be the Contractor's responsibility to comply with OSHA Standards and Regulations pertaining to all aspects of the work.

The HDPE pipe shall be chemically resistant to internal exposure to sewage containing small quantities of hydrogen sulfide, carbon dioxide, methane, mercaptans, kerosene, moisture and diluted sulfuric acid. It shall also be chemically and physically resistant to external exposure of soil, bacteria, roots and chemical attack due to material in the surrounding ground.

The polyethylene resin shall meet or exceed the requirements of ASTM D3350 for PE 3408 material with a cell classification of 345464C, or better.

The maximum allowable hoop stress shall be 800 psi at 73.4 degrees F.

The Hydrostatic Design Basis (HDB) shall be 1600 psi per ASTM D2837.

Material designation shall be PE 3408 following ASTM F412.

Pipe shall be assembled in accordance with ASTM D2657 or as otherwise approved by the Engineer.

Sanitary sewer pipe shall be green in color or contain green striping. Sanitary sewer pipe interior shall have a reflective coating for CCTV inspection.

Contractor shall video laterals prior to pipe bursting in order to identify any features that would disrupt the pipe bursting procedure.

Construction of sewer lateral and cleanout shall be done in accordance with City of Santa Ana Standard Plan No. 1204A.

Insertion rate of HDPE pipe shall not exceed pipe tolerances any given time. Contractor shall maintain logs verifying pipe tolerances do not exceed pipe limitations. Any HDPE pipe stretched beyond its elastic limit or damaged in any way will be rejected.

Any defect which will affect the integrity or strength of the pipe discovered during the warranty period shall be repaired at the Contractor's expense.

The text of Subsection 306-1.6 of the Standard Specifications is hereby deleted and replaced with the following:

> Pipe shall be measured along the longitudinal axis between the ends as laid and shall include the actual pipe in place.

Joining of HDPE pipe shall be performed by thermal butt-fusion in accordance with the manufacturer's recommendations. Internal weld beads formed by the thermal butt-fusion method shall be removed on the bottom 120 degrees of the pipe, minimum. The bead shall be removed to the pipe's surface, but under no circumstances shall it be below it. The joint must sufficiently cool to ambient temperature before the bead is removed.

Butt-fused joint strength shall be equal to or greater than the strength of the pipe.

Threaded or solvent-cement joints and connections shall NOT be permitted.

A "Y" Branch fitting shall be installed on the sewer main at each lateral connection per City of Santa Ana Standard Plan No. 1204A. In the case where the lateral is to be connected to a sewer main that has been lined, a "Y" Saddle fitting shall be installed. The connection shall conform to the size and shape of the inside diameter of the new connection. Service connection openings shall be free from rough edges or protrusions. **CORING OF NEW SEWER MAIN TO ACCOMMODATE LATERAL CONNECTION SHALL NOT BE ALLOWED.**

At all locations where more than one (1) lateral serves a single parcel, Contractor shall expose existing lateral connection to the existing sewer main and verify that the lateral is active by CCTV inspection. In addition, the Contractor shall insert a push camera with sounder/locator up the lateral from the main (insertion pit) to mark and locate the point of connection at the property line. If CCTV investigation is inconclusive, lateral shall be treated as active and shall be constructed per plan. If lateral is determined to be dead, lateral shall be plugged and abandoned in place.

The Contractor shall connect to the new sewer main and to the existing sewer lateral pipe at property line.

During construction, the Contractor shall make provisions for the collection of sewage from cutoff laterals. All sewer laterals shall be reconnected to the main before the termination of each working day.

The Contractor shall submit all material information for sewer lateral cleanout connections and appurtenances prior to commencing work. The Engineer shall review and upon approval notify the Contractor by a memorandum. Non-approved materials shall not be used.

New submittals shall be required for material substitutions. The Engineer shall review and upon approval notify the Contractor by a memorandum.

All fittings shall be pressure rated and classified the same as adjoining pipe. The inside diameter shall match inside diameter of adjoining pipe and shall be designed for pipe bursting or pipe jacking applications.

Metal in saddles, clamps and appurtenances shall be 302 or 304 stainless steel following ASTM A240.

Elastomeric materials, gaskets, clamps and connectors shall be oil resistant and manufactured following ASTM F477.

The Contractor shall submit certification by the manufacturer of the pipe bursting system to have successfully completed training in operating the bursting head, installing proposed replacement pipe and operation and maintenance of all equipment to be used.
The Contractor shall submit certification by the manufacturer of the fusing equipment having successfully completed training in handling replacement of pipe materials, butt-fusion of pipe joints and saddle fusion of fittings for service laterals, and operation and maintenance of all equipment to be used. The Certificate of Training includes at a minimum: Installer's name, date of issuance and process or product the person/s is/are certified to install. These certifications of training and operation of pipe bursting system shall be submitted prior to commencing pipe bursting work.

The curb and gutter shall be protected in place. If the Contractor damages curb, gutter, it shall be removed and replaced to match existing in accordance with City of Santa Ana Standard Plan No. 1101. This work shall also include removal and replacement of PCC sidewalk, driveway panels and landscaping to facilitate construction of sewer laterals. PCC sidewalk and driveway approach panels shall be replaced to match existing in accordance with City of Santa Ana Standard Plan Nos. 1104 and 1112. Sidewalk replacement shall be from score line to score line, unless the sidewalk panels exceed four feet in length. At no time, shall a sidewalk panel floater be less than four feet from the nearest score line. Landscaping shall be replaced in-kind.

6.16 Construct 4" or 6" Polyvinyl Chloride (PVC) Sewer Laterals and Cleanouts (Open Trench)

PVC sewer pipe shall be as manufactured by JM EAGLE or approved equivalent.

PVC gravity sewer pipe and fittings shall conform to ASTM D3034 for diameters from 4" - 15", and ASTM F679 for 18" - 24", with integral bell gasket joints. Rubber gaskets shall be factory installed and conform to ASTM F477.

Pipe shall be made of PVC plastic having a cell classification of 12454B or 12364B as defined in ASTM D1784 and shall have SDR of 26 and minimum pipe stiffness of 115 psi according to ASTM Test D2412.

Pipe shall be installed in compliance with ASTM D2321. Bedding material shall provide adequate and uniform support under the pipe.

Underground conduit construction shall conform to all applicable Subsections of Section 306 of the Standard Specifications, the Standard Plans and these Special Provisions.

There shall be no pipe joints from the sewer lateral cleanout connection to 20 feet into street right away. No pipe joints shall be allowed in the parkway.

Pipe joints shall not be deflected at any joint, either vertically or horizontally, beyond the limits specified by the manufacturer.

Construction of sewer lateral and cleanout shall be done in accordance with City of Santa Ana Standard Plan No. 1204, the contract plans and these Special Provisions.

A "Y" Branch fitting shall be installed on the sewer main at each lateral connection per City of Santa Ana Standard Plan No. 1204. In the case where the lateral is to be connected to a sewer main that has been lined, a "Y" Saddle fitting shall be installed. The connection shall conform to the size and shape of the inside diameter of the new connection. Service connection openings shall be free from rough edges or protrusions. **CORING OF NEW SEWER MAIN TO ACCOMMODATE LATERAL CONNECTION SHALL NOT BE ALLOWED.**

At all locations where more than one (1) lateral serves a single parcel, Contractor shall expose existing lateral connection to the existing sewer main and verify that the lateral is active by CCTV inspection. In addition, the Contractor shall insert a push camera with sounder/locator up the lateral from the main (insertion pit) to mark and locate the point of connection at the property line.

If CCTV investigation is inconclusive, lateral shall be treated as active and shall be constructed per plan. If lateral is determined to be dead, lateral shall be plugged and abandoned in place.

The Contractor shall connect to the new sewer main and to the existing sewer lateral pipe at the property line. The existing sewer lateral shall be depicted on the construction plans based on the best information available. **It is the Contractor's responsibility to "locate all points of connection for each new sewer lateral at both ends: the wye at the public sewer main and the private connection point at property line where lateral cleanout will be constructed."** The Contractor shall insert a push camera with sounder/locator up the lateral from the main (insertion pit) to mark and locate the point of connection at the property line. All locations points shall be marked in the field prior to installation and construction of new sewer lateral.

The Contractor shall perform pipeline testing as directed by the Engineer in accordance with the applicable provisions of Subsection 306-1.4 of the Standard Specifications.

The Contractor shall submit all material information for sewer lateral cleanout connections and appurtenances prior to commencing work. The Engineer shall review and upon approval notify the Contractor by a memorandum. Non-approved materials shall not be used.

New submittals shall be required for material substitutions. The Engineer shall review and upon approval notify the Contractor by a memorandum.

During construction, the Contractor shall make provisions for the collection of sewage from cutoff laterals. All sewer laterals shall be reconnected to the main before the termination of each working day.

The curb and gutter shall be protected in place. If the Contractor damages curb, gutter, it shall be removed and replaced to match existing in accordance with City of Santa Ana Standard Plan No. 1101. This work shall also include removal and replacement of PCC sidewalk, driveway panels and landscaping to facilitate construction of sewer laterals. PCC sidewalk and driveway approach panels shall be replaced to match existing in accordance with the City of Santa Ana Standard Plan No. 1104 and 1112. Sidewalk replacement shall be from score line to score line, unless the sidewalk panels exceed four feet in length. At no time, shall a sidewalk panel floater be less than four feet from the nearest score line. Landscaping shall be replaced in-kind.

6.17 Connect Sewer Laterals

This work shall include reconnecting existing sewer lateral to the new sewer main. This work shall include locating all existing laterals and pipe connection points, furnishing and installing new pipe and connections to the new main in accordance with City of Santa Ana Standard Plan Nos. 1204 and 1204A, replacement of street surface over trench as shown on drawings.

At all locations where more than one (1) lateral serves a single parcel, Contractor shall expose existing lateral connection to the existing sewer main and verify that the lateral is active by CCTV inspection. In addition, the Contractor shall insert a push camera with sounder/locator up the lateral from the main (insertion pit) to mark and locate the point of connection at the property line. If CCTV investigation is inconclusive, lateral shall be treated as active and shall be constructed per plan. If lateral is determined to be dead, lateral shall be plugged and abandoned in place.

During construction, the Contractor shall make provisions for the collection of sewage from cutoff laterals. All sewer laterals shall be reconnected to the main before the termination of each working day.

6.18 Closed Circuit Television (CCTV) Inspection of Sewer Main and Laterals

Following installation of pipe, CCTV inspection shall be performed on all newly constructed sewer mains and sewer laterals. This work shall also include cleaning of sewer main prior to videoing in accordance with section 500-1.1.4 of the Standard Specifications.

The scope of work includes the cleaning and videoing by means of remote CCTV. If a blockage in the pipe hampers the CCTV work, then the Contractor shall attempt to complete the CCTV work by televising from the opposite manhole (upstream or downstream) of the location. The operator immediately shall notify the Contractor. Then, the Contractor shall notify the Engineer.

CCTV inspections shall be delivered in an electronic format (DVD/USB drive) to the Engineer for review and approval.

A. All Pipe Assessment & Certification Program (PACP) header information shall be completed in accordance with the PACP Guidelines.

B. The documentation for the work shall consist of **CCTV reports, database, logs, electronic reports, etc. noting important features during the inspection**. The above documentation must be submitted to the City. The speed of travel during the inspection shall not exceed at any time more than 30 feet per minute, except noted otherwise.

C. The camera must be centered to provide accurate distance measurements and locations of features in the sewer main. All observations shall be displayed and documented on video and identified by audio on PACP log. All video must be continuously metered from the manhole.

D. All lengths of installed sewer main and sewer laterals shall be documented by footage or stationing in the video. Sewer laterals shall be videoed up to the property line. The pipe shall be clean to ensure all defects and observations are logged and documented.

E. During inspection, the operating technician shall, in addition to his/her video (with audio) record of conditions, log in writing the location of all laterals, defects, misalignments, and other conditions and data pertinent to the physical condition and operation of the sewer main and sewer laterals.

Cleaning of the sewer main and laterals shall include removal of debris or foreign objects introduced during construction. Such debris shall be vacuumed from the system and shall not be washed or otherwise deposited downstream. Cleaning apparatus shall be removed prior to insertion of the video camera. Under no circumstances shall cleaning apparatus be used in direct conjunction with video operations.

Under no circumstances will plugging and/or bypassing be permitted without prior approval and presence of the Engineer. If plugging and/or bypassing are deemed necessary, the Contractor shall be responsible for plugging manhole outlets and/or providing a bypass line for the effluent during videotaping. The sewer mains will be "in service" at the time of the video inspection.

If the video is of poor quality and not suitable for review, the Contractor shall re-video the line and resubmit to the City.

The video technician shall hold a current National Association of Sewer Service Companies (NASSCO) certification. Provide operator certification to the engineer for review and approval.

All CCTV work shall conform to the current NASSCO-PACP Standards for sewer main, and sewer lateral and these Special Provisions.

6.19 Sewer Flow Level Monitoring & Alarming Device

Contractor shall supply and install a Smart Cover® sewer flow level monitoring and alarming device as manufactured by Hadronex (760-291-1980). The flow level monitoring and alarming system shall be compatible with the existing sewer flow level and monitoring system utilized by the City's Water Resources Division. Included in this item will be the first year maintenance fee assessed by the alarming company for all sewer flow level monitoring & alarming devices installed.

6.20 Repair Couplings

For sewer repairs, the Contractor shall use a double banded shielded sewer coupling. The coupling shall have excellent resistance to heavy earth loads, shear forces and deflection. The coupling shall be able to connect similar and dissimilar pipe materials and sizes. Clamps shall be stainless steel and have stainless steel grade 316 nuts and bolts. The gasket material shall be molded, one-piece elastomeric. The shield shall be heavy-duty, stainless steel. Increasing the band tension shall secure the pipe ends, forming a watertight, root-proof seal, impervious to infiltration and exfiltration. Sealing "O" rings under each clamp prevent the pipe end from slippage, for a reinforced joint seal.

The shielded sewer coupling shall be Flex-Seal®ARC shielded adjustable repair coupling manufactured by Mission Rubber Company or approved equal.

6.21 Sewer Flow Bypassing

The Contractor is responsible for the temporary handling of sewage, spill prevention and control, and odor control throughout any sewer flow bypass operation. Temporary handling of sewage includes bypass pumping, diversion, bypass piping, plugs, flow-through plugs and other means of handling of sewage flows. Contractor shall provide all materials, labor, supervision, and equipment for temporary handling of flow, including preparation and implementation of a spill prevention, control and countermeasure plan (SPCCP) to facilitate the work. The Contractor shall comply with the Regional Water Quality Control Board, Health Department, and Air Quality Management District permits and regulations.

Contractor shall prepare a detailed bypass pumping plan for any temporary handling of sewage.

Contractor shall be responsible for all aspects of the mobilization, set up, operation, management, monitoring, maintenance operation, pressure testing, spill containment, and spill management including clean up. When bypass pumping flows, the Contractor shall have at least one designated person on site 24 hours per day to operate, monitor and maintain the bypass pumping system and implement the spill prevention and control procedures.

For manhole bypassing, the Contractor shall install and operate a flow bypass system that shall limit the flow to zero (0) flow withing the channel by using a bypass flow through tube for both rechanneling of the manhole base and when connecting to the existing sewer manhole.

The Contractor shall develop a Spill Prevention, Control and Countermeasure Plan (SPCCP) which shall include the following items:

- Identify all equipment, materials and labor necessary to prevent sewage spill in the event there is a sewage leak during bypassing of sewers.
- A description of the Contractor's plan to respond to a sewage spill should it occur.
- The plan shall include a step by step procedure on how the equipment, materials and labor will be mobilized and implemented in the event of a spill.
- Describe handling of sewage flow during a bypass system failure.
- A plan identifying existing storm drains and materials used to block the openings in the event of a spill.
- As a minimum, include the following emergency overflow response equipment: a minimum of 10-feet of pipe of each size and type used on the bypass system together with matching repair couplings; rubber matting to overlap storm drain inlets by a minimum of 24-inches on all sides; for inlets in traffic, the grating removed and wrapped with rubber sheeting and reinstalled; a minimum of one 48-inch wide by 36 foot long roll of rubber matting and the equivalent of eight cubic yards of sandbags in a pre-loaded truck ready for use in addition to the materials required to cover storm drain inlets; and temporary sewer and storm drain plugs to manage collection and disposal of any sewage overflows.

The Contractor shall prepare an Odor Control Plan identifying and locating any potential construction activities that might produce odors. The plan shall describe the means of mitigating the odors and identifying all materials, equipment and systems the Contractor is planning to use. Potential nuisance odor areas shall include open manholes, and open sewers where gases may be present or can be released. During bypass pumping, manholes upstream of the pump shall also be considered as potential odor sources due to the blocking off of the airflow in the headspace of sewer.

The Contractor shall submit the following as part of the Sewer Bypass Plan:

- Plans showing the details of each installation site. For bypass pumping, the plans shall include the arrangement of the temporary pumping equipment, location of suction and discharge points, routing of bypass piping, method of protection of equipment and piping from traffic, and whether the piping is buried, exposed or pipe ramps.
- For gravity bypasses, the plans shall include locations of temporary flow-through plugs, sewer plugs and bypass discharge piping.
- A description of how the bypass system will be controlled and operated. Describe the method of control, the procedure and time requirements for switching to the standby equipment and alarm notification.
- Capacities of pumps, prime movers and standby equipment. Design calculations proving adequacy of the bypass system and selected equipment.

- Standby power source for bypass pumping.
- Staffing plan for maintaining equipment for 24-hour continuous, reliable operation on weekdays and/or weekend days.
- Noise and Odor Control Plan.
- Plan showing the existing sewer line and the proposed points of flow interruption and/or flow diversion.
- Construction time schedule showing anticipated times of flow interruption and/or flow diversion.
- Spill Contingency Plan detailing precautions to be implemented to prevent sewage spills including specific responses and control measures to follow during an overflow resulting from breakage or blockage and maintenance and inspection schedules to detect potential problems to mitigate the potential release resulting from overflows, bypass pipe ruptures, and blockages.

The Contractor shall provide temporary pumps, conduits, and other equipment to bypass the sewer flow. Engine-driven pumps shall be equipped with mufflers and/or shall be enclosed to keep the noise level within the City's Noise Ordinance. Pumps and bypass lines shall be of adequate capacity and size to handle the flows.

Bypass duty and standby pumps shall be designed for raw sewage applications, resistant to ragging, and capable of passing a 3-inch solid sphere. Pumps shall be self-priming with suction lift sufficient to avoid sewer surcharge. The self-priming system shall allow the pump to start dry and run dry without causing damage. Pumps may be equipped with a vacuum assisted self-priming device. Any orifice designed to discharge air during pump priming shall be connected to a portable activated carbon scrubber. All engines shall be critically silenced for sound control and regardless of noise level, soundproofing shield not less than eight feet high shall be provided around each engine to absorb noise. 100% standby pumping shall be provided. Standby pump shall be sized to match the duty pump. Standby pumping equipment shall be at the site continuously during bypassing to provide standby pumping capacity.

Above ground bypass piping shall be high density polyethylene (HDPE) pipe, steel or aluminum pipe with grooved couplings. HDPE shall be butt welded and have a minimum wall thickness of SDR 17. For protection against damage, the bypass piping shall be protected in place by barrier or crash cushions when adjacent to traffic. All temporary connections to existing and new manholes shall be properly covered and sealed to prevent nuisance odors from escaping into the atmosphere. When the bypass piping discharges into a manhole, the discharge pipe shall extend into the manhole, ending at the elevation of the center of the trunk sewer. All valves used on the bypass system shall be open port gate, plug or ball valves.

Temporary plugs shall be appropriate for the application. Plugs shall be heavy-duty inflatable type with a steel rod through plug centerline, a retaining plate and an eye-lift on both ends. Plugs shall have a flexible sealing design to compensate for any irregular interior surface of the pipe.

Flow-through plugs shall be appropriate for the application and provided with the required configuration to perform the bypass. The flow-through plug shall consist of a flow-through plug and a flexible hose. The flexible hose shall be rubber coated, heavy duty, nylon hose with and enclosed steel helix coil. The flow-through plug shall attach to the flexible hose using high torque, stainless steel pipe clamps. The flow-through plugs shall be equipped with continuous pressure monitoring.

The Contractor shall take all necessary precautions, including constant monitoring of bypass pumping to prevent sewage spills due to back-up and/or overflow resulting from breakage or blockage of the bypass system. The Contractor shall provide experienced personnel knowledgeable in the operation of the bypass equipment to monitor each bypass when the bypass is installed and operating. At no time shall the bypass system be left unattended during operation by the designated personnel.

The bypass system (all equipment) shall be fully tested prior to commencing bypass operation, including back-up pumps.

6.22 Submittals

Sewer main pipe and appurtenance submittals shall include, but not limited to the following manufacturer information:

1. SDR-26 PVC pipe, VCP pipe, and or other as approved by the Engineer
2. Fittings and Bends
3. Sewer Main Encasement Materials
4. Adapters/Repair Couplings/Gaskets
5. Sewer Bypass Plan and Overflow Plan
6. Sample of proposed backfill material (approximate one gallon bag)

Sewer manhole structures shall be in conformance with all City of Santa Ana Standard Plans, the Standard Specifications, and these Special Provisions and not limited to the following manufacturer information:

1. Sewer Manhole Structure- Material composition, frame and cover
2. Terminal Cleanout Structure- Material composition, frame and cover
3. Sewer Flow Monitoring and Alarming Device

Sewer laterals shall be in conformance with all City of Santa Ana Standard Plans, the Standard Specifications, and these Special Provisions and not limited to the following manufacturer information:

1. SDR-26 PVC pipe, VCP pipe, HDPE pipe, and or other as approved by the Engineer
2. Cleanout Structure- Material composition, frame and cover
3. Fittings
4. Adapters/Repair Couplings/Gaskets

Special Provisions - Water Main Improvements

7.01 General

All equipment and materials used installed in the water system shall meet all state and federal standards. All products in contact with drinking water shall be tested and certified to meet NSF/ANSI standard 60 (Drinking Water Treatment Chemicals-Health Effects) and NSF/ANSI 61 (Drinking Water System Components-Health Effects)

All materials coming in contact with potable water shall be lead free per California Health & Safety Code Section 116875.

7.02 Open Trench Operations, Excavation, Bedding, and Backfill

Open trench operations, excavation, bedding and backfill shall conform to the applicable provisions of Section 306 of the Standard Specifications and these Special Provisions.

Contractor shall excavate open trench 100 feet ahead of pipe laying operations to allow for any adjustments in grade necessary to resolve unforeseen utility conflicts.

All trenches shall be base paved with hot mix or covered with steel traffic plates recessed and flushed with existing pavement at the end of each working day. No temporary pavement will be allowed.

Trenching operations shall not be allowed on more than one street at any time. Work shall not be allowed in more than one intersection at any one time.

The third paragraph of Subsection 306-1.1.1 of the Standard Specifications is hereby deleted and replaced as follows:

> Excavation shall include the removal of all excess excavated materials and all water and materials of any nature, which interfere with the construction work.

All pavement removals shall be sawcut unless, approved otherwise by the Engineer prior to commencement of work.

All removed pavement and excess excavated material shall be immediately disposed of off the project site at a legal dumpsite at the Contractor's expense.

Pipe bedding and trench backfill shall be accomplished in accordance with the City of Santa Ana Standard Plan No. 1150, these Special Provisions, and the trench details on the construction drawings. The pipe zone and bedding material for water mains shall be imported SE-30 sand. The trench zone backfill shall be Class II aggregate base.

All material tickets (i.e. Sand, Class II Base, Asphalt, Concrete, etc.) shall be given to the City Inspector on a daily basis.

Sand for bedding shall be manufactured or naturally produced by the disintegration of rock and shall be sufficiently free of organic material, mica, loam, clay and other deleterious substances and shall have a minimum sand equivalent of 30. A sample shall be submitted for Engineer’s approval prior to commencement of work.

The following test methods shall be used for determining relative compaction:

California Test 216	(Sand Cone Method)
California Test 231	(Nuclear Gauge Method)

The Contractor will be provided with compaction test at locations deemed necessary by the Engineer. If compaction fails to meet the Contract Specifications, then the Contractor shall make the necessary adjustments until compaction per the specifications is met.

All trench and structure backfill sand shall be compacted to 90% of maximum density at optimum moisture.

If any trench, through the neglect of the Contractor, is excavated below the grade required by the plans and these Special Provisions, it shall be refilled to grade with additional bedding.

7.03 Existing Utilities and Adjustments in Grade

All existing utilities shall be protected in place, unless otherwise noted on the plans. The Contractor shall be responsible for any damage to existing utilities as a result of his operations.

The location of existing utilities as shown on the plans was obtained from a search of available records. It shall be the Contractor's responsibility to notify the respective utility owners and Underground Service Alert (811) to determine the exact field location of all utilities shown or not shown on the plans, which may conflict with his operations. Potholing of existing utilities, points of connection and service connections to determine exact depth and field locations shall be the responsibility of the Contractor.

The Contractor shall determine the location and depth of all utilities including points of connection and service connections, which may affect or be affected by its operation, three (3) weeks in advance. In the event of any conflicts the Engineer shall be immediately notified.

City owned utility frames and covers for survey monuments, water meter, water valves, traffic signal and street light pull boxes, and manholes within the area to be paved or graded, shall be set to finish grade by Contractor after construction of new pavement. In Portland cement concrete pavement and sidewalk areas, City utility frames and covers shall be adjusted to grade prior to placement of concrete. Contractor shall supply new sewer manhole frame and covers, sewer cleanout frame and covers, concrete rings and water valve pot frame, canister and lids per City of Santa Ana Standard Plans.

Prior to paving, an "I.D. Locator" shall be attached to each valve box or manhole cover. An "ID Locator" is a rubberized marker approximately 4" high that adheres to the utility cover and pops-up after paving for easy identification and location of the respective valve box or manhole. Contractor shall measure and tie-out locations of manholes and water valves prior to paving.

7.04 Landscaping and Irrigation Repair

This section shall conform to Sections 212 and 308 of the Standard Specifications and these Special Provisions.

All lawn and landscaped areas disturbed by the Contractor as part of or as a result of the work shall be prepared/brought to adjacent grade and restored to match existing landscaping.

If there are any existing sprinkler heads and irrigation lines in the construction areas, whether on public or private property, they shall be replaced or relocated by the Contractor.

7.05 Portland Cement Concrete (PCC) Cross Gutter

This work shall consist of replacing PCC cross-gutter from the spandrel to street centerline (cold joint to cold joint) to facilitate water main construction. All work shall be accomplished in accordance with City of Santa Ana Standard Plan No. 1109. The replacement areas are clearly indicated on the construction plans.

Concrete shall be high early strength concrete, treated in accordance with section 201-1 to obtain (7) day compressive strength in (3) days.

7.06 Temporary Paving (When Trenching in PCC Streets)

In PCC streets, all trenches shall be backfilled and have temporary pavement installed or covered with steel traffic plates at the end of each working day. All steel plates shall be set flush with adjacent pavement.

Within four consecutive calendar days following installation of the conduit, or after compaction is approved by the Engineer, whichever comes first, steel traffic plates shall be removed and three inches of temporary pavement installed.

Cross streets are to be paved with temporary pavement on the same day that excavation and backfill are completed. Temporary pavement shall be maintained so that a smooth traversable surface is available at all times for vehicular traffic, free from ruts, depressions, and holes and loose gravel. Temporary paving shall be removed and disposed of by the Contractor before the permanent resurfacing is placed.

The Contractor shall construct temporary asphalt concrete with a slope of 1:1 at the edge of open excavation (remove and reconstruct section) if all the following occur:

1. Clearance between travel lane and open excavation is less than five (5) feet

2. Excavation depth is four (4) inches or deeper, and

3. If open excavation will last more than 24 hours

7.07 Permanent Asphalt Concrete Trench Pavement Replacement

This work shall consist of constructing permanent asphalt concrete pavement replacement and shall be accomplished in accordance with the details shown on the Plans, these Special Provisions and the street work permit.

Asphalt concrete construction shall conform to Section 400, 200, 203, and 302 of the Standard Specifications and these Special Provisions.

Tack coat is required and shall be applied and conform to Section 302 of the Standard Specifications. The Contractor shall prevent the tack coat from being applied outside the pavement area.

Course aggregate shall consist of material with at least 75% by weight be crushed particles in lieu of the requirements of Section 400-2.3.

The asphalt concrete trench pavement replacement for each street shall consist of an asphalt concrete base course and a 2" thick asphalt concrete surface course. The asphalt concrete trench pavement replacement shall be adjusted to match existing street section. Recommendations are as follows:

Arterial Streets:

Deep lift asphalt concrete pavement consisting of an asphalt concrete Base Course and 2" asphalt concrete Surface Course. Thickness of entire section and base course shall be as shown on plans. In the absence of a detail on the plans, a 12" thick deep lift asphalt concrete pavement consisting of 10" thick asphalt concrete Base Course and 2" asphalt concrete Surface Course shall be constructed

Local Streets:

Deep lift asphalt concrete pavement consisting of an asphalt concrete Base Course and 2" asphalt concrete Surface Course. Thickness of entire section and base course shall be as shown on plans. In the absence of a detail on the plans, a 6" thick deep lift asphalt concrete pavement consisting of 4" thick asphalt concrete Base Course and 2" asphalt concrete Surface Course shall be constructed.

The required asphalt concrete mix designs shall be as follows:

Base Course	III-B3-AR-4000 or PG 64-10
Overlay/Surface Course	III-C3-AR-4000 or PG 64-10
Crack Filler	III-F-AR-4000 or PG 64-10

7.08 Permanent Portland Cement Concrete (PCC) Trench Pavement Replacement and Bus Pad Replacement

PCC pavement replacement shall be at least 6 inches thick and shall be 1 inch thicker than the existing pavement.

Existing concrete pavement adjacent to trench operations shall be sawcut and drilled with #4 dowel bars epoxy coated and or approved.

Construction and installation of dowels shall be per City of Santa Ana Standard Plan No. 1428A, the construction plans, and these specifications.

Portland cement concrete pavement replacement and bus pad replacement shall conform to Sections, 400, 200, 201, and 302 of the Standard Specifications and these Special Provisions.

PCC used for street pavement and bus pad construction shall be minimum class 560-A-3250. In addition to these minimum requirements, the concrete shall possess the following characteristics:

- Flexural strength at 28 days: 550 p.s.i. min.
- Flexural strength at 7 days: 430 p.s.i. min.
- Compressive strength at 7 days: 2500 p.s.i. min.

All cement to be used or furnished on this Project shall be Type II low alkaline Portland Cement conforming to ASTM C150.

Prior to the start of construction, the Contractor shall furnish to the Engineer laboratory test data for the particular mix design he will use. The data will include the following:

A. A detailed concrete mix design including the type and amount of cement used; complete gradation and source of the aggregate used; the amount of water used; and any proposed admixtures.

B. Flexural strength test data for the same batch of concrete used in A above showing the compressive strength of the concrete at 3, 7, and 28 days.

Section 302-6.4.2 entitled "Tamping" of the Standard Specifications shall be modified by adding the following:

> The outer edge of the gutter shall not be used as a side form for the mechanical tamper except where existing gutter is to remain as shown on the construction plans.
>
> Concrete pavement for bus pads shall be installed monolithic with the curb and gutter and shall be accomplished in accordance with City of Santa Ana Standard Plan No. 1108.

Section 302-6.4.4 entitled "Final Finishing" of the Standard Specifications shall be modified as follows:

> Delete all reference to wetted burlap. Final finish of the surface shall be textured by stiff broom process that will produce scoring perpendicular to the centerline of the street, performed at a time and in a manner to produce a hardened surface have a coefficient of friction of not less than 0.38 as determined by California Test 342. Curing to be applied immediately following broom process.

Joints in the concrete pavement shall be constructed as described in Section 302-6.5 of the Standard Specifications except as modified herein. Sawing of the joints shall begin as soon as the concrete has hardened sufficiently to permit sawing without excessive raveling, usually 4 to 24 hours per Engineer's directions. If necessary, the sawing operations shall be carried on both day and night, regardless of weather conditions.

All joints shall be sawed before uncontrolled shrinkage cracking occurs. A standby saw shall be available in the event of breakdown. All weakened plane joints shall be saw cut to a depth equal to one fourth of the pavement thickness. Longitudinal joint spacing shall be at 10' minimum and 15' maximum on either side of centerline joint. Transverse joint spacing shall be at 10' minimum and 15' maximum for pavement, curb and gutter.

Longitudinal joints shall be aligned such that they will cross manholes and water valves at centerline if possible.

Transverse construction joints within 1' shall cross all manholes and water valves. Provide a weakened plane joint around the perimeter of all utility vaults.

The Cleanness Value requirement of Section 200-1.4 shall be replaced with the following:

Tests	Test Method	Requirements
Cleanness Value	California 227	
Individual Test		70 min
Moving Average		75 min

The Sand Equivalent requirement of Section 200-1.5.3 shall be replaced with the following:

Tests	Test Method	Requirements
Sand Equivalent	California 227	
Individual Test		70 min
Moving Average		75 min

Evaluation of Sand Equivalent and Cleanness Value results shall conform to the provisions of Standard Specifications Subsection 400-1.4.

Concrete shall be high early strength concrete, treated in accordance with section 201-1 to obtain (7) day compressive strength in (3) days.

Traverse joints shall match those of the adjacent pavement. The concrete pavement shall be immediately barricaded upon its installation and no vehicular traffic will be permitted until and after 3-days of placement and with the approval of the Engineer.

7.09 Ductile Iron Water Main Pipe and Appurtenances

Underground conduit construction shall conform to all applicable Subsections of Section 306 of the Standard Specifications, and with City of Santa Ana Design Criteria, Standard Plans and these Special Provisions.

Installation shall be in conformance with American Water Works Association (AWWA) Standard C151 and the Ductile Iron Pipe Research Association (DIPRA) "Guide for the Installation of Ductile Iron Pipe" and the manufacturer's recommendations.

All ductile iron pipe and fittings shall be manufactured in accordance with all applicable requirements of ASTM, ANSI/AWWA Standards and Specifications.

For pipe sizes four (4) inches to twelve (12) inches in diameter, the ductile iron pipe shall be Pressure Class 350. For 16-inches in diameter and larger, the ductile iron pipe shall be Pressure Class 250.

The interior of the pipe and fittings shall be lined with cement-mortar per AWWA C-104. Lining shall be the double thickness, listed in AWWA C-104, Section 4.8. Lining materials shall conform to ASTM C-150, Type II.

Exterior surfaces of pipe and fittings shall be coated with asphaltic material in conformance with AWWA C-110 and AWWA C-151. The coating shall be free from blisters and holes; shall adhere to the metal surfaces at ambient temperatures encountered in the field.

Ductile iron fittings shall conform to AWWA C110 or C153. All pipe and fittings shall have a bituminous coating in accordance with AWWA C151 and C110.

Ductile iron pipe section shall be (18') and or (20') sections, except where shorter lengths are required to fit horizontal or vertical alignment. Pipe sections shall not be deflected at any joint, either vertically or horizontally, beyond the limits specified by the manufacturer.

All pipe segments shall be sound and clean before laying. Ductile iron pipe cutting shall be done with a machine at right angles to the axis of the pipe. Cut end to be joined with a bell shall be beveled to conform to the spigot end.

All fittings shall be mechanical joint, (M.J.), or flanged (FLG) except where noted otherwise. **All valves to fitting connections shall be flanged**. Valves for lateral lines, hydrant leads and service lines shall be bolted directly to main line tee. Where it is necessary to install a reducer or other type of fitting between the lateral valve and main line, said fitting shall be flanged at both ends.

No push-on joint fittings or connections shall be allowed unless specifically approved by the Engineer.

All flanged fittings and connections shall comply with the applicable provisions of AWWA C110. The bolt circle and bolt holes of these flanges shall match those of the Class 125 flanges shown in ANSI B16.1.

The Contractor shall coordinate the flange requirements with the connecting pipe and valve manufacturers.

Contractor shall provide flange to connecting pipe adaptors as needed. Adaptors may be flange by connecting pipe fittings (e.g. FLG x M.J.) or Megaflange-Flange adapter. "E-Z Flange" and similar set screw type adaptors are not acceptable.

Concrete thrust blocks shall be provided at all valves, fittings and hydrants in accordance with AWWA Standards and City of Santa Ana Standard Plan Nos. 1412 and 1420. Type V cement shall be used for all concrete thrust blocks.

Where called for on the plans, a high-early strength concrete shall be used for thrust blocks at points of connection. Admixtures for high-early strength concrete shall be non-chloride admixtures which meet the requirements of ASTM C494. Acceptable products are Pozzutec 200 and Pozzolith NC 534 by Master Builders, Inc. or approved equal. Concrete shall reach 2,500 psi by four (4) hours.

For restrained mechanical joint fittings, the mechanical joint fitting shall be fitted with joint restraints. Mechanical joint restraint shall be incorporated with the design of the follower gland and shall include a restraining mechanism which, when activated, imparts multiple wedging action against the pipe, increasing its resistance as the pressure increases. The joint shall maintain flexibility after burial. Follower glands shall be manufactured of ductile iron conforming to ASTM A536-80. The mechanical joint restraint shall be EBBA IRON, Inc., MEGALUG, UNIFLANGE Series 1400, The Ford Meter Box Co., Inc. or approved equal. Any restrained joint fittings which require a pipe field weldment will not be permitted.

The minimum cover to top of pipe shall be 36" to finished surface except as noted on the plans and with the approval of the Engineer.

The pipe and fittings shall be lowered into the trench. Do not throw the pipe or fittings into the trench.

All buried ductile iron pipe and metallic fittings shall be encased in conformance with ANSI/AWWA C105-A21.5 Standard and these Special Provisions.

All ductile iron pipe, fittings, valves, appurtenances, blowoffs, air valves, and service taps buried underground shall be encased or wrapped with 10-mil linear low-density (LLD) polyethylene film. Any existing or connecting pipe and appurtenances that are exposed as a result of this pipe installation shall be cleaned and wrapped with polyethylene tubing and or sheeting per ANSI/AWWA C105-A21.5. Method- B for ductile iron encasement installation will not be allowed.

All nuts, bolts and washers shall be Type 316 stainless steel and shall have **NON-OXIDE GREASE** or anti-seize compound applied to the threads prior to installation and reapplied prior to wrapping.

Hydrostatic testing pressure and leakage tests shall be in accordance with the applicable provisions of AWWA Standard C600-05. The line shall be tested at a pressure of 200 psi.

All new pipelines and appurtenances shall be chlorinated and disinfected in accordance with AWWA Standard C651-99 and shall meet all health department standards. In addition, all new pipelines and appurtenances shall be chlorinated and disinfected in accordance with the City of Santa Ana Disinfection Guidelines included in these Procedural Guide and Design Guidelines.

Connection to existing water main facilities shall be made only after the successful completion of pressure test, disinfection and flushing procedures.

7.10 Polyvinyl Chloride (PVC) Water Main Pipe and Appurtenances

Underground conduit construction shall conform to all applicable Subsections of Section 306 of the Standard Specifications, the American Water Works Association (AWWA) Standards, the City of Santa Ana Standard Plans and these Special Provisions.

Installation shall be in conformance with AWWA Manual (M23) "PVC Pipe Design and Installation" and the manufacturer's recommendations. Pipe sections shall not be deflected at any joint, either vertically or horizontally, beyond the limits specified by the manufacturer.

All distribution mains, 4-inches thru 12-inches in diameter shall be AWWA C-900 P.V.C. pipe, DR-14. For transmission mains, 16-inches thru 20-inches in diameter, pipe shall be AWWA C-905 P.V.C. pipe, DR-18. This work shall include constructing the PVC pipe water mains, and appurtenances complete and in place, of the size and class, and to the alignment and grade as indicated on the plans.

Fittings shall be ductile iron fittings as specified in Special Provisions Section 7.09 and shall be mechanical joint (M.J.) or flanged (FLG). **No push-on joint fittings or connections shall be allowed unless specifically approved by the Engineer. All valves to fitting connections shall be flanged**. Valves for lateral lines, hydrant leads and service lines shall be bolted directly to main line tee, unless otherwise noted on plans. Where it is necessary to install a reducer or other type of fitting between the lateral valve and main line, said fitting shall be flanged at both ends.

All ductile iron fittings shall be manufactured in accordance with all applicable requirements of ASTM, ANSI/AWWA Standards and Specifications.

Ductile iron fittings shall conform to AWWA C110 or C153. All fittings shall have a bituminous coating in accordance with AWWA C151 and C110.

All flanged fittings and connections shall comply with the applicable provisions of AWWA C110. The bolt circle and bolt holes of these flanges shall match those of the Class 125 flanges shown in ANSI B16.1.

The Contractor shall coordinate the flange requirements with the connecting pipe and valve manufacturers.

Contractor shall provide flange to connecting pipe adaptors as needed. Adaptors may be flange by mechanical joint (FLG x M.J.) adaptor or Megaflange-Flange adapter. "E-Z Flange" and similar setscrew type adaptors are not acceptable. Grip rings for PVC pipe restraint, such as Romac RomaGrip is acceptable.

Concrete thrust blocks shall be provided at all valves, fittings and hydrants in accordance with AWWA Standards and City of Santa Ana Standard Plan Nos. 1412 and 1420. Type V cement shall be used for all concrete thrust blocks.

The minimum cover to top of pipe shall be 36" to finished surface except as noted on the plans and with the approval of the Engineer.

The pipe and fittings shall be lowered into the trench. Do not throw the pipe or fittings into the trench.

All buried ductile iron metallic fittings shall be encased in conformance with ANSI/AWWA C105-A21.5 Standard and these Special Provisions.

All ductile iron pipe, fittings, valves, appurtenances, blowoffs, air valves, and service taps buried underground shall be encased or wrapped with 10-mil linear low-density (LLD) polyethylene film. Any existing or connecting pipe and appurtenances that are exposed as a result of this pipe installation shall be cleaned and wrapped with polyethylene tubing and or sheeting per ANSI/AWWA C105-A21.5. Method- B for ductile iron encasement installation will not be allowed.

All nuts, bolts and washers shall be Type 316 stainless steel and shall have **NON-OXIDE GREASE** or anti-seize compound applied to the threads prior to installation and reapplied prior to wrapping.

When crossing existing water main or service line, Contractor shall adjust grade as necessary to install the new main beneath the existing facility, unless otherwise directed by the Engineer.

When making connections to existing water main or service line, Contractor shall provide all fittings necessary (i.e. tees, bends, adaptors, etc.) to adjust the grade and alignment as needed to facilitate the connection.

When there are specific locations indicated on the plans where it is known that additional excavation will be required to avoid conflicts with other utilities, these locations and required depths are clearly noted on the plans.

PVC pipe shall be marked with the following information

- Manufacturer and Trade Name
- Nominal Size and DR Rating/Pressure Class
- NSF-61 Certification
- Hydrostatic Proof- Test Pressure
- Manufacturing Date

Pipe shall not be stored in direct sunlight. Pipe stored outdoors shall be protected from the natural elements by covering it with opaque material such as canvas. The covering shall be placed in such a way as to allow adequate air circulation between the cover and the pipe. Discolored pipe will not be allowed. Individual pipe sections shall not be stacked in piles higher than five feet. The pipe shall not be stored next heat sources or engine exhausts. All gaskets should be protected from heat, oil and grease.

All pipe segments shall be sound and clean before placed in the ground. PVC pipe cutting shall be done with a machine at right angles to the axis of the pipe. Cut end to be joined with a bell shall be beveled to conform to the spigot end.

Hydrostatic testing: pressure and leakage tests shall be in accordance with the applicable provisions of AWWA Standard C600-05. The line shall be tested at a pressure of 200 psi.

Hydrostatic pressure testing of the main shall not be performed directly against a valve. A steel test plate shall be inserted between the valve and main when performing hydrostatic pressure testing.

All new pipelines and appurtenances shall be chlorinated and disinfected in accordance with AWWA Standard C651-99 “Disinfecting Water Mains” and shall meet all health department standards. In addition, all new pipelines and appurtenances shall be chlorinated and disinfected in accordance with the City of Santa Ana Disinfection Guidelines included in these Procedural Guide and Design Guidelines.

Connection to existing water main facilities shall be made only after the successful completion of pressure test, disinfection and flushing procedures.

7.11 Bore and Jack, Install Steel Casing and Carrier Pipe

This section describes Bore and Jack Casing with Carrier pipe at approved locations as shown on plans. Bore and Jack operations including the installation of carrier pipe shall conform to the applicable provisions of Section 306 of the Standard Specifications, these Special Provisions, as directed by the Engineer and as shown on the Contract Documents.

1. All work shall be as set forth in the rules and regulations of the division of Occupational Safety and Health of the state of California. The Contractor shall obtain from the Division of Industrial Safety a classification for each bore exceeding 30-inches in diameter.

The boring and jacking work shall be done in conformance with the State of California's requirements. It shall be the Contractor's responsibility to call the required safety meeting with representatives from the State Division of Industrial Safety prior to beginning of construction of each bore.

2. It is the Contractor's responsibility to be thoroughly familiarized with the project area. There is no warrantee or guarantee either expressed or implied that the conditions indicated by the Construction Documents or records are representative of the existing field conditions throughout the project area.

3. Casing and carrier pipe installation shall be performed in a way that will not interfere with, interrupt or endanger roadway surface, median landscaping, and minimize subsidence of the surface, structures, and utilities above and in the vicinity of the bore. The Contractor shall be responsible for all settlement resulting from boring operations and shall repair and restore damaged property to its original or better condition at no additional cost to the owner.

4. The face of the excavation shall be protected from the collapse of the soil into the pipe or casing.

5. Design of the jacking/receiving pit and required bearing loads to resist jacking forces are the responsibility of the Contractor. The excavation method selected shall be compatible with expected ground conditions. The lengths of the bore shown on the Contract Documents are not representative of required boring. It is the Contractor's responsibility to develop working drawings detailing the bore and jack process.

6. Contractor shall comply with all manufacturers' specifications and recommendations for the approved products.

A. CASING

Submit manufacturer's mill specification sheet listing diameter, thickness, and class of steel used in making the casing, and the mill certification for Engineer's approval prior to commencement of work.

The Contractor's attention is called to the fact that the casing pipe must be installed such that the carrier pipe grade line matches surrounding proposed water main. Tolerances shall not exceed allowable deflections stipulated in manufacturer's specifications.

Casing pipe shall not be dropped in the trench.

Steel casing shall be ASTM A 283, Grade C, ASTM A 570 Grade 30, 33, and ASTM A-36 unless noted otherwise and have a minimum yield strength of 35,000 psi. The minimum size and thickness of casing pipe shall be per City of Santa Ana Standard Plan No. 1429. Greater casing thickness and diameter may be used as convenient for the method of work and loadings involved, as suitable for the site and as limited by possible interferences. The exterior of the pipe shall be coated with coal tar epoxy or bituminous asphalt. Minimum wall thickness shall be as shown on City of Santa Ana Standard Plan No. 1429.

Casing sections shall be joined by full circumference butt welding in the field. Prepare ends of casings for welding by providing 1/4-inch X 45-degree chamfer on outside edges.

B. CARRIER PIPE

The carrier pipe shall be PVC unless otherwise indicated on the plans. All pressure carrier pipe shall have restrained joints inside the casing.

C. GROUT HOLES

Grout connection holes shall be provided to pressure grout around the periphery of the casing per City of Santa Ana Standard Plan No. 1429 for all casings 24-inches in diameter and larger.

D. WELDING OF CASING PIPE

Welding requirements shall be in accordance with ANSI/AWWA C206. Welding procedures shall be required for longitudinal and girth or special welds for pipe cylinders, casing joint welds, reinforcing plates, and grout coupling connections.

Welding shall be done by skilled welders, welding operators, and tackers who have had adequate experience in the type of materials to be used. Welders shall be qualified under the provisions of ANSI/AWS D1.1 by an independent local, approved testing agency not more than 6 months prior to commencing work on the casing or pipeline. Machines and electrodes similar to those used in the Work shall be used in qualification tests. The Contractor shall bear the expense of qualifying welders. Welder's certification shall be submitted for approval prior to commencement of work.

E. CASING SPACERS

Casing spacers shall be sized sufficiently to provide a minimum clearance of two (2) inches between outside of carrier pipe bells or couplings and inside of casing. The spacers shall be PSI Model C8G-2 or approved equal and consist of the following components:

1. Spacer Band Material: Minimum 14-gauge steel band of either Type T-304 stainless steel or carbon steel coated with fusion bonded epoxy or PVC coating.

2. Spacer Liner Material: Ribbed liner of PVC or EPDM rubber designed to overlap the edges of the upper spacer band and prevent slippage. Liner shall have a minimum thickness of 0.090 inches and a hardness of 85-90 durometer "A".

3. Spacer Width: As recommended by the spacer manufacturer for the specific application. Minimum width shall be 8 inches. Manufacturer's approval in writing shall be required for installations exceeding 300 feet in length, carrier pipes in excess of 48 inches in diameter or multiple carrier pipes in casing.

4. Spacers Risers and Runners must be:

    a. Risers must be minimum 10-gauge steel risers of same material and requirements as spacer band. Risers shall be MIG welded to spacer band prior to coating. Risers must be suitable for supporting the weight of the carrier pipe.

b. Risers shall be manufactured of an abrasion resistant material having a low coefficient of friction (0.1 to 0.6) and designed to support the carrier pipe without damage or excessive wear. Runner material shall be of glass reinforced polyester or nylon and have a minimum compressive strength of 18,000 psi (ASTM D 695).

5. All hardware and fasteners shall be Type 316 stainless steel.

6. Hardwood skids shall NOT be used in place of manufactured casing spacers.

7. The annular space within the casing shall be filled with air-blown sand, unless otherwise specified and with the approval of the Engineer.

F. CASING END SEALS

Both ends of the casing between the casing and carrier pipe shall be sealed watertight using a pull-on rubber end seal such as Model AC as manufactured by Advanced Products or PSI Model C or approved equal. The end seals shall be made of synthetic rubber, conical shape, pull on or wrap-around style with type 316 stainless steel bands.

G. PREPARATION

Confirm location of all known existing utilities prior to start of jacking/receiving pit excavation and pipe installation. The Contractor shall provide the detailed layout required to keep the bore on grade. Notify the Engineer no less than (10) working days before beginning shaft excavation. Before beginning construction of jacking/receiving pit, adequately protect existing structures, utilities, trees, shrubs, and other existing facilities. Place fencing, gates, lights, and signs, as necessary around shafts and staging areas to provide for public safety. When preparing to install casing pipe, verify casing pipe minimum wall thickness is adequate for anticipated jacking loads.

H. INSTALLATION

Jacking and receiving pit construction shall be such as to ensure the safety of the work, Contractor's employees, the public, existing utilities, and adjacent property and improvements, whether public or private and shall comply with the State of California requirements and Section 306 of the Standard Specifications and these Special Provisions. Provide complete groundwater control for excavations at all times. Perform jacking and receiving pit excavations using appropriate excavation or large hole drilling methods, as required. Inspect shaft and pit excavations daily to check the safety of excavation and structural integrity of support system. Open excavations shall conform to all federal, state, and local requirements. Once initiated jacking operations shall continue without interruption, to prevent the pipe from becoming firmly set in the embankment.

I. LUBRICATION OF EXTERIOR OF PIPE AND/OR CASING

Bentonite slurry may be used to lubricate exterior of pipe and/or casing during installation. Use of water to facilitate removal of spoil is permitted; however, water jetting is not allowed.

J. JACKED AND BORED STEEL CASING

Bore hole diameter shall not exceed outside diameter of casing by more than one (1) inch. When unstable soil conditions are found to exist, conduct boring operations in a manner that will not be detrimental to facility being crossed. Horizontal line tolerance is two (2) inches, maximum. Vertical line tolerance is two (2) inches, maximum. A means of steering the pipe or casing must be provided to ensure allowable tolerances will not be exceeded. The Contractor must measure and record progress at all times to confirm that horizontal and vertical lines are within allowable tolerances.

For casing: Weld sections of casing pipe together to provide water tight joints by operators qualified in accordance with the American Welding Society Standard Procedures. These welds shall be continuous, complete joint penetration butt joint welds as required for rigid and watertight connections. If the removal of casing is permitted, make proper provisions to prevent caving in of the earth surrounding the casing. If it is necessary to abandon a bore hole, remedial measures shall be taken by the contractor, subject to review by the Engineer. If required grade tolerance has not been achieved, corrections in grade are to be made using casing spacers of varying height per manufacturer's recommendations.

K. MONITORING OF SURFACE MOVEMENT

Perform a pre-construction survey of road surface and landscaped median. Contractor shall record horizontal coordinates and elevations. Document and record the location of field measurements. Monitor movement of road surface and landscaped median on a daily basis and provide results to the Engineer. Stop operations if movement exceeds ¼ inch and immediately notify the Engineer.

L. GROUTING JACKED AND BORED STEEL CASING

Overcutting in excess of one (1) inch shall be remedied by pressure grouting the entire length of the installation for all casings 24-inches in diameter and larger. Pressure grouting around the periphery of the casing shall be performed with the grout pressure never exceeding five (5) psi for the duration sufficient to fill all voids.

Should appreciable loss of ground occur during jacking or boring operations, Contractor shall backpack all voids promptly. Fill all remaining voids upon completion of operations: such filling or backpacking shall be with grout unless otherwise approved.

M. CARRIER PIPE INSTALLATION

Entire length of casing shall be installed complete, inspected, and approved by Engineer before any carrier pipe is placed therein. Repair defects in casing pipe or leakage at joints. Casing spacers shall be installed per manufacturer's recommendations and in such a manner that electrical continuity will not occur between casing pipe and carrier pipe. Check each joint makeup and pipe segment prior to pushing carrier pipe segments into casing. Carrier pipe shall be PVC pipe unless otherwise specified and approved by the Engineer, mechanical joints shall have restraints. Casing end seals shall be provided at the end of the casing pipe after installation of the carrier pipe. Casing end seals shall be installed per manufacturer's recommendations.

N. ANNULAR SPACE

The annular space within the casing shall be completely filled with air-blown sand to support the carrier pipe and provide long time stability unless otherwise specified and approved by the Engineer. Carrier pipe shall be pressure tested prior to filling casing with air-blown sand.

O. REMOVAL OF JACKING AND RECEIVING PIT SUPPORTS

Remove support elements except those required by Engineer to remain in place, from excavation. In addition, remove support elements as needed to install carrier pipe. Removal of support system shall be performed in a manner that will not disturb or harm adjacent construction or facilities. Fill voids created by removal of support system with clean sand, flowable fill, or similar fill material approved by Engineer.

P. BACKFILLING OF JACKING AND RECEIVING PIT

Seal jacking and receiving pit opening and backfill at shafts. Backfill shall be gunite sand, gunite concrete or pressure concrete and the process shall conform to the applicable provisions of Section 306-2.3 of the Standard Specifications, these Special Provisions, as directed by the Engineer and as shown on the Contract Documents.

7.12 Trace Wire

Installation of trace wire shall be a continuous single wire, except where using connectors. The trace wire shall be performed and allow for proper access for connection of line tracing equipment, proper wire locating shall be without loss and distortion of signal for distances in excess of 1,000 linear feet. Trace wire shall by-pass around the outside of valves and fittings.

Installation of trace wire shall be in accordance with these Special Provisions and as detailed on the City of Santa Ana Standard Plan No. 1405.

All trace wire for open trench shall be #12 AWG copper clad steel, high strength, insulated with high molecular weight polyethylene (HMWPE) specifically for use in direct burial applications. The color shall per AWWA standards for potable water.

No looping or coiling of wire is allowed.

Trace wire shall be secured to the top of the pipe at 5-foot intervals or less to ensure that the wire remains (top of pipe) at the same location as the PVC pipe being laid.

A. ACCESS/TERMINATION

Trace wire on all fire hydrants/stubs must terminate on an approved tracer wire access box located directly and next to the hydrant barrel and per City of Santa Ana Standard Plan Nos. 1405 and 1407 for the parkway (if necessary). The tracer wire box shall be CD14*TP as manufactured by SNAKEPIT.

Where the anode wire will be connected to the trace wire access box, a 2ft. minimum excess/slack wire is required.

Access boxes shall be installed within a 500ft. radius of each other.

The grounding anode wire shall be connected to the identified terminal on all access boxes.

B. CONNECTORS

Direct bury wire connectors shall be specifically manufactured for underground trace wire installation. Connectors shall be dielectric and filled with silicon to seal out moisture and corrosion.

All splices of the wire shall be made securely and covered thoroughly with a Direct Bury Splice Kit, 3M DBY/DBR or approved equal.

All mainline trace wires must be interconnected at intersections and at fire hydrant tees. At tees, the connections and splices shall be accomplished using a direct burial connectors and splice kits with single 3-way lockable connector and or 4-way lockable connector.

Non-locking friction fit, taped and twist on connectors are not allowed.

C. GROUNDING

At all dead-ends, trace wire shall go to ground using an approved connection to a drive- in magnesium grounding anode rod with a minimum of 20ft of #14 red HDPE insulated copper clad steel wire connected to the anode. In occurrences where trace wire is encountered on an existing utility that is being extended or tied into, the new trace wire and the existing wire shall be connected using approved splice connectors.

When grounding the trace wire, the grounding anode shall be installed in a direction 180 degrees opposite to the trace wire. Do not coil excess wire from grounding anode. The grounding anode wire shall be trimmed to an appropriate length before connecting to the trace wire with a mainline to lateral connector.

D. TESTING

The Contractor shall schedule and conduct a conductivity test on completion of the water main installation and prior to placement final pavement.

All trace wire installations shall be located using low frequency line tracing equipment. If the conductivity test fails, the Contractor shall be responsible for making the necessary repairs, including but not limited to excavation, repair and re-test passing results are achieved and satisfactory to the Engineer.

Continuity test in lieu of actual line testing will not be accepted.

7.13 Resilient Wedge Gate Valves

This work shall consist of furnishing and installing gate valves, including risers with valve boxes, and PCC collars where indicated on the plans. All work shall conform to City of Santa Ana Standard Plan No. 1410.

Gate valves shall be of the size and configuration as indicated on the plans and shall be AWWA and UL/FM tested, resilient wedge with operating nuts and non-rising stems, and shall be designed for a minimum working pressure of 150 psi and be tested at 200 psi. Valves shall be bubble-tight at the working pressure. Gate valves shall be Clow, Mueller, Renselear, or approved equivalent. Valves shall have all Type 316 stainless steel nuts and bolts and shall be manufactured in accordance with AWWA C509 Standards. Valve linings and coatings shall be made in accordance with AWWA C-550.

All valves to fitting connections shall be flanged. Valves for lateral lines shall be bolted directly to main line tee, unless otherwise noted on the plans. Where it is necessary to install a reducer or other type of fitting between the lateral valve and main line, said fitting shall be flanged at both ends.

All valve box frame and covers shall require PCC collars and shall be adjusted to finished grade following paving operations.

Portland cement concrete pavement for gate collars shall conform to Sections, 400, 200, 201, and 302 of the Standard Specifications and these Special Provisions.

PCC used for gate collars construction shall be minimum class 560-A-3250. In addition to these minimum requirements, the concrete shall possess the following characteristics:

- Flexural strength at 28 days: 550 p.s.i. min.
- Flexural strength at 7 days: 430 p.s.i. min.
- Compressive strength at 7 days: 2500 p.s.i. min.

All cement to be used or furnished on this Project shall be Type II low alkaline Portland Cement conforming to ASTM C150.

Prior to the start of construction, the Contractor shall furnish to the Engineer laboratory test data for the particular mix design he will use. The data will include the following:

A. A detailed concrete mix design including the type and amount of cement used; complete gradation and source of the aggregate used; the amount of water used; and any proposed admixtures.

B. Flexural strength test data for the same batch of concrete used in A above showing the compressive strength of the concrete at 3, 7, and 28 days.

Section 302-6.4.4 entitled "Final Finishing" of the Standard Specifications shall be modified as follows:

> Delete all reference to wetted burlap. Final finish of the surface shall be textured by stiff broom process that will produce scoring perpendicular to the centerline of the street, performed at a time and in a manner to produce a hardened surface have a coefficient of friction of not less than 0.38 as determined by California Test 342. Curing to be applied immediately following broom process.

Concrete shall be high early strength concrete, treated in accordance with section 201-1 to obtain (7) day compressive strength in (3) days.

The concrete shall be immediately protected upon its installation and no vehicular traffic will be permitted thereon for the next (3) days.

7.14 Butterfly Valves

Butterfly valves shall conform to the City's Standard Specifications and AWWA C504. Butterfly valves shall be rated at 150 psi working pressure and hydrostatically tested at 200 psi. All valves shall be factory epoxy lined and coated. Epoxy lining shall be 15 mils of keysite 740. All work shall conform to City of Santa Ana Standard Plan No. 1411.

All butterfly valves shall be rubber seated in accordance with ANSI/AWWA C504-87. Valve shafts shall be stainless steel ASTM 276, Type 304. All buried valves shall have operators specifically designed for buried service. These operators shall be lubricated for the life of the valve. Buried valves shall be installed in accordance with City of Santa Ana Standard Plan No. 1411.

Butterfly valves shall be Pratt, Mueller, M & H or approved equivalent.

Opening Direction: Valves shall open by turning counterclockwise.

4-inch through 20-inch butterfly valves shall have gear actuators of the “traveling nut type”. Traveling nut actuators shall be furnished on all valves in this size range unless torque or pressure conditions dictate a “worm gear type”.

Traveling nut type actuators shall withstand 450 foot pounds of input torque against the stop limiting devices without causing damage. Signed factory compliance shall accompany submittals stating that these specifications and applicable standards have been adhered to.

All exposed threaded parts, including cap screws, case bolts, carriage bolts, cover screws, machine screws, set screws, bonnet bolts on the housing or any other exterior location on the actuator, its cover or housing shall be Type 316 stainless steel.

Travel nut gear actuators shall be Prat MDT, Mueller MDT, or approved equal.

All butterfly valves shall be tested for leakage at the same time that the connecting pipelines are hydrostatically tested.

In addition, all butterfly valves 12-inches in diameter and larger shall be field tested for leakage. Valves may be tested in a horizontal position. All valves shall be tested bi-directionally after the actuator/operator is installed and the adjustment stops are set. Each side of the valve is to be tested for a duration of at least five (5) minutes at the pressure rating of the valve with zero loss or leakage. The field pressure test shall be witnessed by the City’s representative. Final field tests shall be performed within 75 miles of the project site. A minimum of 72 hours (or three working days) advance notice to the City for testing is required.

All valve box frame and covers shall require PCC collars and shall be adjusted to finished grade following paving operations.

Portland cement concrete pavement for gate collars shall conform to Sections, 400, 200, 201, and 302 of the Standard Specifications and these Special Provisions.

PCC used for gate collars construction shall be minimum class 560-A-3250. In addition to these minimum requirements, the concrete shall possess the following characteristics:

- Flexural strength at 28 days: 550 p.s.i. min.
- Flexural strength at 7 days: 430 p.s.i. min.
- Compressive strength at 7 days: 2500 p.s.i. min.

All cement to be used or furnished on this Project shall be Type II low alkaline Portland Cement conforming to ASTM C150.

Prior to the start of construction, the Contractor shall furnish to the Engineer laboratory test data for the particular mix design he will use. The data will include the following:

A. A detailed concrete mix design including the type and amount of cement used; complete gradation and source of the aggregate used; the amount of water used; and any proposed admixtures.

B. Flexural strength test data for the same batch of concrete used in A above showing the compressive strength of the concrete at 3, 7, and 28 days.

Section 302-6.4.4 entitled "Final Finishing" of the Standard Specifications shall be modified as follows:

> Delete all reference to wetted burlap. Final finish of the surface shall be textured by stiff broom process that will produce scoring perpendicular to the centerline of the street, performed at a time and in a manner to produce a hardened surface have a coefficient of friction of not less than 0.38 as determined by California Test 342. Curing to be applied immediately following broom process.

Concrete shall be high early strength concrete, treated in accordance with section 201-1 to obtain (7) day compressive strength in (3) days.

The concrete shall be immediately protected upon its installation and no vehicular traffic will be permitted thereon for the next (3) days.

7.15 Water Service

All work shall conform to City of Santa Ana Standard Plans and meet all AWWA Specifications.

All ductile or cast iron pipe, fittings, valves, and appurtenances buried underground shall be encased or wrapped with 10-mil linear low-density (LLD) polyethylene film. Any existing or connecting pipe and appurtenances that are exposed as a result of this pipe installation shall also be wrapped with polyethylene sheeting.

Service laterals shall be installed in a perpendicular direction to the centerline of the water main.

Removal and replacement of sidewalk, driveway approach as necessary to facilitate water service meter installation, shall be included as part of this work. All work shall conform to City of Santa Ana Standard Nos. 1104, 1112, 1401, and 1402.

Sidewalk replacement shall be from score line to score line, unless the sidewalk panels exceed four feet in length. At no time, shall a sidewalk panel floater be less than four feet from the nearest score line.

The City shall furnish and install the water meter after all other work is complete.

Note: Angle meter stops are not acceptable. The connection to the meter coupling shall be a curb stop with locking wing nut as noted on the Standard Plans.

For all water service relocations and installations, Contractor shall notify residents a minimum of 48-hours prior to any interruption in service. Every effort shall be made to minimize the inconvenience to the customer. Contractor shall coordinate these activities with the City of Santa Ana Water Resources Division a minimum of four (5) working days prior to beginning work on services. When necessary, such work shall be performed after-hours or on weekends as directed by the Engineer. In no case shall any property be without service for more than four (4) hours. In special circumstances, emergencies, or when directed by the Engineer, Contractor shall provide temporary service lines to prevent any interruption in service. All piping and associated equipment used in temporary service connections shall be flushed and disinfected. All hoses shall be NSF approved.

All fittings and appurtenances for water service and fire lines shall conform to AWWA Standard C800 "Underground Service Line Valves and Fittings" and the California Health and Safety Code 116875.

A. 1" & 2" NEW WATER SERVICE CONSTRUCTION

This work shall consist of constructing a complete new water service where indicated on the plans, and shall include service saddle, corporation stop, curb stop, copper tubing, meter box, and appurtenances all in accordance with City of Santa Ana Standard Plan Nos. 1401 and 1402.

B. 3", 4", AND 6" WATER SERVICE CONSTRUCTION

This work shall consist of constructing a complete new water service of the size and type indicated on the plans. All work shall conform to City of Santa Ana Standard Plan No. 1403A, B, or C as applicable. The Contractor shall furnish and install the water meter, as well as all valves, piping fittings and appurtenances, including meter vault for the complete installation of these services. The meter vault for these services shall be constructed in accordance with City of Santa Ana Standard Plan No. 1403D.

C. 3" AND GREATER RELOCATION OF WATER SERVICES

Relocation of these facilities may be accomplished by installing new portions of pipe as necessary to complete the relocation and connecting back to the existing service line. Pipe may be either ductile iron or PVC C-900 pipe.

If relocation requires an increase in depth or horizontal realignment of the pipe, 45˚ Bends shall be used to re-route the pipe.

Thrust blocks shall be required in accordance with City of Santa Ana Standard Plan Nos. 1403A, 1403B, 1403C, and 1412. All pipe trenches shall have 6" minimum of sand bedding beneath the pipe and sand backfill over the pipe compacted to 90% relative compaction.

7.16 Fire Line Services

This work shall consist of constructing a complete new fire service of the size and type indicated on the plans. All work shall conform to City of Santa Ana Standard Plan No. 1417. The Contractor shall furnish and install the water meter, as well as all valves, piping fittings and appurtenances, including meter vault for the complete installation of these services.

A. RELOCATION OF FIRE LINES

Relocation of these facilities may be accomplished by installing new portions of pipe as necessary to complete the relocation and connecting back to the existing service line. Pipe may be either ductile iron or PVC C-900 pipe.

All ductile or cast iron pipe, fittings, valves, and appurtenances buried underground shall be encased or wrapped with 10-mil linear low-density (LLD) polyethylene film. Any existing or connecting pipe and appurtenances that are exposed as a result of this pipe installation shall also be wrapped with polyethylene sheeting.

If relocation requires an increase in depth or horizontal realignment of the pipe, 45˚ Bends shall be used to re-route the pipe. Thrust blocks shall be required in accordance with City of Santa Ana Standard Plan Nos. 1403A, 1403B, 1403C, and 1412. All pipe trenches shall have 6" minimum of sand bedding beneath the pipe and sand backfill over the pipe compacted to 90% relative compaction.

7.17 Fire Hydrant Assembly

This work shall consist of furnishing and installing wet barrel fire hydrants, break away spool, check valve, spool extensions and bury assemblies in the locations indicated on the plans.

Hydrant lateral pipe, gate valves and appurtenances are included as part of this work.

Fire Hydrant assembly shall be installed in accordance with AWWA C502, City of Santa Ana Standard Plan No. 1405 and these Special Provisions. Wet barrel fire hydrant shall be Clow Model 860. The break off check valve shall be Clow Model LBI 400A. Bury shall be ductile iron body with mechanical joint per Clow. No break away bolts will be allowed.

The Contractor shall install trace wire in accordance with and per Section 7.12 **Trace Wire,** of these Special Provisions and City Standard Plan No. 1405.

All hydrant exposed metal exterior coatings shall be in conformance with City of Santa Ana Standard Plan No. 1405, and these Special Provisions.

The fire hydrant must have factory applied coating when delivered to site (i.e. must come white from factory).

Fire Hydrant Coating (exposed exterior above ground)

- Type- Gloss synthetic enamel white
- Prime Coat: Apply a one coat, 4-mil
- Finish Coat: Apply two coats of (OSHA White), 6-mil for each coat

Each coat shall be applied evenly and with the use of mechanical devices. Allow sufficient time between successive coats. The use of rollers and brushes is not allowed.

All ductile or cast iron pipe, fittings, valves, and appurtenances buried underground shall be encased or wrapped with 10-mil linear low-density (LLD) polyethylene film. Any existing or connecting pipe and appurtenances that are exposed as a result of this pipe installation shall also be wrapped with polyethylene sheeting.

Where necessary, Contractor shall saw-cut, remove and replace sidewalk to facilitate hydrant installation. Sidewalk shall be replaced per City of Santa Ana Standard Plan No. 1104. Sidewalk replacement shall be from score line to score line, unless the sidewalk panels exceed four feet in length. At no time, shall a sidewalk panel floater be less than four feet from the nearest score line.

All removed/abandoned upper and lower fire hydrant dry barrels shall be transported by the Contractor to the City Corporate Yard (220 S. Center Street, Santa Ana, CA 92703). It is the Contractor's responsibility to coordinate this task with the Engineer prior to delivery of the hydrants. Proper care and protection of the salvaged fire hydrant and related components is required (dumping or dropping of hydrants will not be allowed). If damage to any salvaged fire hydrant is caused by Contractor negligence, a charge of $1,000 per damaged hydrant will be applied.

7.18 Hot Tap Connection

This section consists and describes materials, requirements and procedures for hot tap (system under pressure) connections to existing distribution system.

All approved manufactures and materials shall comply with City Standard No. 1408, the engineering plans and these Special Provisions.

Tapping sleeves shall be epoxy coated fabricated steel with Type 316 stainless steel nuts and bolts. The tapping sleeve shall be installed in accordance with manufacturer's instructions and to the satisfaction of the Water Resources Division. 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 independently of the pipe during the hot tap operation and shall be pressure tested prior to the hot tap in the presence of the City's certified Public Works inspector. Thrust blocks shall be provided at the tapping location per City of Santa Ana Standard Plan No. 1412.

The tapping valve shall be a resilient wedge as described on the City of Santa Ana Standard Plan No. 1408.

The hot tap into the existing pipe shall be made using the appropriate type of cutting machine and shell cutting bit for material being tapped.

Tapping machine must be operated per manufacturer's instructions. Proper care shall be taken to prevent cutting material from entering the pipeline and the tapping coupon must be extracted.

The interior of the tapping valve and connecting piping shall be sprayed with a sodium hypochlorite solution prior to connection.

All nuts and bolts shall be Type 316 stainless steel and shall be coated with mastic such as 3M EC244, or Koppers Bitumastic 505 applied to the threads prior to installation and reapplied prior to wrapping.

All ductile or cast iron pipe, fittings, valves, and appurtenances buried underground shall be encased or wrapped with 10-mil linear low-density (LLD) polyethylene film. Any existing or connecting pipe and appurtenances that are exposed as a result of this pipe installation shall also be wrapped with polyethylene sheeting.

All tapping sleeves must be a minimum of 24" from the nearest joint or service.

7.19 Combination Air Valves (as needed)

This item is to be used on an "as needed" basis and only with the prior approval of the Engineer.

This work shall consist of furnishing and installing air and vacuum release valve assemblies per City of Santa Ana Standard Plan No. 1415A. All work shall be in conformance with AWWA C512 and these Special Provisions.

Main line taps and copper pipe line runs for 1" air and vacuum release valves shall be constructed per the applicable provisions pertaining to water services and fire lines of these Special Provisions.

Air and vacuum release valves shall be field located by the Engineer or as noted on the construction plans.

The exterior of the vented cover shall be installed with a City of Santa Ana logo decal.

7.20 Vertical Offset (as needed)

This item is to be used on an "as needed" basis and only with the prior approval of the Engineer.

This work shall consist of furnishing and installing a vertical offset per City of Santa Ana Standard Plan No. 1413B. All work shall conform to applicable AWWA standards as necessary.

7.21 Disinfection and Flushing Plan

All disinfection and flushing tasks shall be completed per AWWA C651 and these Special Provisions.

Prior to start of construction, the Contractor shall submit to the City for review and approval a water line "Disinfection and Flushing Plan" prepared by a D3 or T3 Operator Certified with California Department Health Services, or a Registered Civil Engineer practicing in the field of water resources, indicating the following as a minimum:

- Phasing of disinfection and flushing
- Source of flushing water
- Type and configuration of connection required to introduce flushing water into the proposed water main
- Method of disposal of flushed water
- Total number and locations of sampling points
- Types of testing to be performed:
  Acceptable Bacteriological:
  Total Coliform = Negative
  Fecal Coliform - Negative
  Heterotrophic Plate Count Less than 150 CFU per 1 ml
  Chlorine Residual: Free or Total
- Company performing sampling and testing

Discharge from flushing of pipelines shall be routed to the sanitary sewer system.

Disinfection and Flushing shall be performed under the supervision of a D3 or T3 Certified Operator and or a Registered Civil Engineer practicing in the field of water resources.

7.22 Water Main Tie-Ins, Shutdown, and Abandonment

The following is the procedure for water main shut down to facilitate tie-ins or abandonment of existing mains:

1. Contractor to pothole and expose existing connection.

2. Engineer to verify existing conditions. Excavation shall be plated, not backfilled.

3. Prior to any shutdown of existing water system, the Contractor shall have all necessary fittings and equipment on site to complete the water main tie-in or abandonment.

4. Shut down shall be scheduled within the allowable working hours.

Contractor shall notify residents and businesses 48- hours in advance of shutdown. Water shall not be shut off outside of times listed above except in an emergency.

All work necessary to shutdown an existing public water main shall be coordinated by the Water Resources Division. Under no circumstances shall the Contractor operate valves, hydrants, and other appurtenant equipment on the existing public water system. It shall be the Contractor's responsibility to coordinate the necessary shutdown schedules through the Construction Inspector assigned to the project. Scheduled shutdowns shall require sufficient time to allow water maintenance personnel to review, approve, and develop an appropriate Operation Program. Contractor shall coordinate shut down activities with the City of Santa Ana Water Resources Division a minimum of five (5) working days prior to any water main shutdown. The Contractor shall be responsible for maintaining all schedules current and coordinating all deviations, which may occur from time to time with the Construction Inspector. When necessary, such work shall be performed after-hours or on weekends as directed by the Engineer.

The City will make a concerted effort to isolate the system as planned with the Contractor.

However, due to the age of the pipe and valves the Contractor should not expect an absolute shutdown and shall be prepared to employ pumping equipment in the event that an absolute shutdown cannot be achieved. The Engineer shall judge the shutdown to be adequate for the tie-in to proceed as indicated on the plans and specified here in. The City will not be responsible for any delays due to system shutdown and isolation when an adequate shutdown can be achieved.

When an extensive water main shutdown is required and cannot be achieved adequately, the Water Resources Division will determine what temporary service connections may be required. The Contractor shall furnish all necessary appurtenances (i.e. hose, piping, valves, and water trucks) and associated labor required to provide such temporary service. All piping and associated equipment used in temporary service connections shall be flushed and disinfected. All hoses shall be NSF approved.

Water main and services abandonment shall be per the engineering plans and these Special Provisions. Any deviations shall require prior approval by the Engineer.

7.23 Asbestos Cement Pipe (ACP)

The Contractor may encounter existing asbestos materials (i.e. asbestos cement pipe) during constructing water main improvements within the City. The Contractor is warned that asbestos is a known human carcinogen when inhaled and poses serious health risks. Asbestos fibers are easily inhaled and can result in chronic respiratory illness, cancer, and other severe health effects.

Removal, handling and disposal of existing asbestos cement pipe (ACP) shall be performed by a contractor or subcontractor registered by CAL/OSHA and certified by the State Contractors Licensing Board for asbestos removal. Submit copies of the certification to the City prior to the commencement of any asbestos removal activities. The contractor or subcontractor shall comply with all State and Federal laws and regulations regarding the handling and removal of asbestos materials. The contractor or subcontractor shall properly identify, remove, and dispose of all asbestos materials. Provide sufficient supervision and monitoring to assure conformance.

In specific instance of making connections to existing asbestos cement pipe, disconnect, at the nearest joints, the length of asbestos cement pipe to be connected to the new pipe. This length of existing asbestos cement pipe will be replaced by the new pipe making the tie-in. No cutting, snap cutting or milling of the asbestos cement pipe will be allowed.

All removed ACP shall be wrapped in 6 mil polyethylene sheeting or bags sealed with appropriate tape, and properly labeled and removed away from the construction area to prevent damage. The contractor or subcontractor shall be responsible for the proper identification, removal and disposal of the ACP pipe. Contractor or subcontractor shall provide the City of Santa Ana field representative with the manifest for proper ACP disposal.

7.24 Submittals

Water main pipe and appurtenance submittals shall include, but not be limited to the following manufacturer information:

1. C900 PVC pipe, Ductile Iron pipe and or other as approved by the Engineer
2. Gate Valves
3. Butterfly Valves
4. Fittings and Bends
5. Air Vacuum and Release Valves
6. Valve Box Frames and Covers
7. Polyethylene Sheeting
8. Trace Wire and Appurtenances
9. Ductile Iron Spools
10. Steel Casing, Casing Spacers and Casing End Seals
11. Polyethylene casing insulators
12. Blind Flanges
13. Mechanical Joint Caps
14. Disinfection and Flushing Plan
15. Sample of proposed sand bending material (approximate one gallon bag).

Fire Hydrant submittals shall be in conformance with City of Santa Ana Standard Plan Nos. 1405, 1407, 1407A, and 1408 (if applicable), and shall include, but not be limited to, manufacturer information from the following:

1. Fire Hydrant
2. Break off Spool, Check Valve, Extension and Bury

Water Service submittals shall be in conformance with all City of Santa Ana Standard Plans for Water Services and shall include, but not be limited to, manufacturer information from the following:

1. Service Saddles
2. Corporation stops
3. Copper tubing
4. Polymer meter box with lid
5. Meter coupling
6. Flanged coupling
7. Bronze elbows
8. Brass elbows
9. Brass nipples
10. Brass plugs
11. Curb stop
12. Compression bend
13. Suction Strainer
14. Pre-cast Concrete Service Vault Box and cover
15. Adaptors/Coupling Gaskets

Jack and bore equipment, appurtenance, and process submittals shall include, but not be limited to the following manufacturer information:

1. Casing pipe and carrier pipe material including the standard to which it is manufactured, outside diameter, wall thickness, joint configuration, and certificate of compliance certifying that the pipe meets these specifications.
2. Details of casing spacers, including manufacturer's recommended spacing.
3. Details of end seals for casing.
4. Working drawings of jacking pit and receiving pit
5. Details of jacking pit bracing, casing, jacking head, concrete support blocks, bracing to prevent pipe shifting or floatation.
6. Concrete mix design. Concrete placement method and equipment.
7. Air-blown sand.
8. As-built drawings to include both alignment and profile. Drawings should be constructed from actual field measurements. Raw data shall be submitted as part of the As-built document. Contractor shall stipulate the tracking method to ensure the data was captured.
9. Adaptors/Couplings/Gaskets

END OF SECTION

PART IV

STANDARD DRAWINGS

FOR

WATER AND SEWER FACILITIES

CITY OF SANTA ANA

STANDARD PLAN	NUMBER
SEWER CONSTRUCTION GENERAL NOTES	1200
SEWER MANHOLE; NOTES FOR SEWER MANHOLE	1201
DROP MANHOLE	1201A
STEEL CASING	1203
SEWER ENCASEMENT/CONCRETE BLANKET	1203A
SEWER LATERAL AND CLEANOUT (OPEN TRENCH)	1204
SEWER LATERAL AND CLEANOUT (PIPE BURSTING)	1204A
METHOD OF SUPPORTING STORM DRAIN AND SEWER PIPES ACROSS TRENCHES	1207
MANHOLE ABANDONMENT	1209
GRAVITY GREASE INTERCEPTOR	1210
36" SEWER MANHOLE COVER	1211
SEWER LATERAL ABANDONMENT	1212

APPROVED: DATE: 11/24/20

CITY OF SANTA ANA

PUBLIC WORKS AGENCY

DATE		REVISION
1/23/06	A.F.	DELETE STD PLAN 240A
7/16/09	R.R.	ADD STD 1204A & 1209 ADD STD DEVELOPMENT SPECIFICATIONS
11/5/12	J.A.	ADD STD 1203A AND 1208A
11/2020	R.R	DEL STD 1202; ADD 1210-1212

INDEX OF STANDARD PLANS
FOR SANITARY SEWERS

SHEET
1 OF 1

General Notes for Public Works Permitted Work on Sewer Collection System

1. Construction and installation of all sewer mains and appurtenances shall be in accordance with the City of Santa Ana Standard Plans and Specifications. Where the standard plans are silent, construction and installation of sewer mains and appurtenances shall conform to the Standard Specifications for Public Works Construction, 2012 edition.

2. Construction of sewer mains and appurtenances shall only be performed by qualified contractors with a valid California Contractor A or C34 license.

3. All newly constructed sewer mains and appurtenances shall be tested in accordance with Standard Specifications for Public Works Construction. All newly constructed sewer mains, laterals and manholes must be inspected via closed circuit television camera by a National Association of Sewer Service Companies (NASSCO) certified technician and video submitted in a digital format to the Water Resources Division for review and final acceptance of work.

4. All sewer mains shall be vitrified clay pipe (VCP) or PVC SDR-26 pipe. All other pipe materials require special review and approval from the Water Resources Division.

5. Trench plates shall be flush with pavement and shall be non-skid.

6. Contractor to verify depth and location of all utilities and points of connection prior to trenching.

7. When public sewer facilities are located on private property, easement documents are to be submitted to City for approval prior to a permit being issued.

8. Final acceptance will not occur until original record drawings on mylar and digital format are delivered to and accepted by the City's inspector. Show all field changes on record drawings.

9. All sewer repairs shall be accomplished using stainless steel double banded couplings.

"ADD ALL NOTES TO PLANS"

APPROVED: DATE: 11/24/2020

CITY OF SANTA ANA

PUBLIC WORKS AGENCY

DATE		REVISION
3/1/16	R.R.	NEW
11/2020	R.R.	UPDATED

SEWER CONSTRUCTION GENERAL NOTES

STD. PLAN NUMBER 1200

STANDARD PLAN	NUMBER
SEWER CONSTRUCTION GENERAL NOTES	1200
SEWER MANHOLE; NOTES FOR SEWER MANHOLE	1201
DROP MANHOLE	1201A
STEEL CASING	1203
SEWER ENCASEMENT/CONCRETE BLANKET	1203A
SEWER LATERAL AND CLEANOUT (OPEN TRENCH)	1204
SEWER LATERAL AND CLEANOUT (PIPE BURSTING)	1204A
METHOD OF SUPPORTING STORM DRAIN AND SEWER PIPES ACROSS TRENCHES	1207
MANHOLE ABANDONMENT	1209
GRAVITY GREASE INTERCEPTOR	1210
36" SEWER MANHOLE COVER	1211
SEWER LATERAL ABANDONMENT	1212

APPROVED: DATE: 11/24/2020

CITY OF SANTA ANA

PUBLIC WORKS AGENCY

DATE		REVISION
1/23/06	A.F.	DELETE STD PLAN 240A
7/16/09	R.R.	ADD STD 1204A & 1209 ADD STD DEVELOPMENT SPECIFICATIONS
11/5/12	J.A.	ADD STD 1203A AND 1208A
11/2020	R.R	DEL STD 1202; ADD 1210-1212

INDEX OF STANDARD PLANS
FOR SANITARY SEWERS

SHEET
1 OF 1

General Notes for Public Works Permitted Work on Sewer Collection System

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3. All newly constructed sewer mains and appurtenances shall be tested in accordance with Standard Specifications for Public Works Construction. All newly constructed sewer mains, laterals and manholes must be inspected via closed circuit television camera by a National Association of Sewer Service Companies (NASSCO) certified technician and video submitted in a digital format to the Water Resources Division for review and final acceptance of work.

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"ADD ALL NOTES TO PLANS"

APPROVED: DATE: 11/24/22

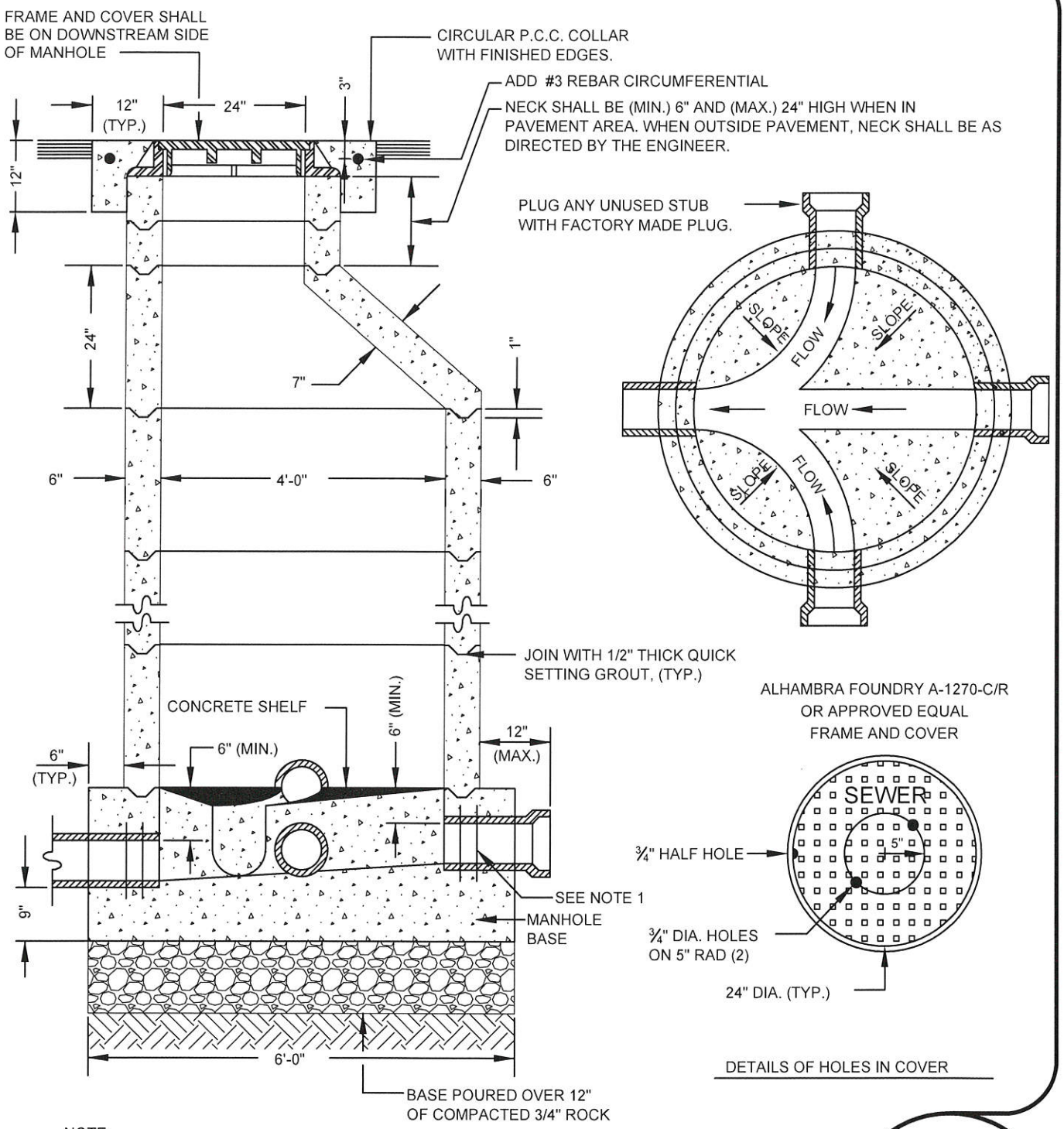
CITY OF SANTA ANA

PUBLIC WORKS AGENCY

DATE		REVISION
3/1/16	R.R.	NEW
11/2020	R.R.	UPDATED

SEWER CONSTRUCTION GENERAL NOTES

STD. PLAN NUMBER 1200



NOTE:
1. FOR PVC SEWER PIPES, INSTALL WATER STOP GASKETS

SEE ADDITIONAL INFORMATION ON SHEET 2

APPROVED: DATE: 11/24/2020

CITY OF SANTA ANA

PUBLIC WORKS AGENCY

DATE		REVISION
7/16/09	R.R	WATER STOP GASKET
11/5/12	J.A.	ADDED REBAR
3/1/16	R.R.	ADDED COMPOSITE COVER
11/2020	R.R.	UPDATED

SEWER MANHOLE

STD. PLAN NUMBER 1201

STANDARD PLAN	NUMBER
SEWER CONSTRUCTION GENERAL NOTES	1200
SEWER MANHOLE; NOTES FOR SEWER MANHOLE	1201
DROP MANHOLE	1201A
STEEL CASING	1203
SEWER ENCASEMENT/CONCRETE BLANKET	1203A
SEWER LATERAL AND CLEANOUT (OPEN TRENCH)	1204
SEWER LATERAL AND CLEANOUT (PIPE BURSTING)	1204A
METHOD OF SUPPORTING STORM DRAIN AND SEWER PIPES ACROSS TRENCHES	1207
MANHOLE ABANDONMENT	1209
GRAVITY GREASE INTERCEPTOR	1210
36" SEWER MANHOLE COVER	1211
SEWER LATERAL ABANDONMENT	1212

APPROVED: DATE: 11/24/2020

CITY OF SANTA ANA

PUBLIC WORKS AGENCY

DATE		REVISION
1/23/06	A.F.	DELETE STD PLAN 240A
7/16/09	R.R.	ADD STD 1204A & 1209 ADD STD DEVELOPMENT SPECIFICATIONS
11/5/12	J.A.	ADD STD 1203A AND 1208A
11/2020	R.R	DEL STD 1202; ADD 1210-1212

INDEX OF STANDARD PLANS
FOR SANITARY SEWERS

SHEET
1 OF 1

General Notes for Public Works Permitted Work on Sewer Collection System

1. Construction and installation of all sewer mains and appurtenances shall be in accordance with the City of Santa Ana Standard Plans and Specifications. Where the standard plans are silent, construction and installation of sewer mains and appurtenances shall conform to the Standard Specifications for Public Works Construction, 2012 edition.

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9. All sewer repairs shall be accomplished using stainless steel double banded couplings.

"ADD ALL NOTES TO PLANS"

APPROVED: DATE: 11/24/2020

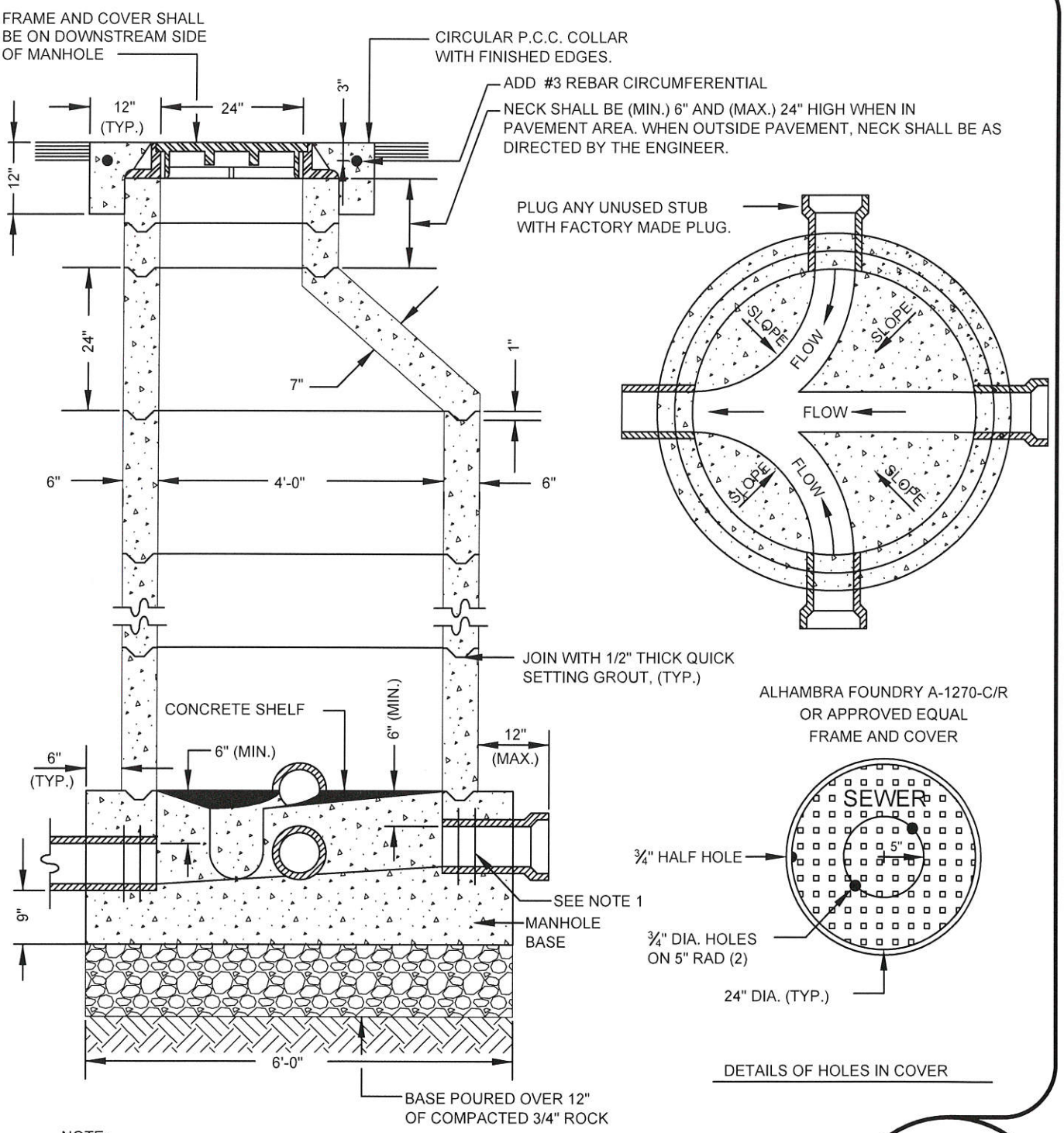
CITY OF SANTA ANA

PUBLIC WORKS AGENCY

DATE		REVISION
3/1/16	R.R.	NEW
11/2020	R.R.	UPDATED

SEWER CONSTRUCTION GENERAL NOTES

STD. PLAN NUMBER 1200



NOTE:
1. FOR PVC SEWER PIPES, INSTALL WATER STOP GASKETS

SEE ADDITIONAL INFORMATION ON SHEET 2

APPROVED: DATE: 11/24/2020

CITY OF SANTA ANA

PUBLIC WORKS AGENCY

DATE		REVISION
7/16/09	R.R	WATER STOP GASKET
11/5/12	J.A.	ADDED REBAR
3/1/16	R.R.	ADDED COMPOSITE COVER
11/2020	R.R.	UPDATED

SEWER MANHOLE

STD. PLAN NUMBER 1201

SHEET 1 OF 2

NOTES:

1. MANHOLE FRAME AND COVER SHALL BE CAST IRON AND SHALL CONFORM TO A.S.T.M. A-48, CLASS 30. MANHOLE FRAME AND COVER SHALL BE ALHAMBRA FOUNDRY A-1270-C/R OR APPROVED EQUAL. MANHOLE COVER SHALL HAVE 2 PICK HOLES PER DETAIL ON SHEET 1.

2. THE IDENTIFYING WORD "SEWER" SHALL APPEAR ON ALL SANITARY SEWER MANHOLE COVERS.

3. ELEVATION OF THE COVER TO BE DETERMINED BY THE ENGINEER.

4. ALL CONCRETE SHALL BE 560-C-3250 PER STANDARD SPECIFICATIONS.

5. BACKFILL MATERIAL TO SUBGRADE SHALL BE SAND, S.E. 30 (MIN) OR 0 SACK SLURRY, PLACED A MINIMUM OF 2 FEET LATERALLY AROUND STRUCTURE.

6. WHERE MANHOLE HAS 1 OR 2 INLETS AND 1 OUTLET, PLACE THE COVER DOWNSTREAM AND AWAY FROM PIPES.

7. THE TOP SURFACE OF THE SHELVES SHALL BE SLOPED DOWNWARD TOWARD THE CENTER OF MANHOLE AT THE RATE OF 1 INCH PER FOOT. THE HIGHEST ELEVATION OF THE SHELVES SHALL BE 6" MINIMUM ABOVE THE TOP OF PIPE OF THE MAIN SEWER LINE. CHANNELS AND SHELVES SHALL HAVE A SMOOTH STEEL TROWEL FINISH.

8. MANHOLES SHALL BE PRECAST NON-REINFORCED CONCRETE EXCEPT THAT THE CONTRACTOR, AT HIS OPTION AND EXPENSE, MAY FURNISH REINFORCED PRECAST MANHOLES CONFORMING TO SECTION 70-1.02H OF THE STATE STANDARD SPECIFICATIONS, (CURRENT EDITION).

9. SOFFIT OF MAIN LINE BRANCHES AND LATERALS SHALL MATCH SOFFIT OF TRUNK SEWER.

10. RIGHT ANGLE TURN OF MANHOLE'S CHANNEL SHALL HAVE A MINIMUM DROP OF 0.20 FEET.

11. MAINTAIN THE SLOPE OF THE SEWER MAIN IN THE MANHOLES WITH A STRAIGHT THROUGH CHANNEL, IF NO INLET-OUTLET ELEVATIONS ARE SHOWN ON THE PLANS.

12. MANHOLE SHALL NOT HAVE STEPS. IF PRE-CAST MANHOLE IS MANUFACTURED W/ STEPS, CONTRACTOR SHALL AT HIS EXPENSE, REMOVE THE STEPS PRIOR TO INSTALLATION.

13. INSTALL #3 REBAR CIRCUMFERENTIAL TO THE P.C.C. COLLAR, 3" BELOW FINISHED GRADE

14. COMPOSITE MANHOLES AS MANUFACTURED BY EJ BEING H-20 TRAFFIC RATED MAY BE INSTALLED SUBJECT TO THE APPROVAL OF THE ENGINEER.

APPROVED: _____ DATE: 11/24/2020

CITY OF SANTA ANA

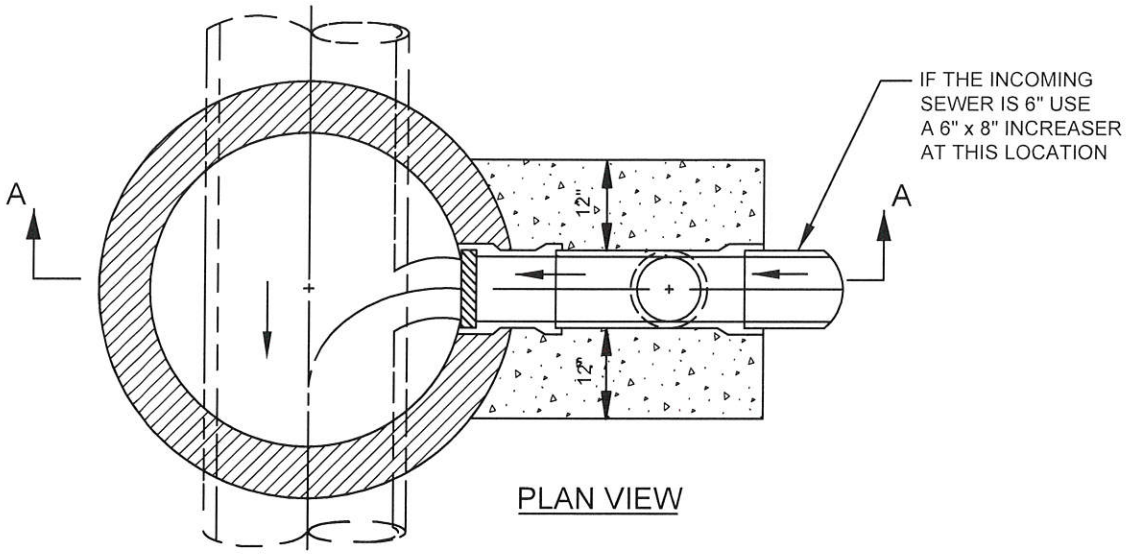
PUBLIC WORKS AGENCY

DATE		REVISION
7/16/09	R.R	SPECIFY MH COVER
11/5/12	J.A.	ADD NOTE 12 & 13
3/1/16	R.R.	ADDED COMPOSITE COVER
11/2020	R.R.	UPDATED

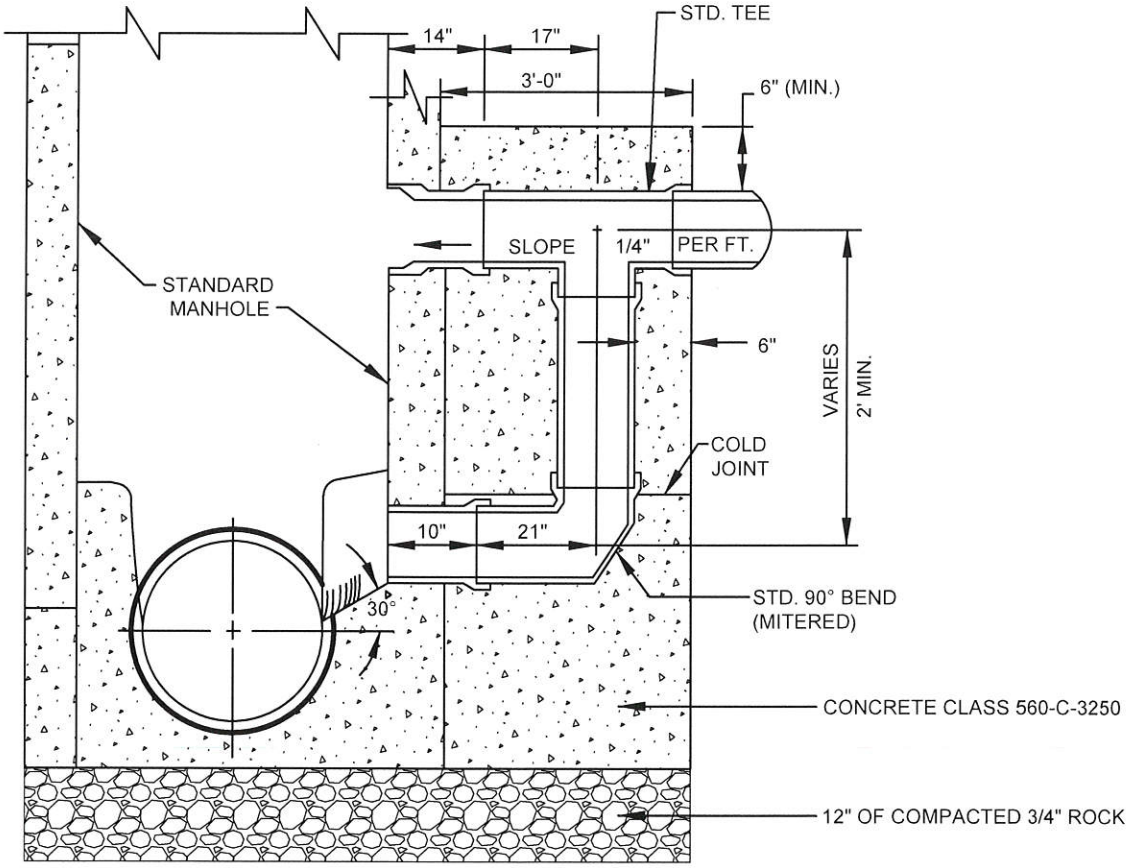
NOTES FOR SEWER MANHOLE AND DROP MANHOLE

STD. PLAN NUMBER 1201

SHEET 2 OF 2



PLAN VIEW



SECTION A-A

NOTE:

1. DIMENSIONS SHOWN ARE FOR 8" FITTINGS (THE MINIMUM SIZE TO BE USED).
2. NOTES ON SHEET 2 OF CITY STD. PLAN 1201 APPLY TO THIS STANDARD PLAN.
3. MATERIAL OF TEE AND FITTINGS TO MATCH THE MAIN MATERIAL.

APPROVED: DATE: 11/24/2020

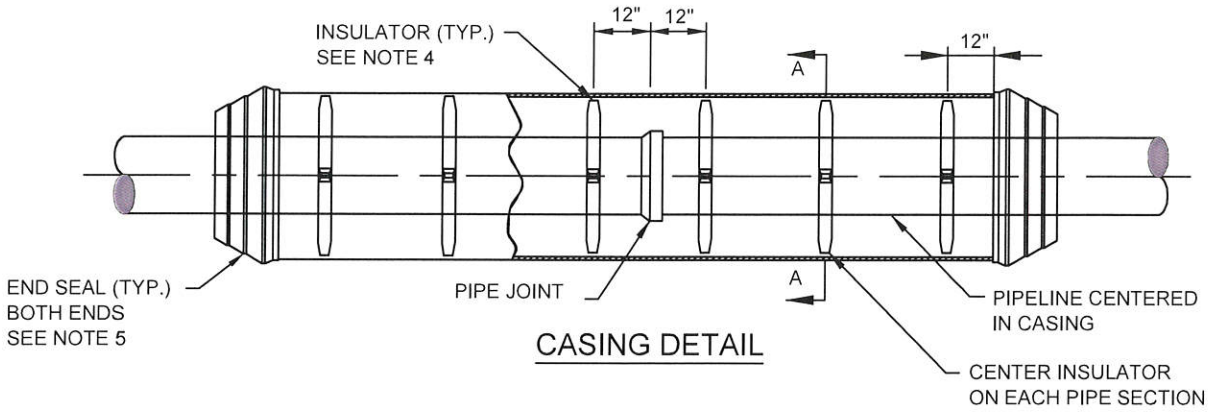
CITY OF SANTA ANA

PUBLIC WORKS AGENCY

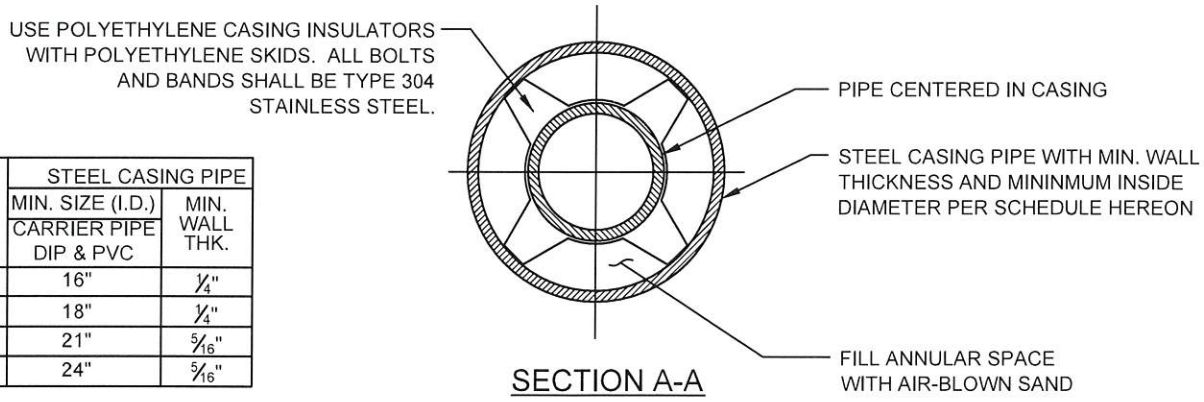
DATE		REVISION
11/7/67	R.E.W.	ADD INCREASER
7/16/09	R.R.	UPDATED
11/2020	R.R.	UPDATED

DROP MANHOLE

STD. PLAN NUMBER 1201A



CASING DETAIL



SECTION A-A

PIPE SIZE (I.D.)	STEEL CASING PIPE	
	MIN. SIZE (I.D.) CARRIER PIPE DIP & PVC	MIN. WALL THK.
6"	16"	1/4"
8"	18"	1/4"
10"	21"	5/16"
12"	24"	5/16"

NOTES:

1. ALL SEWER ENCASEMENT REQUIRES ENGINEER'S APPROVAL.
2. ALL STEEL CASING PIPE JOINTS SHALL BE WELDED FULL CIRCUMFERENCE.
3. UPSTREAM AND DOWNSTREAM ELEVATIONS TO BE VERIFIED.
4. SPACING BETWEEN THE CASING INSULATORS SHALL BE PER THE MANUFACTURER'S RECOMMENDATIONS, EXCEPT THAT THERE SHALL BE AT LEAST 3 CASING INSULATORS PER PIPE SECTION, ONE 12" FROM EACH JOINT AND ONE CENTERED. ADDITIONALLY, ONE INSULATOR SHALL BE INSTALLED 12" FROM EACH END OF THE CASING.
5. BOTH ENDS OF THE CASING BETWEEN THE CASING AND CARRIER PIPE SHALL BE SEALED WATER TIGHT USING AN END SEAL. BANDS SHALL BE TYPE 304 STAINLESS STEEL.

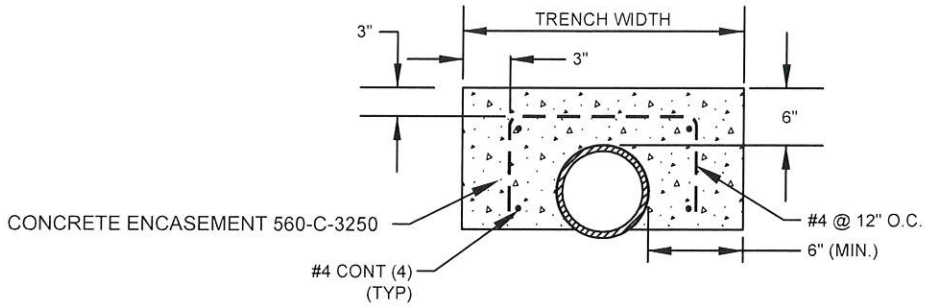
APPROVED: DATE: 11/24/2020

CITY OF SANTA ANA
PUBLIC WORKS AGENCY

DATE		REVISION
7/16/09	R.R.	ADD CASING PIPE
11/05/12	J.A.	SEPARATED INTO TWO CASES
11/2020	R.R.	UPDATED

STEEL CASING

STD. PLAN NUMBER 1203

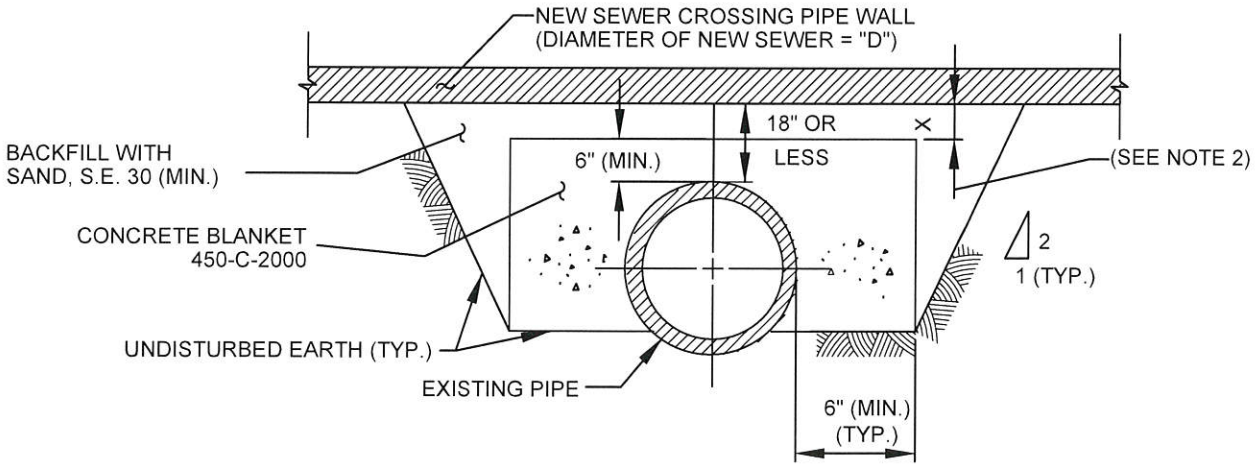


FOR USE WHEN PIPE COVER TO SURFACE IS LESS THAN 36"

CASE 1

NOTES:

1. ALL SEWER ENCASEMENT REQUIRES APPROVAL FROM THE WATER RESOURCES DIVISION.



CONCRETE BLANKET
(FOR EXISTING PIPES CROSSED OVER BY A NEW PIPE)

NOTES:

1. CONCRETE BLANKET IS REQUIRED WHEN THE CLEARANCE BETWEEN THE TOP OF THE EXISTING PIPE AND THE BOTTOM OF THE CROSSING PIPE IS LESS THAN 18".

2. X = 4-INCHES, MINIMUM, TO PROVIDE BEDDING MATERIAL FOR THE CROSSING PIPE. WHEN X IS LESS THAN MINIMUM, THE ENTIRE TOP SURFACE OF THE BLANKET SHALL BE RAISED TO MAKE CONTACT WITH THE LOWER 90° OF THE CROSSING PIPE.

3. THE BLANKET SHALL EXTEND LONGITUDINALLY TO THE FIRST JOINT BEYOND THE TRENCH EXCAVATION AT EACH END OF THE BLANKET, EXCEPT THAT THE BLANKET NEED NOT BE EXTENDED MORE THAN 4' BEYOND THE TRENCH.

CASE 2

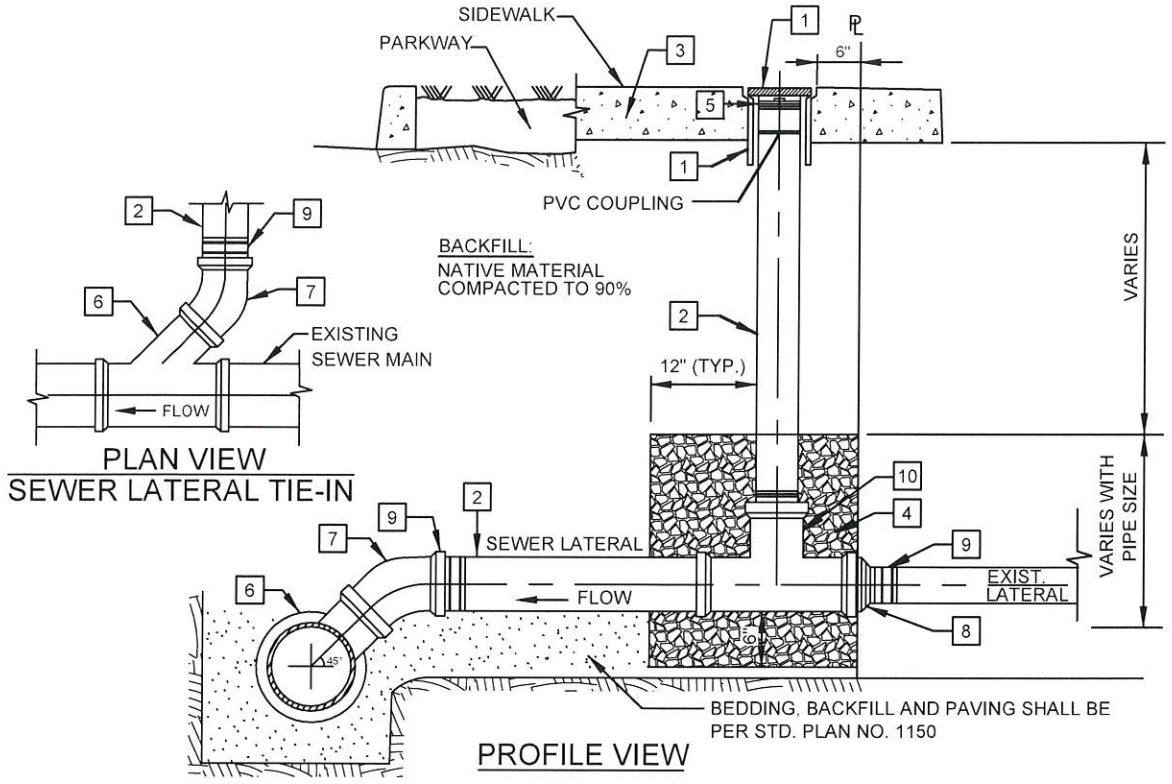
APPROVED: DATE: 11/24/2020

CITY OF SANTA ANA
PUBLIC WORKS AGENCY

DATE		REVISION
11/05/12	J.A.	ADDED 1203A
11/2020	R.R.	UPDATED

SEWER ENCASEMENT/
CONCRETE BLANKET

STD. PLAN
NUMBER
1203A



CONSTRUCTION ITEMS / MATERIALS LIST

NO.	SIZE AND DESCRIPTION	MANUFACTURER/MATERIAL	MFR. CAT. NO.
1	CAST IRON FRAME AND COVER ("SEWER")	ALHAMBRA FOUNDRY	A-2100
2	SDR-26; PVC SEWER PIPE -4" (MIN.) IF SERVING 4 DWELLINGS OR LESS -6" (MIN.) ALL OTHER CASES	SDR-26	
3	CONSTRUCT CONCRETE SIDEWALK PER CITY STD. PLAN 1104, SEE NOTE 3		
4	CRUSHED ROCK, 1/2" DIAMETER (MAX)		
5	MALE THREADED NUT PLUG		
6	CONSTRUCT NEW WYE AND MATCH EXIST. SEWER MAIN MATERIAL	SDR-26 PVC OR V.C.P.	
7	45° ELBOW SHALL MATCH WYE MATERIAL	SDR-26 PVC OR V.C.P.	
8	REDUCER (IF NECESSARY)	SDR-26	
9	COUPLING ADAPTER (IF NECESSARY)	STAINLESS STEEL DOUBLE BANDED	
10	PVC TWO-WAY TEE, DR 17	SDR-26	
11	45° PVC ELBOW	SDR-26	

NOTE:

1. MINIMUM LATERAL SLOPE SHALL BE 1/4" PER FOOT (2%).
2. ALL NEW DEVELOPMENTS SHALL CONSTRUCT NEW LATERAL PER THIS STANDARD.
3. SIDEWALK SHALL BE REPLACED FROM SCORE JOINT TO SCORE JOINT OR A MINIMUM OF 4 FEET BUT IN NO CASE SHALL FLOATING SECTION BE LESS THAN 4 FEET.

APPROVED: DATE: 11/24/2020

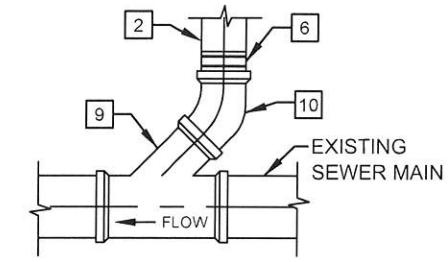
CITY OF SANTA ANA

PUBLIC WORKS AGENCY

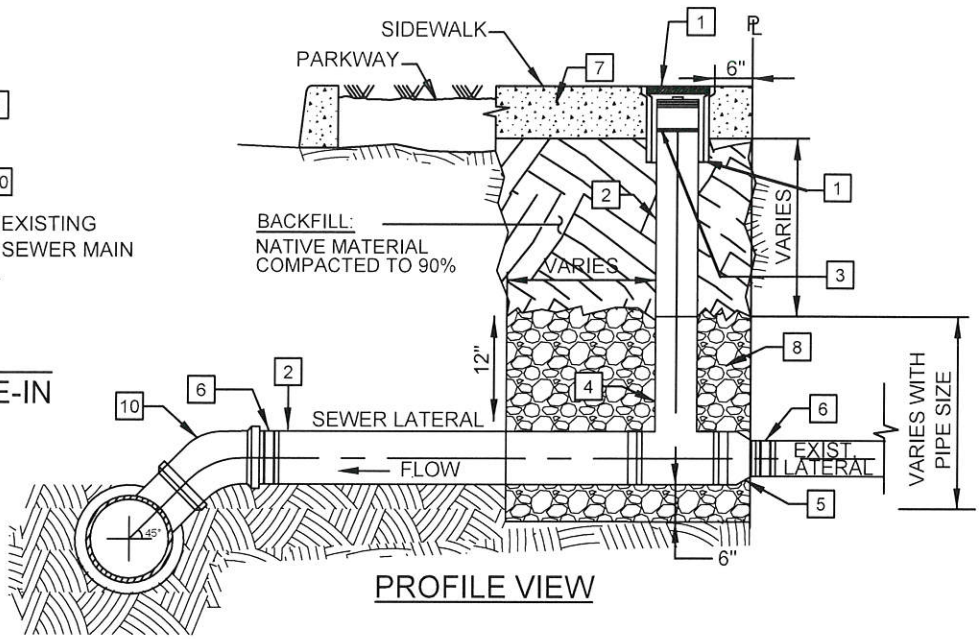
DATE		REVISION
8/19/03	A.F.	NEW DETAIL
7/16/09	R.R.	CHANGED MIN. LATERAL SIZE
11/5/12	J.A.	ADDED SDR 26
11/2020	R.R.	UPDATED

SEWER LATERAL AND CLEANOUT (OPEN TRENCH)

STD. PLAN NUMBER 1204



PLAN VIEW
SEWER LATERAL TIE-IN



PROFILE VIEW

CONSTRUCTION ITEMS / MATERIALS LIST

NO.	SIZE AND DESCRIPTION	MANUFACTURER/MATERIAL	MFR. CAT. NO.
1	CAST IRON FRAME AND COVER	ALHAMBRA FOUNDRY	A-2100
2	HDPE SEWER PIPE -4" (MIN.) IF SERVING 4 DWELLINGS OR LESS -6" (MIN.) ALL OTHER CASES	HDPE (HIGH DENSITY POLYETHELYNE) DR-17 OUTER SURFACE - GREEN STRIPE INNER SURFACE - REFLECTIVE COATING	
3	CLEAN OUT, 4", DR11 IPS	P & F DISTRIBUTORS OR APPROVED EQUAL	40040010
4	TWO-WAY TEE, DR 17	P & F DISTRIBUTORS OR APPROVED EQUAL	
5	REDUCER (IF NECESSARY)	SDR-26 OR DR-17	
6	COUPLING ADAPTER (IF NECESSARY)		
7	CONSTRUCT CONCRETE SIDEWALK PER CITY STD. PLAN 1104, SEE NOTE 4		
8			
9	CONSTRUCT WYE AND MATCH EXISTING SEWER MAIN MATERIAL		
10	45° ELBOW SHALL MATCH WYE MATERIAL		

NOTES:

1. WATER RESOURCES DIVISION SHALL REVIEW AND APPROVE OF PIPE BURSTING METHOD PRIOR TO CONTRACTOR COMMENCING WORK.
2. ALL HDPE JOINTS SHALL BE FUSED.
3. CONTRACTOR SHALL REMOVE THE FUSION "BEAD" FROM INSIDE OF PIPE USING APPROPRIATE CUTTING TOOL.
4. SIDEWALK SHALL BE REPLACED FROM SCORE JOINT TO SCORE JOINT OR A MINIMUM OF 4 FEET BUT IN NO CASE SHALL FLOATING SECTION BE LESS THAN 4 FEET.

APPROVED: DATE: 11/24/2020

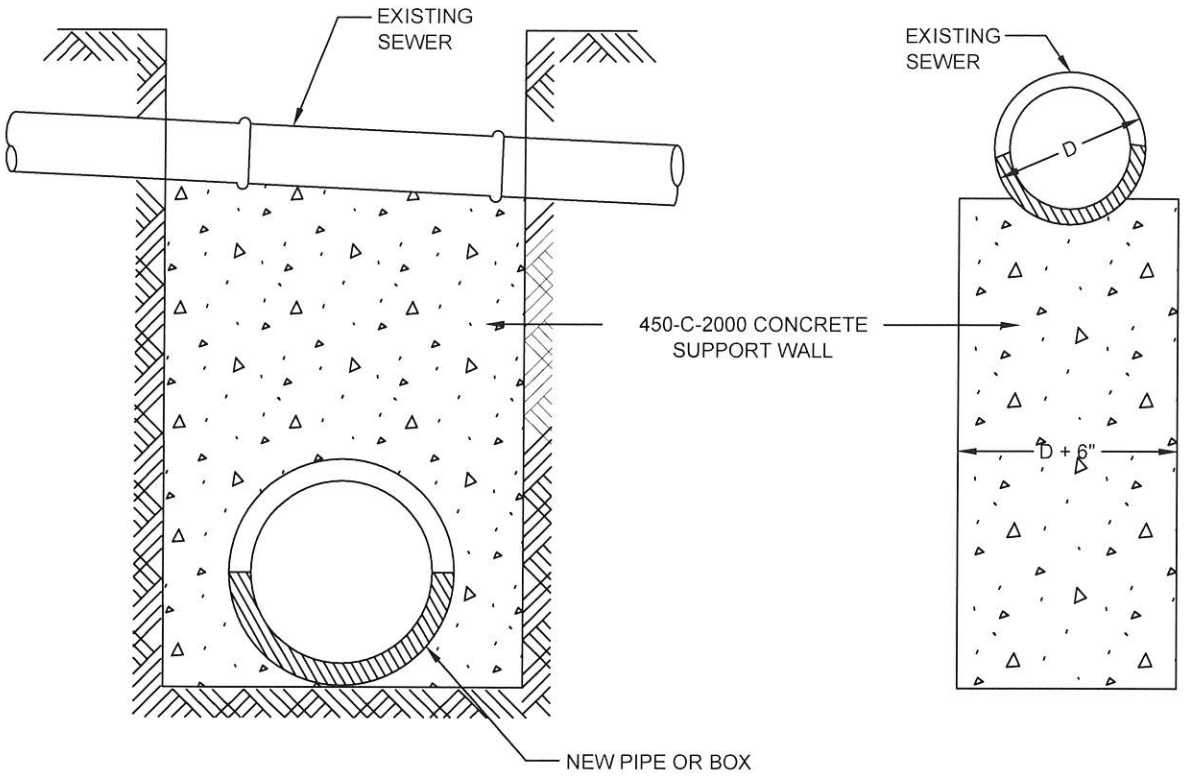
CITY OF SANTA ANA

PUBLIC WORKS AGENCY

DATE		REVISION
7/16/09	R.R.	NEW DETAIL
11/2020	R.R.	UPDATE

SEWER LATERAL
AND CLEANOUT
(PIPE BURSTING)

STD. PLAN
NUMBER
1204A



NOTES:

1. SUPPORTING WALL SHALL HAVE A FIRM BEARING ON THE SUBGRADE AND AGAINST THE SIDES OF THE EXCAVATION.
2. WALL SHALL BE AT LEAST 2" FREE AND CLEAR OF ANY GAS OR WATER MAIN OR OTHER CONDUIT OR DUCT.
3. WHENEVER SO DIRECTED BY THE ENGINEER, THE CONTRACTOR SHALL PIERCE THE WALL WITH SUITABLE OPENINGS TO PREVENT UNEQUAL PRESSURE RESULTING FROM FLOODING THE BACKFILL. THE VOLUME OF THE PIERCED OPENING SHALL NOT EXCEED 1/2 THE VOLUME OF THE SUPPORTING WALL.

APPROVED: DATE: 11/24/2026

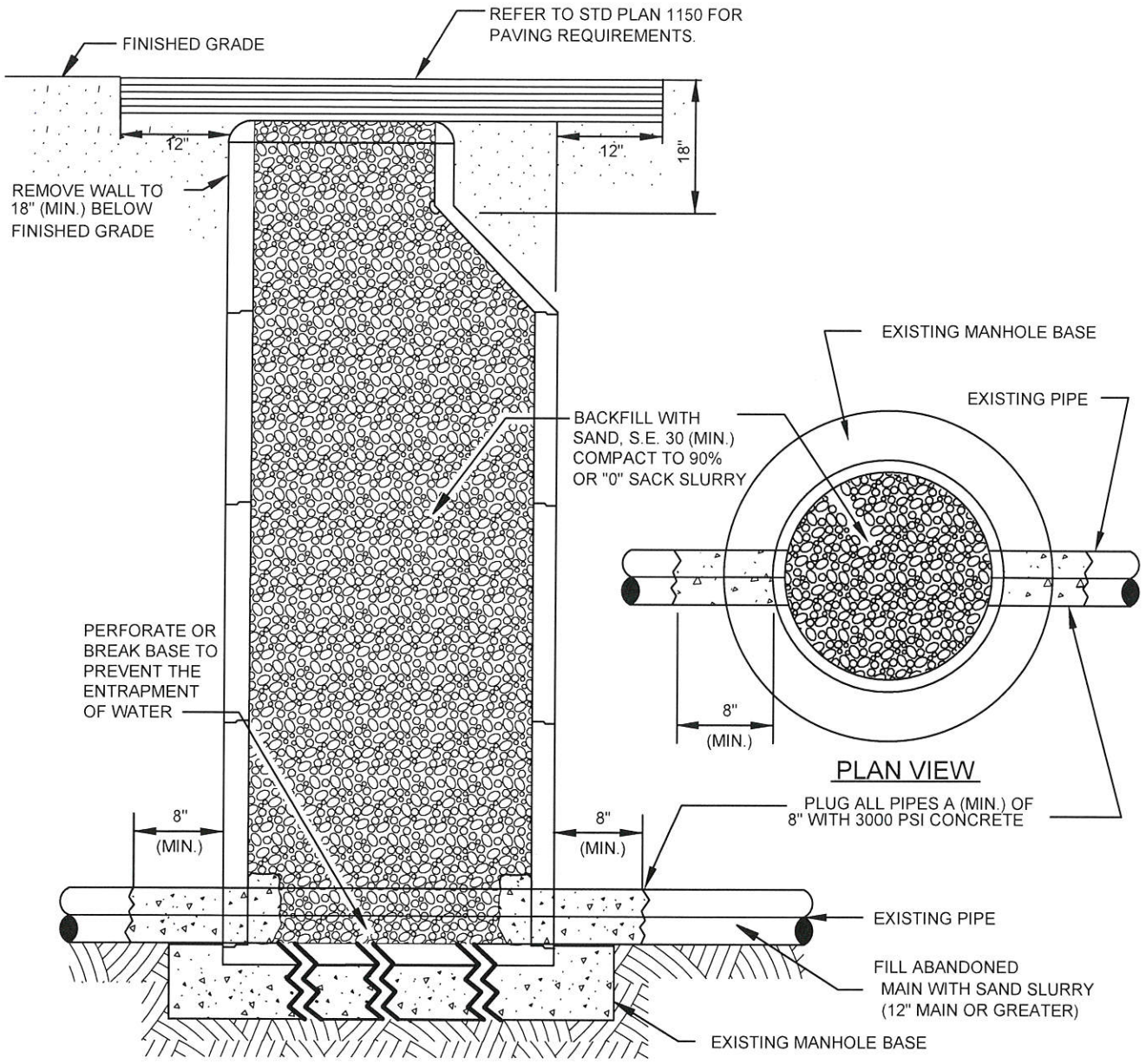
CITY OF SANTA ANA

PUBLIC WORKS AGENCY

DATE		REVISION
7/16/09	R.R.	DELETED CASE 1

METHOD OF SUPPORTING STORM DRAIN AND SEWER PIPES ACROSS TRENCHES

STD. PLAN NUMBER 1207



APPROVED: DATE: 11/24/2020

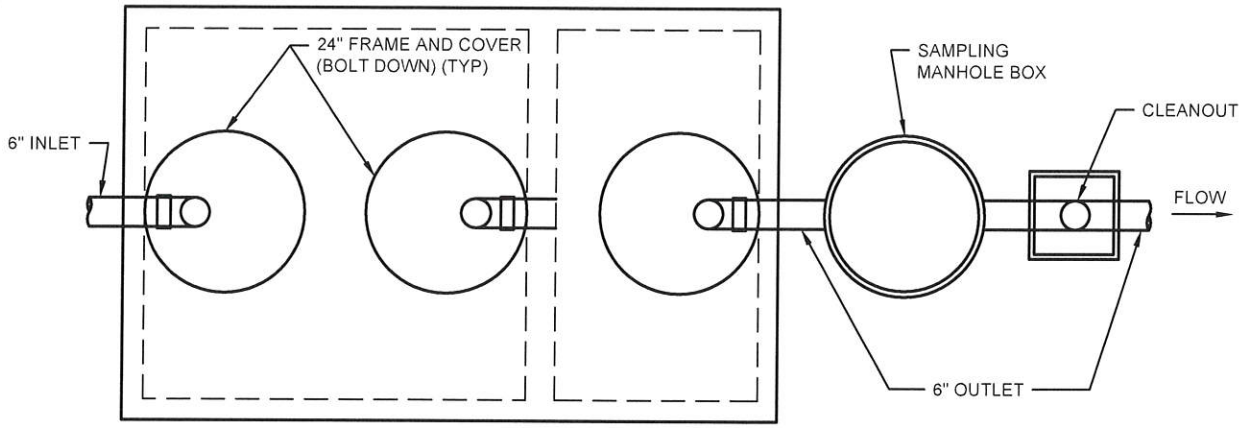
CITY OF SANTA ANA

PUBLIC WORKS AGENCY

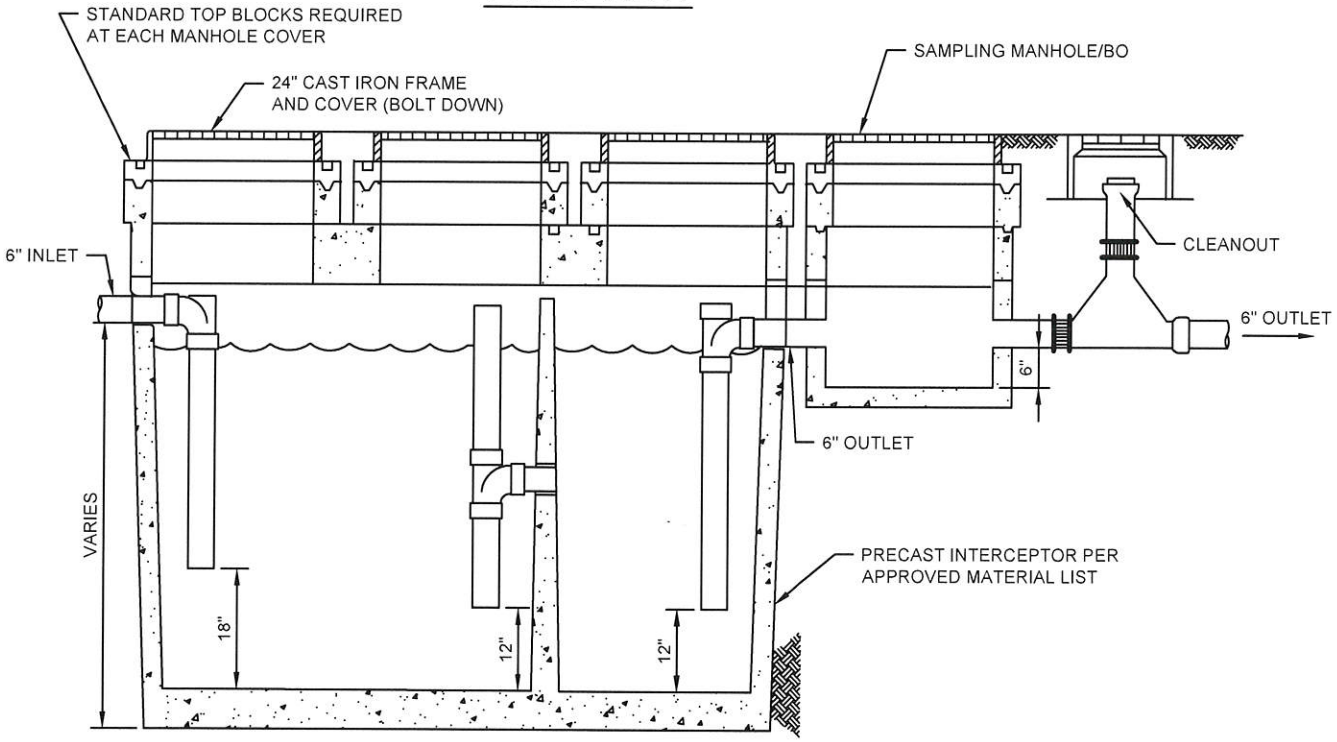
DATE		REVISION
7/16/09	R.R.	NEW DETAIL
11/5/12	J.A.	ADDED PLUG DETAIL
11/2020	R.R.	UPDATED

MANHOLE ABANDONMENT

STD. PLAN NUMBER 1209



PLAN VIEW



SECTION VIEW

NOTES:

1. MANHOLE LID ACCESS OVER EACH BAFFLE TUBE.
2. INTERCEPTOR LOCATED IN AN AREA SUBJECT TO TRAFFIC MUST BE HS-20 TRAFFIC RATED.
3. ALTERNATIVE MATERIALS ACCEPTABLE: HDPE OR FIBERGLASS (CAST IRON PIPE IS PROHIBITED)
4. INTERCEPTOR MUST HAVE IAPMO APPROVAL.
5. OUTLET SHALL BE SAME DIAMETER AS INLET.
6. INTERIOR OF INTERCEPTOR, INCLUDING ROOF, SHALL BE COATED WITH A PROTECTIVE COATING.

APPROVED: DATE: 11/24/2020

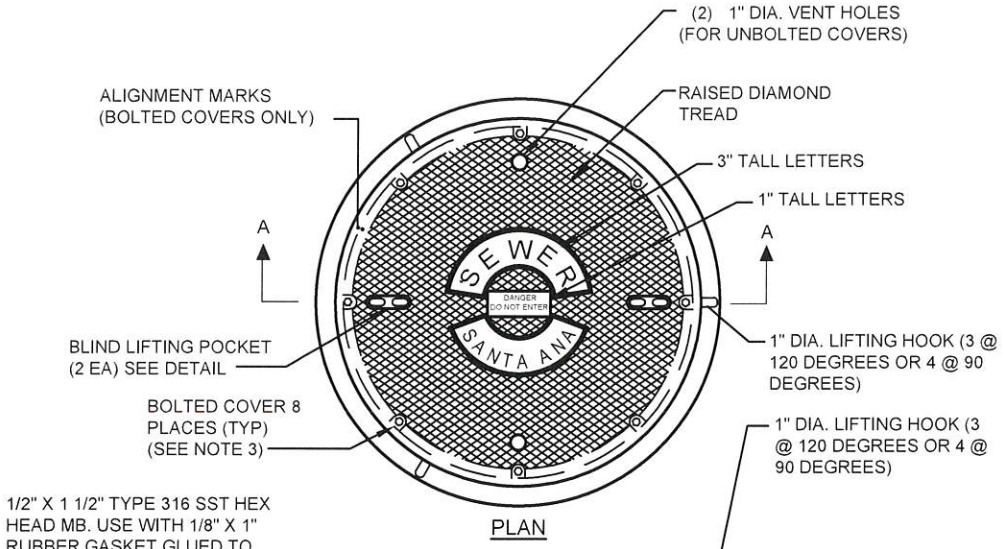
CITY OF SANTA ANA

PUBLIC WORKS AGENCY

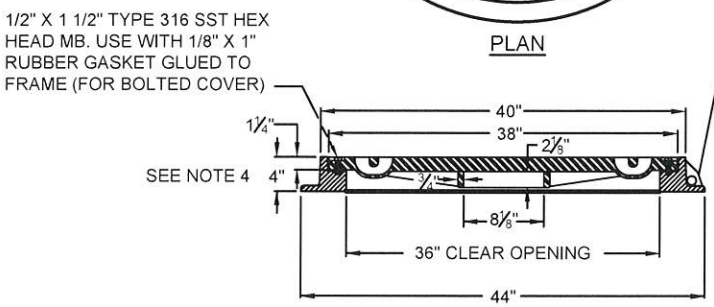
DATE		REVISION
11/2020	R.R.	NEW

GRAVITY GREASE INTERCEPTOR

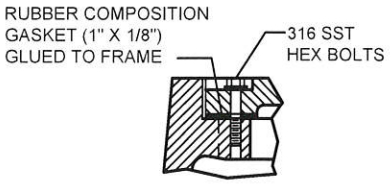
STD. PLAN NUMBER 1210



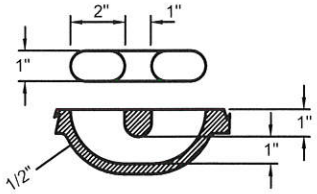
PLAN



SECTION A-A



BOLTING / SELF-SEAL DETAIL



BLIND LIFTING POCKET DETAIL

NOTES:

1. COVERS SHALL BE TRAFFIC GRADE.
2. ALL CASTINGS SHALL BE COMPLETELY PAINTED WITH 6 MILS. BITUMINOUS PAINT AND LETTERED "MADE IN COUNTRY OF ORIGIN", MARKED WITH MANUFACTURER'S IDENTIFICATION "HEAT NO._____" , "ASTM A-48", AND "CLASS 35B IRON" ON UNDERSIDE OF COVER. WEIGHT OF COVER SHALL BE 325 LBS. MIN., WEIGHT OF FRAME SHALL BE 270 LBS. MIN. ACTUAL WEIGHTS SHALL BE +/- 5 PERCENT OF THE MINIMUM.
3. BOLTED COVERS SHALL BE INSTALLED AT ALL INTERSECTIONS.
4. PROVIDE 6" RIM IF REQUIRED FOR ADJUSTMENT TO GRADE.
5. THE GAP BETWEEN THE COVER AND THE RING SHALL BE APPROXIMATELY 1/8" AROUND THE ENTIRE CIRCUMFERENCE AND SHALL NOT BE GREATER THAN 1/4" WHEN THE COVER IS SLID TO ONE SIDE.
6. IN LIEU OF CAST IRON FRAME AND COVER, THE WATER RESOURCES DIVISION MAY REQUEST A FIBER REINFORCED POLYMER (FRP) FRAME AND COVER MANUFACTURED BY GMI COMPOSITES, INC.

APPROVED: DATE: 11/24/2020

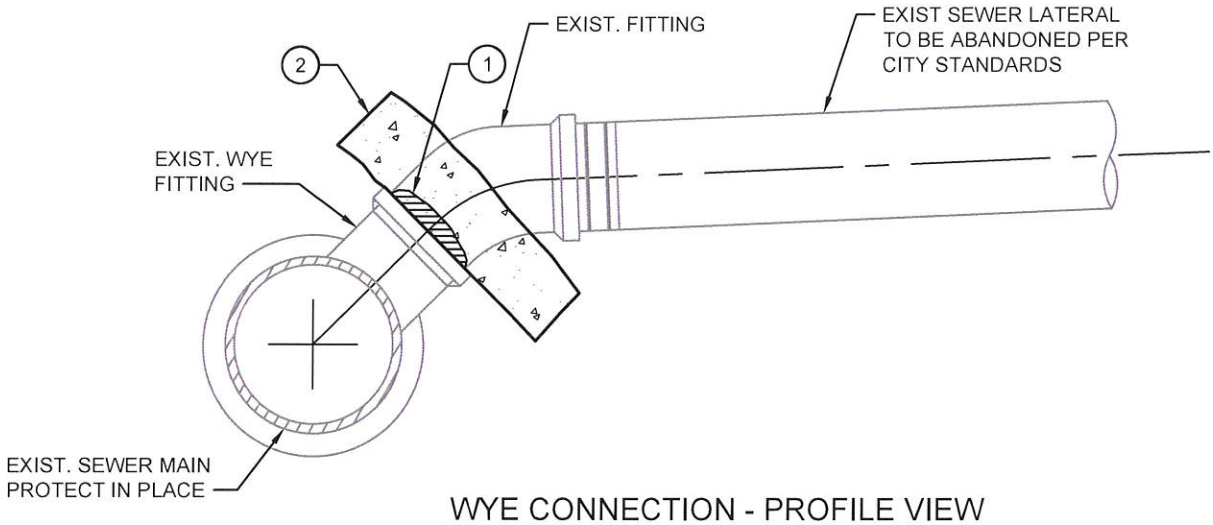
CITY OF SANTA ANA

PUBLIC WORKS AGENCY

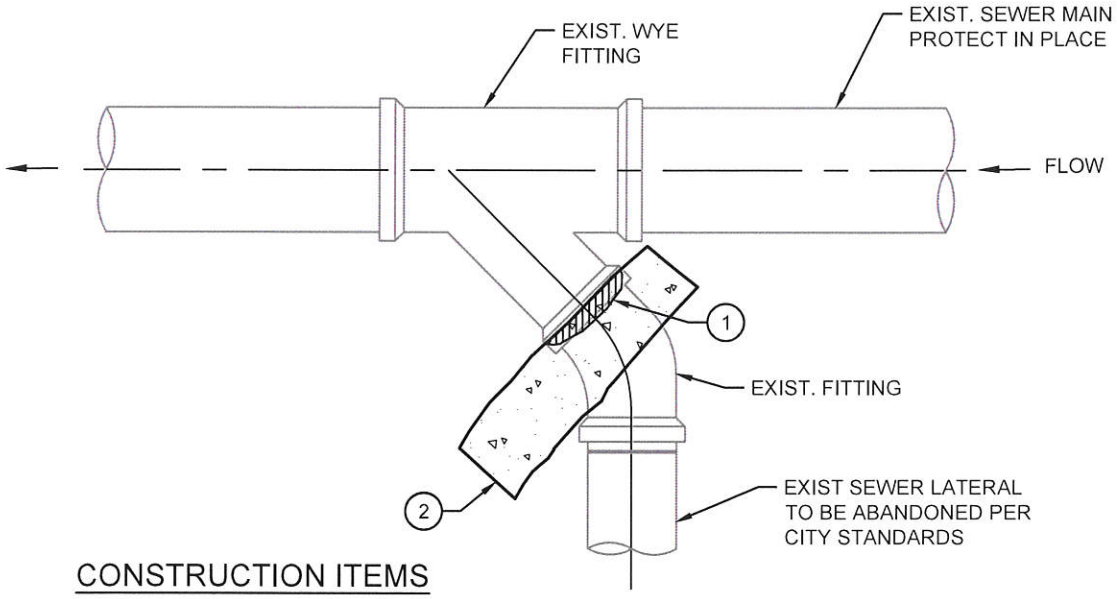
DATE		REVISION
11/2020	R.R.	NEW

36" SEWER MANHOLE COVER

STD. PLAN NUMBER 1211



WYE CONNECTION - PROFILE VIEW



CONSTRUCTION ITEMS

1. ALL LATERAL ABANDONMENTS SHALL HAVE A FACTORY MADE VCP PLUG INSTALLED IN THE BELL END OF THE EXISTING WYE CONNECTION, WITH RESTRAINT SUFFICIENT ENOUGH TO WITHSTAND LEAKAGE TESTING.
2. KEY SHAPED THRUST BLOCK SHALL BEAR AGAINST UNDISTURBED NATIVE SOIL. CONCRETE SHALL BE 560-C-3250 PER STANDARD SPECIFICATIONS.
3. IF EXISTING LATERAL IS NOT A WYE FITTING, CUT LATERAL PIPE AND INSTALL PLUG AND CONCRETE THRUST BLOCK.

APPROVED: DATE: 11/24/2020

CITY OF SANTA ANA

PUBLIC WORKS AGENCY

DATE		REVISION
11/2020	R.R.	NEW

SEWER LATERAL ABANDONMENT

STD. PLAN NUMBER 1212

STANDARD PLAN	NUMBER
WATER CONSTRUCTION GENERAL NOTES	1400
1" COPPER WATER SERVICE	1401
2" COPPER WATER SERVICE	1402
3" WATER SERVICE (SMALLER VAULT)	1403A
4" WATER SERVICE (SMALLER VAULT)	1403B
6" WATER SERVICE (SMALLER VAULT)	1403C
3", 4", AND 6" WATER SERVICE VAULT (SMALLER VAULT)	1403D
RESIDENTIAL FIRE AND DOMESTIC COMBINATION METER AND BACKFLOW ASSEMBLY	1404
FIRE HYDRANT INSTALLATION	1405
FIRE HYDRANT WITH PROTECTIVE CURB	1407
FIRE HYDRANT WITH PROTECTIVE POSTS	1407A
TAPPING SLEEVE AND GATE VALVE	1408
CUT / CAP AND PLUG INSTALLATION TIE-IN CONNECTION INSTALLATION	1409
GATE VALVE INSTALLATION	1410
BUTTERFLY VALVE INSTALLATION	1411
THRUST BLOCK INSTALLATION	1412
WATER MAIN TYPE 1 - VERTICAL OFFSET	1413A

APPROVED: DATE: 11/24/2020

CITY OF SANTA ANA

PUBLIC WORKS AGENCY

DATE		REVISION
11/2/05	J.B.	1405, 1413A, 1413B
3/17/08	R.R.	1410B
06/4/13	J.A.	ADDED STD 1404, DELETED STD 1100 COMBINED STD 1410 & 1410A
11/2020	R.R.	UPDATED

INDEX OF
STANDARD PLANS FOR
WATER IMPROVEMENTS

STANDARD PLAN	NUMBER
WATER MAIN TYPE 2 - VERTICAL OFFSET	1413B
2" BLOW OFF ASSEMBLY	1414
AIR AND VACUUM RELEASE VALVE ASSEMBLY (1")	1415A
FIRE SERVICE	1417
VALVE ANCHOR	1419
VERTICAL BEND ANCHOR	1420
TYPICAL DIMENSIONS PRACTICE FOR "AS-BUILT" WATER SYSTEM MAP	1421
SEPARATION OF WATER, NON-DOMESTIC WATER MAINS, SEWERS AND STORM DRAINS	1427
WATER PIPE CASING	1429
ABANDONMENT DETAILS	1430
DOUBLE CHECK VALVE ASSEMBLY (2" AND SMALLER)	1431
REDUCED PRESSURE PRINCIPLE BACKFLOW DEVICE (2" OR SMALLER)	1432
DOUBLE CHECK ASSEMBLY (3" OR LARGER)	1433A
DOUBLE CHECK DETECTOR ASSEMBLY (3" OR LARGER)	1433B
REDUCED PRESSURE PRINCIPLE ASSEMBLY (3" OR LARGER)	1434

APPROVED: DATE: 11/24/2020

CITY OF SANTA ANA

PUBLIC WORKS AGENCY

DATE		REVISION
8/19/03	A.F.	STD. 1428
9/2/08	R.R.	ADDED STD 1414 & 1429
6/14/13	J.A.	ADDED STD 1428A
11/2020	R.R.	UPDATED

INDEX OF
STANDARD PLANS FOR
WATER IMPROVEMENTS

STANDARD PLAN	NUMBER
REDUCED PRESSURE DETECTOR ASSEMBLY (3" OR LARGER)	1435
COMPACT DOUBLE CHECK DETECTOR ASSEMBLY (3" OR LARGER)	1436
COMPACT REDUCED PRESSURE DETECTOR ASSEMBLY (3" OR LARGER)	1437
COMPACT REDUCED PRESSURE PRINCIPLE ASSEMBLY (3" OR LARGER)	1438
ABOVE GROUND METER WITH APPROVED BACKFLOW ASSEMBLY (3")	1439A
ABOVE GROUND METER WITH APPROVED BACKFLOW ASSEMBLY (4")	1439B
ABOVE GROUND METER WITH APPROVED BACKFLOW ASSEMBLY (6")	1439C
RPP OR DCV APPROVED BACKFLOW ASSEMBLY (3" OR LARGER)	1440
PRIVATE WATER LINES WITH PUBLIC METERS	1442
CUT-IN TEE/AC MAIN TIE-IN	1443
WELD ON TAPPING SLEEVE	1444
RETAINING WALL	1445

APPROVED: DATE: 11/24/2020

CITY OF SANTA ANA

PUBLIC WORKS AGENCY

DATE		REVISION
8/19/03	A.F.	STD. 1428
9/2/08	R.R.	ADDED STD 1414 & 1429
6/4/13	J.A.	ADDED STD 1428A
11/2020	R.R.	UPDATED

INDEX OF
STANDARD PLANS FOR
WATER IMPROVEMENTS

SHEET
3 OF 3

General Notes for Public Works Permitted Work on Water Distribution System

1. Construction and installation of all water mains and appurtenances shall be in accordance with the City of Santa Ana Standard Plans and Specifications. Where the standard plans are silent, construction and installation of water mains and appurtenances shall conform to the American Water Works Association (AWWA) specifications and the Standard Specifications for Public Works Construction, 2012 edition.

2. Construction of water mains and appurtenances shall only be performed by qualified contractors with a valid California Contractor A or C34 license.

3. No person, other than City of Santa Ana Water Resources Division staff certified by the State of California as a Water Distribution Operator, shall be allowed to operate the City's water system valves.

4. No person, other than City of Santa Ana Water Resources Division staff certified by the State of California as a Water Distribution Operator, shall shut water service off to any customer.

5. Prior to the start of construction, the contractor shall submit to the City for review and approval "Disinfection and Flushing Plan" per the City of Santa Ana Design Guidelines and Standard Drawings.

6. All newly constructed water mains and appurtenances shall be disinfected and tested in accordance with American Water Works Association Standard C600's, prior to connecting to the City's water distribution system. Disinfection testing results shall be submitted to the Water Resources Division for review and approval prior to connecting to the City's water distribution system.

7. Water mains will be hydrostatic tested at 200 psi for 2 hours. New water mains cannot be tested against an existing valve but can be tested using a test plate.

8. Requests to shut-down the water distribution system for tie-ins or other purposes shall be coordinated with the Water Resources Division staff at least 2 weeks in advance through the City Inspector. All customers affected by the proposed shut down shall be notified in writing 48 hours in advance by the contractor.

9. The City of Santa Ana Water Resources Division cannot guarantee a complete shutdown of existing mains. The contractor shall be responsible for dewatering and isolation of construction for testing or any other purposes.

10. All fire hydrants which are out of service or new fire hydrants which have not been accepted for service shall be covered with a sack indicating that the hydrants are not in service.

11. Maintaining water service shall be the responsibility of the contractor for any shutdown lasting longer than four (4) hours. Method of providing temporary service must be approved by the Water Resources Division. The water shall be safe for drinking in accordance with State of California Water Resources Control Board (SWRCB) Drinking Water Program (DWP).

APPROVED: DATE: 11/24/2020

CITY OF SANTA ANA

PUBLIC WORKS AGENCY

DATE		REVISION
3/1/16	R.R	NEW
11/2020	R.R	UPDATED

WATER CONSTRUCTION GENERAL NOTES

STD. PLAN NUMBER 1400

General Notes for Public Works Permitted Work on Water Distribution System

12. Water meter will not be installed nor water turned on until the backflow devices required for the building and irrigation systems have been installed, tested, approved, and certified, and approved and signed off by the City. Contact Water Resources Division at 714-647-3320.

13. All water mains shall be AWWA C-900 PVC, DR14 pipe or AWWA C-151 Ductile Iron pipe. All other pipe materials require special review and approval from the Water Resources Division.

14. Water mains shall have 36" minimum cover to finished grade. Any deviation from this requirement requires approval from the Water Resources Division.

15. Contractor to verify depth and location of all utilities and points of connection prior to trenching.

16. Private water appurtenances such as backflow preventers, fire hydrants and standpipes, and valves shall be painted as follows:

a. Domestic water: Blue
b. Potable Irrigation: Green
c. Recycled Irrigation: Purple
d. Fire Protection: OSHA Safety Red

17. Do not cut or snap cut or mill asbestos cement pipe. Where joining existing asbestos cement pipe, expose six feet in each direction, looking for the nearest joint and join to new pipe with a properly dimensioned adapter per Standard Plan Number 1443.

18. Do not tap existing mains without the presence of a certified Public Works inspector. Pressure test tapping sleeve in the presence of a certified Public Works inspector before tapping existing main.

19. Final acceptance will not occur until original record drawings on mylar and digital file are delivered to and accepted by the City's inspector. Show all field changes on record drawings.

20. Trench plates shall be flush with pavement and shall be non-skid.

21. When public water facilities are located on private property, easement documents are to be submitted to City for approval prior to a permit being issued.

22. All recycled water projects require review and approval by the Water Resources Division.

23. Remove from the field upper and lower fire hydrant dry barrel and 24" X 36" iron vault lid covers and deliver undamaged to the City Water Resources Division Yard located at 215 S. Center Street. Prior notification of the delivery is required at 714-647-3320.

24. Water main fittings shall be flange or mechanical joints only, no push-on joint fittings allowed.

25. Contractor shall not remove or dispose existing water meters. Contractor shall apply for an Abandon Water Meter Application. Contractor shall contact Water Resources Division at 714-647-3320 for existing meter removals.

26. Installation of new water meter service curb stop shall be done after installation of new curb and gutter or after contractor has established the proposed curb grade by staking of the proposed curb.

"ADD ALL NOTES TO PLANS"

APPROVED: DATE: 11/24/2020

CITY OF SANTA ANA

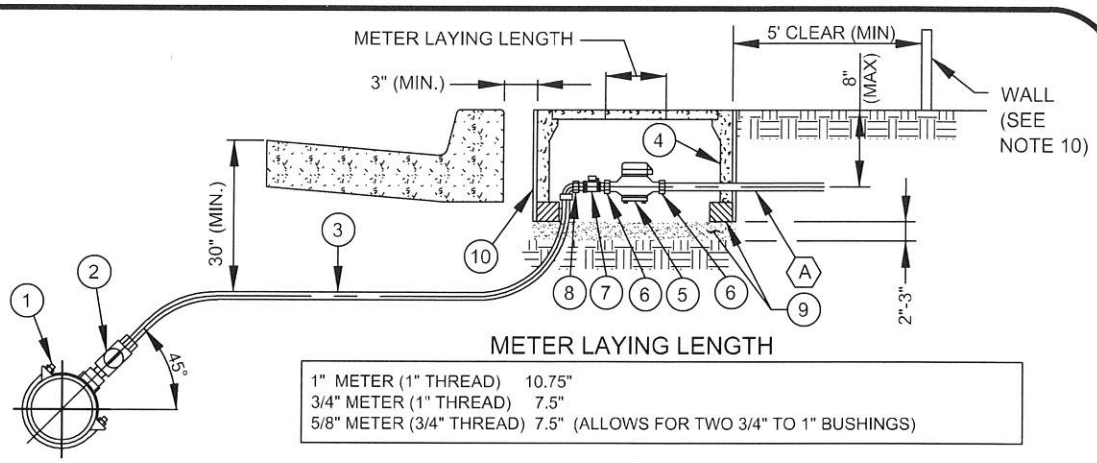
PUBLIC WORKS AGENCY

DATE		REVISION
3/1/16	R.R.	NEW
11/2020	R.R.	UPDATED

WATER CONSTRUCTION GENERAL NOTES

STD. PLAN NUMBER 1400

SHEET 2 OF 2



METER LAYING LENGTH

1" METER (1" THREAD)	10.75"
3/4" METER (1" THREAD)	7.5"
5/8" METER (3/4" THREAD)	7.5" (ALLOWS FOR TWO 3/4" TO 1" BUSHINGS)

CONSTRUCTION ITEMS / MATERIALS LIST

NO.	SIZE AND DESCRIPTION	MANUFACTURER	MFR. CAT. NO.
1	LEAD FREE BRASS SERVICE SADDLE WITH IP TAP	FORD, JONES, MUELLER	S-912 SERIES, J-996, H13000 SERIES
2	1 INCH LEAD FREE BRASS CORPORATION STOP	FORD, JONES	F1100-4, J-3403
3	1 INCH TYPE K SOFT COPPER TUBING	TYPE "K" SOFT	
4	PLASTIC METER BOX	DFW	DFW 486WBC4-12 BODY DFW 486C-AF4T 63D NHK - LID COLOR-GREY
5	METER	FURNISHED & INSTALLED BY CITY SEE NOTES 6 AND 8 (BELOW)	
6	1 INCH BRONZE METER COUPLING	FORD	C38-44
7	1 INCH LEAD FREE BRASS CURB STOP WITH LOCKING WING NUT	FORD, JONES	B11-444W, J-1900
8	1 INCH LEAD FREE BRASS 90° BEND COMPRESSION X M.I.P.	FORD, JONES	L84-44, J-2619
9	COMMON BRICK (TYPICAL) WITH PEA GRAVEL BASE	ONE AT EACH CORNER	
10	THIN PLYWOOD ON OUTSIDE OF BOX (ALL SIDES)	TO PREVENT CAVE-IN THROUGH NOTCHES	

NOTES:

1. CONNECTION TO WATER MAINS GREATER THAN 12 INCHES IN DIAMETER OR ANY WATER MAIN MADE OF STEEL (CML&C, CYLINDER,ETC.) REQUIRES APPROVAL FROM WATER RESOURCES DIVISION.
2. WHEN CONNECTING A 5/8" METER TO A 1" SERVICE, USE A BRONZE WATER METER BUSHING ON BOTH ENDS (FORD A-34).
3. NO SPLICES WILL BE PERMITTED BETWEEN THE CORPORATION STOP AND THE CURB STOP.
4. NO TAP TO A MAIN SHALL BE WITHIN 18" OF A COUPLING OR WITHIN 18" OF ANOTHER TAP.
5. UNDER NORMAL CONDITIONS THE WATER SERVICE SHALL EXTEND PERPENDICULAR TO THE CENTERLINE OF THE STREET FROM THE WATER MAIN TO THE METER STOP.
6. METER IS TO BE INSTALLED BY THE CITY AFTER METER BOX IS IN PLACE (SEE GENERAL NOTE 12 ON STD. PLAN NO. 1400.
7. CURB STOP IS TO BE INSTALLED PLUMB AND SQUARE WITH THE CURB.
8. METER LAYING LENGTH IS MEASURED FROM THE FACE OF THE METER COUPLINGS. THE DISTANCE BETWEEN COUPLINGS SHALL NOT DEVIATE FROM THOSE SPECIFIED IN THE METER LAYING LENGTH TABLE.
9. METER BOX IS TO BE POSITIONED SO THAT METER FACE IS HORIZONTALLY CENTERED WITHIN THE BOX. THE TOP OF THE BOX SHALL BE LEVEL AND FLUSH WITH THE TOP OF THE CURB.
10. METER BOX SHALL HAVE 5' CLEARANCE FROM ANY WALL, TREE, OTHER UTILITY OR SUB-SURFACE FACILITY, UNLESS APPROVED BY WATER RESOURCES DIVISION.

(A) HOUSE LINE PER PLUMBING CODE REQUIREMENTS.

APPROVED: DATE: 11/24/2020

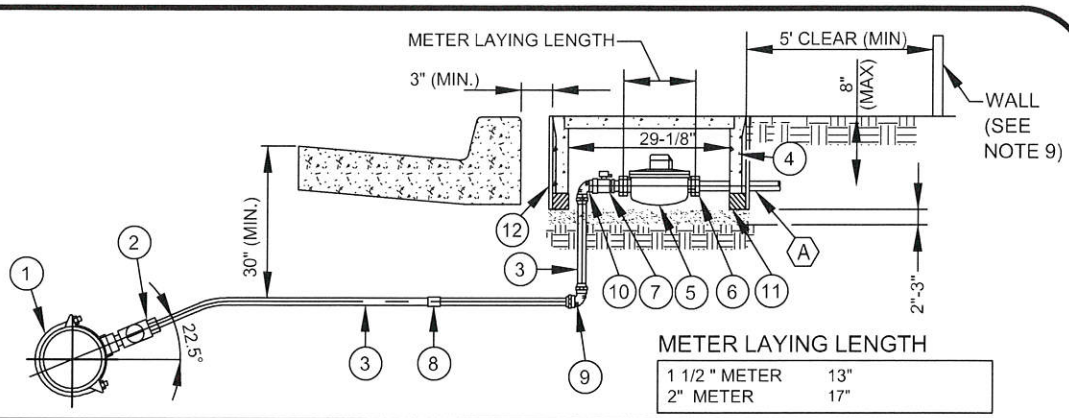
CITY OF SANTA ANA

PUBLIC WORKS AGENCY

DATE		REVISION
3/17/08	R.R.	UPDATED
6/4/13	J.A.	UPDATED
3/1/16	R.R.	ADDED NOTE 1
11/2020	R.R.	UPDATED

1" COPPER WATER SERVICE

STD. PLAN NUMBER 1401



METER LAYING LENGTH

1 1/2 " METER	13"
2" METER	17"

CONSTRUCTION ITEMS / MATERIALS LIST

NO.	SIZE AND DESCRIPTION	MANUFACTURER	MFR. CAT. NO.
1	LEAD FREE BRASS SERVICE SADDLE WITH I.P. TAP	FORD, JONES, MUELLER	S-912 SERIES, J-996, H13000 SERIES
2	2 INCH LEAD FREE BRASS CORPORATION STOP	FORD	FB1100-7
3	2 INCH TYPE K SOFT COPPER TUBING	TYPE "K" SOFT	
4	PLASTIC METER BOX	DFW DFW	DFW 1640C4-12 BODY DFW 1640C-AF4T 63D NHK - LID
5	METER	FURNISHED & INSTALLED BY CITY SEE NOTES 5 AND 7 (BELOW)	
6	LEAD FREE FLANGE COUPLING WITH I.P. FEMALE THREAD	FORD	CF31-66 (1-1/2"), CF 31-77 (2")
7	LEAD FREE BRASS FLANGED CURB STOP WITH PADLOCK WING	FORD	BF13-777WK
8	SOLDERED COPPER COUPLINGS		
9	LEAD FREE BRASS 90° ELBOW - COMPRESSION CONNECTIONS	FORD	L44-77 (2")
10	LEAD FREE BRASS 90° ELBOW - COMPRESSION X M.I.P.	FORD	L84-77 (2")
11	COMMON BRICK (TYPICAL) WITH PEA GRAVEL BASE	ONE AT EACH CORNER & ONE AT MIDPOINT OF EACH LONGSIDE	
12	THIN PLYWOOD ON OUTSIDE OF BOX (ALL SIDES)	TO PREVENT CAVE-IN THROUGH NOTCHES	

NOTES:

1. CONNECTION TO WATER MAINS GREATER THAN 12 INCHES IN DIAMETER OR ANY WATER MAIN MADE OF STEEL (CML&C, CYLINDER, ETC.) REQUIRES APPROVAL FROM WATER RESOURCES DIVISION.
2. NO COUPLING WILL BE PERMITTED BETWEEN CURB STOP AND CORPORATION STOP EXCEPT WHEN THE LENGTH BETWEEN THE ELBOW AND THE CORPORATION STOP EXCEEDS 20'.
3. NO TAP TO A MAIN SHALL BE WITHIN 18" OF A COUPLING OR WITHIN 18" OF ANOTHER TAP.
4. UNDER NORMAL CONDITIONS THE WATER SERVICE SHALL EXTEND PERPENDICULAR TO THE CENTERLINE OF THE STREET FROM THE WATER MAIN TO THE METER STOP.
5. METER IS TO BE INSTALLED BY THE CITY AFTER METER BOX IS IN PLACE. (SEE GENERAL NOTE 12 ON STD. PLAN NO. 1400)
6. CURB STOP IS TO BE INSTALLED PLUMB AND SQUARE WITH THE CURB.
7. METER LAYING LENGTH IS MEASURED FROM THE FACE OF THE METER COUPLINGS. THE DISTANCE BETWEEN COUPLINGS SHALL NOT DEVIATE FROM THOSE SPECIFIED IN THE METER LAYING LENGTH TABLE.
8. METER BOX IS TO BE POSITIONED SO THAT METER FACE IS HORIZONTALLY CENTERED WITHIN THE BOX. THE TOP OF THE BOX SHALL BE LEVEL AND FLUSH WITH THE TOP OF THE CURB.
9. METER BOX SHALL HAVE 5' CLEARANCE FROM ANY WALL, TREE, OTHER UTILITY, OR SUB-SURFACE FACILITY, UNLESS APPROVED BY WATER RESOURCES DIVISION.

(A) HOUSE LINE PER PLUMBING CODE REQUIREMENTS.

APPROVED: _____ DATE: 11/24/2020

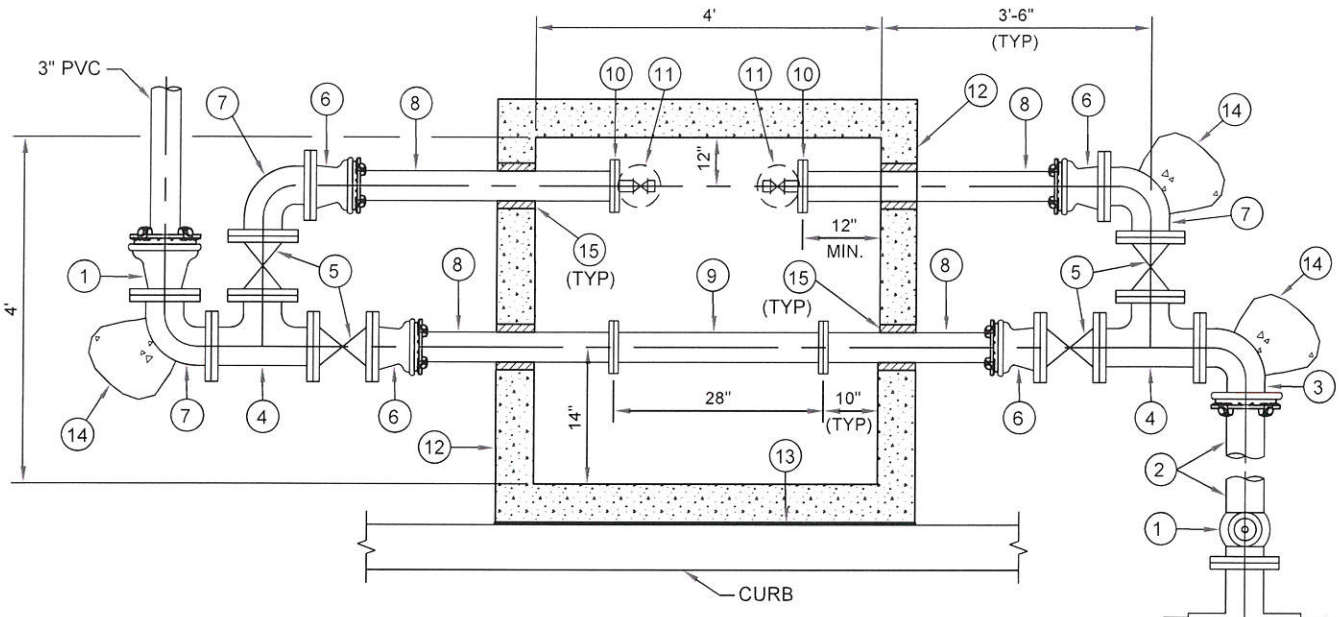
CITY OF SANTA ANA

PUBLIC WORKS AGENCY

DATE		REVISION
3/17/08	R.R.	REMOVED 1-1/2" SERVICE
6/4/13	J.A.	UPDATED
3/1/16	R.R.	ADDED NOTE 1
11/2020	R.R.	UPDATED

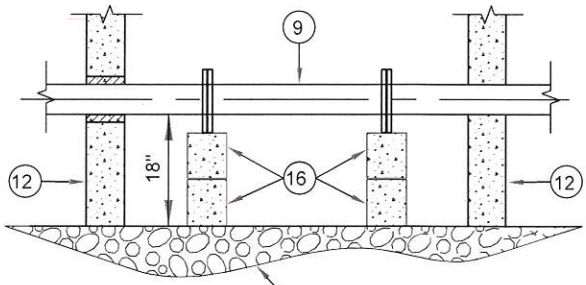
2" COPPER WATER SERVICE

STD. PLAN NUMBER 1402



PLAN VIEW

NOTE:
ON EXISTING MAIN CONSTRUCT HOT TAP PER CITY STD. 1408. FOR NEW MAIN CONSTRUCT TEE PER PLAN.



SIDE VIEW

NO.	CONSTRUCTION ITEMS / MATERIALS LIST	3" SERVICE LENGTH
1	4" R.W. GATE VALVE, (FLG X MJ) & VALVE BOX PER CITY STD PLAN 1410	-
2	4" DIA. DR 14, C900 P.V.C PIPE	-
3	4" DIA. 90° ELBOW, (FLG X MJ)	6.5"L
4	4" x 4" x 4" D.I. TEE (FLG x FLG x FLG)	13"L x 6.5"L
5	4" RW GATE VALVE (FLG) & VALVE BOX PER CITY STD PLAN 1410	9"L
6	D.I. REDUCER 4" x 3" (FLG x MJ)	7"L
7	4" DIA 90° ELBOW (FLG X FLG)	6.5"L
8	3" D.I. SPOOL (FLG X PE)	-
9	3" D.I. SPOOL (FLG X FLG)	28"L
10	3" D.I. BLIND FLANGE WITH 2" TAP	-
11	2" LEAD FREE BRASS CLOSE NIPPLE; 2" LEAD FREE BRASS CURB STOP WITH PADLOCK WING (F.I.P. X F.I.P.) FORD; 2" LEAD FREE BRASS PLUG	-
12	VAULT PER STD 1403D	-
13	1/2" EXPANSION JOINT MATERIAL BETWEEN VAULT AND SIDEWALK OR CURB	-
14	THRUST BLOCK PER CITY STD PLAN 1412	-
15	ALL VOIDS OR OPENING AROUND PIPES SHALL BE FILLED WITH DRY PACK	-
16	MASONRY BLOCK	-

NOTES:

1. ALL FITTINGS SHALL BE DUCTILE IRON UNLESS SPECIFIED OTHERWISE.
2. METER BOX SHALL HAVE 10' CLEARANCE FROM ANY WALL, TREES, OTHER UTILITIES OR SUB-SURFACE FACILITIES, UNLESS APPROVED BY THE WATER RESOURCES DIVISION.
3. ALL NUTS AND BOLTS SHALL BE STAINLESS STEEL TYPE 316.
4. METER TO BE SUPPLIED BY CITY AFTER SUBMITTAL OF METER APPLICATION, PAYMENT OF FEES AND REQUIRED APPROVALS (SEE GENERAL NOTE 12 ON STD PLAN NO. 1400).

APPROVED: DATE: 11/24/2020

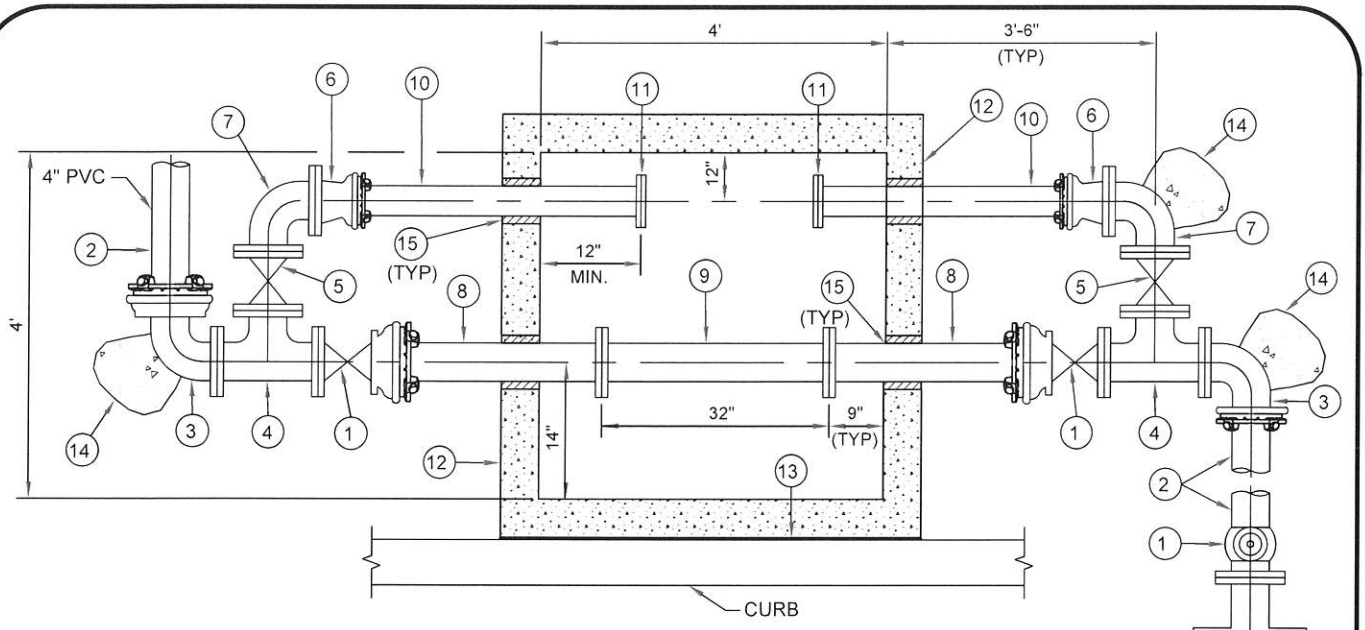
CITY OF SANTA ANA

PUBLIC WORKS AGENCY

DATE		REVISION
11/2020	R.R.	UPDATED

3" WATER SERVICE (SMALLER VAULT)

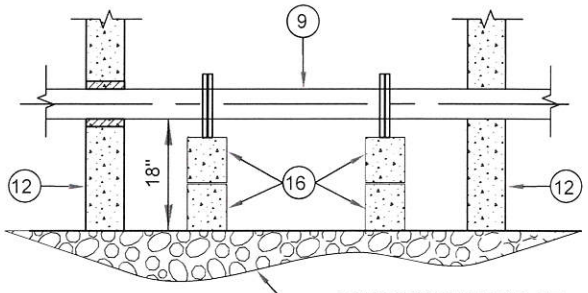
STD. PLAN NUMBER 1403A



PLAN VIEW

NO.	CONSTRUCTION ITEMS / MATERIALS LIST	4" SERVICE LENGTH
1	4" R.W. GATE VALVE, (FLG X MJ) & VALVE BOX PER CITY STD PLAN 1410	-
2	4" DIA. DR 14, C900 P.V.C PIPE	-
3	4" DIA. 90° ELBOW, (FLG X MJ)	6.5"L
4	4" x 4" x 4" D.I. TEE (FLG x FLG x FLG)	13"L x 6.5"L
5	4" RW GATE VALVE (FLG) & VALVE BOX PER CITY STD PLAN 1410	9"L
6	D.I. REDUCER 4" x 3" (FLG x MJ)	7"L
7	4" DIA 90° ELBOW (FLG X FLG)	6.5"L
8	4" D.I. SPOOL (FLG X PE)	-
9	4" D.I. SPOOL (FLG X FLG)	32"L
10	3" D.I. SPOOL (FLG X PE)	-
11	3" D.I. BLIND FLANGE	-
12	VAULT PER STD 1403D	-
13	1/2" EXPANSION JOINT MATERIAL BETWEEN VAULT AND SIDEWALK OR CURB	-
14	THRUST BLOCK PER CITY STD PLAN 1412	-
15	ALL VOIDS OR OPENING AROUND PIPES SHALL BE FILLED WITH DRY PACK	-
16	MASONRY BLOCK	-

NOTE:
ON EXISTING MAIN CONSTRUCT HOT TAP PER CITY STD. 1408. FOR NEW MAIN CONSTRUCT TEE PER PLAN.



CONSTRUCT FLOOR OF 18" OF 3/4" ROCK COMPACTED TO 90% RELATIVE COMPACTION

SIDE VIEW

NOTES:
1. ALL FITTINGS SHALL BE DUCTILE IRON UNLESS SPECIFIED OTHERWISE.
2. METER BOX SHALL HAVE 10' CLEARANCE FROM ANY WALL, TREES, OTHER UTILITIES OR SUB-SURFACE FACILITIES, UNLESS APPROVED BY THE WATER RESOURCES DIVISION.
3. ALL NUTS AND BOLTS SHALL BE STAINLESS STEEL TYPE 316.
4. METER TO BE SUPPLIED BY CITY AFTER SUBMITTAL OF METER APPLICATION, PAYMENT OF FEES AND REQUIRED APPROVALS (SEE GENERAL NOTE 12 ON STD PLAN NO. 1400).

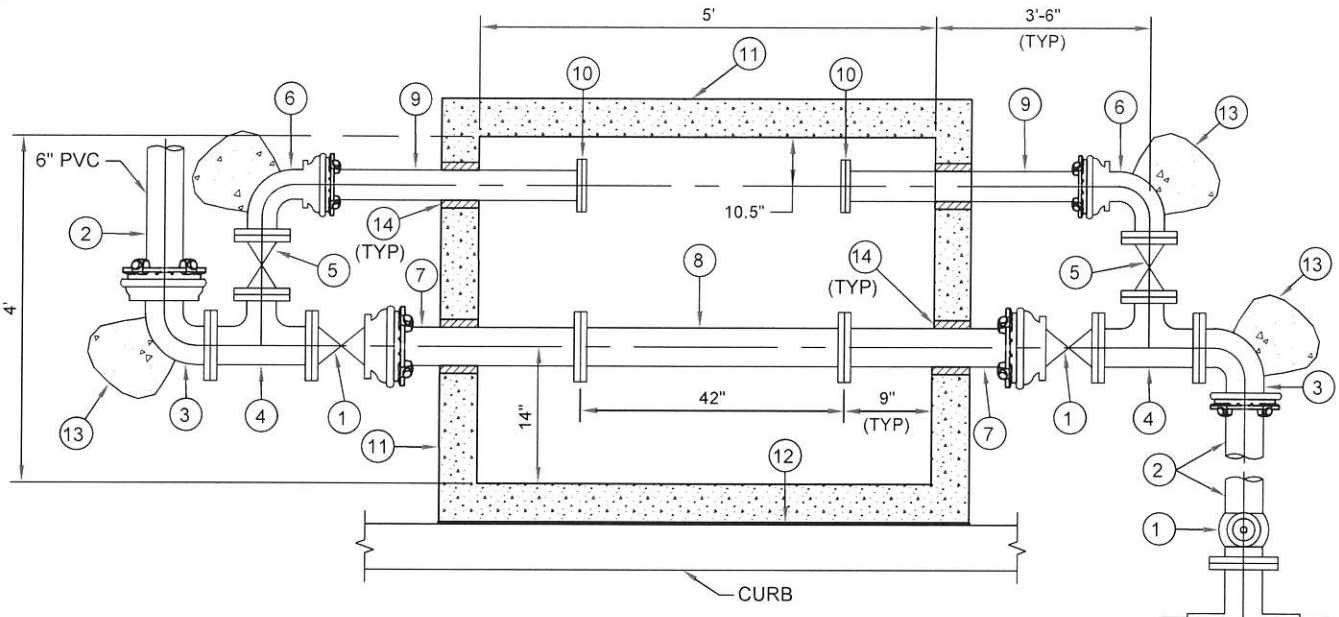
APPROVED: DATE: 11/24/2020

CITY OF SANTA ANA
PUBLIC WORKS AGENCY

DATE		REVISION
11/2020	R.R.	UPDATED

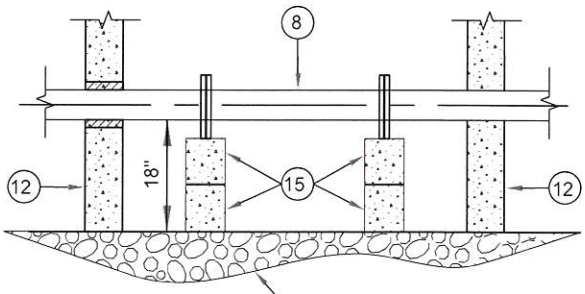
4" WATER SERVICE (SMALLER VAULT)

STD. PLAN NUMBER 1403B



PLAN VIEW

NOTE:
ON EXISTING MAIN CONSTRUCT HOT TAP PER CITY STD. 1408. FOR NEW MAIN CONSTRUCT TEE PER PLAN.



SIDE VIEW

NO.	CONSTRUCTION ITEMS / MATERIALS LIST	6" SERVICE LENGTH
1	6" R.W. GATE VALVE, (FLG X MJ) & VALVE BOX PER CITY STD PLAN 1410	-
2	6" DIA. DR 14, C900 P.V.C PIPE	-
3	6" DIA. 90° ELBOW, (FLG X MJ)	8"L
4	6" x 6" x 4" D.I. TEE (FLG x FLG x FLG)	16"L x 8"L
5	4" RW GATE VALVE (FLG) & VALVE BOX PER CITY STD PLAN 1410	9"L
6	4" DIA 90° ELBOW (FLG X MJ)	6.5"L
7	6" D.I. SPOOL (FLG X PE)	-
8	6" D.I. SPOOL (FLG X FLG)	42"L
9	4" D.I. SPOOL (FLG X PE)	-
10	4" D.I. BLIND FLANGE	-
11	VAULT PER STD 1403D	-
12	1/2" EXPANSION JOINT MATERIAL BETWEEN VAULT AND SIDEWALK OR CURB	-
13	THRUST BLOCK PER CITY STD PLAN 1412	-
14	ALL VOIDS OR OPENING AROUND PIPES SHALL BE FILLED WITH DRY PACK	-
15	MASONRY BLOCK	-

NOTES:
1. ALL FITTINGS SHALL BE DUCTILE IRON UNLESS SPECIFIED OTHERWISE.
2. METER BOX SHALL HAVE 10' CLEARANCE FROM ANY WALL, TREES, OTHER UTILITIES OR SUB-SURFACE FACILITIES, UNLESS APPROVED BY THE WATER RESOURCES DIVISION.
3. ALL NUTS AND BOLTS SHALL BE STAINLESS STEEL TYPE 316.
4. METER TO BE SUPPLIED BY CITY AFTER SUBMITTAL OF METER APPLICATION, PAYMENT OF FEES AND REQUIRED APPROVALS (SEE GENERAL NOTE 12 ON STD PLAN NO. 1400).

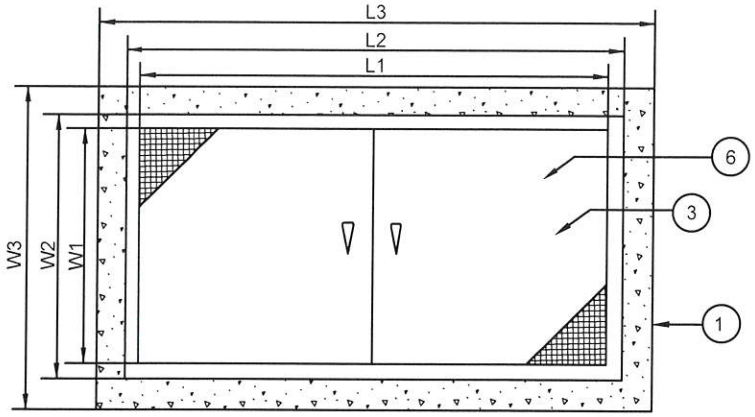
APPROVED: DATE: 11/24/2020

CITY OF SANTA ANA
PUBLIC WORKS AGENCY

DATE		REVISION
11/2020	R.R.	UPDATED

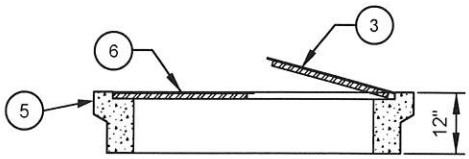
6" WATER SERVICE (SMALLER VAULT)

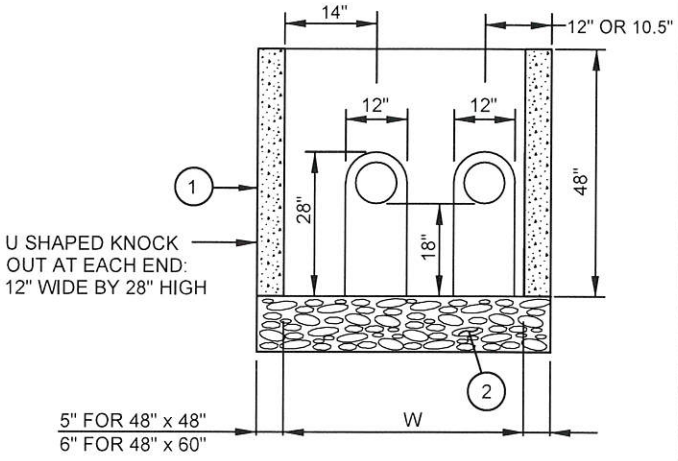
STD. PLAN NUMBER 1403C



SERVICE SIZE	L1	L2	L3	W1	W2	W3
3"	48"	48"	63"	48"	48"	68"
4"	48"	48"	63"	48"	48"	68"
6"	60"	60"	77"	48"	48"	68"

VAULT & METER PLAN VIEW





SIDE VIEW

NOTES:

1. VAULTS SHALL BE P.C.C. CONCRETE STRUCTURES CLASS 560-C-3250 MANUFACTURED BY J & R CONCRETE PRODUCTS, INC.
2. NO FLOOR. CONSTRUCT 18" OF 3/4" ROCK BASE COMPACTED TO 90% RELATIVE COMPACTION BENEATH VAULT
3. FRAME AND COVER COMPONENTS INCLUDING BRACES, SPRINGS, NUTS, AND BOLTS SHALL BE TYPE 316 STAINLESS STEEL
4. METER VAULT SHALL HAVE 10' CLEARANCE FROM ANY WALLS, TREES, OTHER UTILITIES OR SUB-SURFACE FACILITIES, UNLESS APPROVED BY WATER DIVISION
5. TOP OF BOX COVER SHALL BE FLUSH WITH CURB AND SIDEWALK.
6. VAULT COVER DESIGN:

   A. IF INSTALLED IN PARKING LOTS OR AREAS THAT MAY RECEIVE TRAFFIC, USE U.S.F. P-AHD STEEL DIAMOND PLATE. SPRING ASSIST TRAFFIC DOOR, 316 STAINLESS STEEL HARDWARE, OPEN SPRINGS, BOLT DOWN COVER, (2) DRAIN COUPLING, GALVZANIZED. DESIGNED FOR USE IN LOCATIONS THAT RECEIVE SLOW-MOVING H-20 TRAFFIC WHEEL LOADS ON A REGULAR BASIS AND WHERE THE SPEED LIMIT DOES NOT EXCEED 15 M.P.H. INTENDED FOR CONTINUOUS OFF-STREET TRAFFIC APPLICATIONS FOR USE IN PARKING LOTS.

   B. IF INSTALLED IN PARKWAYS OR AREAS PROTECTED FROM TRAFFIC, USE U.S.F. THD ALUMINUM DIAMOND PLATE. SPRING ASSIST COVER 316 STAINLESS STEEL HARDWARE, SLAM-LOCK AND SLAVE LOCK SYSTEM, OPEN SPRINGS, (2) DRAIN COUPLING. AREA OF FRAME IN CONTACT WITH CONCRETE TO BE PAINTED WITH BITUMINOUS COATING DESIGNED FOR OFF-STREET LOCATIONS WHICH MAY OCCASIONALLY RECEIVE H-20 WHEEL LOADS.

APPROVED: DATE: 11/24/2020

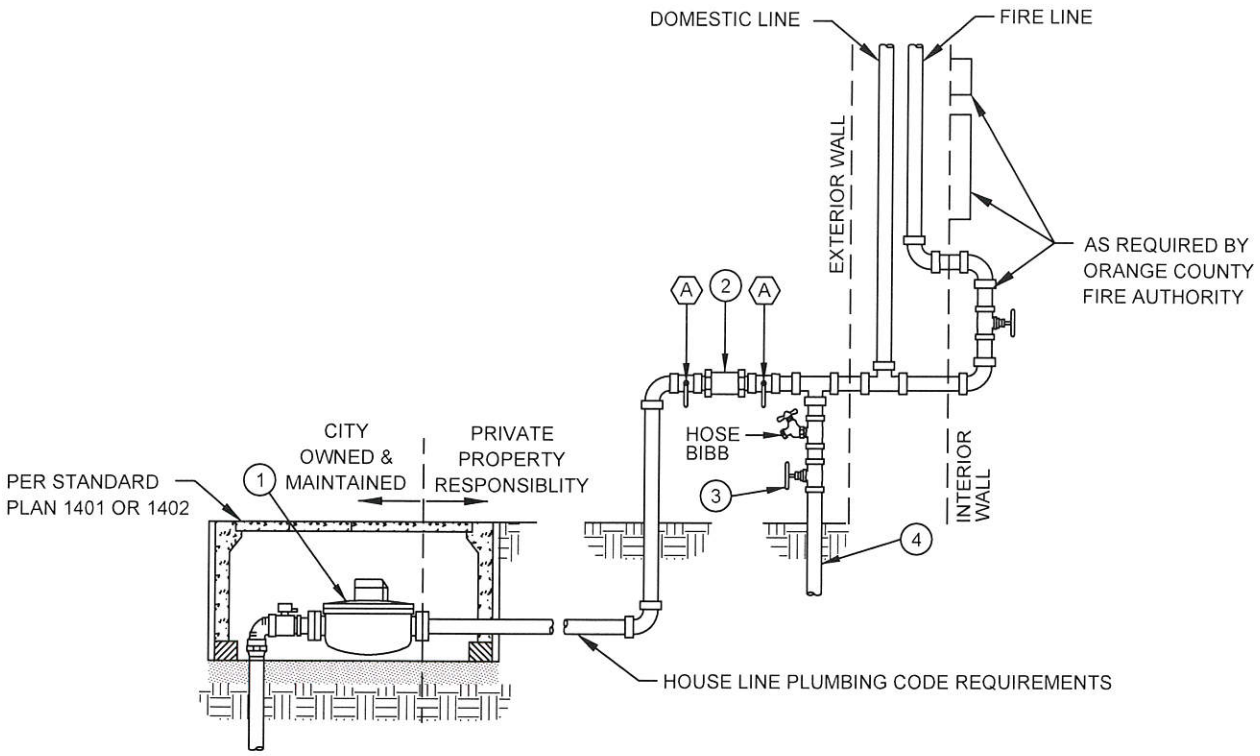
CITY OF SANTA ANA

PUBLIC WORKS AGENCY

DATE		REVISION
11/2020	R.R.	UPDATED

3", 4", AND 6"
WATER SERVICE VAULT
(SMALLER VAULT)

STD. PLAN NUMBER 1403D



CONSTRUCTION ITEMS / MATERIALS LIST			
NO.	SIZE AND DESCRIPTION	MANUFACTURER	MFR. CAT. NO.
1	RESIDENTIAL FIRE METER; MINIMUM 1" FOR RESIDENTIAL FIRE SERVICE	FURNISHED & INSTALLED BY CITY	
2	DOUBLE CHECK VALVE BACK FLOW ASSEMBLY	PER CITY APPROVED LIST CONTACT WATER QUALITY COORDINATOR AT (714) 647-3320	
3	IRRIGATION SHUT OFF VALVE	PER PLUMBING CODE REQUIREMENTS	
4	IRRIGATION LINE WITH AIR VACUUM BREAKER (AVB)	PER PLUMBING CODE REQUIREMENTS	

NOTES:

1. FOR WATER SERVICE AND METER DETAILS SEE CITY STD. PLANS 1401 AND 1402.
2. 1" MIN. RESIDENTIAL FIRE METER (RFM) REQUIRED FOR ALL NEW 'R' OCCUPANCY CONSTRUCTION.

(A) REMOVE AND STORE BACK FLOW ASSEMBLY SHUT OFF VALVE HANDLES IN FIRE SPRINKLER SPARE HEAD BOX

APPROVED: DATE: 11/24/2020

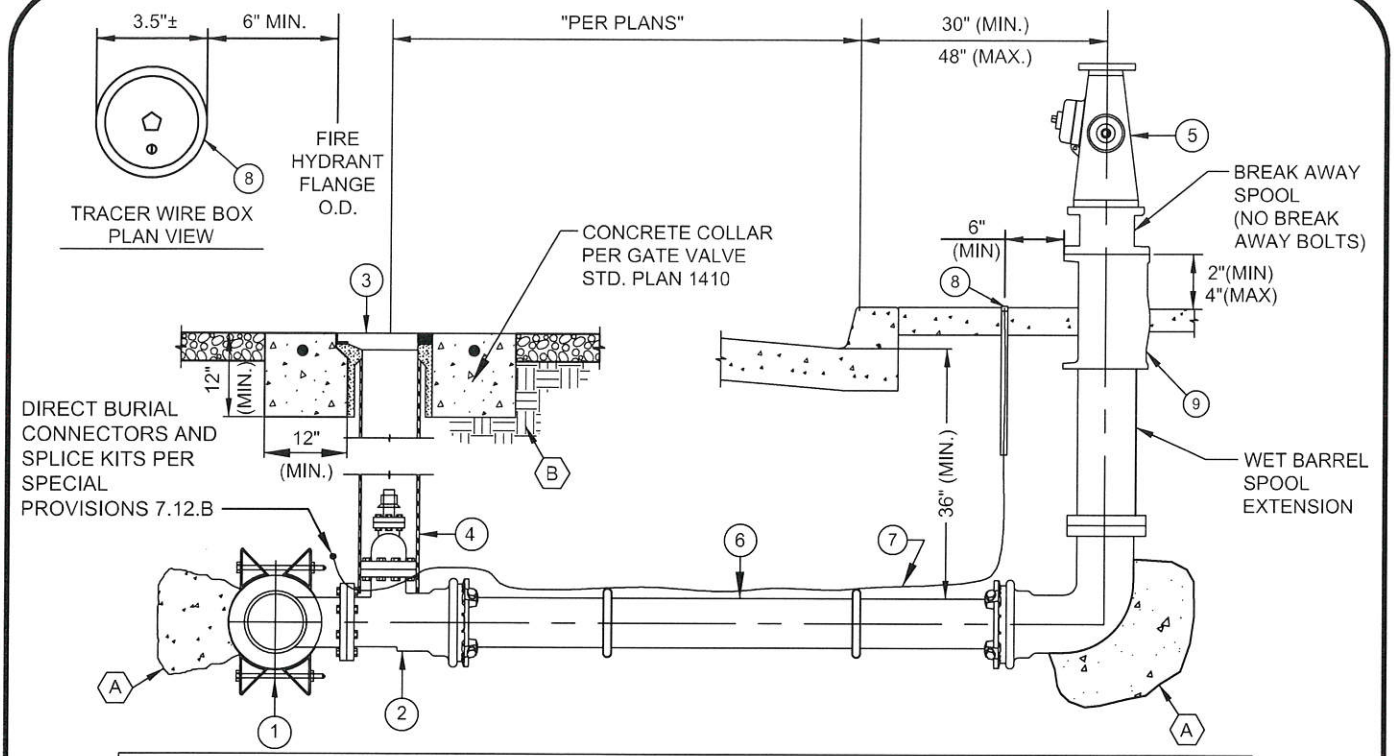
CITY OF SANTA ANA

PUBLIC WORKS AGENCY

DATE		REVISION
6/4/13	J.A.	NEW DETAIL
11/2020	R.R.	UPDATED

RESIDENTIAL
FIRE AND DOMESTIC COMBINATION
METER AND BACKFLOW ASSEMBLY

STD. PLAN NUMBER 1404



CONSTRUCTION ITEMS / MATERIALS LIST

NO.	SIZE AND DESCRIPTION	MANUFACTURER	MFR. CAT. NO.
1	TAPPING SLEEVE ON EXISTING MAIN EPOXY COATED & STAINLESS STEEL BOLTS (FOR NEW WATER MAIN CONSTRUCTION USE D.I. MJ X FLG TEE)	FORD SMITH-BLAIR	FTSC 622
2	GATE VALVE, 6" FLG. x M.J., (RESILIENT WEDGE) CLASS 200	CLOW	———
3	VALVE BOX FRAME & COVER, C.I.	MARK SERIES	10" MARK V TRI LID WATER POWDER COATED - BLUE
4	P.V.C. PIPE, 8", SCHEDULE 40	———	———
5	FIRE HYDRANT, SPOOL EXTENSION AND BURY ASSEMBLY:	CLOW	MODEL 860
6	LATERAL PIPE 6"; DR 14, C900 P.V.C.	———	———
7	#12 AWG WIRE, DIRECT BURY, HIGH MOL. WEIGHT POLY.	COPPERHEAD OR EQUAL	1230-HS-500 ROADWAY BOX RB14 *TP
8	TRACER WIRE BOX	SNAKEPIT	CD14*TP
9	CHECK VALVE AND BREAK AWAY SPOOL	CLOW	CLOW MODEL LBI 400A

NOTES:

1. ALL FIRE HYDRANT NUTS SHALL BE COATED WITH TRIPAC 2000 BLUE COAT SYSTEM. ALL OTHER BURIED NUTS AND BOLTS SHALL BE TYPE 316 STAINLESS STEEL.
2. ALL FIRE HYDRANTS SHALL HAVE A CONCRETE PAD 4'x4'x4".
3. FIRE HYDRANT SPECIFICATIONS: 5-1/2" MIN. - 7" WET BARREL, 1-4" PUMPER NOZZLE; AND 2-2 1/2" HOSE NOZZLE SIX HOLE LA DRILL PATTERN W/ REMOVABLE 4" OUTLETS, DUCTILE IRON WET BARREL HYDRANT, 1 1/8" PENTAGONAL NUT ON DUCTILE IRON CAPS SECURED W/ LINKED CHAINS, POWDER COATED EPOXY POLAR WHITE, VALVE SYSTEMS INSTALLED WITH 1 1/8" DUMMY NUT
4. HEAVY HEX BOLT GRADE B8M T-316 SHALL BE USED ON FIRE HYDRANT UPPER BARREL TO CHECK VALVE, EXTENSION SPOOL AND BURY CONNECTIONS.
5. RING FLANGE - TYTE GASKETS SHALL BE USED AT ALL FLANGE CONNECTIONS.
6. BLUE DOT HYDRANT MARKER SHALL BE LOCATED IN ACCORDANCE WITH ORANGE COUNTY FIRE AUTHORITY GUIDELINE B-09.

(A) THRUST BLOCK DETAILS (SEE CITY STD. PLAN 1412, CONDITION 2).

(B) PAVEMENT BASE MATERIAL OR COMPACTED SOIL.

APPROVED: DATE: 11/24/2020

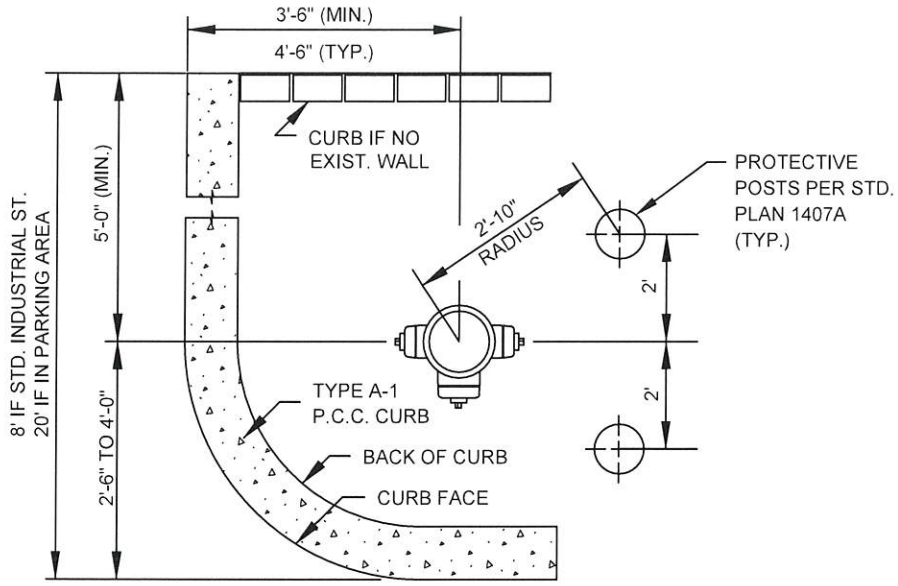
CITY OF SANTA ANA

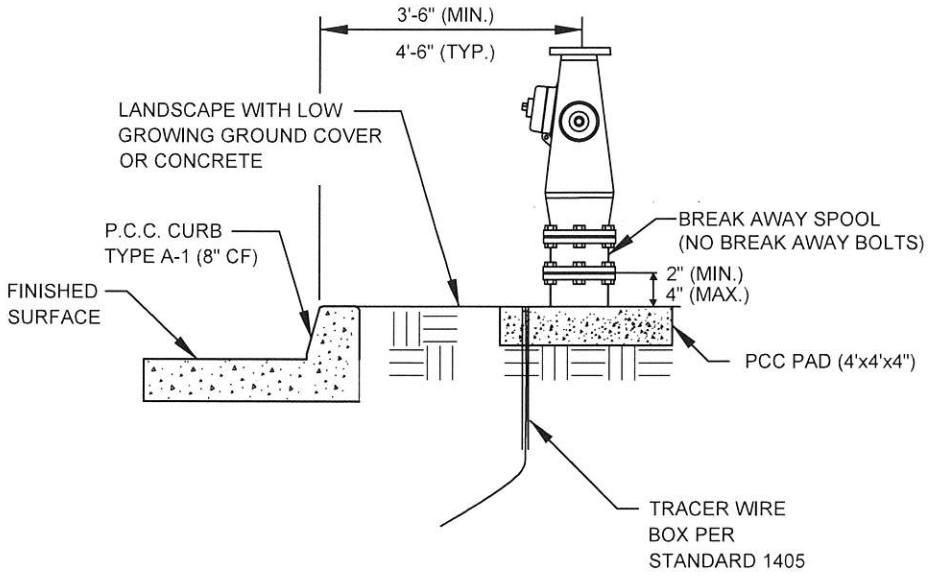
PUBLIC WORKS AGENCY

DATE		REVISION
11/2/05	J.B.	DRAIN VALVE PLUG
6/4/13	J.A.	UPDATED
3/1/16	R.R.	CHANGE TO WET BARREL
11/2020	R.R.	UPDATED

WET BARREL FIRE HYDRANT INSTALLATION

STD. PLAN NUMBER 1405





NOTES:

1. SEE CITY STD. PLAN 1405 FOR ADDITIONAL HYDRANT DETAILS.

FOR USE IN INDUSTRIAL ZONES

APPROVED: _____ DATE: 4/24/2020

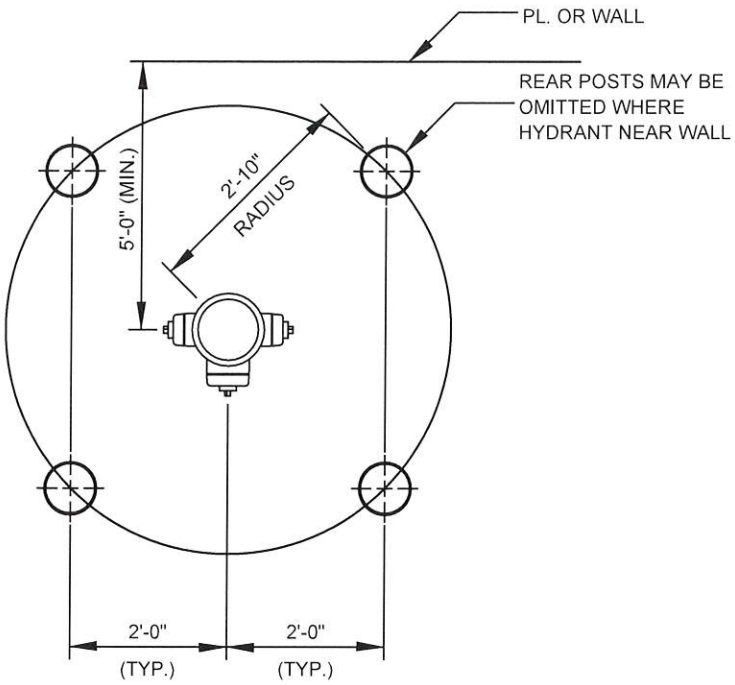
CITY OF SANTA ANA

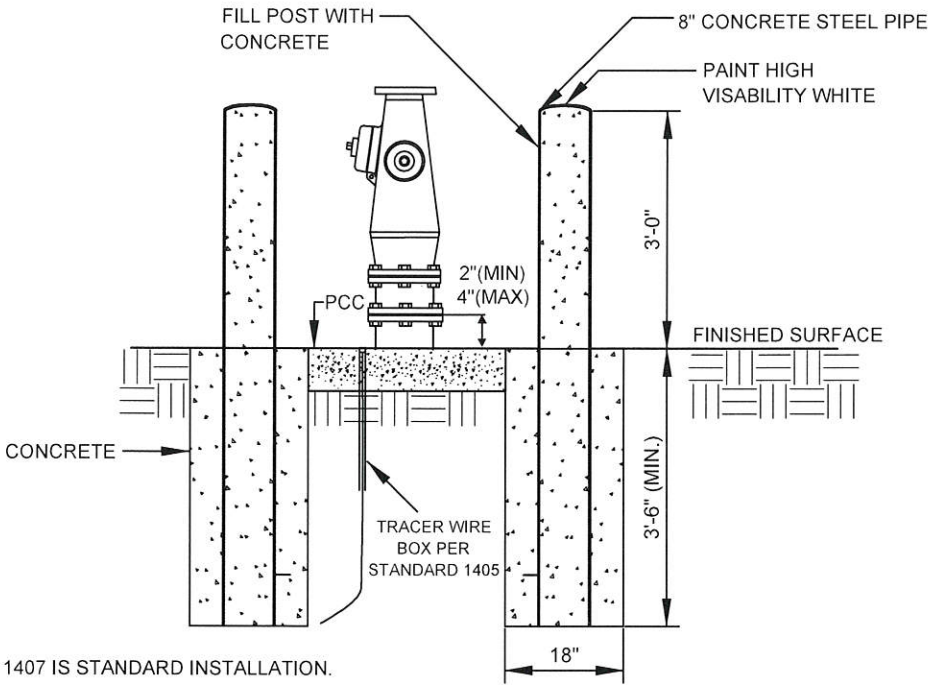
PUBLIC WORKS AGENCY

DATE		REVISION
9/28/01	A.F.	MODIFIED CONC. POST
6/4/13	J.A.	SEPARATED CASE 1 & 2
11/2020	R.R.	UPDATED

FIRE HYDRANT WITH PROTECTIVE CURB

STD. PLAN NUMBER 1407





NOTES:

1. CITY STD. PLAN 1407 IS STANDARD INSTALLATION.
2. CITY STD. PLAN 1407A IS TO BE USED ONLY WITH PRIOR WRITTEN APPROVAL OF CITY.
3. SEE CITY STD. PLAN 1405 FOR ADDITIONAL HYDRANT DETAILS.

FOR USE IN INDUSTRIAL ZONES

APPROVED: _____ DATE: 11/24/2020

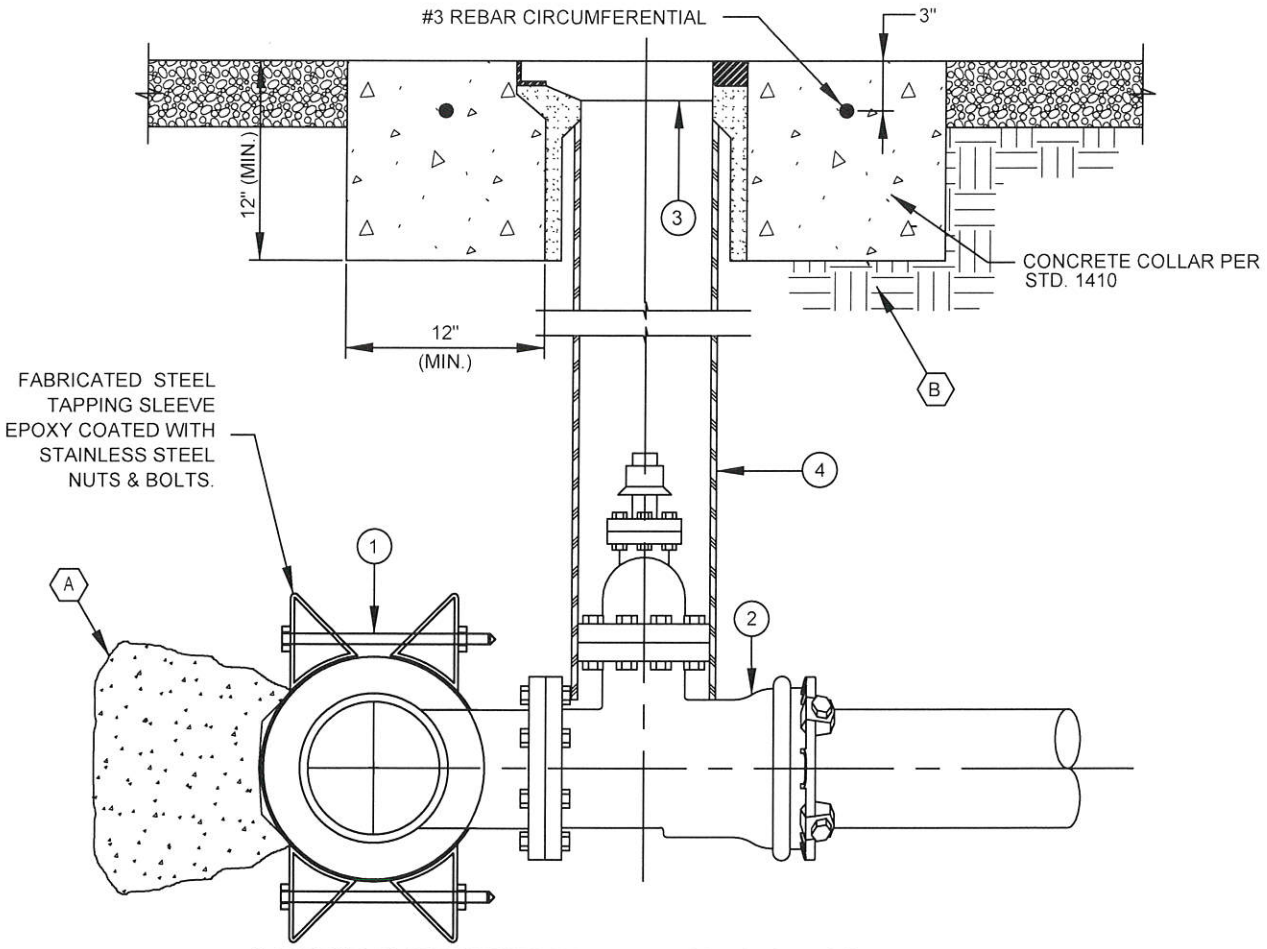
CITY OF SANTA ANA

PUBLIC WORKS AGENCY

DATE		REVISION
6/4/13	J.A.	NEW DETAIL
11/2020	R.R.	UPDATED

FIRE HYDRANT
WITH PROTECTIVE POSTS

STD. PLAN NUMBER
1407A



ALL EQUALS TO BE APPROVED BY WATER RESOURCES DIVISION.

CONSTRUCTION ITEMS / MATERIALS LIST

NO.	SIZE AND DESCRIPTION	MANUFACTURER	MFR. CAT. NO.
1	TAPPING SLEEVE (EPOXY COATED & STAINLESS STEEL BOLTS)	FORD SMITH-BLAIR	FTSC 622
2	GATE VALVE, TAPPING X MJ OR FLG X FLG (RESILIENT WEDGE) CLASS 200	CLOW OR EQUAL	_____
3	VALVE BOX FRAME & COVER, PER STD. PLAN 1410	MARK SERIES	10" MARK V TRI LID WATER POWDER COATED - BLUE
4	P.V.C. PIPE, 8", SCHEDULE 40	_____	_____

NOTES:

1. ALL BURIED NUTS AND BOLTS SHALL BE TYPE 316 STAINLESS STEEL.
2. ALL BURIED IRON SHALL BE WRAPPED WITH 1 LAYER OF 10 MIL POLYETHYLENE SHEETING TAPED IN PLACE.
3. ALL TAPPING SLEEVES MUST BE 24" (MIN.) FROM THE NEAREST JOINT OR SERVICE.
4. APPLICABLE ONLY FOR C900 PVC, CAST IRON, AND DUCTILE IRON WATER MAINS. NO TAPPING OF AC MAINS ALLOWED.

(A) THRUST BLOCK DETAILS (SEE CITY STD. PLAN 1412, CONDITION 1).

(B) PAVEMENT BASE MATERIAL OR COMPACTED SOIL.

APPROVED: _____ DATE: 11/24/2020

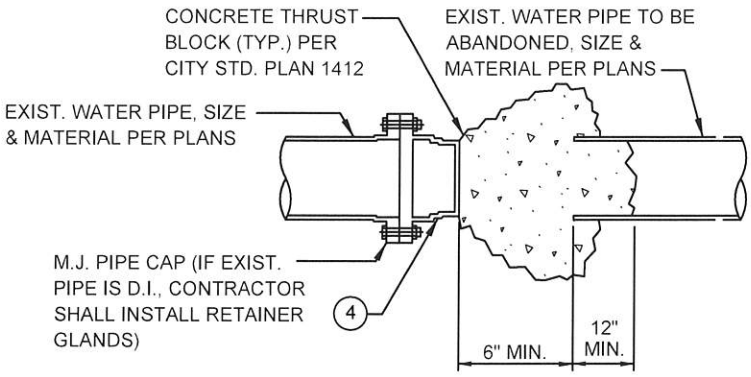
CITY OF SANTA ANA

PUBLIC WORKS AGENCY

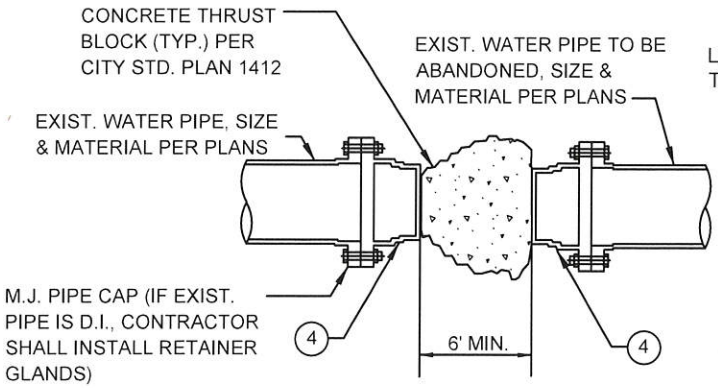
DATE		REVISION
8/12/09	R.R.	REVISE MANUFACTURER LIST
6/4/13	J.A.	UPDATED
8/31/15	J.B.	UPDATED TAPPING SLEEVE SPECS.
11/2020	R.R.	UPDATED

TAPPING SLEEVE AND GATE VALVE

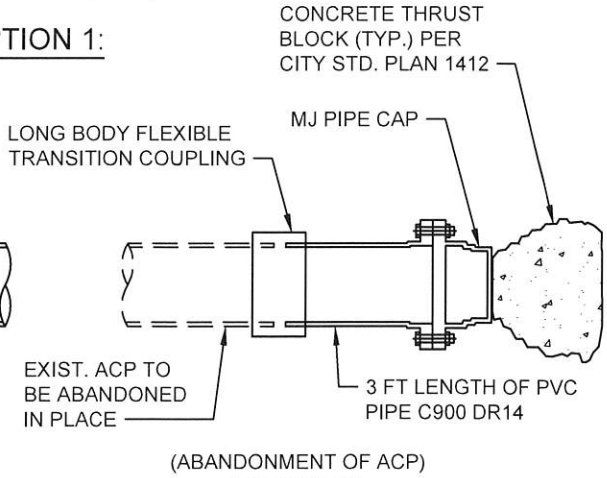
STD. PLAN NUMBER 1408



OPTION 1:



OPTION 2:



(ABANDONMENT OF ACP)

OPTION 3:

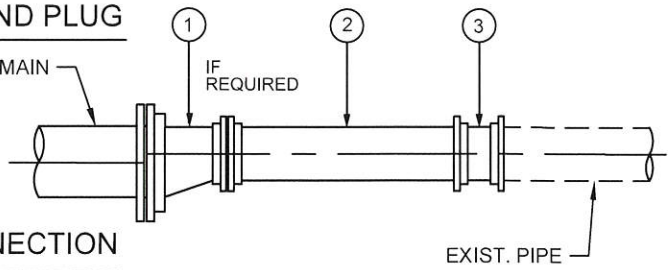
NOTES:

1. DRAIN WATERLINE COMPLETELY BEFORE PLUGGING. ALL WATER DRAINED FROM PIPELINE SHALL BE DISCHARGED INTO A SEWER SYSTEM.
2. CAP, PLUG, OR BLIND FLANGE PER FIELD CONDITIONS.
3. PIPES 10" IN DIAMETER AND LARGER TO BE ABANDONED IN PLACE SHALL BE FILLED WITH SLURRY.

CUT / CAP AND PLUG

NOTE:

IF EXISTING PIPE IS ACP, INSTALL LONG BODY FLEXIBLE TRANSITION COUPLING IN LIEU OF MJ SLEEVE



TIE-IN CONNECTION

CONSTRUCTION ITEMS / MATERIALS LIST		
NO.	SIZE AND DESCRIPTION	MANUFACTURER
1	REDUCER (IF NEEDED)	SIGMA, U.S. PIPE, TYLER
2	SPOOL - PVC OR MATCH NEW MAIN MATERIAL	
3	COUPLING	SIGMA, U.S. PIPE, TYLER
4	CAP	SIGMA, U.S. PIPE, TYLER

APPROVED: DATE: 11/24/20

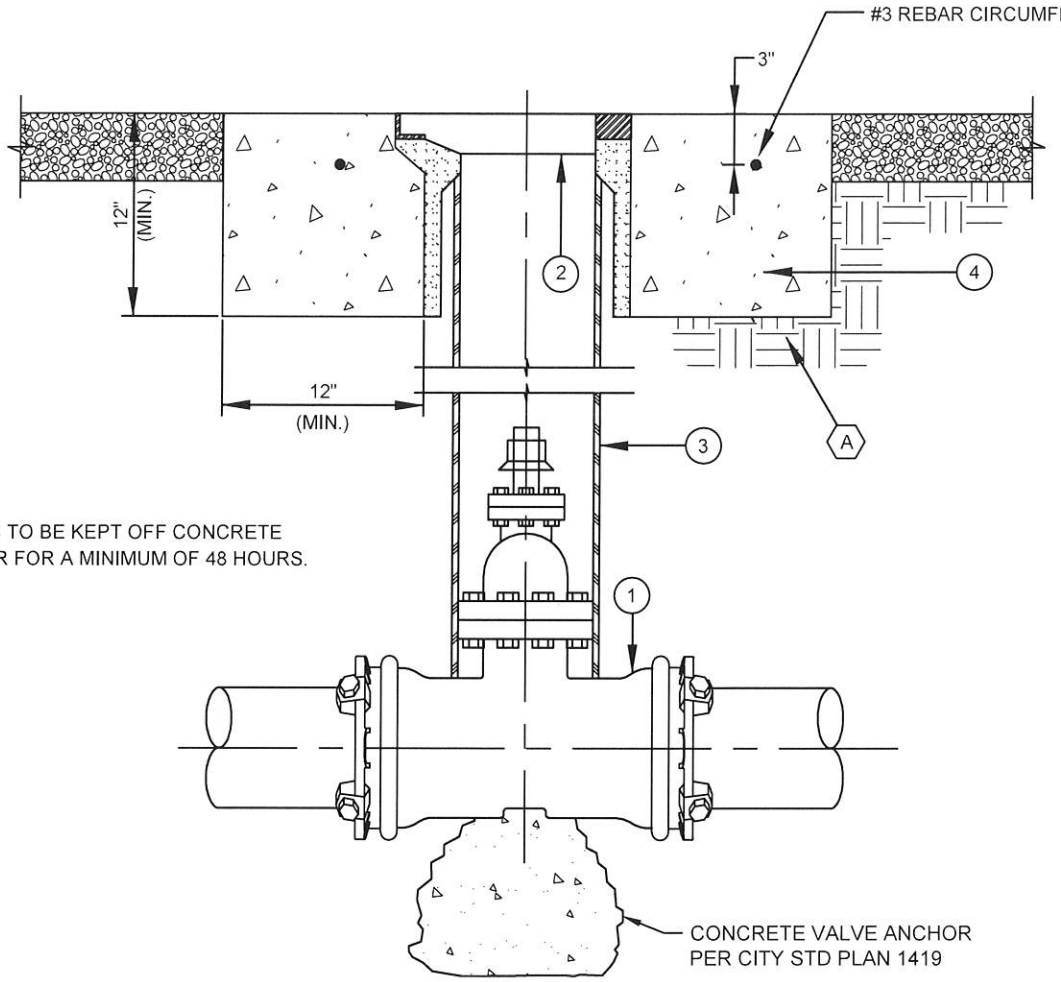
CITY OF SANTA ANA

PUBLIC WORKS AGENCY

DATE		REVISION
3/1/16	R.R.	NEW STD.
11/2020	R.R.	UPDATED

CUT/CAP AND PLUG INSTALLATION
TIE-IN CONNECTION INSTALLATION

STD. PLAN NUMBER 1409



NOTE:

TRAFFIC TO BE KEPT OFF CONCRETE COLLLAR FOR A MINIMUM OF 48 HOURS.

CONSTRUCTION ITEMS / MATERIALS LIST		
NO.	SIZE AND DESCRIPTION	MANUFACTURER
1	GATE VALVE, (FLG X FLG OR FLG X MJ OR MJ X MJ) RESILIENT WEDGE, CLASS 200	CLOW, MUELLER, OR EQUAL
2	VALVE BOX FRAME & COVER	MARK SERIES 10" MARK V TRI AND WATER POWDER COATED BLUE
3	P.V.C. PIPE, 8", SCHEDULE 40	———
4	CONCRETE COLLAR	CONCRETE CLASS (560-C-3250)

NOTES:

1. ALL BURIED NUTS AND BOLTS SHALL BE TYPE 316 STAINLESS STEEL.
2. ALL BURIED IRON SHALL BE WRAPPED WITH 1 LAYER OF 10 MIL POLYETHYLENE SHEETING TAPED IN PLACE.

(A) PAVEMENT BASE MATERIAL OR COMPACTED SOIL.

APPROVED: DATE: 11/24/22

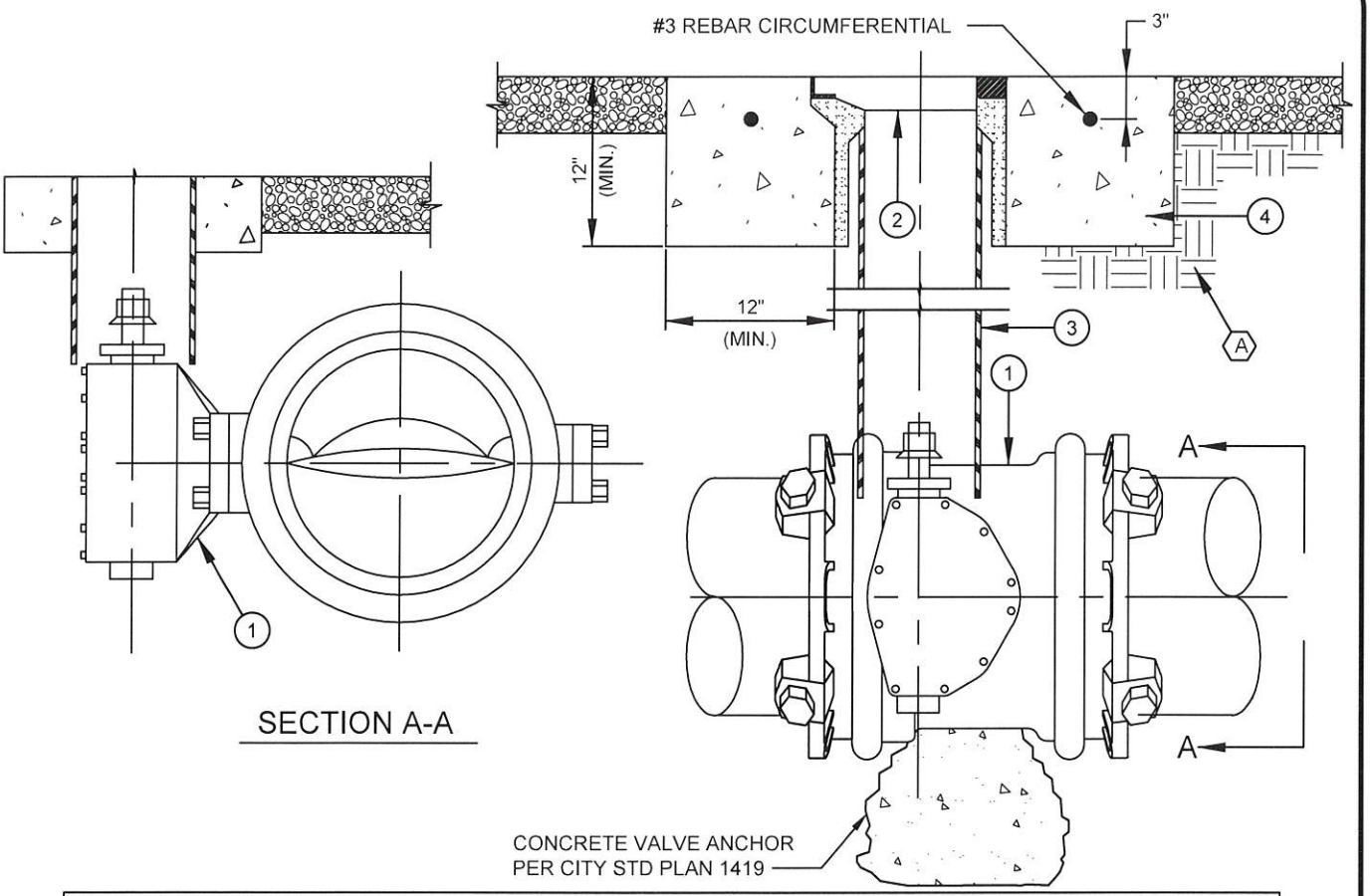
CITY OF SANTA ANA

PUBLIC WORKS AGENCY

DATE		REVISION
9/28/01	A.F.	UPDATED
6/4/13	J.A.	ADDED REBAR
3/1/16	R.R.	REMOVED RAPID SET
11/2020	R.R.	UPDATED

GATE VALVE INSTALLATION

STD. PLAN NUMBER 1410



SECTION A-A

CONSTRUCTION ITEMS / MATERIALS LIST

NO.	SIZE AND DESCRIPTION	MANUFACTURER	MFR. CAT. NO.
1	BUTTERFLY VALVE RUBBER-SEATED, CLASS 150 (FLG X FLG OR FLG X MJ OR MJ X MJ)	PRATT OR APPROVED EQUAL	GROUND HOG (AWWA C504 SPEC.)
2	VALVE BOX FRAME & COVER	MARK SERIES	10" MARK V TRI AND WATER POWDER COATED-BLUE
3	P.V.C. PIPE, 8", SCHEDULE 40	———	———
4	CONCRETE COLLAR	CONCRETE CLASS (560-C-3250)	———

NOTES:

1. ALL BURIED NUTS AND BOLTS SHALL BE TYPE 316 STAINLESS STEEL.
2. ALL BURIED IRON SHALL BE WRAPPED WITH 1 LAYER OF 10 MIL POLYETHYLENE SHEETING TAPED IN PLACE.
3. BUTTERFLY VALVES SHALL BE USED ON ALL WATER MAINS 14-INCHES IN DIAMETER AND LARGER.

(A) PAVEMENT BASE MATERIAL OR COMPACTED SOIL.

APPROVED: DATE: 11/24/20

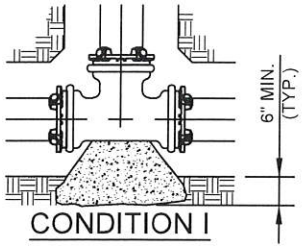
CITY OF SANTA ANA

PUBLIC WORKS AGENCY

DATE		REVISION
6/4/13	J.A.	ADDED REBAR TO COLLAR
8/31/15	R.R.	REMOVED RAPID SET
11/2020	R.R.	UPDATED

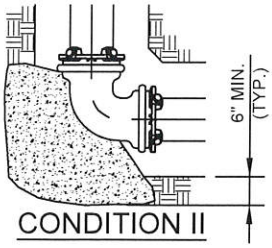
BUTTERFLY VALVE INSTALLATION

STD. PLAN NUMBER 1411



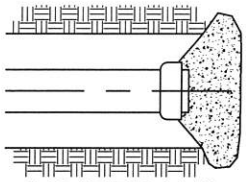
CONDITION I

TEE



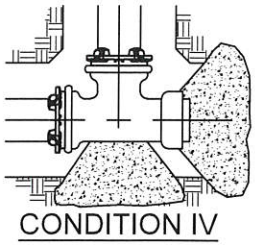
CONDITION II

90°BEND



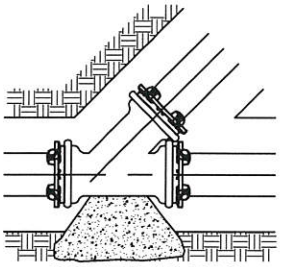
CONDITION III

CAP OR PLUG



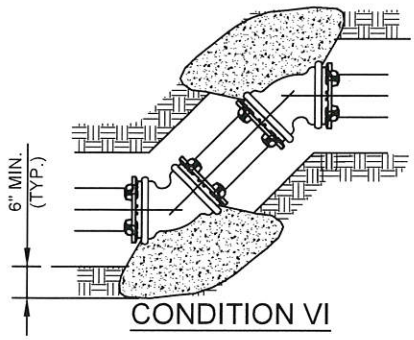
CONDITION IV

TEE & PLUG



CONDITION V

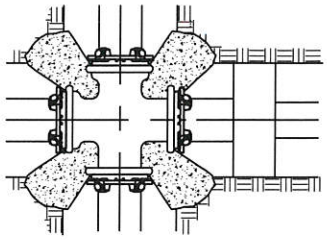
45°LATERAL



CONDITION VI

(A) 22.5°OR 11.25°BEND

(B) 45° BEND



CONDITION VII

CROSS & REDUCER

NOTES:

1. PIPE FITTINGS SHALL BE WRAPPED WITH 1 LAYER OF 10 MIL POLYETHYLENE SHEETING TAPED IN PLACE. SEE SPECIFICATIONS.
2. THRUST BLOCK BEARING FACES SHALL BE POURED AGAINST UNDISTURBED SOIL, OR APPROVED COMPACTED BACKFILL. BEARING FACES SHALL BE A MINIMUM OF 6-INCHES PAST THE TRENCH WALL.
3. THRUST BLOCKS SHALL BE CLASS 560-C-3250 CONCRETE, UNLESS OTHERWISE SPECIFIED.
4. ALL BURIED NUTS AND BOLTS SHALL BE TYPE 316 STAINLESS STEEL.
5. FOR THRUST RESTRAINT ON PIPES LARGER THAN 12-INCHES IN DIAMETER, SPECIAL REVIEW AND APPROVAL IS REQUIRED FROM THE WATER RESOURCES DIVISION.

- THRUST BLOCK BEARING AREA -									
PIPE SIZE (IN INCHES)	CONDITIONS								
	I.	II.	III.	IV.	V.	(A) VI. (B)		VII.	
4	3.2	4.5	3.2	2 @ 3.2	3.2	1.2	2.4	4 @ 4.5	AREA IN SQ. FT.
6	7.1	10	7.1	2 @ 7.1	7.1	2.8	5.4	4 @ 10.0	
8	12.6	17.8	12.6	2 @ 12.6	12.6	4.9	9.6	4 @ 17.8	
10	19.6	27.7	19.6	2 @ 19.6	19.6	7.7	15.0	4 @ 27.7	
12	28.2	39.9	28.2	2 @ 28.2	28.2	11.0	21.6	4 @ 39.9	

BASED ON 100 P.S.I. PRESSURE AND ALLOWABLE BEARING PRESSURE OF 1000 P.S.F.
TEST PRESSURE OF 200 PSI.

APPROVED: DATE: 11/24/2020

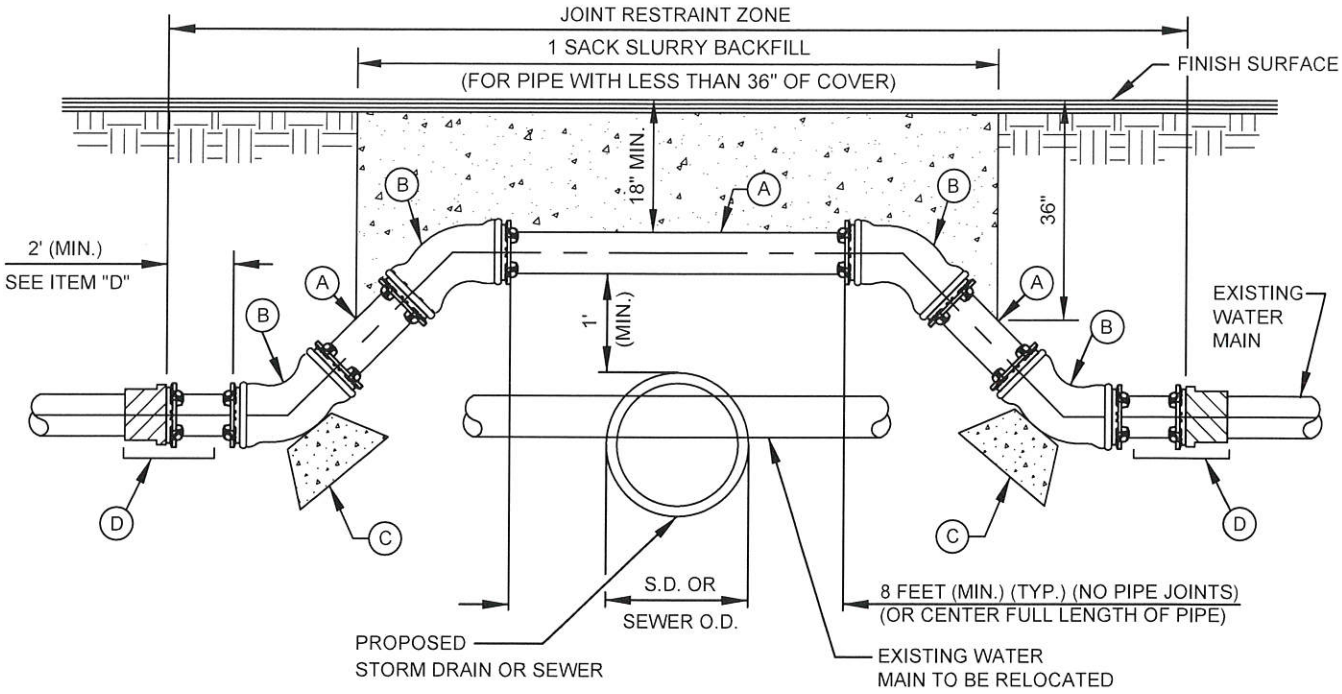
CITY OF SANTA ANA

PUBLIC WORKS AGENCY

DATE		REVISION
5/2/07	J.B.	UPDATED
8/12/09	R.R.	ADDED 11 1/4° BEND
6/4/13	J.A.	UPDATED INFORMATION
11/2020	R.R.	UPDATED

THRUST BLOCK INSTALLATION

STD. PLAN NUMBER 1412



TYPE 1- VERTICAL OFFSET PROFILE

ITEM	CONSTRUCTION NOTES
(A)	CONSTRUCT MINIMUM CLASS 350 DUCTILE IRON PIPE, SIZE AS NECESSARY TO MATCH EXISTING MAIN.
(B)	CONSTRUCT 45° BEND (MJ X MJ) WITH MEGALUG JOINT RESTRAINTS AT EACH END.
(C)	CONSTRUCT THRUST BLOCK PER CITY STD. PLAN 1412.
(D)	IF EXISTING MAIN IS ASBESTOS-CEMENT (A.C.) PIPE, CONNECT D.I. PIPE TO EXISTING A.C. PIPE USING AN APPROVED D.I. TO A.C. TRANSITION COUPLING, A 2 FOOT SECTION OF D.I. PIPE, AND MEGALUG RESTRAINTS. DO NOT TIE ONTO EXISTING A.C. PIPE WITH MEGALUG RESTRAINTS.

NOTES:

1. WATER MAIN CONSTRUCTION SHALL COMPLY WITH CALIFORNIA CODE OF REGULATIONS TITLE 22, CALIFORNIA WATER WORKS STANDARDS, CHAPTER 16 AND DDW SEPARATION REQUIREMENTS.
2. ALL BURIED IRON SHALL BE WRAPPED WITH 1 LAYER OF 10 MIL POLYETHYLENE SHEETING TAPED IN PLACE.
3. ALL BURIED NUTS AND BOLTS SHALL BE TYPE 316 STAINLESS STEEL.
4. NO UNRESTRAINED JOINTS BETWEEN FITTINGS.
5. THE CITY OF SANTA ANA WATER RESOURCES DIVISION CAN NOT GUARANTEE A COMPLETE SHUT DOWN OF EXISTING MAIN, THE DEPARTMENT WILL ATTEMPT TO SHUT DOWN MAINS AS COMPLETELY AS POSSIBLE; HOWEVER, THE CONTRACTOR SHALL BE RESPONSIBLE FOR DEWATERING AND ISOLATION FOR TESTING PURPOSES.
6. THIS STANDARD PLAN SHALL APPLY ONLY TO 12" AND SMALLER WATER MAINS. OFFSETS IN LARGER WATER MAINS MUST BE DESIGNED BY A REGISTERED CIVIL ENGINEER AND APPROVED BY THE CITY'S WATER RESOURCES DIVISION.

APPROVED: DATE: 11/24/2020

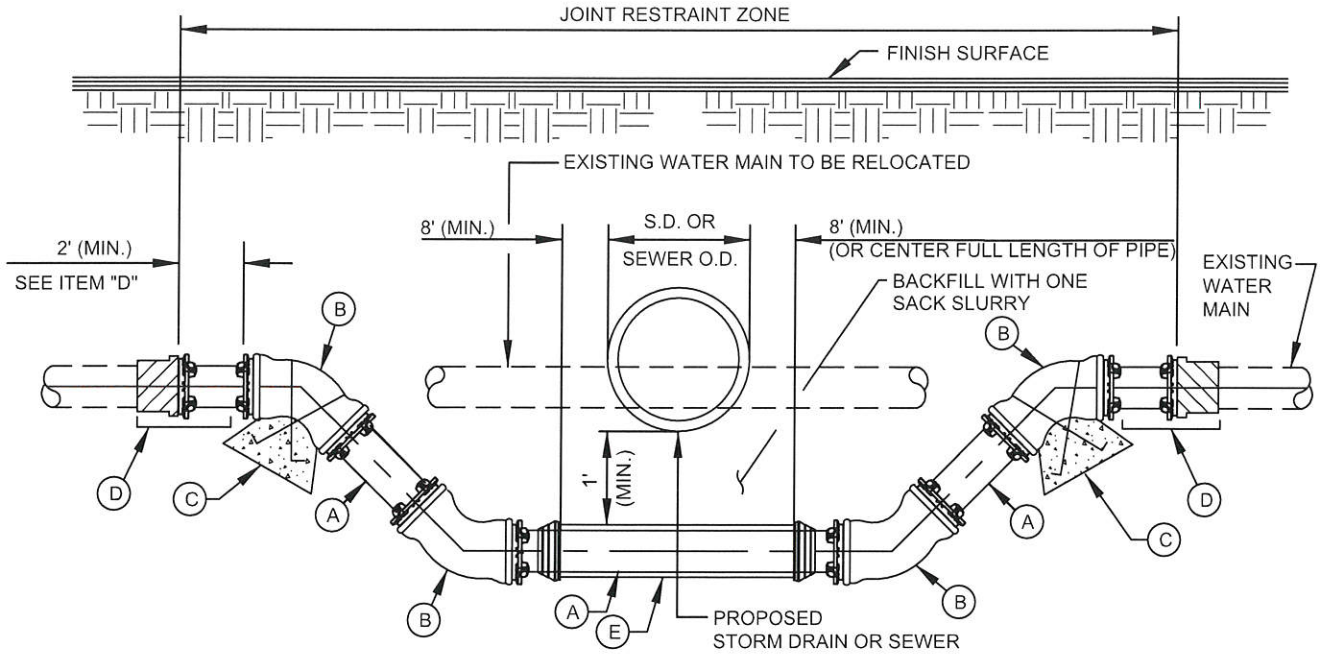
CITY OF SANTA ANA

PUBLIC WORKS AGENCY

DATE		REVISION
6/4/13	R.R.	1' VERTICAL SEPARATION
11/2020	R.R.	UPDATED

WATER MAIN
TYPE 1 - VERTICAL OFFSET

STD. PLAN NUMBER 1413A



TYPE 2- VERTICAL OFFSET PROFILE

ITEM	CONSTRUCTION NOTES
(A)	CONSTRUCT MINIMUM CLASS 350 DUCTILE IRON PIPE, SIZE AS NECESSARY TO MATCH EXISTING MAIN.
(B)	CONSTRUCT 45° BEND (MJ X MJ) WITH MEGALUG JOINT RESTRAINTS AT EACH END.
(C)	CONSTRUCT THRUST BLOCK WITH VERTICAL BEND ANCHOR PER CITY STD. PLAN 1420.
(D)	IF EXISTING MAIN IS ASBESTOS-CEMENT (A.C.) PIPE, CONNECT D.I. PIPE TO EXISTING A.C. PIPE USING AN APPROVED D.I. TO A.C. TRANSITION COUPLING, A 2 FOOT SECTION OF D.I. PIPE, AND MEGALUG RESTRAINTS. DO NOT TIE ONTO EXISTING A.C. PIPE WITH MEGALUG RESTRAINTS.
(E)	CONSTRUCT WATER PIPE CASING PER CITY STD. PLAN 1429.

NOTES:

1. WATER MAIN CONSTRUCTION SHALL COMPLY WITH CALIFORNIA CODE OF REGULATIONS TITLE 22, CALIFORNIA WATER WORKS STANDARDS, CHAPTER 16 AND DDW SEPARATION REQUIREMENTS.
2. ALL BURIED IRON SHALL BE WRAPPED WITH 1 LAYER OF 10 MIL POLYETHYLENE SHEETING TAPED IN PLACE.
3. ALL BURIED NUTS AND BOLTS SHALL BE TYPE 316 STAINLESS STEEL.
4. NO UNRESTRAINED JOINTS BETWEEN FITTINGS.
5. THE CITY OF SANTA ANA WATER RESOURCES DIVISION CAN NOT GUARANTEE A COMPLETE SHUT DOWN OF EXISTING MAIN, THE DEPARTMENT WILL ATTEMPT TO SHUT DOWN MAINS AS COMPLETELY AS POSSIBLE; HOWEVER, THE CONTRACTOR SHALL BE RESPONSIBLE FOR DEWATERING AND ISOLATION FOR TESTING PURPOSES.
6. THIS STANDARD PLAN SHALL APPLY ONLY TO 12" AND SMALLER WATER MAINS. OFFSETS IN LARGER WATER MAINS MUST BE DESIGNED BY A REGISTERED CIVIL ENGINEER AND APPROVED BY THE CITY'S WATER RESOURCES DIVISION.

APPROVED: DATE: 11/24/20

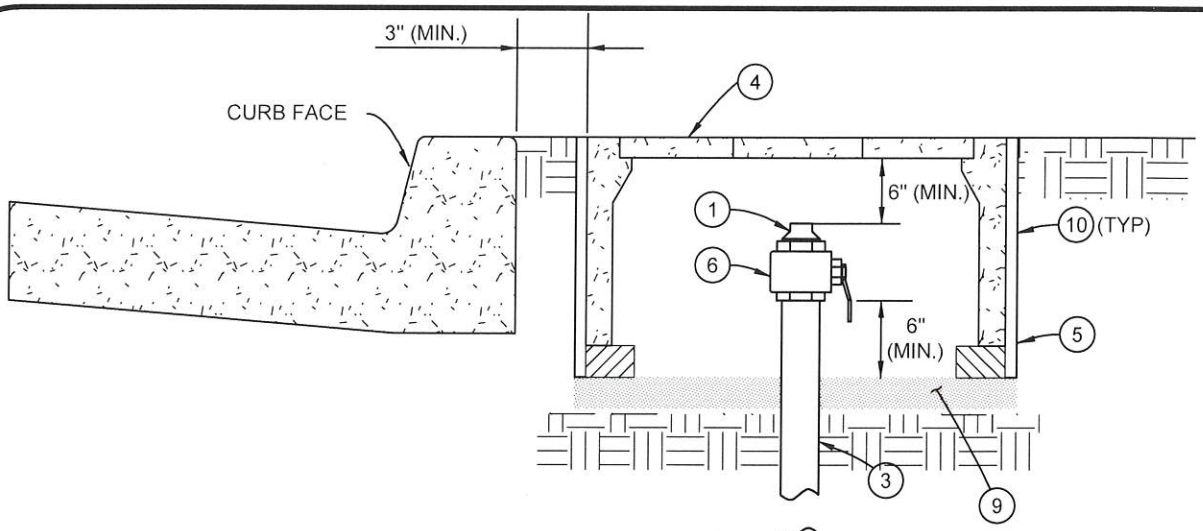
CITY OF SANTA ANA

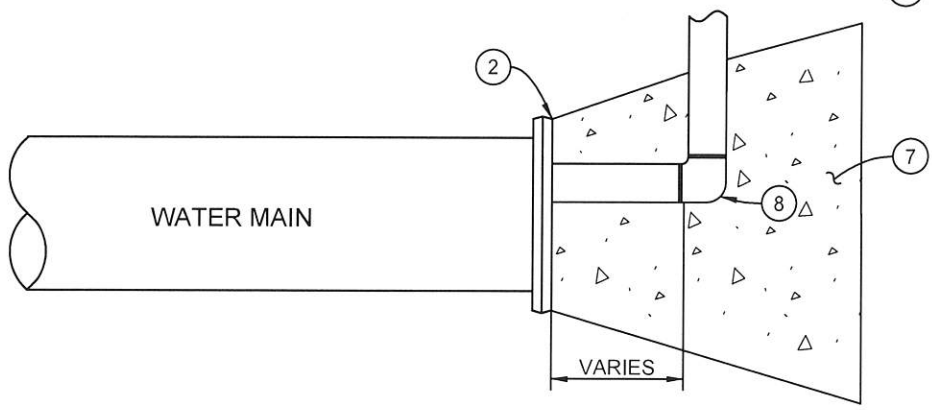
PUBLIC WORKS AGENCY

DATE		REVISION
6/4/13	R.R.	CASING REQUIREMENT
11/2020	R.R.	UPDATED

WATER MAIN
TYPE 2 - VERTICAL OFFSET

STD. PLAN NUMBER
1413B





CONSTRUCTION ITEMS / MATERIALS LIST

NO.	SIZE AND DESCRIPTION	MANUFACTURER	MFR. CAT. NO.
1	PLUG, 2"- BRASS; LEAD FREE (SQUARE HEX HEAD)	FORD, JONES	
2	CAP (MJ) WITH 2" THREADED OFFSET TAP		
3	2" - COPPER TUBING	TYPE "K" SOFT	
4	POLYMER METER BOX WITH HINGED READING LID	DFW DFW	DFW486WBC4-12-BODY DFW486C-AF4C-LID COLOR - GRAY
5	COMMON BRICK (TYP.)	ONE AT EACH CORNER	
6	2" LEAD FREE BRASS CURB STOP WITH PADLOCK WING	FORD	
7	THRUST BLOCK PER CITY STANDARD PLAN 1412		
8	LEAD FREE BRASS 90° ELBOW (COMPRESSION CONNECTIONS)	FORD	L44-77 (2")
9	PEA GRAVEL BASE		
10	THIN PLYWOOD ON OUTSIDE OF BOX TO PREVENT CAVE-IN THROUGH NOTCHES		

NOTE:
BLOW OFF ASSEMBLY SHALL BE LOCATED IN PARKWAY.

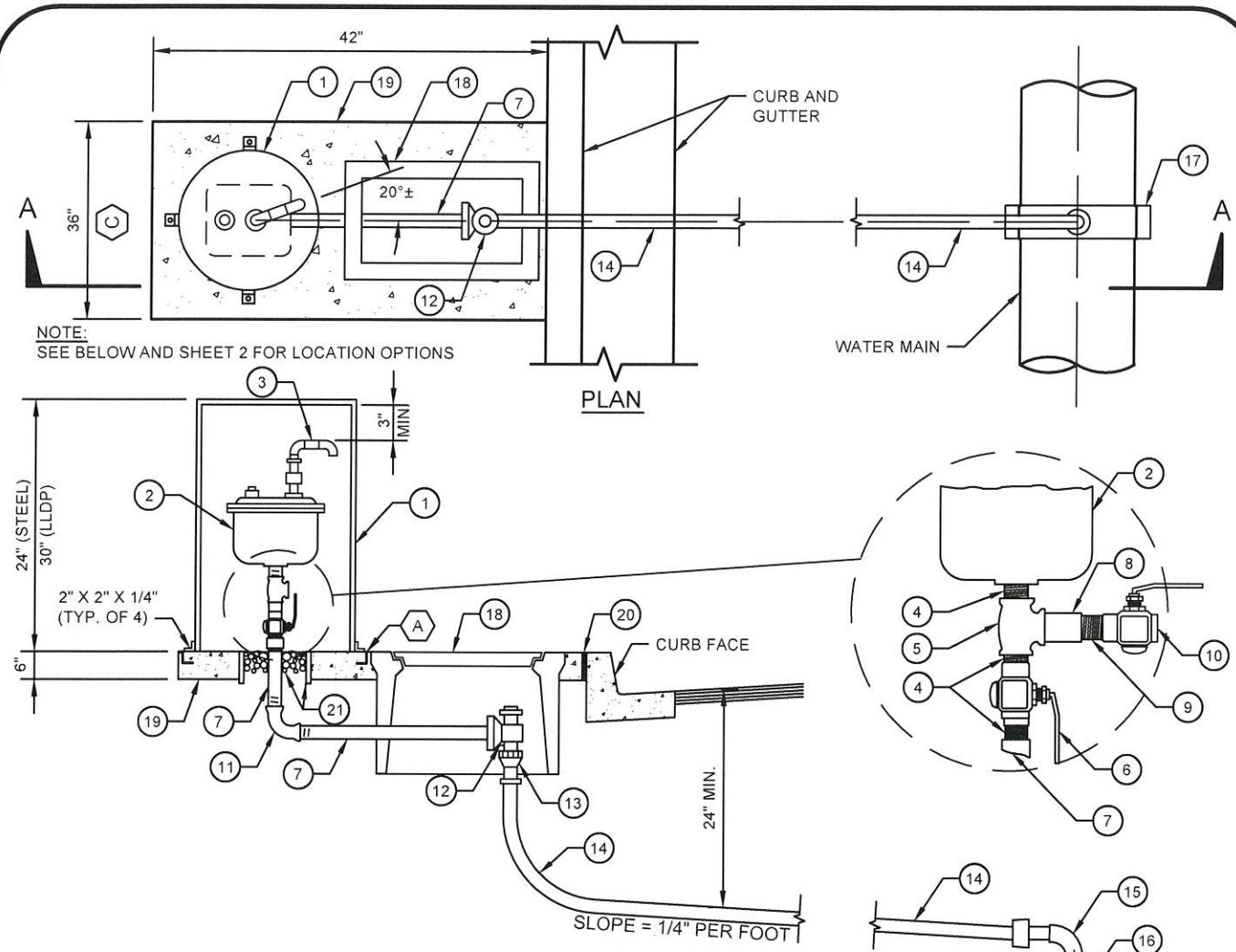
APPROVED: DATE: 11/24/2021

CITY OF SANTA ANA
PUBLIC WORKS AGENCY

DATE		REVISION
3/1/16	R.R.	UPDATED
11/2020	R.R.	UPDATED

2" BLOW OFF ASSEMBLY

STD. PLAN NUMBER 1414



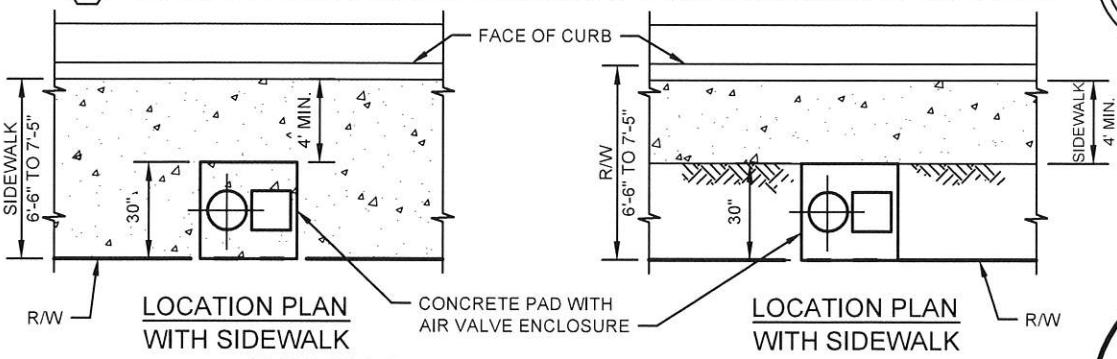
NOTES:

1. ALL COPPER FITTINGS SHALL BE SOLDERED OR COMPRESSION TYPE FITTINGS.

(A) 1/2" DIA. STAINLESS STEEL ANCHOR BOLTS SET IN CONCRETE SLAB (4 REQUIRED)

(B) SADDLE AND CORPORATION STOP PER CITY STD PLAN 1401

(C) FOR R/W LESS THAN 7.5' WIDE WITH A SIDEWALK, THIS DIMENSION CAN BE REDUCED TO 30"



APPROVED: DATE: 11/24/2020

CITY OF SANTA ANA

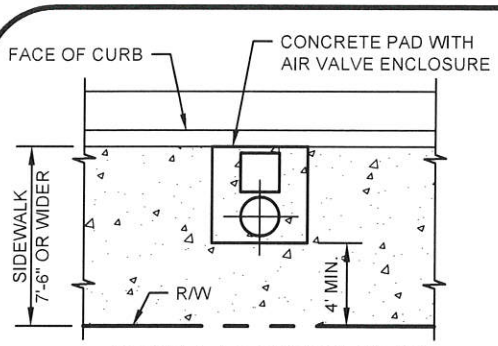
PUBLIC WORKS AGENCY

DATE		REVISION
9/28/01	A.F.	UPDATED
3/17/08	R.R.	UPDATED DIMENSIONS
6/4/13	J.A.	ADDED SUCTION STRAINER
11/2020	R.R.	UPDATED

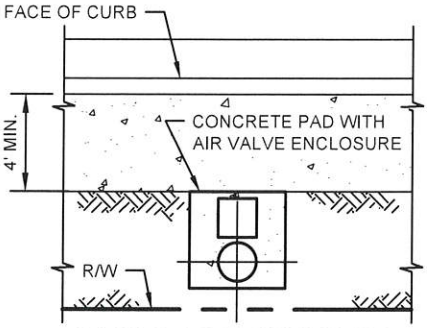
AIR AND VACUUM RELEASE VALVE ASSEMBLY (1")

STD. PLAN NUMBER 1415A

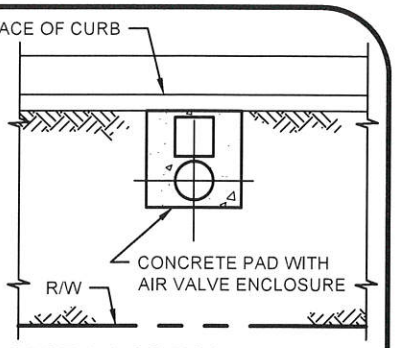
SHEET 1 OF 2



CASE 1: LOCATION PLAN WITH SIDEWALK



CASE 2: LOCATION PLAN WITH SIDEWALK



CASE 3: LOCATION PLAN WITHOUT SIDEWALK

(R/W 7'-6" OR WIDER)

CONSTRUCTION ITEMS / MATERIALS LIST

NO.	SIZE AND DESCRIPTION	MANUFACTURER	MFR. CAT. NO.
1	18" X 24" SCHEDULE 40 STEEL VENTED PIPE COVER, WELD 1/4" PLATE TO TOP, ANCHOR LUGS AT BOTTOM AND GALVANIZE; PRIMER & PAINTED DESERT SAND OR 18" DIA. X 30" (HIGH) LINEAR LOW DENSITY POLYETHYLENE COVER; COLOR SANDSTONE. INSTALL CITY OF SANTA ANA LOGO DECAL ON EXTERIOR	ARMORAST PRODUCTS PIPELINE PRODUCTS	
2	AIR AND VACUUM RELIEF VALVE: 1"	A.R.I. APCO VALMATIC	D-040 ST 140 C 200 C
3	VENT PIPING, BENDS AND STRAINER/SCREEN: 1"	SCH. 80 PVC	
4	LEAD FREE BRASS CLOSE NIPPLE: 1"		
5	LEAD FREE BRASS TEE: 1"		
6	LEAD FREE BRASS CURB STOP WITH LOCKING WING NUT	FORD	B11-444W
7	LEAD FREE BRASS PIPING (THREADED ENDS): 1"		
8	1" X 1/4" STAINLESS STEEL BUSHING		
9	1/4" DIA. X 1" LONG SS NIPPLE		
10	1/4" SS BALL VALVE W\ HANDLE		
11	LEAD FREE BRASS 90° ELBOW: 1"		
12	LEAD FREE BRASS ANGLE METER STOP: 1"		
13	LEAD FREE BRASS ADAPTOR: 1"		
14	TYPE K SOFT COPPER TUBING: 1"	TYPE "K" SOFT	
15	LEAD FREE BRASS 90° ELBOW: 1"		
16	LEAD FREE BRASS CORPORATION STOP: 1"	JAMES JONES FORD	J-3403 F-1100-4
17	LEAD FREE BRASS SERVICE SADDLE W/ IP TAP	JONES, MUELLER FORD	J-996, H 13000 SERIES S-912 SERIES
18	PLASTIC METER BOX	DFW	DFW 486WBC4-12 BODY DFW 486C-AF4C LID COLOR GREY
19	36" X 42" CONCRETE PAD (6" THICK)		
20	1/2" EXPANSION JOINT MATERIAL BETWEEN CURB/SIDEWALK AND CONCRETE PAD		
21	8" DIAMETER PVC COLLAR WITH 6 INCHES OF PEA GRAVEL		

APPROVED: DATE: 11/24/2020

CITY OF SANTA ANA

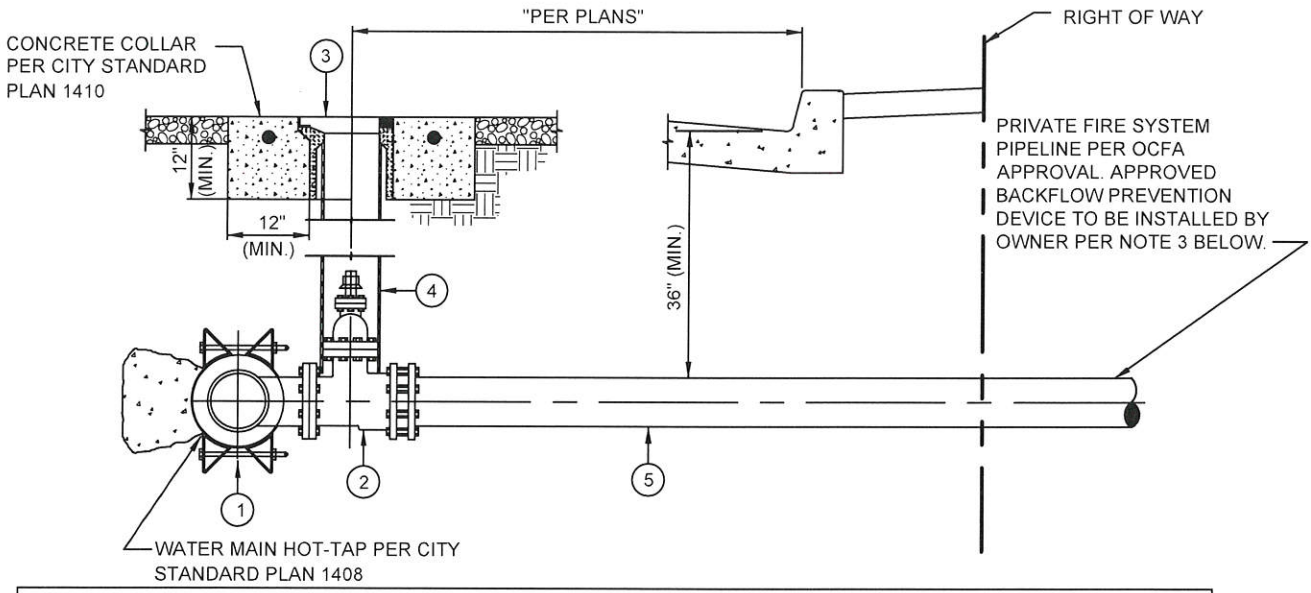
PUBLIC WORKS AGENCY

DATE		REVISION
9/28/01	A.F.	UPDATED
3/17/08	R.R.	UPDATED DIMENSIONS
6/4/13	J.A.	ADDED SUCTION STRAINER
11/2020	R.R.	UPDATED

AIR AND VACUUM RELEASE VALVE ASSEMBLY (1")

STD. PLAN NUMBER 1415A

SHEET 2 OF 2



CONSTRUCTION ITEMS / MATERIALS LIST

NO.	SIZE AND DESCRIPTION	MANUFACTURER	MFR. CAT. NO.
1	TAPPING SLEEVE ON EXISTING MAIN (EPOXY COATED & STAINLESS STEEL BOLTS) (FOR NEW WATER MAIN CONSTRUCTION USE D.I. TEE (MJ X FLG)	FORD SMITH-BLAIR	FTSC 622
2	TAPPING VALVE, "RESILIENT WEDGE" FLG. x M.J. CLASS 200	CLOW OR EQUAL	F-6108
3	VALVE BOX FRAME & COVER	MARK SERIES	NO. 10" MARK V TRI AND WATER POWDER COATED. BLUE
4	P.V.C. PIPE, 8" (SCHEDULE 40)	———	———
5	LATERAL PIPE; DR 14, C900 P.V.C.	———	———

NOTES:

1. ALL BURIED IRON SHALL BE WRAPPED WITH 1 LAYER OF 10 MIL POLYETHYLENE SHEETING TAPED IN PLACE. SEE SPECIFICATIONS.
2. ALL BURIED NUTS AND BOLTS SHALL BE TYPE 316 STAINLESS STEEL.
3. ALL ON-SITE PRIVATE FIRE PROTECTION SYSTEMS REQUIRE PROPER BACKFLOW DEVICE(S). DEVELOPER SHALL CALL CITY'S WATER QUALITY INSPECTOR AT (714) 647-3320 FOR BACKFLOW DEVICE REQUIREMENTS.

APPROVED: DATE: 11/24/2020

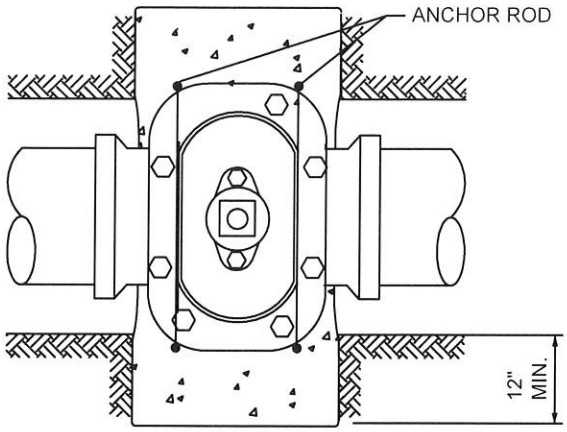
CITY OF SANTA ANA

PUBLIC WORKS AGENCY

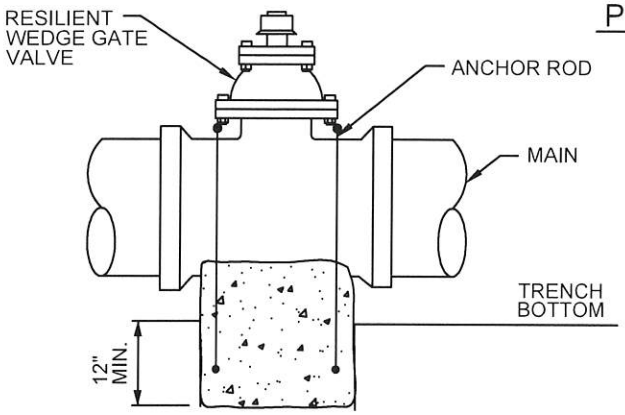
DATE		REVISION
5/16/05	R.R.	LATERAL PIPE CLASS & TYPE
6/4/13	J.A.	UPDATED
3/1/16	R.R.	UPDATED
11/2020	R.R.	UPDATED

FIRE SERVICE

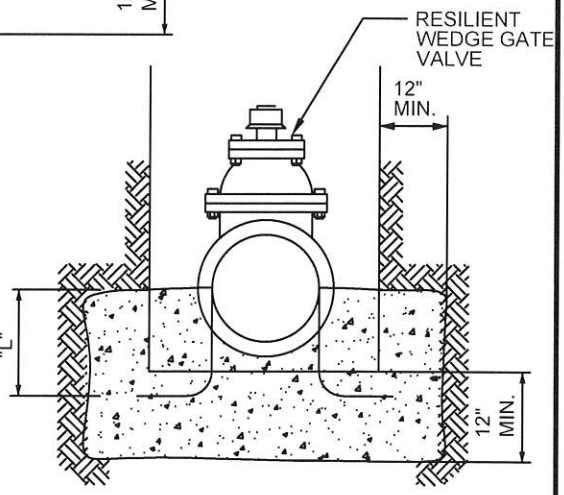
STD. PLAN NUMBER 1417



PLAN-VIEW



ELEVATION-VIEW



SECTION-VIEW

VALVE SIZE	ANCHOR ROD		NET BEARING SURFACE
	DIA.	"L"*MIN*	
8"	5/8"	18"	15 SQ. FT.
12"	5/8"	24"	34 SQ. FT.

1. NET BEARING SURFACES ARE DESIGNED AGAINST UNDISTURBED SOIL WITH A SAFE LATERAL BEARING OF 1000 LBS/S.F., AT A TEST PRESSURE OF 200 PSI, ADJUSTMENT SHALL BE MADE FOR OTHER SOILS.
2. ALL THRUST BLOCKS SHALL BE PORTLAND CEMENT CONCRETE BLOCK MIX 560-C-3250 AND PLACED AGAINST UNDISTURBED SOIL.
3. THRUST BLOCKS ON VALVES SHALL BE KEYED INTO THE TRENCH BOTTOM AS SHOWN.
4. CONCRETE SHALL NOT EXTEND ONTO FLANGE OR ADJOINING PIPE.
5. DO NOT COVER FITTING BOLTS WITH CONCRETE.
6. WHEN VALVES ARE FLANGED TO FITTINGS AVOID PLACING CONCRETE ON ANY PART OF THE VALVE BONNET OR VALVE OPERATOR.
7. ANCHOR RODS SHALL BE COATED WITH 2 COATS OF 3M CO. EC-244 OR APPROVED EQUAL.
8. MINIMUM CONCRETE COVER OVER ANCHOR ROD SHALL BE 3".
9. NO CONCRETE SHALL BE POURED ON VALVE OR PIPE JOINT.
10. MIN. YIELD STRENGTH OF STEEL BARS (36 KSI).

APPROVED: DATE: 11/24/2020

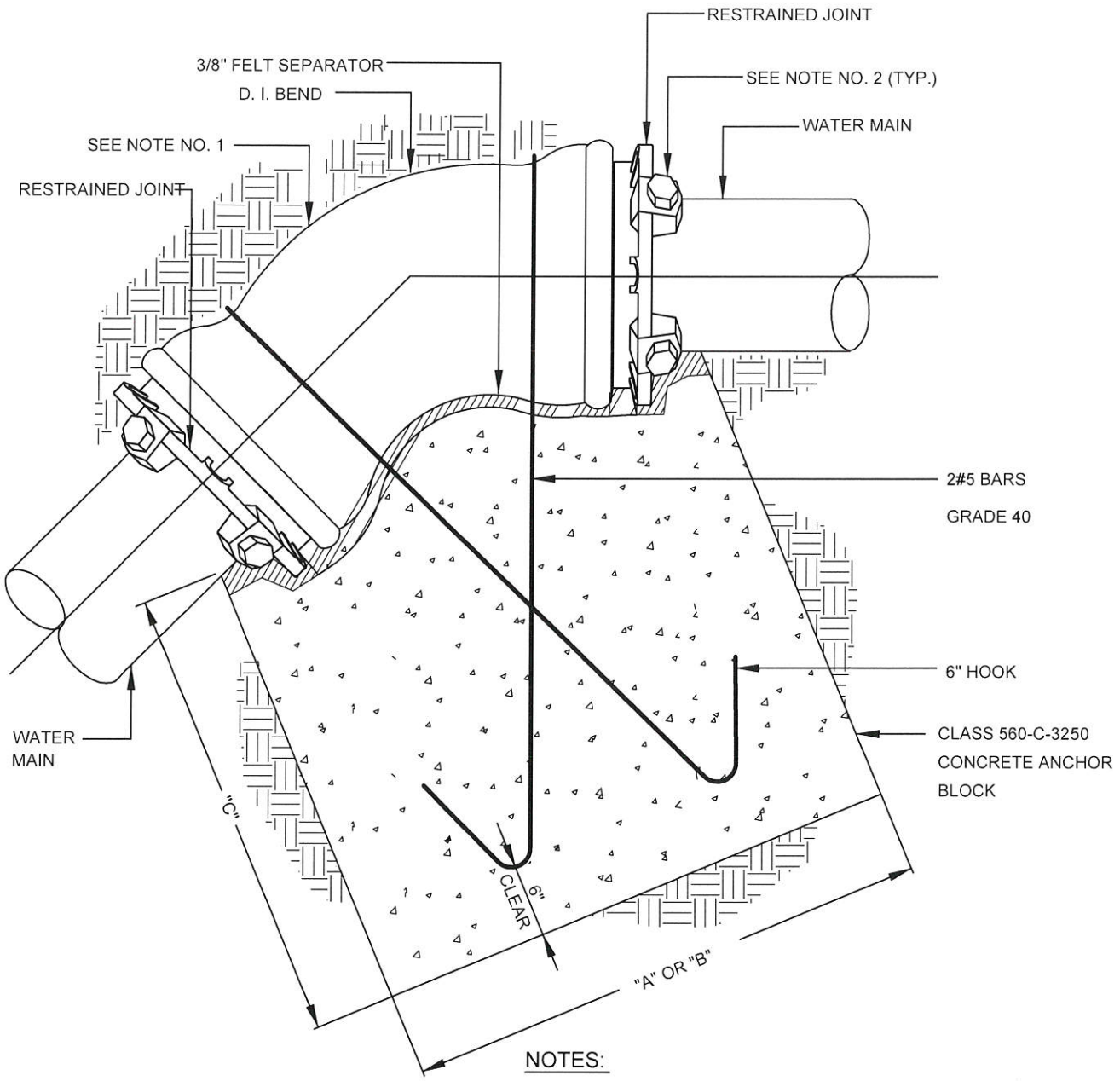
CITY OF SANTA ANA

PUBLIC WORKS AGENCY

DATE		REVISION
3/1/16	R.R.	NEW

VALVE ANCHOR

STD. PLAN NUMBER 1419



I. D. BEND	CONC. ANCHOR BLOCK			MIN. TIE BAR LENGTH
	"A" LENGTH	"B" WIDTH	"C" DEPTH	
6"	3.0'	3.0'	4.5'	8.5'
8"	4.0'	4.0'	4.5'	9.0'
10"	4.5'	4.5'	5.5'	11.5'
12"	5.0'	5.0'	6.5'	12.0'

NOTES:

1. ALL BURIED IRON SHALL BE WRAPPED WITH 1 LAYER OF 10 MIL POLYETHYLENE SHEETING TAPED IN PLACE. SEE SPECIFICATIONS.
2. ALL BURIED NUTS AND BOLTS SHALL BE TYPE 316 STAINLESS STEEL.
3. TIE BARS NOT EMBEDED IN CONCRETE SHALL BE CLEANED AND COATED WITH 3M CO. NUMBER 505 OR PREVIOUSLY APPROVED EQUAL.
4. 45° MAXIMUM BEND
5. 200 PSI TEST PRESSURE

APPROVED: DATE: 11/24/2020

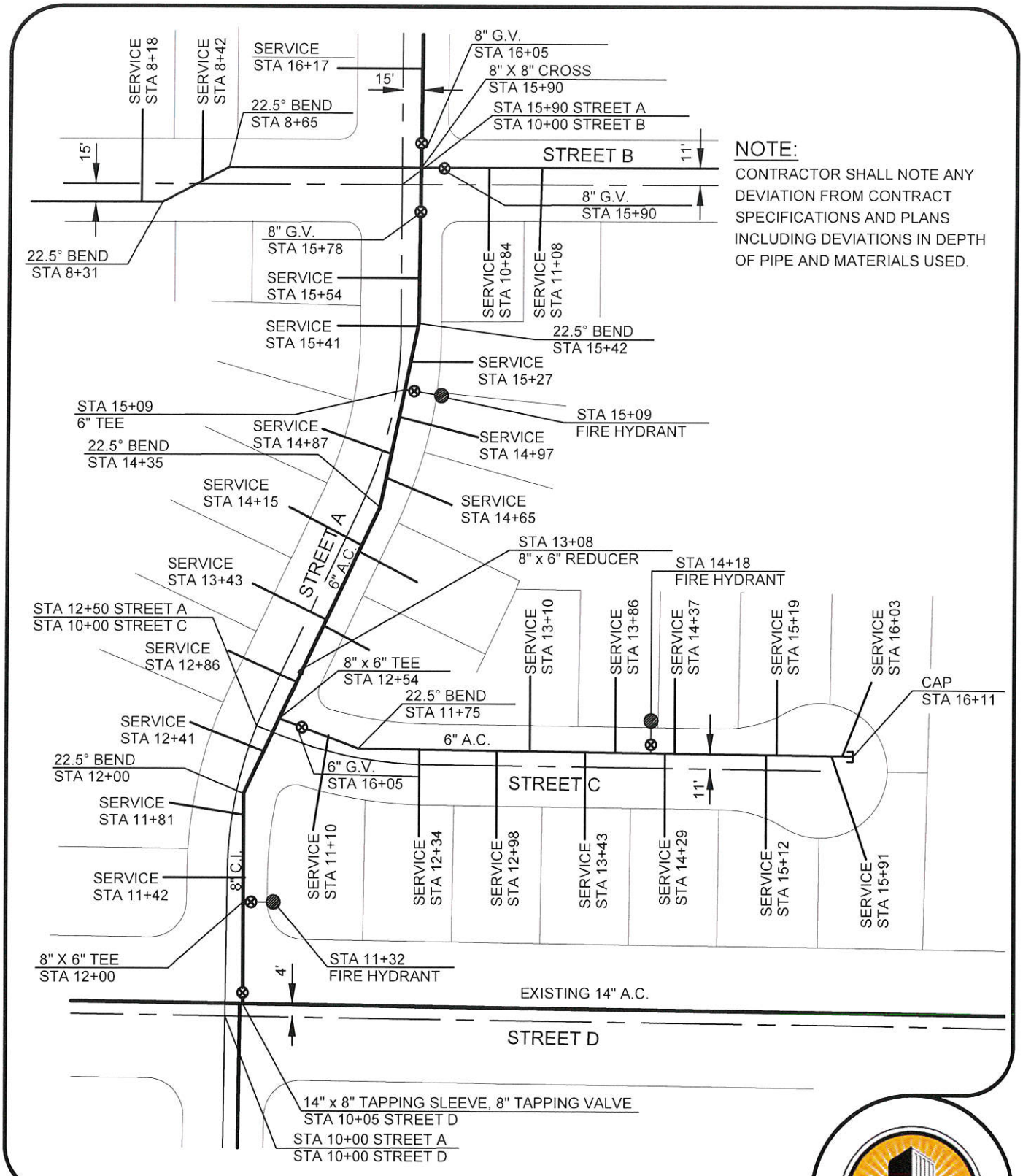
CITY OF SANTA ANA

PUBLIC WORKS AGENCY

DATE		REVISION
12/7/06	A.F.	CONC. BLOCK SIZE
3/17/08	R.R.	ADDED NOTE 1 & 2
6/4/13	J.A.	UPDATED
11/2020	R.R.	UPDATED

VERTICAL BEND ANCHOR

STD. PLAN NUMBER 1420



NOTE:

CONTRACTOR SHALL NOTE ANY DEVIATION FROM CONTRACT SPECIFICATIONS AND PLANS INCLUDING DEVIATIONS IN DEPTH OF PIPE AND MATERIALS USED.

APPROVED: DATE: 11/24/2020

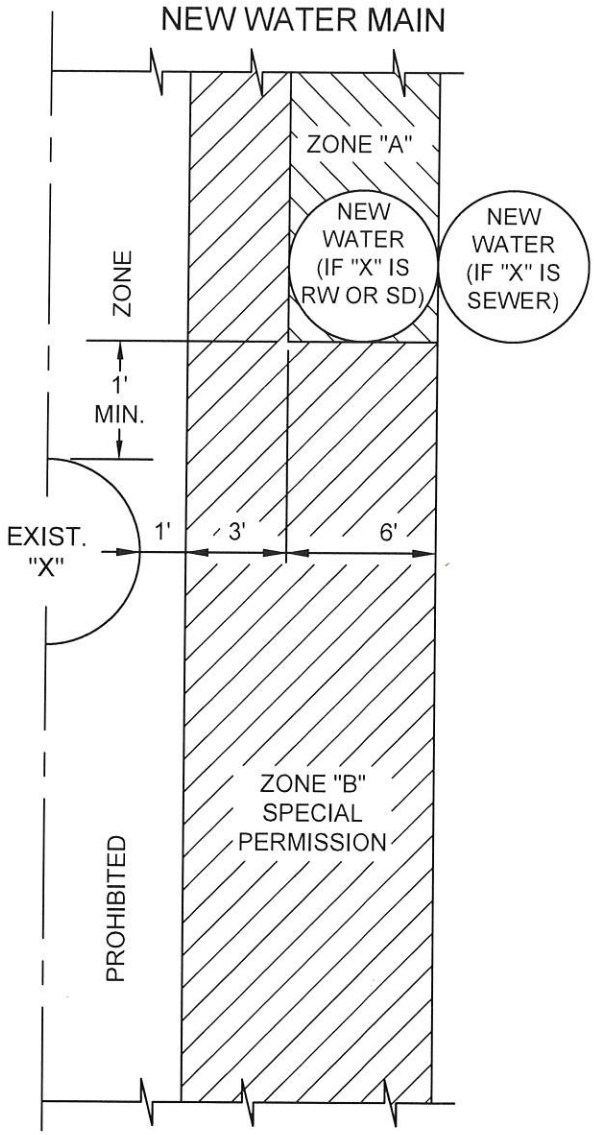
CITY OF SANTA ANA

PUBLIC WORKS AGENCY

DATE		REVISION
3/17/08	R.R.	UPDATED
6/4/13	J.A.	UPDATED

TYPICAL DIMENSIONS PRACTICE FOR "AS BUILT" WATER SYSTEM MAP

STD. PLAN NUMBER 1421



GENERAL NOTES:

1. ZONES IDENTICAL ON EITHER SIDE OF CENTER LINES.
2. ZONE "A" CONSTRUCTION IS ALLOWED ONLY FOR THE INDICATED CONVEYANCE; OTHERWISE SPECIAL PERMISSION. NO PIPES SHALL BE INSTALLED WITHIN THE PROHIBITED ZONE.
3. SPECIAL PERMISSION WILL BE REQUIRED TO CONSTRUCT WITHIN THE ZONE "B". WITH STATE DEPARTMENT OF PUBLIC HEALTH APPROVAL, NEWLY INSTALLED MAINS MAY BE EXEMPTED FROM THE SEPARATION DISTANCES IF THE WATER MAIN CAN BE ADEQUATELY PROTECTED AS SET FORTH IN CALIFORNIA ADMINISTRATIVE CODE (CAC), TITLE 22, SECTION 64572, SUB-SECTION (H). PROPOSED PROTECTIVE MEASURE(S) SHALL BE SUBMITTED TO THE CITY FOR CONSIDERATION BEFORE REQUESTING APPROVAL FROM THE STATE HEALTH DEPARTMENT.

FIGURE 1 - PARALLEL CONSTRUCTION

APPROVED: DATE: 11/24/2020

CITY OF SANTA ANA

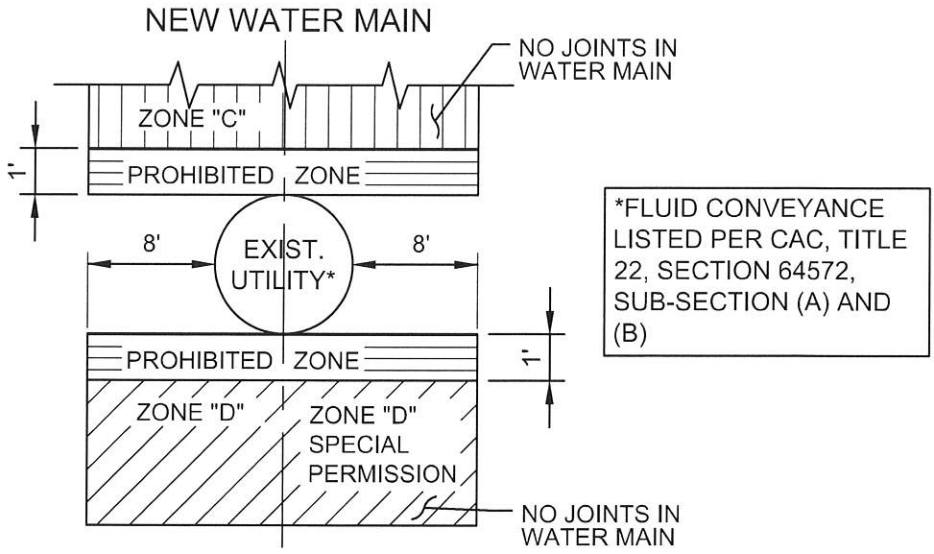
PUBLIC WORKS AGENCY

DATE		REVISION
9/2/08	R.R.	UPDATED
6/4/13	J.A.	UPDATED
11/2020	R.R.	NEW SEPARATION REQUIREMENT

SEPARATION OF WATER, NON-DOMESTIC WATER MAINS, SEWERS AND STORM DRAINS

STD. PLAN NUMBER 1427

SHEET 1 OF 3



GENERAL NOTES:

1. ZONE "C" CONSTRUCTION SHALL HAVE NO JOINTS. CROSSINGS SHALL BE MADE AT AN ANGLE NO LESS THAN 45° TO EXISTING PIPELINE. NO PIPES SHALL BE INSTALLED WITHIN THE PROHIBITED ZONE.

2. SPECIAL PERMISSION WILL BE REQUIRED TO CONSTRUCT WITHIN THE ZONE "D". WITH STATE DEPARTMENT OF PUBLIC HEALTH APPROVAL, NEWLY INSTALLED MAINS MAY BE EXEMPTED FROM THE SEPARATION DISTANCES IF THE WATER MAIN CAN BE ADEQUATELY PROTECTED AS SET FORTH IN CALIFORNIA ADMINISTRATIVE CODE (CAC), TITLE 22, SECTION 64572, SUB-SECTION (H). PROPOSED PROTECTIVE MEASURE(S) SHALL BE SUBMITTED TO THE CITY FOR CONSIDERATION BEFORE REQUESTING APPROVAL FROM THE STATE HEALTH DEPARTMENT.

FIGURE 2 - CROSSINGS

APPROVED: DATE: 11/24/2020

CITY OF SANTA ANA

PUBLIC WORKS AGENCY

DATE		REVISION
11/2020	R.R.	NEW

SEPARATION OF WATER MAINS, SANITARY SEWERS AND STORM DRAINS

STD. PLAN NUMBER 1427

NOTES:

1. ALL NEW DOMESTIC WATER MAINS SHALL BE INSTALLED PER THE LATEST CALIFORNIA PUBLIC HEALTH LAWS FOR DRINKING WATER SAFETY.

2. CALIFORNIA ADMINISTRATIVE CODE, TITLE 22, SECTION 64572 (UPDATED JUNE 2015) STATES:

(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 6 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 NO LESS THAN 45-DEGREES TO AND AT LEAST ONE FOOT ABOVE THAT PIPELINE. NO CONNECTION JOINTS SHALL BE MADE IN THE WATER MAIN WITHIN EIGHT HORIZONTAL FEET OF THE 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 LESS THAN TEN FEET.

(F) NEW WATER MAINS SHALL NOT BE INSTALLED WITHIN 100 HORIZONTAL FEET OF THE NEAREST EDGE OF ANY SANITARY LANDFILL, WASTEWATER DISPOSAL POND, OR HAZARDOUS WASTE DISPOSAL SITE, OR WITHIN 25 HORIZONTAL FEET OF THE NEAREST EDGE OF ANY CESSPOOL, SEPTIC TANK, SEWAGE LEACH FIELD, SEEPAGE PIT, UNDERGROUND HAZARDOUS MATERIAL STORAGE TANK, 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.

(H) WITH DEPARTMENT APPROVAL, NEWLY INSTALLED WATER MAINS MAY BE EXEMPT FROM THE SEPARATION DISTANCES IN THIS SECTION, EXCEPT SUBSECTION (F), IF THE NEWLY INSTALLED MAIN IS:

1) LESS THAN 1320 LINEAR FEET,
2) REPLACING AN EXISTING MAIN, INSTALLED IN THE SAME LOCATION, AND HAS A DIAMETER NO GREATER THAN SIX INCHES MORE THAN THE DIAMETER OF THE MAIN IT IS REPLACING, AND
3) INSTALLED IN A MANNER THAT MINIMIZES THE POTENTIAL FOR CONTAMINATION, INCLUDING, BUT NOT LIMITED TO:
   A. SLEEVING THE NEWLY INSTALLED MAIN, OR
   B. UTILIZING UPGRADED PIPING MATERIAL (DIP WITH HOT DIP BITUMINOUS COATING)

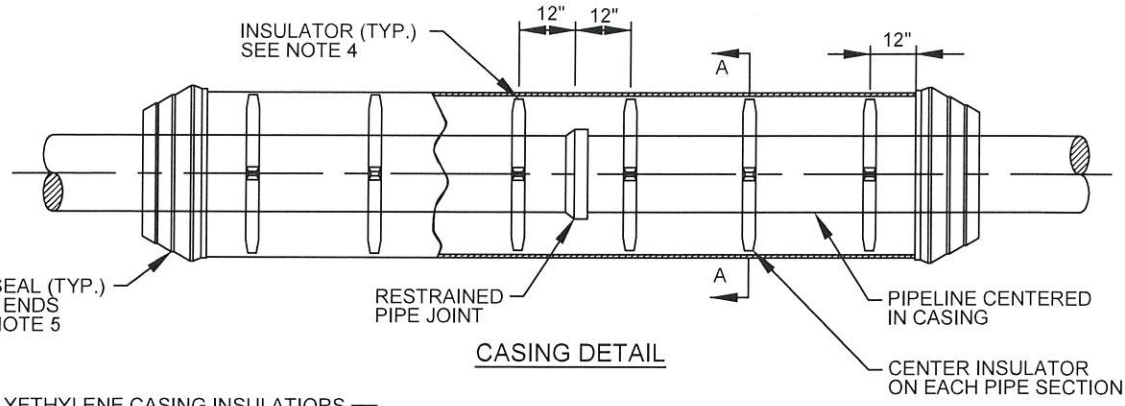
APPROVED: DATE: 11/24/2020

CITY OF SANTA ANA
PUBLIC WORKS AGENCY

DATE		REVISION
11/2020	R.R.	NEW

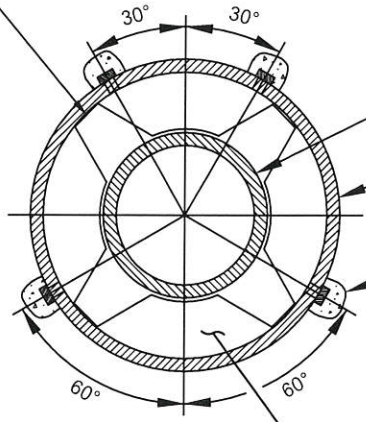
SEPARATION OF WATER MAINS, SANITARY SEWERS AND STORM DRAINS

STD. PLAN NUMBER 1427



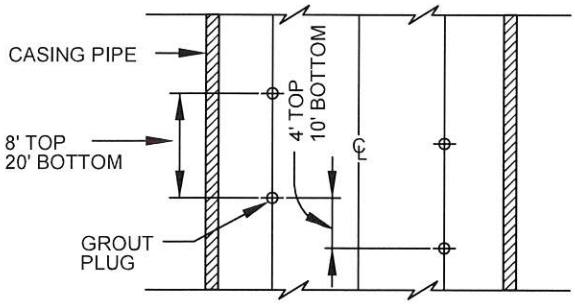
CASING DETAIL

USE POLYETHYLENE CASING INSULATORS WITH POLYETHYLENE SKIDS. ALL BOLTS AND BANDS SHALL BE TYPE 304 STAINLESS STEEL.

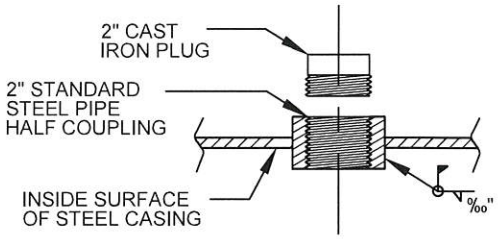


SECTION A-A

PIPE SIZE (D.I.)	STEEL CASING PIPE	
	MIN. SIZE (I.D.)	MIN. WALL THK.
6"	16"	1/4"
8"	18"	1/4"
10"	21"	5/16"
12"	24"	5/16"



COUPLING SPACING
(PLAN VIEW)



GROUT COUPLING
(FOR ALL CASINGS 24" IN DIA. AND LARGER)

NOTES:

1. ALL STEEL CASING PIPE JOINTS SHALL BE WELDED FULL CIRCUMFERENCE.
2. PERIPHERY OF CASING TO BE PRESSURE GROUTED FOR ALL CASINGS 24" IN DIAMETER AND LARGER.
3. UPSTREAM AND DOWNSTREAM ELEVATIONS TO BE VERIFIED.
4. SPACING BETWEEN THE CASING INSULATORS SHALL BE PER THE MANUFACTURERES RECOMMENDATIONS EXCEPT THAT THERE SHALL BE AT LEAST 3 CASING INSULATORS PER PIPE SECTION, ONE 12" FROM EACH JOINT AND ONE CENTERED ADDITIONALLY, ONE INSULATOR SHALL BE INSTALLED 12" FROM EACH END OF THE CASING.
5. BOTH ENDS OF THE CASING BETWEEN THE CASING AND CARRIER PIPE SHALL BE SEALED WATER TIGHT USING AN END SEAL. BANDS SHALL BE TYPE 304 STAINLESS STEEL.

APPROVED: DATE: 11/24/2020

CITY OF SANTA ANA

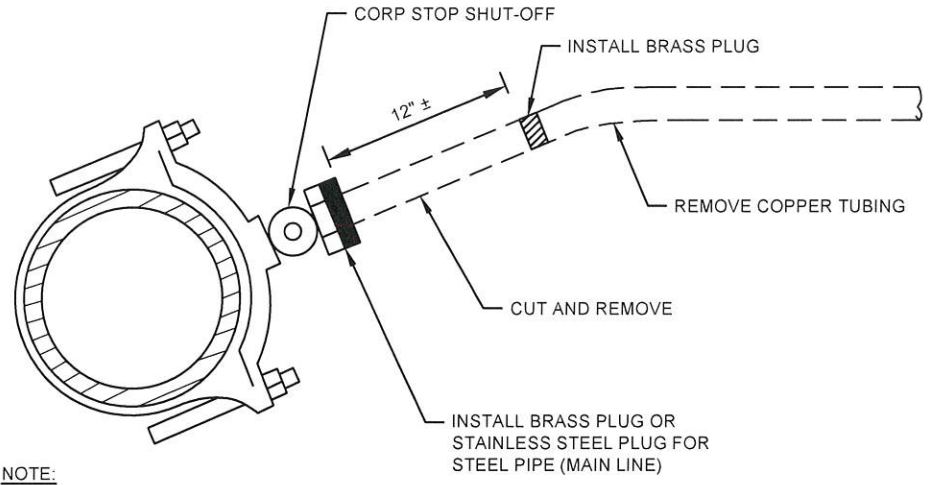
PUBLIC WORKS AGENCY

DATE		REVISION
11/2020	R.R.	UPDATED

WATER PIPE CASING

STD. PLAN NUMBER 1429

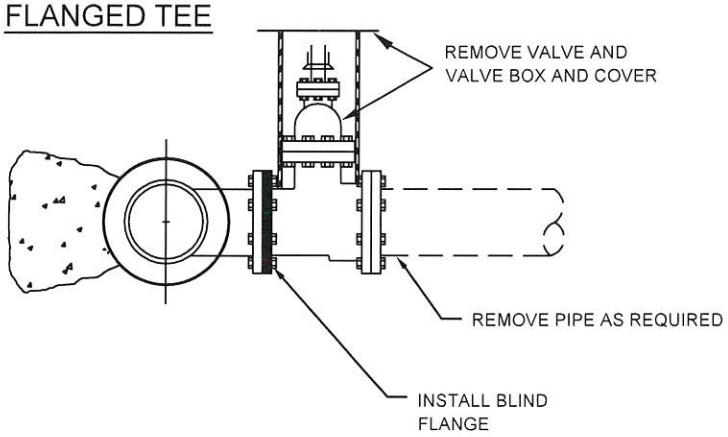
2" AND SMALLER



NOTE:
REMOVE ABANDONED WATER METER BOX (SEE NOTE NO. 3 BELOW) AND REMOVE AND DISPOSE COPPER SERVICE PIPE TO THE 90° ELBOW OR END OF SWEEP BELOW GROUND. INSTALL BRASS PLUG ON REMAINING END OF COPPER SERVICE PIPING.

4" AND LARGER

FLANGED TEE



NOTE:
WHEN EXISTING TEE BRANCH HAS A PUSH-ON OR MECHANICAL JOINT, REMOVE TEE IN ITS ENTIRETY AND REPLACE WITH PVC, DR14, C-900 PIPE AND JOIN TO EXISTING WATER MAIN WITH SMITH BLAIR FLEXIBLE COUPLINGS.

NOTES:

1. ALL EXISTING VALVES (4" AND LARGER) SHALL BE SALVAGED AND DELIVERED TO CITY'S WATER RESOURCES DIVISION AT 215 S. CENTER ST. PRIOR NOTIFICATION OF DELIVERY IS REQUIRED AT 714-647-3320.
2. PAVE AND BACKFILL PER CITY STD. PLAN 1150.
3. REMOVE METER BOX AND RESTORE HARDSCAPE/LANDSCAPE ONLY AFTER CONTACTING CITY TO REQUEST METER BE REMOVED.

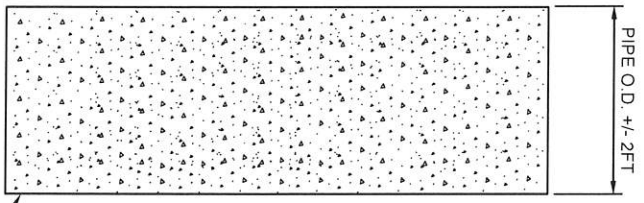
APPROVED: DATE: 11/24/2020

CITY OF SANTA ANA
PUBLIC WORKS AGENCY

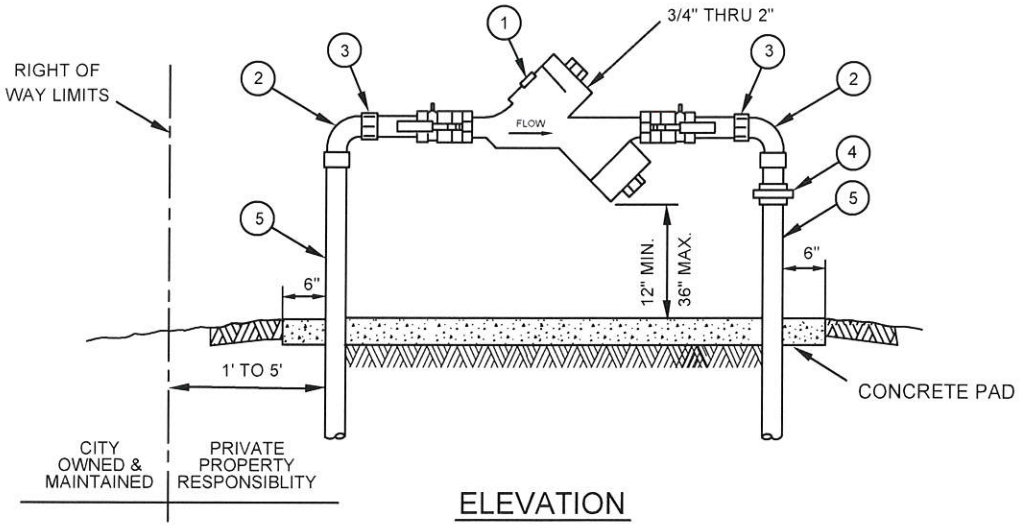
DATE		REVISION
3/1/16	R.R.	REVISED
11/2020	R.R.	REVISED

ABANDONMENT DETAILS

STD. PLAN NUMBER 1430



PLAN
(PAD ONLY)



ELEVATION

LEGEND OF MATERIAL:	
NO.	SIZE & DESCRIPTION
1	APPROVED BACKFLOW PREVENTION ASSEMBLY
2	SOLDER 90° ELL
3	MIP SOLDER ADAPTER
4	SOLDER UNION
5	TYPE "K" SOFT COPPER OR BRASS

GENERAL NOTES:

1. TO ENSURE APPROPRIATE FLOW PLEASE CHECK WITH THE CITY PLUMBING INSPECTOR FOR SIZING.
2. ALL BACKFLOW PREVENTION DEVICES SHALL BE TESTED BY A CERTIFIED TESTER AFTER INSTALLATION, RELOCATION OR REPAIR.
3. BACKFLOW MUST BE EASILY ACCESSIBLE TO FACILITATE TESTING AND SERVICING.
4. THE USC LIST OF APPROVED BACKFLOW PREVENTION ASSEMBLIES HAS BEEN ADOPTED BY THE CITY WATER DEPARTMENT AS THE ONLY ASSEMBLIES APPROVED FOR USE ON THE WATER LINES UNDER OUR JURISDICTION.
5. PRIVATE WATER APPURTENANCES SUCH AS BACKFLOW PREVENTERS, FIRE HYDRANTS AND STANDPIPES, AND VALVES SHALL BE PAINTED AS FOLLOWS:
   - DOMESTIC WATER (BLUE)
   - POTABLE IRRIGATION (GREEN)
   - RECYCLED IRRIGATION (PURPLE)
   - FIRE PROTECTIONS (OSHA SAFETY RED)

HEALTH HAZARD (POLLUTANT) BACKFLOW PREVENTION DEVICE

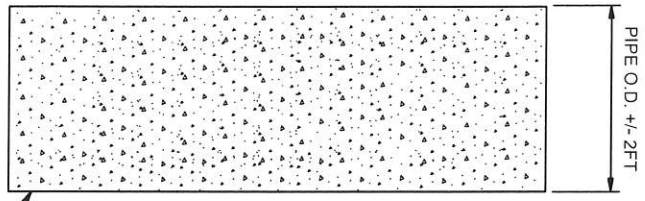
APPROVED: DATE: 11/20/2020

CITY OF SANTA ANA
PUBLIC WORKS AGENCY

DATE		REVISION
3/1/16	R.R.	NEW

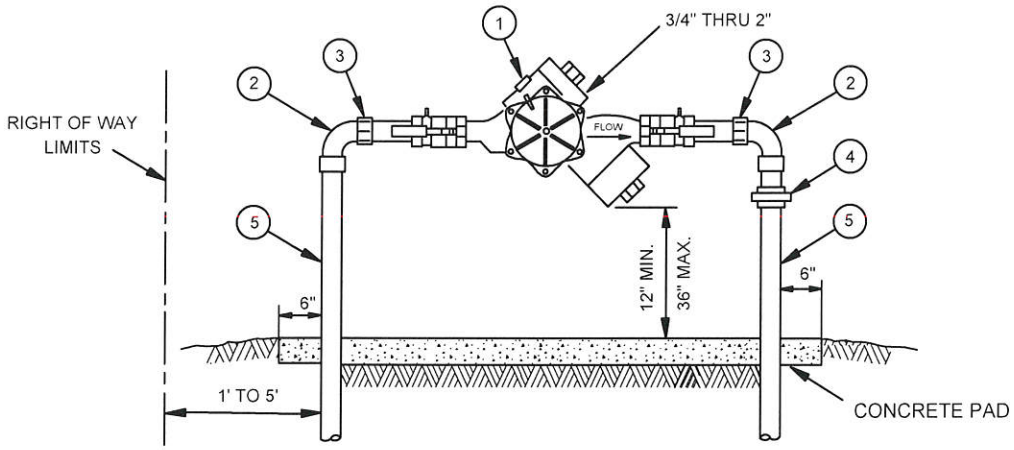
DOUBLE CHECK VALVE ASSEMBLY
(2" OR SMALLER)

STD. PLAN NUMBER 1431



CONCRETE PAD

PLAN
(PAD ONLY)



ELEVATION

LEGEND OF MATERIAL:	
NO.	SIZE & DESCRIPTION
1	APPROVED BACKFLOW PREVENTION ASSEMBLY
2	SOLDER 90° ELL
3	MIP SOLDER ADAPTER
4	SOLDER UNION
5	TYPE "K" SOFT COPPER OR BRASS

GENERAL NOTES:

1. TO ENSURE APPROPRIATE FLOW PLEASE CHECK WITH THE CITY PLUMBING INSPECTOR FOR SIZING.
2. ALL BACKFLOW PREVENTION DEVICES SHALL BE TESTED BY A CERTIFIED TESTER AFTER INSTALLATION, RELOCATION OR REPAIR.
3. BACKFLOW MUST BE EASILY ACCESSIBLE TO FACILITATE TESTING AND SERVICING.
4. THE USC LIST OF APPROVED BACKFLOW PREVENTION ASSEMBLIES HAS BEEN ADOPTED BY CITY WATER DEPARTMENT AS THE ONLY ASSEMBLIES APPROVED FOR USE ON THE WATER LINES UNDER JURISDICTION.
5. PRIVATE WATER APPURTENANCES SUCH AS BACKFLOW PREVENTERS, FIRE HYDRANTS AND STANDPIPES, AND VALVES SHALL BE PAINTED AS FOLLOWS:
   - DOMESTIC WATER (BLUE)
   - POTABLE IRRIGATION (GREEN)
   - RECYCLED IRRIGATION (PURPLE)
   - FIRE PROTECTIONS (OSHA SAFETY RED)

HEALTH HAZARD (POLLUTANT/CONTAMINANT) BACKFLOW PREVENTION DEVICE

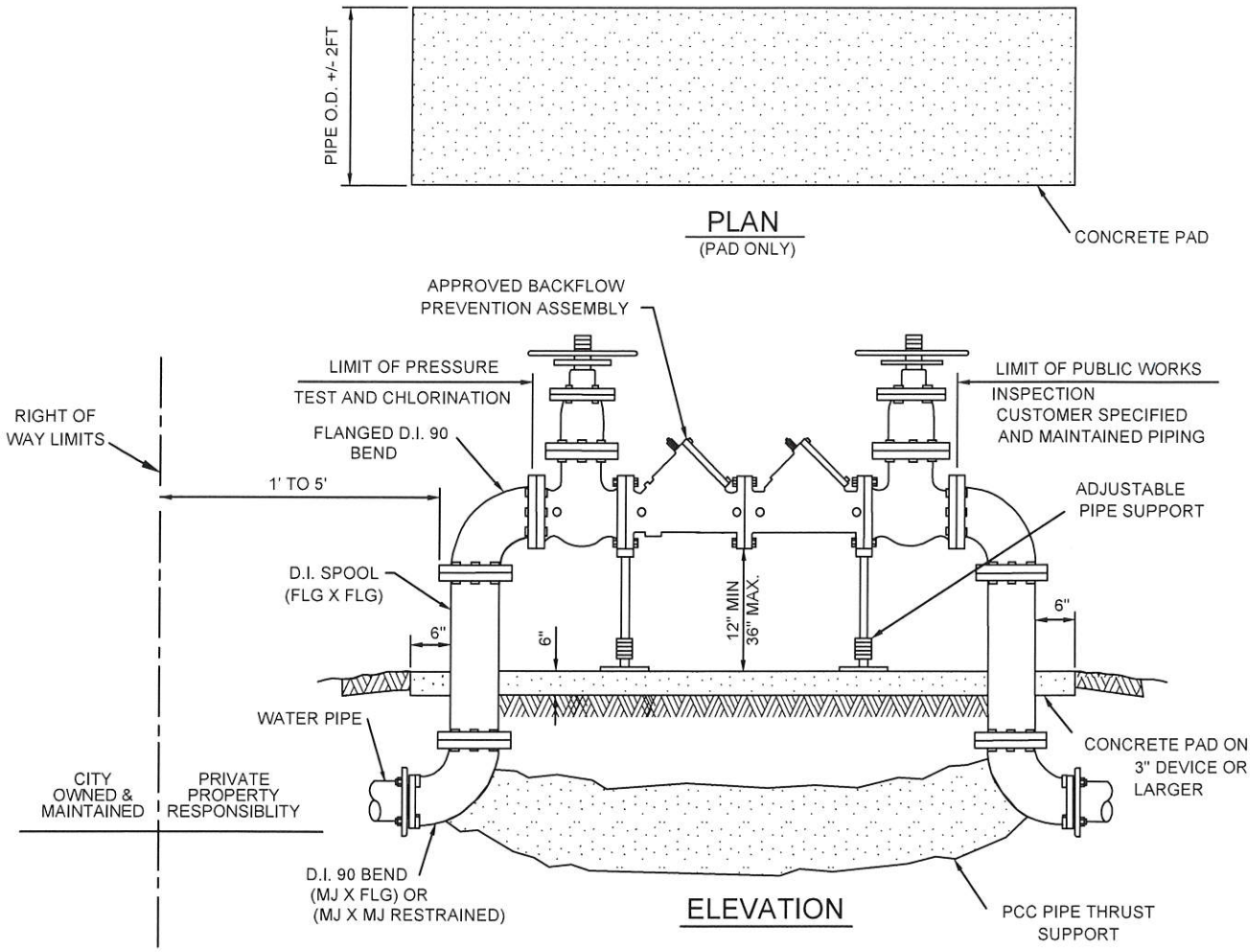
APPROVED: DATE: 11/24/2020

CITY OF SANTA ANA
PUBLIC WORKS AGENCY

DATE		REVISION
3/1/16	R.R.	NEW
11/2020	R.R.	UPDATED

REDUCED PRESSURE PRINCIPLE BACKFLOW DEVICE (2" OR SMALLER)

STD. PLAN NUMBER 1432



GENERAL NOTES

1. PRESSURE TEST AND CHLORINATION TO LIMITS SHOWN ABOVE
2. BACKFLOW ASSEMBLY SHALL BE A MINIMUM OF 36" FROM ANY STRUCTURE, CURB OR SIDEWALK.
3. BACKFLOW ASSEMBLY MUST BE EASILY ACCESSIBLE TO FACILITATE TESTING AND SERVICING
4. THE USC LIST OF APPROVED BACKFLOW PREVENTION ASSEMBLIES HAS BEEN ADOPTED BY CITY WATER DEPARTMENT AS THE ONLY ASSEMBLIES APPROVED FOR USE ON THE WATER LINES UNDER OUR JURISDICTION.
5. PRIVATE WATER APPURTENANCES SUCH AS BACKFLOW PREVENTERS, FIRE HYDRANTS AND STANDPIPES, AND VALVES SHALL BE PAINTED AS FOLLOWS:
   - DOMESTIC WATER (BLUE)
   - POTABLE IRRIGATION (GREEN)
   - RECYCLED IRRIGATION (PURPLE)
   - FIRE PROTECTIONS (OSHA SAFETY RED)
6. ALL BACKFLOW PREVENTION DEVICES SHALL BE TESTED BY A CERTIFIED TESTER AFTER INSTALLATION, RELOCATION OR REPAIR.

"FOR DOMESTIC USE ONLY"
HEALTH HAZARD (POLLUTANT) BACKFLOW PREVENTION DEVICE

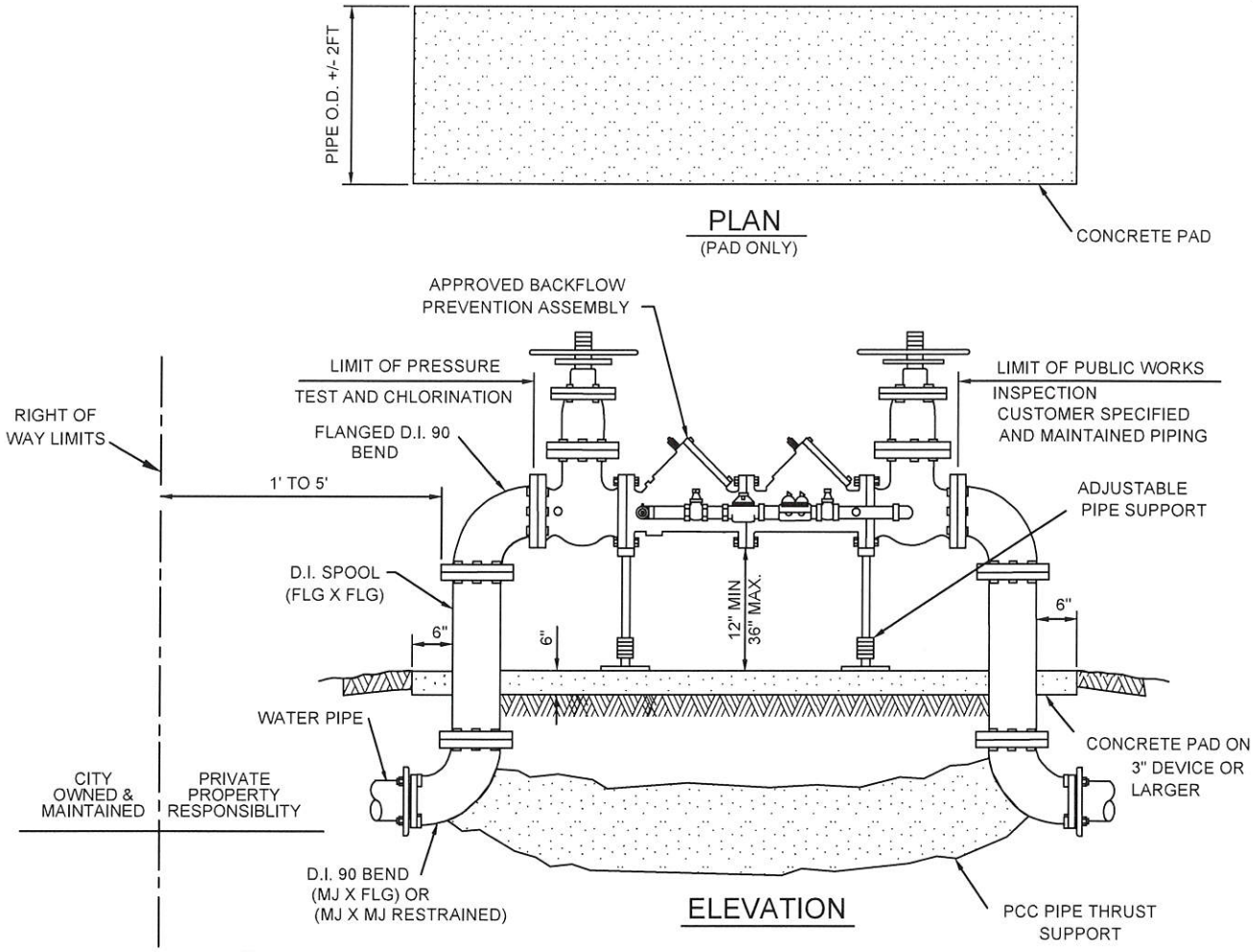
APPROVED: DATE: 11/24/2020

CITY OF SANTA ANA
PUBLIC WORKS AGENCY

DATE		REVISION
3/1/16	R.R.	NEW
11/2020	R.R.	REVISED

DOUBLE CHECK ASSEMBLY
(3" OR LARGER)

STD. PLAN NUMBER
1433A



GENERAL NOTES

1. PRESSURE TEST AND CHLORINATION TO LIMITS SHOWN ABOVE
2. BACKFLOW ASSEMBLY SHALL BE A MINIMUM OF 36" FROM ANY STRUCTURE, CURB OR SIDEWALK.
3. BACKFLOW ASSEMBLY MUST BE EASILY ACCESSIBLE TO FACILITATE TESTING AND SERVICING
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   - POTABLE IRRIGATION (GREEN)
   - RECYCLED IRRIGATION (PURPLE)
   - FIRE PROTECTIONS (OSHA SAFETY RED)
6. ALL BACKFLOW PREVENTION DEVICES SHALL BE TESTED BY A CERTIFIED TESTER AFTER INSTALLATION, RELOCATION OR REPAIR.

"FOR FIRE USE ONLY"
HEALTH HAZARD (POLLUTANT) BACKFLOW PREVENTION DEVICE

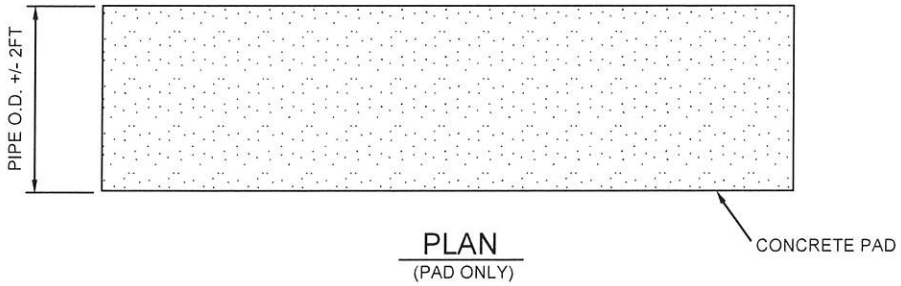
APPROVED: DATE: 11/24/2020

CITY OF SANTA ANA
PUBLIC WORKS AGENCY

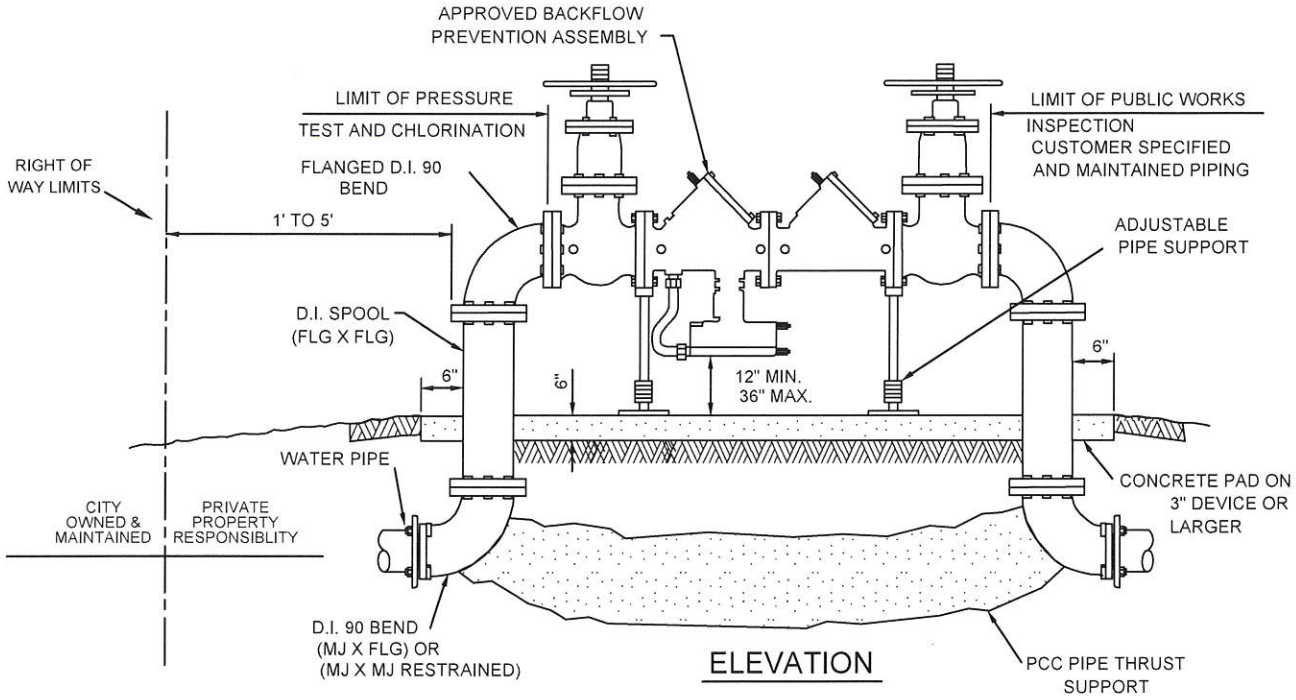
DATE		REVISION
11/2020	R.R.	NEW

DOUBLE CHECK DETECTOR ASSEMBLY
(3" OR LARGER)

STD. PLAN NUMBER
1433B



PLAN
(PAD ONLY)



ELEVATION

GENERAL NOTES

1. PRESSURE TEST AND CHLORINATION TO LIMITS SHOWN ABOVE
2. BACKFLOW ASSEMBLY SHALL BE A MINIMUM OF 36" FROM ANY STRUCTURE, CURB OR SIDEWALK.
3. BACKFLOW ASSEMBLY MUST BE EASILY ACCESSIBLE TO FACILITATE TESTING AND SERVICING
4. THE USC LIST OF APPROVED BACKFLOW PREVENTION ASSEMBLIES HAS BEEN ADOPTED BY CITY WATER DEPARTMENT AS THE ONLY ASSEMBLIES APPROVED FOR USE ON THE WATER LINES UNDER OUR JURISDICTION.
5. PRIVATE WATER APPURTENANCES SUCH AS BACKFLOW PREVENTERS, FIRE HYDRANTS AND STANDPIPES, AND VALVES SHALL BE PAINTED AS FOLLOWS:
   - DOMESTIC WATER (BLUE)
   - POTABLE IRRIGATION (GREEN)
   - RECYCLED IRRIGATION (PURPLE)
   - FIRE PROTECTIONS (OSHA SAFETY RED)
6. ALL BACKFLOW PREVENTION DEVICES SHALL BE TESTED BY A CERTIFIED TESTER AFTER INSTALLATION, RELOCATION OR REPAIR.

"FOR DOMESTIC/IRRIGATION/INDUSTRIAL USE"
HEALTH HAZARD (POLLUTANT/CONTAMINANT) BACKFLOW PREVENTION DEVICE

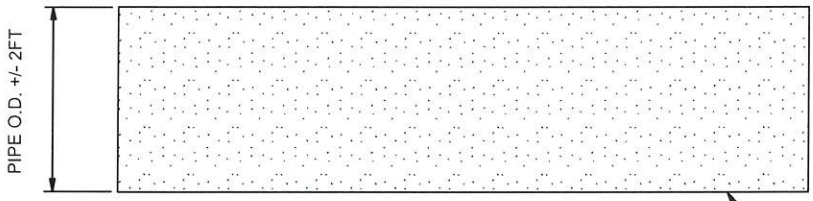
APPROVED: DATE: 11/24/2020

CITY OF SANTA ANA
PUBLIC WORKS AGENCY

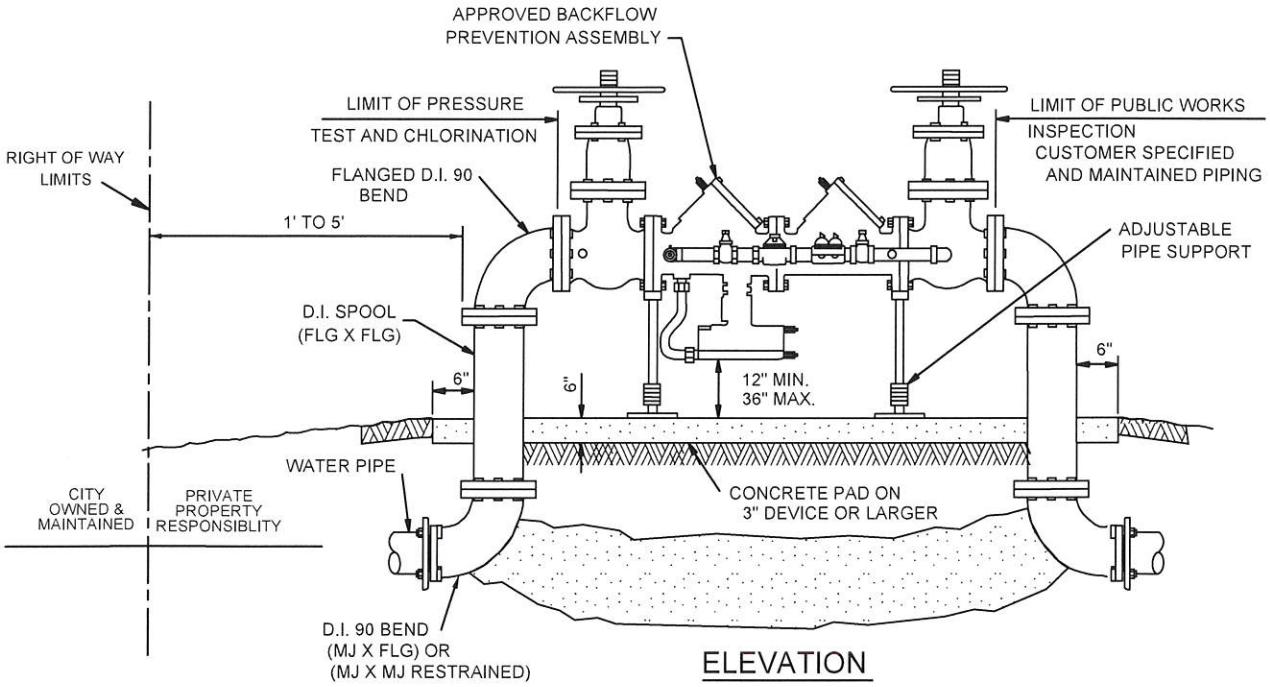
DATE		REVISION
3/1/16	R.R.	NEW
11/2020	R.R.	UPDATED

REDUCED PRESSURE PRINCIPLE ASSEMBLY (3" OR LARGER)

STD. PLAN NUMBER 1434



PLAN
(PAD ONLY)



ELEVATION

GENERAL NOTES

1. PRESSURE TEST AND CHLORINATION TO LIMITS SHOWN ABOVE
2. BACKFLOW ASSEMBLY SHALL BE A MINIMUM OF 36" FROM ANY STRUCTURE, CURB OR SIDEWALK.
3. BACKFLOW ASSEMBLY MUST BE EASILY ACCESSIBLE TO FACILITATE TESTING AND SERVICING
4. THE USC LIST OF APPROVED BACKFLOW PREVENTION ASSEMBLIES HAS BEEN ADOPTED BY CITY WATER DEPARTMENT AS THE ONLY ASSEMBLIES APPROVED FOR USE ON THE WATER LINES UNDER OUR JURISDICTION.
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   - DOMESTIC WATER (BLUE)
   - POTABLE IRRIGATION (GREEN)
   - RECYCLED IRRIGATION (PURPLE)
   - FIRE PROTECTIONS (OSHA SAFETY RED)
6. ALL BACKFLOW PREVENTION DEVICES SHALL BE TESTED BY A CERTIFIED TESTER AFTER INSTALLATION, RELOCATION OR REPAIR.

"FOR FIRE USE ONLY"
HEALTH HAZARD (CONTAMINANT) BACKFLOW PREVENTION DEVICE

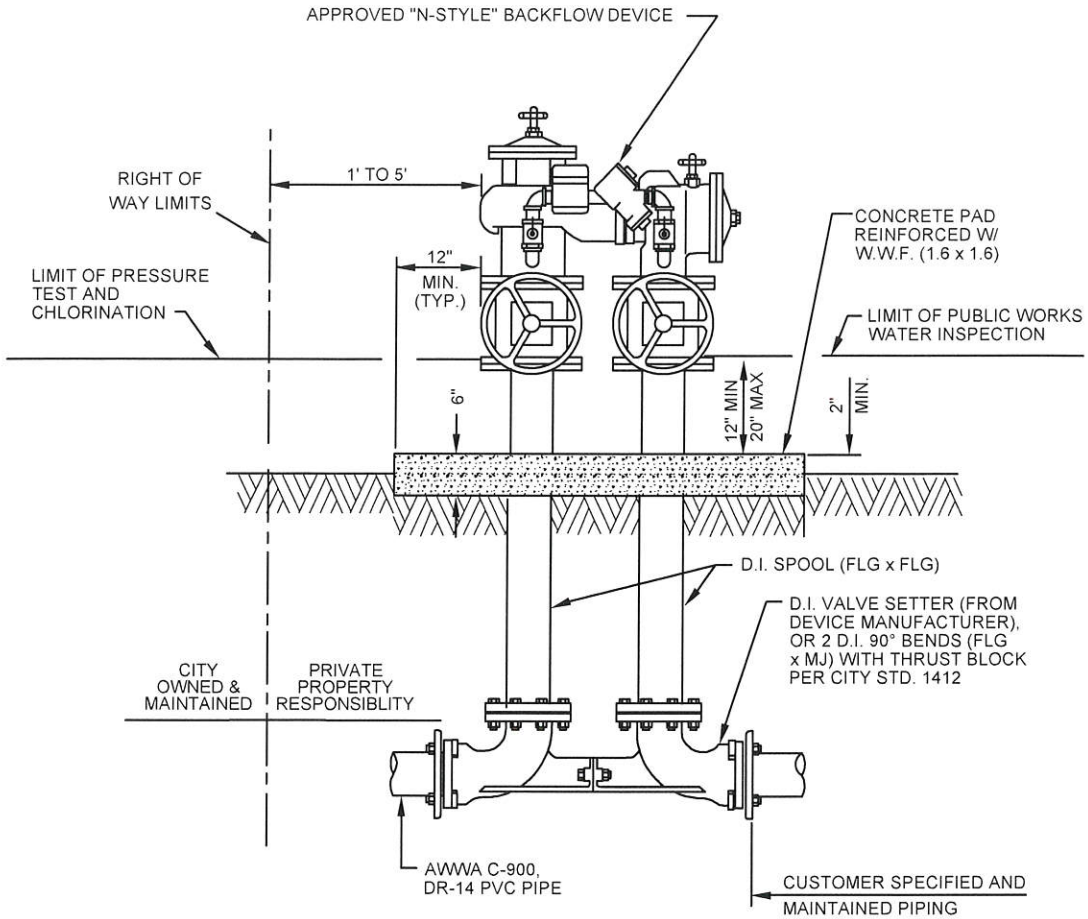
APPROVED: DATE: 11/24/2020

CITY OF SANTA ANA
PUBLIC WORKS AGENCY

DATE		REVISION
3/1/16	R.R.	NEW
11/2020	R.R.	UPDATED

REDUCED PRESSURE DETECTOR ASSEMBLY (3" OR LARGER)

STD. PLAN NUMBER 1435



FRONT ELEVATION VIEW

GENERAL NOTES:

1. PRESSURE TEST AND CHLORINATE TO LIMITS SHOWN ABOVE.
2. BACKFLOW ASSEMBLY SHALL BE A MINIMUM OF 36" FROM ANY STRUCTURE, CURB OR SIDEWALK.
3. BACKFLOW ASSEMBLY MUST BE EASILY ACCESSIBLE TO FACILITATE TESTING AND SERVICING.
4. THE USC LIST OF APPROVED BACKFLOW PREVENTION ASSEMBLIES HAS BEEN ADOPTED BY CITY WATER DEPARTMENT AS THE ONLY ASSEMBLIES APPROVED FOR USE ON THE WATER LINES UNDER OUR JURISDICTION.
5. PRIVATE WATER APPURTENANCES SUCH AS BACKFLOW PREVENTERS, FIRE HYDRANTS AND STANDPIPES, AND VALVES SHALL BE PAINTED AS FOLLOWS:
   - DOMESTIC WATER (BLUE)
   - POTABLE IRRIGATION (GREEN)
   - RECYCLED IRRIGATION (PURPLE)
   - FIRE PROTECTIONS (OSHA SAFETY RED)
6. ALL BACKFLOW PREVENTION DEVICES SHALL BE TESTED BY A CERTIFIED TESTER AFTER INSTALLATION, RELOCATION OR REPAIR.

"FOR FIRE USE ONLY"
HEALTH HAZARD (POLLUTANT) BACKFLOW PREVENTION DEVICE

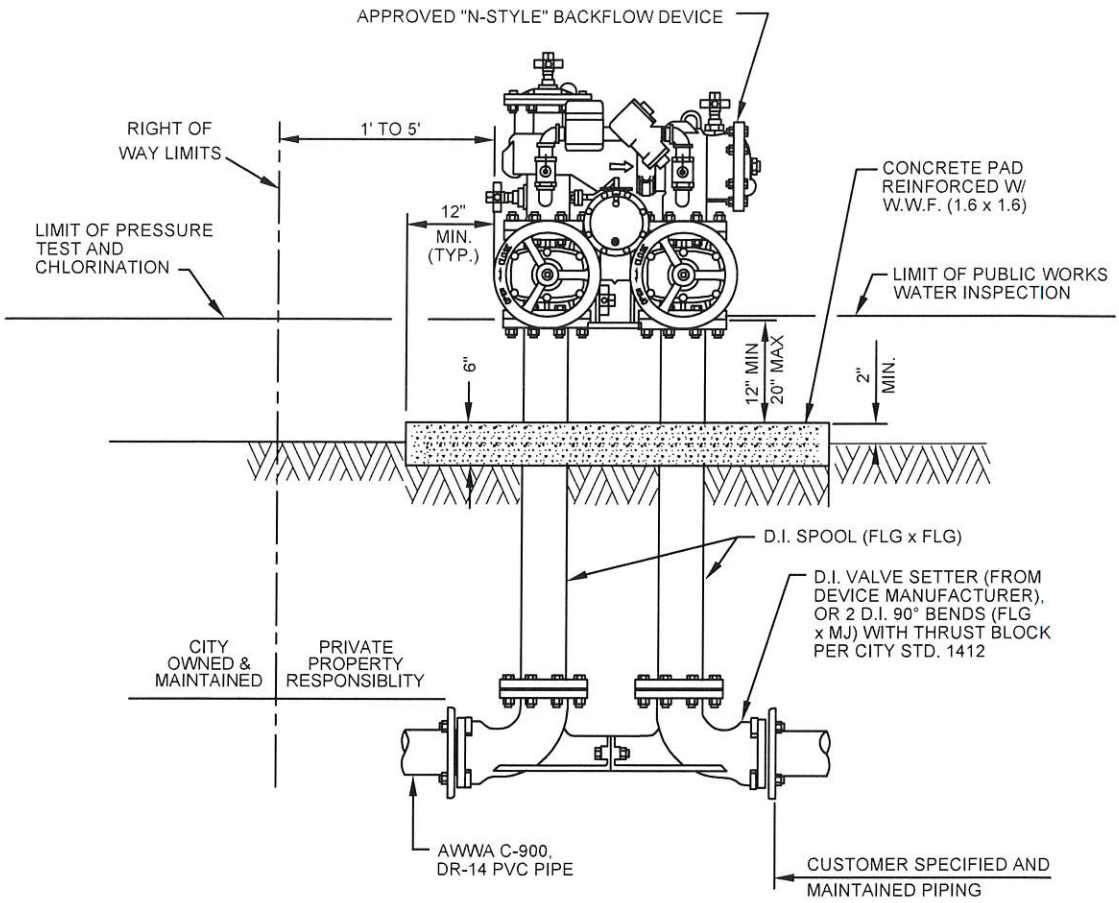
APPROVED: DATE: 11/24/202

CITY OF SANTA ANA
PUBLIC WORKS AGENCY

DATE		REVISION
3/1/16	R.R.	NEW
11/2020	R.R.	UPDATED

COMPACT DOUBLE CHECK DETECTOR ASSEMBLY (3" OR LARGER)

STD. PLAN NUMBER 1436



FRONT ELEVATION VIEW

GENERAL NOTES:

1. PRESSURE TEST AND CHLORINATE TO LIMITS SHOWN ABOVE.
2. BACKFLOW ASSEMBLY SHALL BE A MINIMUM OF 36" FROM ANY STRUCTURE, CURB OR SIDEWALK.
3. BACKFLOW ASSEMBLY MUST BE EASILY ACCESSIBLE TO FACILITATE TESTING AND SERVICING.
4. THE USC LIST OF APPROVED BACKFLOW PREVENTION ASSEMBLIES HAS BEEN ADOPTED BY CITY WATER DEPARTMENT AS THE ONLY ASSEMBLIES APPROVED FOR USE ON THE WATER LINES UNDER OUR JURISDICTION.
5. PRIVATE WATER APPURTENANCES SUCH AS BACKFLOW PREVENTERS, FIRE HYDRANTS AND STANDPIPES, AND VALVES SHALL BE PAINTED AS FOLLOWS:
   - DOMESTIC WATER (BLUE)
   - POTABLE IRRIGATION (GREEN)
   - RECYCLED IRRIGATION (PURPLE)
   - FIRE PROTECTIONS (OSHA SAFETY RED)
6. ALL BACKFLOW PREVENTION DEVICES SHALL BE TESTED BY A CERTIFIED TESTER AFTER INSTALLATION, RELOCATION OR REPAIR.

"FOR FIRE USE ONLY"
HEALTH HAZARD (CONTAMINANT) BACKFLOW PREVENTION DEVICE

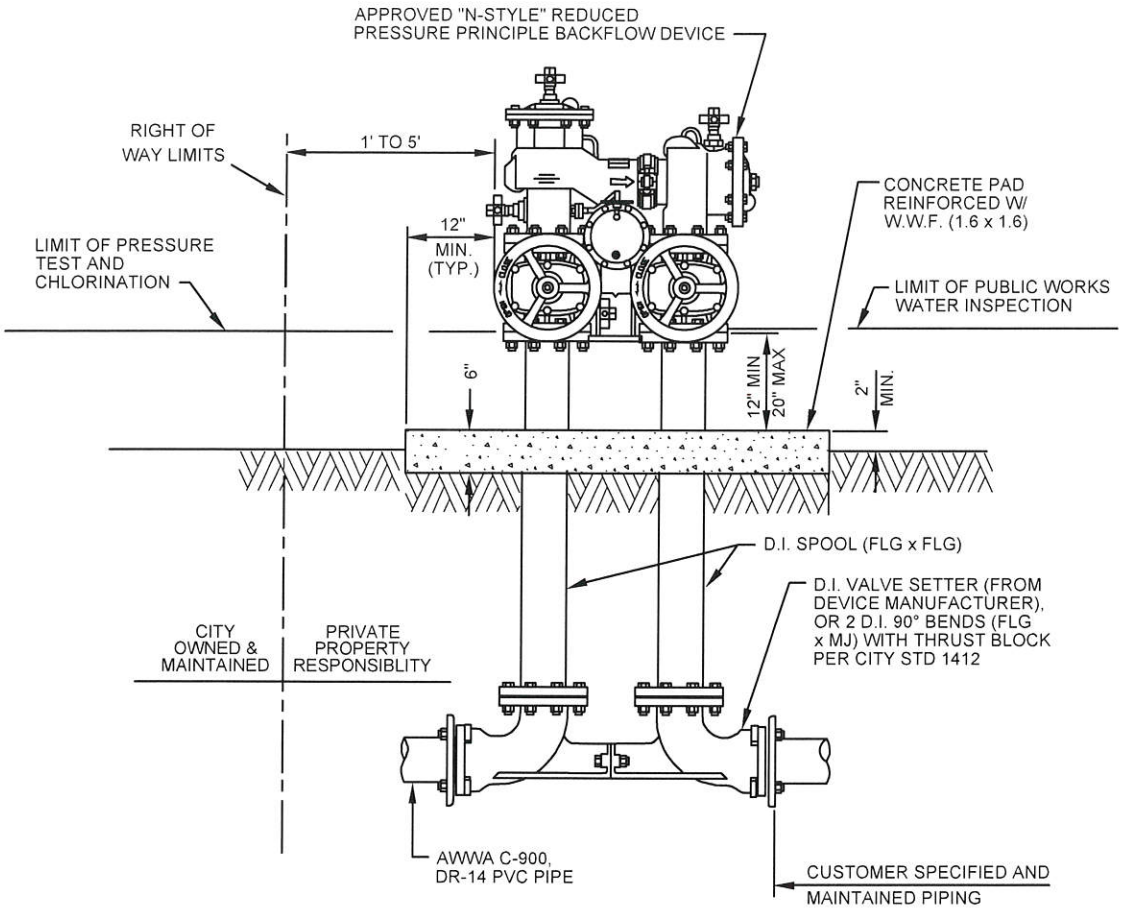
APPROVED: DATE: 11/24/2020

CITY OF SANTA ANA
PUBLIC WORKS AGENCY

DATE		REVISION
3/1/16	R.R.	NEW
11/2020	R.R.	UPDATED

COMPACT REDUCED PRESSURE DETECTOR ASSEMBLY (3" OR LARGER)

STD. PLAN NUMBER 1437



FRONT ELEVATION VIEW

GENERAL NOTES:

1. PRESSURE TEST AND CHLORINATE TO LIMITS SHOWN ABOVE.
2. BACKFLOW ASSEMBLY SHALL BE A MINIMUM OF 36" FROM ANY STRUCTURE, CURB OR SIDEWALK.
3. BACKFLOW ASSEMBLY MUST BE EASILY ACCESSIBLE TO FACILITATE TESTING AND SERVICING.
4. THE USC LIST OF APPROVED BACKFLOW PREVENTION ASSEMBLIES HAS BEEN ADOPTED BY CITY WATER DEPARTMENT AS THE ONLY ASSEMBLIES APPROVED FOR USE ON THE WATER LINES UNDER OUR JURISDICTION.
5. PRIVATE WATER APPURTENANCES SUCH AS BACKFLOW PREVENTERS, FIRE HYDRANTS AND STANDPIPES, AND VALVES SHALL BE PAINTED AS FOLLOWS:
   - DOMESTIC WATER (BLUE)
   - POTABLE IRRIGATION (GREEN)
   - RECYCLED IRRIGATION (PURPLE)
   - FIRE PROTECTIONS (OSHA SAFETY RED)
6. ALL BACKFLOW PREVENTION DEVICES SHALL BE TESTED BY A CERTIFIED TESTER AFTER INSTALLATION, RELOCATION OR REPAIR.

"FOR DOMESTIC/IRRIGATION/INDUSTRIAL USE"
HEALTH HAZARD (POLLUTANT/CONTAMINANT) BACKFLOW PREVENTION DEVICE

APPROVED: DATE: 11/24/2020

CITY OF SANTA ANA
PUBLIC WORKS AGENCY

DATE		REVISION
3/1/16	R.R.	NEW
11/2020	R.R.	UPDATED

COMPACT REDUCED PRESSURE PRINCIPLE ASSEMBLY (3" OR LARGER)

STD. PLAN NUMBER 1438

DATE	REVISION
11/2020	R.R. NEW

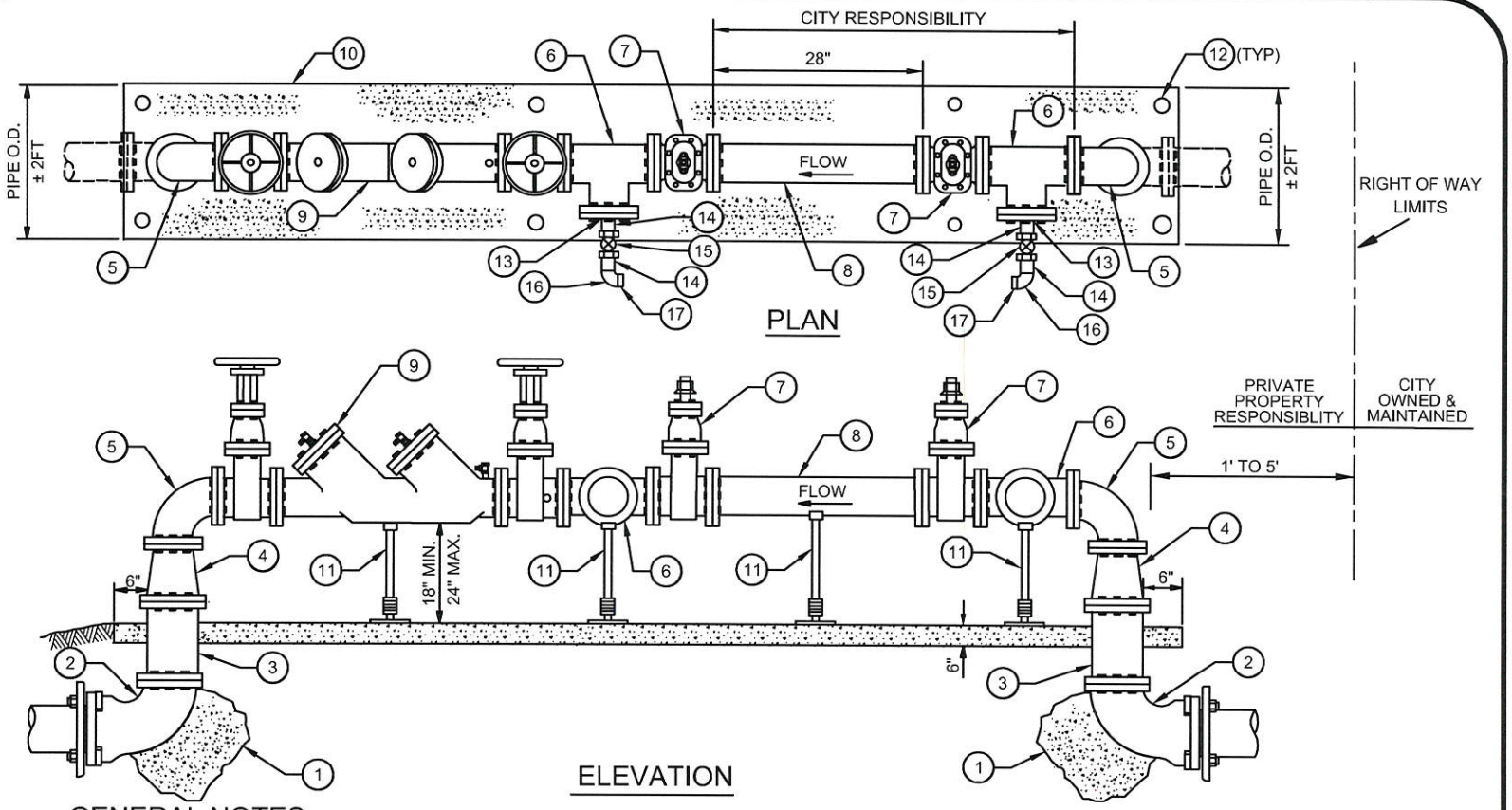
APPROVED: DATE: 4/24/2020

CITY OF SANTA ANA

PUBLIC WORKS AGENCY

ABOVE GROUND METER WITH APPROVED BACKFLOW ASSEMBLY (3")

STD. PLAN NUMBER 1439A



GENERAL NOTES:

1. DIMENSIONS SHOWN ARE APPROXIMATE. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS TO CITY FOR REVIEW PRIOR TO CONSTRUCTION.
2. ASSEMBLY MUST BE EASILY ACCESSIBLE TO FACILITATE TESTING AND SERVICING. AT A MINIMUM TWO FEET AWAY FROM ANY WALL.
3. PRIVATE WATER APPURTENANCES SUCH AS BACKFLOW PREVENTERS, FIRE HYDRANTS AND STANDPIPES, AND VALVES SHALL BE PAINTED AS FOLLOWS:
   - DOMESTIC WATER (BLUE)
   - POTABLE IRRIGATION (GREEN)
   - RECYCLED IRRIGATION (PURPLE)
   - FIRE PROTECTIONS (OSHA SAFETY RED)
4. ALL BACKFLOW PREVENTION DEVICES SHALL BE TESTED BY A CERTIFIED TESTER AFTER INSTALLATION, RELOCATION OR REPAIR.
5. CONTACT WATER QUALITY INSPECTOR FOR APPROPRIATE/REQUIRED BACKFLOW PREVENTION DEVICE.
6. AN EASEMENT MUST BE GRANTED TO THE CITY FOR ACCESS TO AND MAINTENANCE OF THE WATER METER.

LEGEND OF MATERIALS:

NO.	SIZE & DESCRIPTION	NO.	SIZE & DESCRIPTION
1	CONCRETE THRUST BLOCK PER CITY STD. 1412	10	CONCRETE PAD REINFORCEMENT W/ W.W.F. (1.6 X 1.6). 2% SLOPE. CONCRETE CLASS 560-C-3250
2	4"-90° D.I. BEND (MJ. x FLG. OR MJ. X MJ. RESTRAINED)	11	ADJUSTABLE PIPE SUPPORTS
3	4" D.I. SPOOL (FLG. x FLG.)	12	PROTECTIVE POST PER CITY STD. 1407A WHEN REQUIRED BY CITY
4	REDUCER 4" X 3" D.I. (FLG. x FLG.)	13	D.I. BLIND FLANGE W/ 2" TAP
5	3"-90° D.I. BEND (FLG. x FLG.)	14	2" LEAD FREE BRASS CLOSE NIPPLE
6	3" x 3" D.I. TEE (FLG. x FLG.)	15	2" LEAD FREE BRASS CURB STOP VALVE WITH PADLOCK WING (F.I.P. X F.I.P.) FORD
7	3" R.W. GATE VALVE, CLASS 200 (FLG. x FLG.)	16	2" LEAD FREE BRASS F.I.P. THREAD 90° ELBOW
8	3" D.I. SPOOL (FLG. x FLG.)	17	LEAD FREE BRASS PLUG
9	3" APPROVED BACKFLOW ASSEMBLY (FLG. x FLG.)		

LEGEND OF MATERIALS:

NO.	SIZE & DESCRIPTION
1	CONCRETE THRUST BLOCK PER CITY STD. 1412
2	3"- 90° D.I. BEND (FLG. x FLG.)
3	4" - 90° D.I. BEND (MJ x FLG. OR MJ X MJ RESTRAINED)
4	3" R.W. GATE VALVE, CLASS 200 (FLG. x FLG.)
5	4" R.W. GATE VALVE, CLASS 200 (FLG. x FLG.)
6	4" APPROVED BACKFLOW ASSEMBLY (FLG. x FLG.)
7	4" - 90° D.I. BEND (FLG. X FLG.)
8	4" D.I. SPOOL (FLG. x FLG.)
9	4" X 3" D.I. TEE (FLG. x FLG.)
10	CONCRETE PAD REINFORCEMENT W/ W.W.F. (1.6 X 1.6). 2% SLOPE. CONCRETE CLASS 560-C-3250
11	ADJUSTABLE PIPE SUPPORTS
12	PROTECTIVE POST PER CITY STD. 1407A WHEN REQUIRED BY CITY
13	3" D.I. BLIND FLANGE

GENERAL NOTES:

1. DIMENSIONS SHOWN ARE APPROXIMATE. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS TO CITY FOR REVIEW PRIOR TO CONSTRUCTION.
2. ASSEMBLY MUST BE EASILY ACCESSIBLE TO FACILITATE TESTING AND SERVICING, AT A MINIMUM TWO FEET AWAY FROM ANY WALL.
3. PRIVATE WATER APPURTENANCES SUCH AS BACKFLOW PREVENTERS, FIRE HYDRANTS AND STANDPIPES, AND VALVES SHALL BE PAINTED AS FOLLOWS:
   - DOMESTIC WATER (BLUE)
   - POTABLE IRRIGATION (GREEN)
   - RECYCLED IRRIGATION (PURPLE)
   - FIRE PROTECTIONS (OSHA SAFETY RED)
4. ALL BACKFLOW PREVENTION DEVICES SHALL BE TESTED BY A CERTIFIED TESTER AFTER INSTALLATION, RELOCATION OR REPAIR.
5. CONTACT WATER QUALITY INSPECTOR FOR APPROPRIATE/REQUIRED BACKFLOW PREVENTION DEVICE.
6. AN EASEMENT MUST BE GRANTED TO THE CITY FOR ACCESS TO AND MAINTENANCE OF THE WATER METER.

APPROVED: DATE: 11/24/2020

◦ CITY OF SANTA ANA ◦

PUBLIC WORKS AGENCY

DATE		REVISION
11/2020	R.R.	NEW

ABOVE GROUND METER WITH APPROVED BACKFLOW ASSEMBLY (4")

STD. PLAN NUMBER 1439B

LEGEND OF MATERIALS:

NO.	SIZE & DESCRIPTION
1	CONCRETE THRUST BLOCK PER CITY STD. 1412
2	4"-90° D.I. BEND (MJ. x FLG. OR MJ. X MJ. RESTRAINED)
3	6" - 90° D.I. BEND (MJ. x FLG. OR MJ. X MJ. RESTRAINED)
4	4" R.W. GATE VALVE, CLASS 200 (FLG. x FLG.)
5	6" R.W. GATE VALVE, CLASS 200 (FLG. x FLG.)
6	6" APPROVED BACKFLOW ASSEMBLY (FLG. x FLG.)
7	6" - 90° D.I. BEND (FLG. X FLG.)
8	6" D.I. SPOOL (FLG. x FLG.)
9	6" X 4" D.I. TEE (FLG. x FLG.)
10	CONCRETE PAD REINFORCEMENT W/ W.W.F. (1.6 X 1.6), 2% SLOPE. CONCRETE CLASS 560-C-3250
11	ADJUSTABLE PIPE SUPPORTS
12	PROTECTIVE POST PER CITY STD. 1407A WHEN REQUIRED BY CITY
13	4" D.I. BLIND FLANGE

GENERAL NOTES:

1. DIMENSIONS SHOWN ARE APPROXIMATE. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS TO CITY FOR REVIEW PRIOR TO CONSTRUCTION.
2. ASSEMBLY MUST BE EASILY ACCESSIBLE TO FACILITATE TESTING AND SERVICING, AT A MINIMUM TWO FEET AWAY FROM ANY WALL.
3. PRIVATE WATER APPURTENANCES SUCH AS BACKFLOW PREVENTERS, FIRE HYDRANTS AND STANDPIPES, AND VALVES SHALL BE PAINTED AS FOLLOWS:
   - DOMESTIC WATER (BLUE)
   - POTABLE IRRIGATION (GREEN)
   - RECYCLED IRRIGATION (PURPLE)
   - FIRE PROTECTIONS (OSHA SAFETY RED)
4. ALL BACKFLOW PREVENTION DEVICES SHALL BE TESTED BY A CERTIFIED TESTER AFTER INSTALLATION, RELOCATION OR REPAIR.
5. CONTACT WATER QUALITY INSPECTOR FOR APPROPRIATE/REQUIRED BACKFLOW PREVENTION DEVICE.
6. AN EASEMENT MUST BE GRANTED TO THE CITY FOR ACCESS TO AND MAINTENANCE OF THE WATER METER.

APPROVED: DATE: 11/24/2020

DATE		REVISION
11/2020	R.R.	NEW

CITY OF SANTA ANA

PUBLIC WORKS AGENCY

ABOVE GROUND METER WITH APPROVED BACKFLOW ASSEMBLY (6")

STD. PLAN NUMBER 1439C

LEGEND OF MATERIALS:

NO.	SIZE & DESCRIPTION
1	CONCRETE THRUST BLOCK PER CITY STD. 1412
2	90° D.I. BEND (FLG. x FLG.) (4" OR 6")
3	D.I. SPOOL (FLG. x FLG.) (4" OR 6")
4	D.I. REDUCER (FLG. x FLG.) (4" X 3" FOR 3" METER ONLY)
5	R.W. GATE VALVE (CLASS 200) WITH HANDWHEEL (NRS) (FLG. x FLG.) (SAME SIZE AS METER)
6	D.I. STRAINER (FLG. x FLG.) (SAME SIZE AS METER)
7	TURBO METER (FLG. x FLG.) U.L. LISTED AND FM APPROVED FOR FIRE SERVICE
8	APPROVED REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTION ASSEMBLY OR APPROVED DOUBLE CHECK VALVE ASSEMBLY (FLG. x FLG.)
9	90° D.I. BEND (FLG. x FLG.) (SAME SIZE AS METER)
10	D.I. SPOOL (FLG. x FLG.) (SAME SIZE AS METER)
11	D.I. TEE (FLG. x FLG.) (SAME SIZE AS METER)
12	CONCRETE PAD REINFORCED W/ W.W.F. 1.6 x 1.6)
13	ADJUSTABLE PIPE SUPPORTS
14	PROTECTIVE POST PER CITY STD. 1407A

GENERAL NOTES:

1. DIMENSIONS SHOWN ARE APPROXIMATE. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS TO CITY FOR REVIEW PRIOR TO CONSTRUCTION.
2. R.W. VALVES IN METER ASSEMBLY TO BE LOCKED (BY CHAIN) IN THE OPEN POSITION. R.W. VALVE IN BYPASS TO BE LOCKED (BY CHAIN) IN THE CLOSED POSITION.
3. ASSEMBLY MUST BE EASILY ACCESSIBLE TO FACILITATE TESTING AND SERVICING.
4. PRIVATE WATER APPURTENANCES SUCH AS BACKFLOW PREVENTERS, FIRE HYDRANTS AND STANDPIPES, AND VALVES SHALL BE PAINTED AS FOLLOWS:
   - DOMESTIC WATER (BLUE)
   - POTABLE IRRIGATION (GREEN)
   - RECYCLED IRRIGATION (PURPLE)
   - FIRE PROTECTIONS (OSHA SAFETY RED)
5. ALL BACKFLOW PREVENTION DEVICES SHALL BE TESTED BY A CERTIFIED TESTER AFTER INSTALLATION, RELOCATION OR REPAIR.
6. CONTACT WATER QUALITY INSPECTOR FOR APPROPRIATE/REQUIRED BACKFLOW PREVENTION DEVICE.

APPROVED: DATE: 11/24/2020

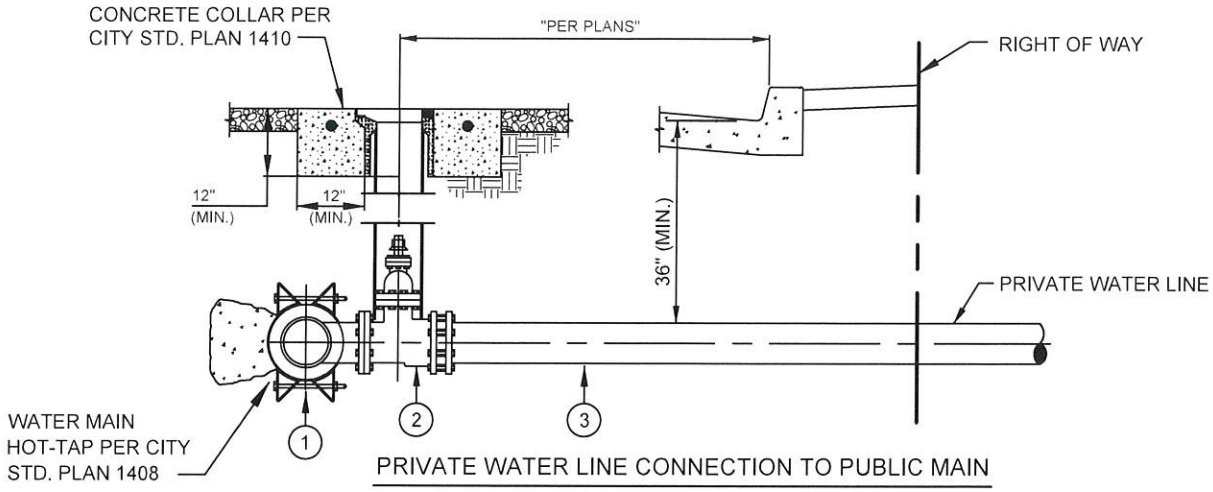
CITY OF SANTA ANA

PUBLIC WORKS AGENCY

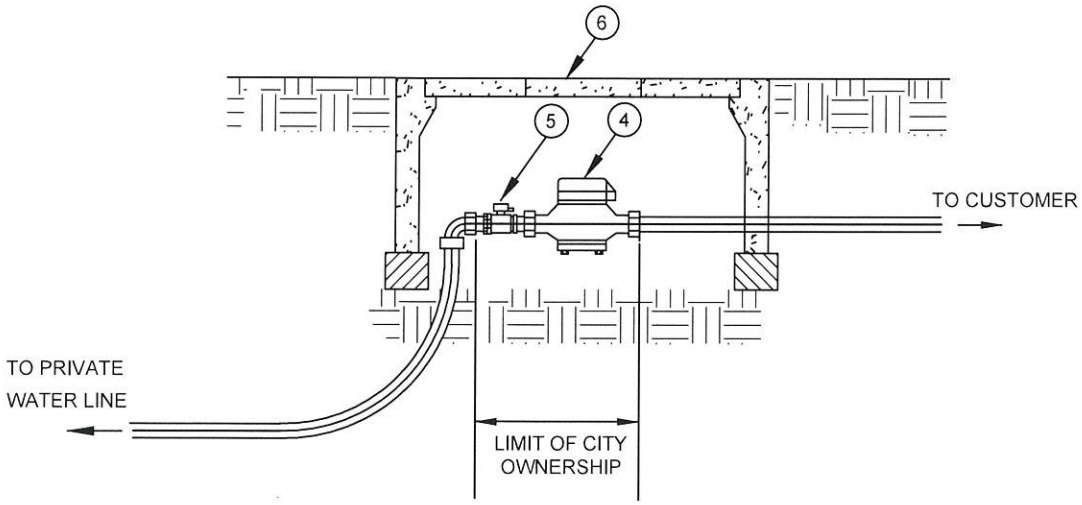
DATE		REVISION
3/1/16	R.R.	NEW
11/2020	R.R.	UPDATED

RPP OR DCV APPROVED BACKFLOW ASSEMBLY (3" OR LARGER)

STD. PLAN NUMBER 1440



PRIVATE WATER LINE CONNECTION TO PUBLIC MAIN



PUBLIC METER IN PRIVATE WATER LINES

CONSTRUCTION ITEMS / MATERIALS LIST

NO.	SIZE AND DESCRIPTION	MANUFACTURER	MFR. CAT. NO.
1	TAPPING SLEEVE ON EXIST MAIN (EPOXY COATED & STAINLESS STEEL BOLTS) (FOR NEW WATER MAIN CONSTRUCTION USE D.I. TEE (MJ X FLG)).	FORD SMITH-BLAIR	FTSC 622
2	TAPPING VALVE, "RESILIENT WEDGE" CLASS 200 FLG. x M.J.	CLOW OR EQUAL	F-6108
3	LATERAL PIPE; DR 14, C900 P.V.C.	———	———
4	WATER METER SIZED PER APROVED PLANS. METER SUPPLIED, INSTALLED, AND MAINTAINED BY CITY'S WATER RESOURCES DIVISION.	SEE CITY STD. PLANS 1401 & 1402.	
5	CURB STOP VALVE SUPPLIED AND INSTALLED BY PRIVATE PROPERTY OWNER OR REPRESENTATIVE. AFTER INITIAL INSTALLATION, CURB STOP WILL BE MAINTAINED BY THE CITY'S WATER RESOURCES DIVISION.	SEE CITY STD. PLANS 1401 & 1402.	
6	METER BOX SUPPLIED AND INSTALLED BY CUSTOMER. AFTER INITIAL INSTALLATION, METER BOX WILL BE MAINTAINED BY CITY.	SEE CITY STD. PLANS 1401 & 1402.	

APPROVED: _____ DATE: 11/24/2020

CITY OF SANTA ANA

PUBLIC WORKS AGENCY

DATE		REVISION
3/1/16	R.R.	NEW
11/2020	R.R.	UPDATED

PRIVATE WATER LINES WITH PUBLIC METERS

STD. PLAN NUMBER 1442

SHEET 1 OF 2

GENERAL NOTES:

1. PRIVATE WATER LINES MUST BE CONSTRUCTED IN CONFORMANCE WITH THE CALIFORNIA WATERWORKS STANDARDS AND THE CITY'S WATER RESOURCES DIVISION. LOOPED WATER LINES MUST ALSO BE PROTECTED AGAINST BACKFLOW AT EACH CONNECTION TO THE CITY'S PUBLIC WATER SYSTEM.

2. IT IS THE RESPONSIBILITY OF THE OWNER OF THE PRIVATE WATER LINE TO HANDLE ALL ROUTINE AND EMERGENCY REPAIRS, OPERATION, AND THE UPKEEP OF ALL ABOVE GROUND APPURTENANCES AS WELL AS UNDERGROUND VALVES, FITTINGS, PIPES, AND SERVICE CONNECTIONS UP TO THE METER CURB STOP.

3. APPROVED BACKFLOW PREVENTION DEVICE TO BE INSTALLED BY OWNER. CONTACT WATER QUALITY COORDINATOR AT 714-647-3320 FOR APPROVED LIST.

4. MODIFICATIONS TO THE PRIVATE WATER LINES OR THEIR APPURTENANCES SHALL BE PERFORMED IN ACCORDANCE WITH THE CITY'S WATER RESOURCES DIVISION'S STANDARD PLANS AND THE CALIFORNIA WATERWORKS STANDARDS. THIS INCLUDES THE RENEWAL, ADDITION, OR REMOVAL OF SERVICE CONNECTIONS. ALL WORK PERFORMED MUST BE PERMITTED BY THE PUBLIC WORKS AGENCY.

5. ALL NEW DEVELOPMENTS SERVING MULTI-FAMILY DWELLINGS SUCH AS APARTMENTS, CONDOMINIUMS, TOWNHOMES, MOBILE HOME PARKS, MULTI-TENANT INDUSTRIAL AND COMMERCIAL CENTERS, AND MIXED USE DEVELOPMENTS ARE REQUIRED TO PROVIDE SEPARATE INDIVIDUAL DOMESTIC WATER SERVICES AND METERS TO ALL UNITS WITHIN THE DEVELOPMENT. WHEN THE INSTALLATION OF SEPARATE INDIVIDUAL DOMESTIC METERS IS DETERMINED TO BE INFEASIBLE BY THE CITY'S WATER RESOURCES DIVISION, DEVELOPMENTS WILL INSTALL A MASTER METER IN ACCORDANCE WITH THE CITY STANDARD PLANS 1403A-D.

6. ALL NEW DEVELOPMENTS SHALL PAY ALL RELATED NEW WATER SERVICE FEES FOR THE INSTALLATION OF METERS.

7. CONTRACTOR SHALL INSTALL WATER SERVICE, STOP VALVES AND METER BOX. THE CITY'S WATER RESOURCES DIVISION WILL INSTALL THE METER AND ACTIVATE THE SERVICE UPON COMPLETION OF A WATER SERVICE ACCOUNT REQUEST BY THE NEW WATER CUSTOMER.

8. THE CITY RESERVES THE RIGHT TO ACCESS PRIVATE PROPERTY FOR THE PURPOSES OF READING METERS AND MAINTAINING CITY OWNED METER FACILITIES. ONCE INSTALLED AND APPROVED, THE CITY WILL RETAIN OWNERSHIP OF AND MAINTAIN THE UPSTREAM STOP VALVE, METER, METER BOX, AND COVER.

9. EASEMENTS FOR THE MAINTENANCE REPAIR AND INSTALLATION OF WATER METERS AND RELATED APPURTENANCES SHALL BE DEDICATED TO THE CITY'S WATER RESOURCES DIVISION.

10. IF METER BOXES ARE PLACED IN PARKING LOTS OR AREAS THAT MAY RECEIVE TRAFFIC, METER BOX SHALL BE TRAFFIC RATED.

11. PUBLIC METERING WILL BE REQUIRED REGARDLESS OF WHETHER THE ONSITE WATER DISTRIBUTION SYSTEM IS PUBLICLY OR PRIVATELY OWNED AND MAINTAINED.

12. THIS REQUIREMENT WILL NOT BE IMPOSED ON LOW-INCOME HOUSING, STUDENT DORMITORIES, LONG-TERM HEALTH CARE FACILITIES, TIME-SHARE PROPERTIES, HIGH-RISE BUILDINGS AND HOTELS.

APPROVED: DATE: 11/24/2020

CITY OF SANTA ANA

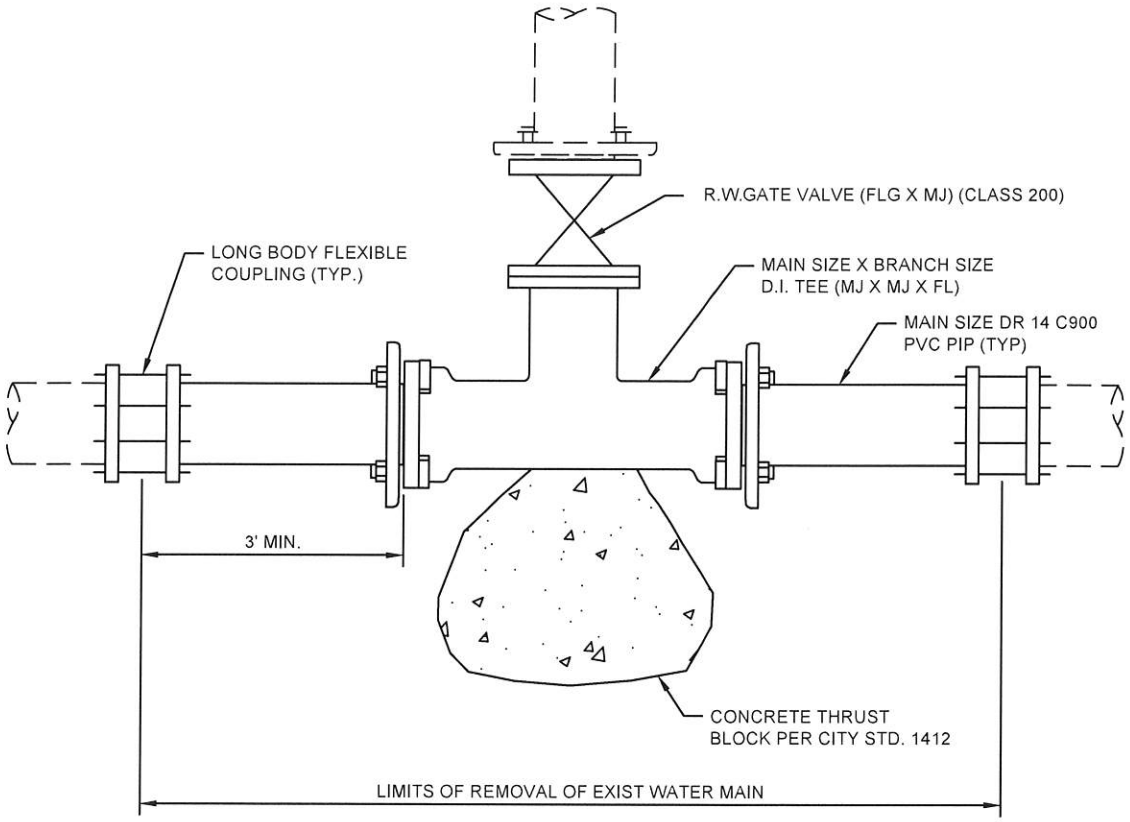
PUBLIC WORKS AGENCY

DATE		REVISION
11/2020	R.R.	UPDATED

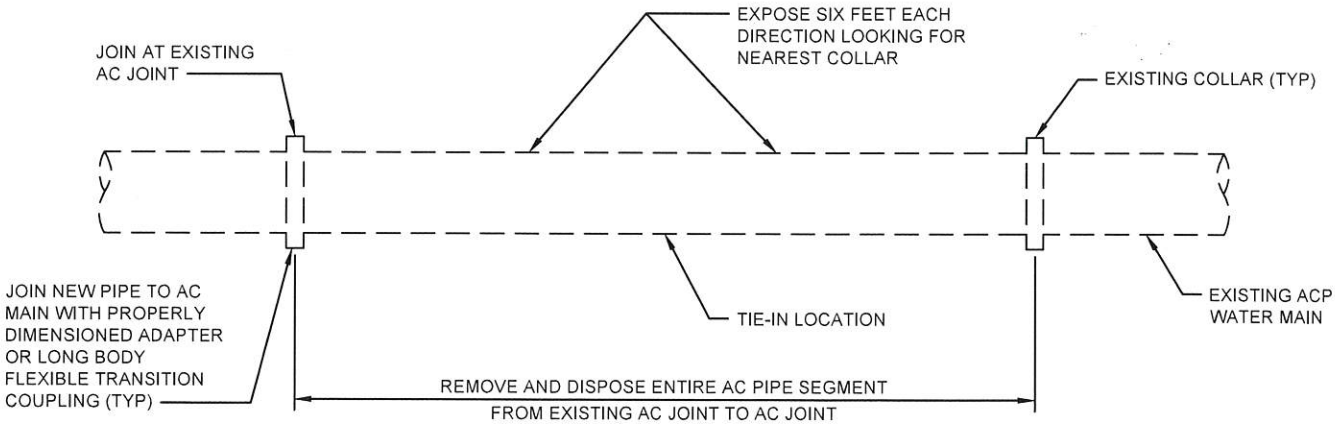
PRIVATE WATER LINES WITH PUBLIC METERS

STD. PLAN NUMBER 1442

SHEET 2 OF 2



CUT-IN TEE



A.C. MAIN TIE-IN

NOTE:
ACP SHALL BE REMOVED, HANDLED, AND DISPOSED OF IN A MANNER THAT KEEPS THE MATERIAL IN A NON-FRIABLE CONDITION. CONTRACTOR SHALL BE RESPONSIBLE FOR STATE AND FEDERAL REGULATIONS PERTAINING TO THE HANDLING, REMOVAL, AND DISPOSAL OF ACP. CONTRACTOR SHALL PROVIDE THE CITY INSPECTOR WITH THE MANIFEST FOR PROPER ACP DISPOSAL.

APPROVED: DATE: 11/24/2020

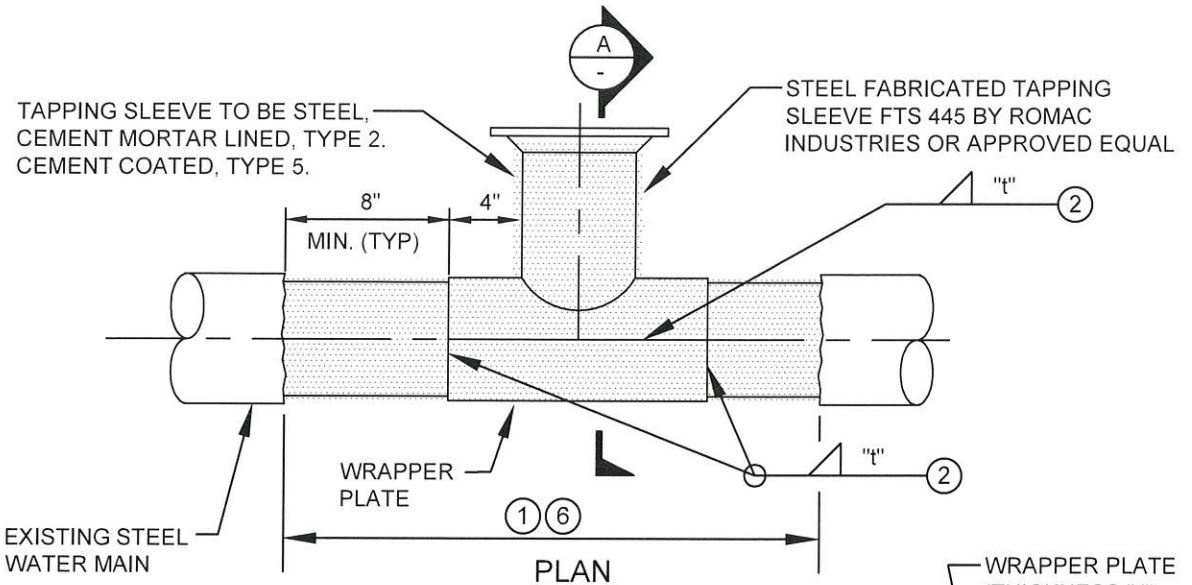
CITY OF SANTA ANA

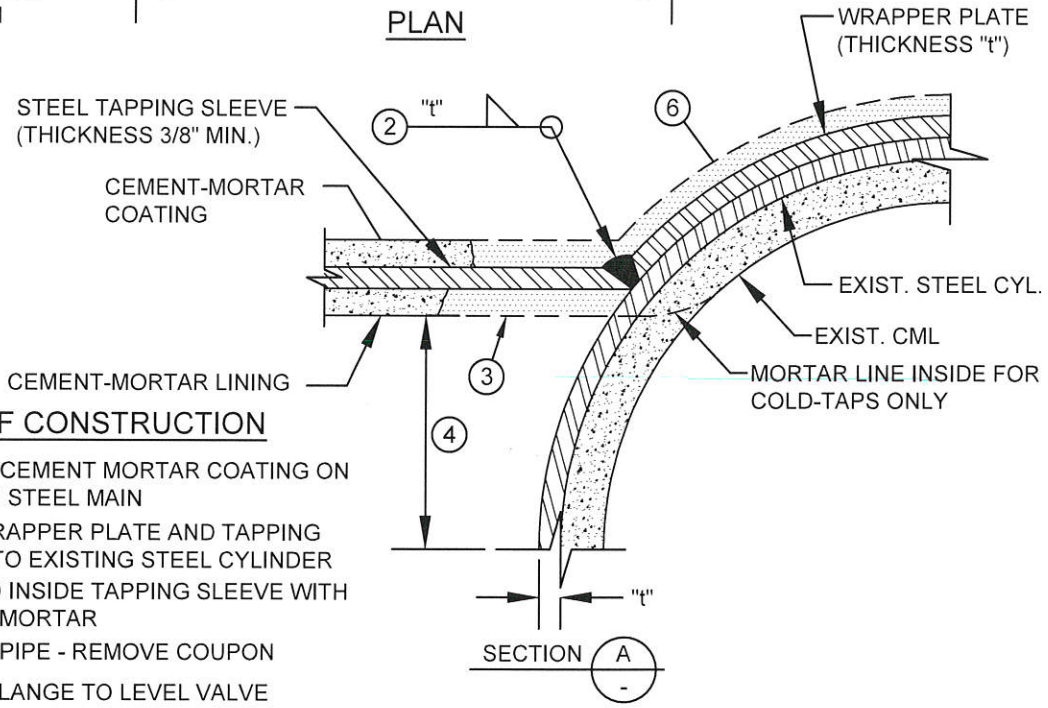
PUBLIC WORKS AGENCY

DATE		REVISION
11/2020	R.R.	NEW

CUT-IN TEE/AC MAIN TIE-IN

STD. PLAN NUMBER 1443





ORDER OF CONSTRUCTION

1. REMOVE CEMENT MORTAR COATING ON EXISTING STEEL MAIN
2. WELD WRAPPER PLATE AND TAPPING SLEEVE TO EXISTING STEEL CYLINDER
3. FILL VOID INSIDE TAPPING SLEEVE WITH CEMENT-MORTAR
4. HOT TAP PIPE - REMOVE COUPON
5. 2-HOLE FLANGE TO LEVEL VALVE
6. CEMENT-MORTAR COATING OF PIPE EXTERIOR

GENERAL NOTES:

1. HOT-TAP EXISTING MAINS UNLESS CITY WATER RESOURCES REQUIRES A COLD-TAP.
2. ALL CEMENT MORTAR LINING AND COATING SHALL BE PER CITY SPECIAL PROVISIONS
3. PERFORM WORK IN CONFORMANCE WITH THE INSTALLATION INSTRUCTIONS PROVIDED BY MANUFACTURER OF TAPPING SLEEVE.

APPROVED: DATE: 11/24/2020

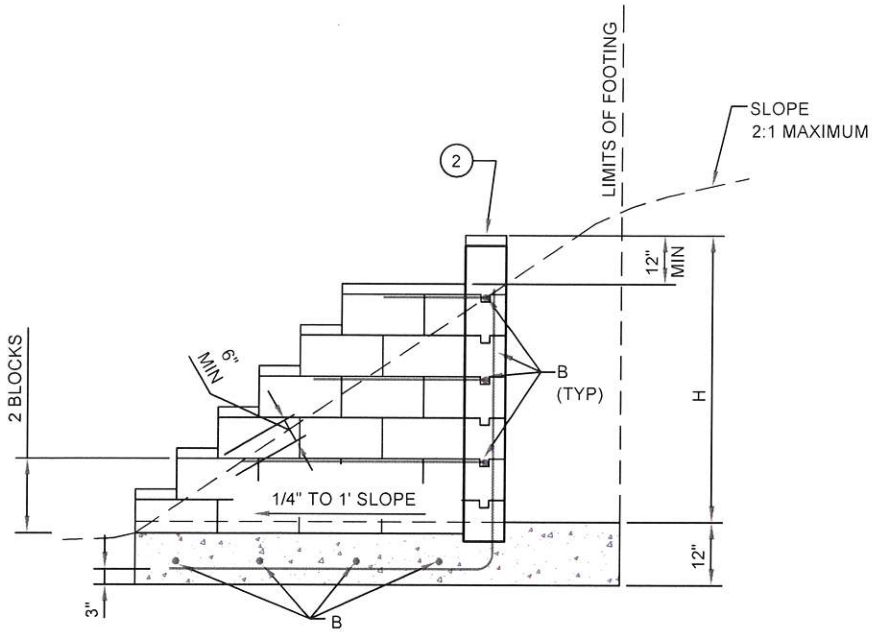
CITY OF SANTA ANA

PUBLIC WORKS AGENCY

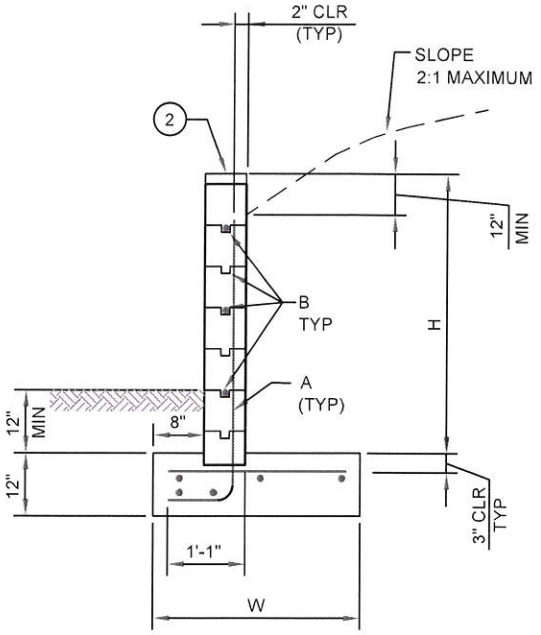
DATE		REVISION
11/2020	R.R.	NEW

WELD ON TAPPING SLEEVE

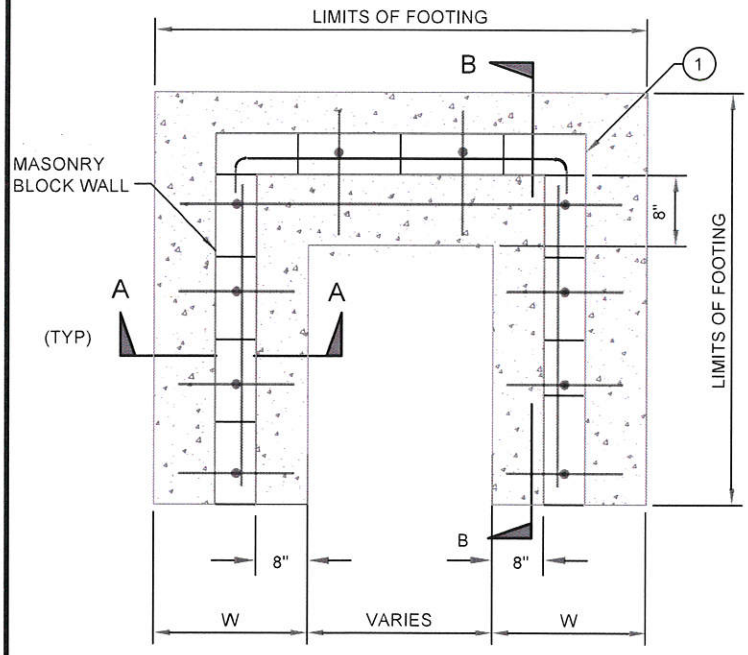
STD. PLAN NUMBER 1444



SECTION B-B



SECTION A-A



PLAN

CONSTRUCTION ITEMS

ITEM	MATERIALS
1	MASONRY BLOCK. SEE NOTE 2.
2	BLOCK CAP. MATCH BLOCK STYLE AND COLOR.

APPROVED: DATE: 11/24/2020

CITY OF SANTA ANA

PUBLIC WORKS AGENCY

DATE		REVISION
11/2020	R.R.	NEW

RETAINING WALL

STD. PLAN NUMBER 1445

SHEET 1 OF 2

NOTES:

1. RETAINING WALL TO BE CONSTRUCTED WITH ALL APPURTENANCES WHEN A SLOPE EXISTS AT THE LOCATION OF THE APPURTENANCES. EXAMPLES INCLUDE BACKFLOW DEVICES, FIRE HYDRANTS, AIR/VACS, METERS, VAULTS, VALVES AND WHEREVER REQUIRED BY THE CITY.

   A. CLEARANCE BETWEEN INSIDE WALL FACE AND APPURTENANCE SHALL BE 36-INCH MINIMUM.

   B. FOR POWERED APPURTENANCES, SUCH AS TRANSFORMERS, REFER TO THE SCE MINIMUM CLEARANCE REQUIREMENTS.

2. MASONRY BLOCK SHALL BE 8" X 8" X 16" UNITS CONFORMING TO ASTM C-90 CLASS "S" AND CONCRETE MASONRY ASSOCIATION STANDARDS. BLOCK SHALL BE "SPLIT FACE" BEIGE COLOR FINISH ON ALL EXPOSED FACES TO MATCH EXISTING. FILL ALL CELLS WITH GROUT.

3. MORTAR AND GROUT SHALL MATCH BLOCKWORK AND BE IN CONFORMANCE WITH SECTION 202-2 OF THE STD. SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION (GREEN BOOK).

4. OMIT MORTAR FROM THE FIRST VERTICAL JOINT OF THE BLOCK COURSE ABOVE FINISH GRADE TO PROVIDE WEEP HOLES FOR SUB-DRAINAGE PURPOSES.

5. CONCRETE SHALL BE CLASS 560-C-3250.

6. WALL CONSTRUCTION SHALL MEET "GREEN BOOK".

7. PROVIDE RAILING ON TOP OF WALL WHEN REQUIRED BY CODE.

REINFORCEMENT TABLE					
DESIGN H	3'-4"	4'-0"	4'-8"	5'-4"	6'-0"
DESIGN W	2'-8"	3'-0"	3'-4"	3'-8"	4'-0"
A VERT REINF	#4@16"	#4@16"	#5@16"	#6@16"	#6@16"
B VERT REINF	#4@16"	#4@16"	#5@16"	#6@16"	#6@16"

DESIGN CRITERIA

1. EQUIVALENT FLUID PRESSURE = 35 pcf (TOE AND HEEL)
2. ALLOWABLE BEARING CAPACITY = 1500 psf

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SHEET 2 OF 2