CITY OF FULLERTON

WATER UTILITY SPECIFICATIONS

PUBLIC WORKS DEPARTMENT

APRIL 2022

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PUBLIC WORKS DEPARTMENT
WATER ENGINEERING DIVISION
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ALL DEVELOPERS, CONTRACTORS, AND OTHER INDIVIDUALS OR COMPANIES PREFORMING ANY WORK ON THE CITY OF FULLERTON'S WATER SYSTEM SHALL COMPLY WITH THESE SPECIFICATIONS. IT IS THEIR RESPONSIBILITY THAT THEY HAVE THE MOST CURRENT COPY BY CONTACTING THE WATER ENGINEERING DIVISION.

APPROVED Meg McWade DATE 5/24/2022
MEG MCWADE
PUBLIC WORKS DIRECTOR

APPROVED _____ DATE 5/9/2022
STEPHEN BISE, PE, TE
CITY ENGINEER/ASSISTANT PUBLIC WORKS DIRECTOR

INTRODUCTION

These Water Utility Specifications (Specifications) are to be used as a guide by Developers, Engineers, and Contractors in the design and installation of all additions, replacements, and modifications to the City of Fullerton's public water system. It is the intent that these Specifications will provide uniformity in materials and installation of piping, valves, fire hydrants, service laterals, meters, and other water system appurtenances. The Specifications shall also provide construction methods and controls to be used by contractors to construct, pressure test, disinfect and place in service all improvements and modifications to the City's public water system.

CITY OF FULLERTON

WATER UTILITY SPECIFICATIONS

TABLE OF CONTENTS

SECTION 1 – GENERAL

1-01 PLANS AND SPECIFICATIONS

Construction of all water system improvements by contract and/or intended to be dedicated to Water Utility of the City of Fullerton will be governed by plans and specifications approved by the City. All work shall be in accordance with these plans and specifications and shall be inspected by the Utility to insure conformity.

In cases of conflict of information, the following documents will have precedence in the order listed:

1. Permits and licenses from affected agencies.

2. Special Provisions to the specifications of the City of Fullerton.

3. Construction plans approved by the City Engineer.

4. The City of Fullerton, Public Works Department, Water Engineering Division Water Utility Specifications, herein called Specifications.

5. The applicable requirements of the Standard Specifications for Public Works Construction, "Greenbook", as last revised, herein called Standard Specifications.

Conflicts and discrepancies noted by the Contractor shall be brought to the attention of the Engineer. Instructions will be given by the Engineer to provide a complete and satisfactory project. The most stringent/restrictive condition shall apply unless otherwise determined by the Engineer.

Provisions of reference specifications and publications of any scientific or technical society or other organization noted in these specifications and plans shall have the same effect as if written herein. Any reference specification or publication in the absence of designation to the contrary, shall be understood to refer to the latest revision of the specification, standard, method, or publication as of the date of the beginning of the work.

1-02 DEFINITIONS

a.	City, Engineer, Utility	The Director of Public Works of the City of Fullerton, or their authorized representative.
b.	Owner/Developer	The person or organization having legal responsibility for construction of water system improvements in conjunction with development of property.
c.	Contractor	The individual, partnership, corporation, joint venture, or other legal entity having a contract with the City to perform the construction of water system improvements. In the case of improvements being done under a permit issued by the City.
d.	Superintendent	The field representative of the Contractor, present at the job site at all times during work, which is authorized to receive and fulfill instruction from the City.
e.	Consultant	The agent of the Developer or independent engineer who has responsibility for the design and drawing of construction documents.
f.	Water Supplier	The City of Fullerton who owns and operates the City's public water system.
g.	Regulatory Agency	State Water Resources Control Board (SWRCB) and/or the Santa Ana Regional Water Quality Control Board (SARWQCB).
h.	Plans	Those drawings accompanying the specifications that show the location, nature, extent and form of the work, together with applicable details.
i.	Standard Specification	Latest edition of the Standard Specifications for Public Works Construction, also known as the "Greenbook".
j.	Approved Materials List	List of materials approved for use in the City of Fullerton's Public Water system.
k.	Or approved equal	A product equivalent to that specified in these water utility standard specifications and approved by the Utility before start of construction. No approved equal product is intended.

1-03 ABBREVIATIONS AND UNITS

Whenever the following abbreviations are used in these specifications, the meaning shall be interpreted as follows:

a.	ANSI	American National Standards Institute
b.	ASTM	American Society for Testing and Materials
c.	AWWA	American Water Works Association
d.	CAL/OSHA	Division of Industrial Safety of the State of California
e.	DIPRA	Ductile Iron Pipe Research Association
f.	NSF	National Sanitation Foundation
g.	SWRCB	State Water Resources Control Board
h.	SARWQCB	Santa Ana Regional Water Quality Control Board
i.	UL	Underwriter's Laboratory
j.	WATCH	Work Area Traffic Control Handbook

Whenever the following units are used in these specifications, the meaning shall be interpreted as follows:

a.	gpm	Gallons per Minute
b.	psi	Pounds per Square Inch

1-04 LICENSES, PERMITS, AND FEES

The Contractor shall have a Class "C-34" Pipeline or Class "A" General Engineering Contractor's License valid in the State of California and shall meet all the applicable requirements of the Fullerton Municipal Code.

The Contractor and/or Developer shall obtain all necessary permits, licenses, or agreements required by any legally constituted agencies, pay all fees, and give all necessary notices required for the construction of the work.

Prior to beginning any work, a water permit and an excavation permit from the Engineering Division including any required deposits and bonds, are required for excavation in the public right-of-way within the City of Fullerton. Pavement repair shall be made by a licensed paving contractor and shall conform to these Specifications and the Standard Specifications. The contractor is responsible for all costs associated with the work performed, including any corrections or repairs. In the event the Contractor fails to complete the work or make any required corrections/repairs, any and all costs incurred by the City will be deducted from the deposit or the surety will be billed for these expenses. Said deposit or bond shall be retained by the City for payment and for material and labor.

Before the Contractor or any subcontractor performs work, it shall be necessary for each company to obtain a business license from the City of Fullerton.

1-05 INSPECTION

The construction of any water system improvement intended for dedication to the City and used for public water service shall be subject to inspection and approval/acceptance by the Engineer. Such inspection will assure that all phases of the work are in compliance with these Specifications. The City's designated inspector will be the representative of the Engineer and shall coordinate the various responsibilities of the Utility throughout the work. Contractor shall schedule pre-construction meeting with Utility a minimum of two business days prior to construction. Inspection costs will be paid by the Developer at the rate or fee prescribed by the City Council resolution.

The inspector shall have access to the work area and shall be furnished every reasonable facility for ascertaining full knowledge of the progress, material, and workmanship used to complete the work. The Contractor shall provide at least one business day advance notice of major phases of construction for purposes of inspection. All material shall be approved prior to placement and all water system works shall be visually inspected prior to backfilling.

The Engineer shall have the authority to suspend the work wholly, or in part, for such time as it may deem necessary due to failure of the Contractor to perform any provisions of the plans or specifications. The work may only continue when the defective material or construction method is recognized as corrected by the Engineer.

1-06 GUARANTEE

The Contractor shall guarantee the work against defective material or workmanship for a period of one year from the date of completion of the contract and/or acceptance of the work by the City and/or filing of Notice of Completion. The City may conduct a warranty inspection at any time during the warranty period and produce a punch list of defective items. Damage due to acts of God or from sabotage and/or vandalism is specifically exempted from the guarantee. When defective materials and/or workmanship are discovered which requires repairs to be made under this guarantee, all such work shall be done by the Contractor at their own expense and shall begin within five working days after written notice of such defects have been given to them by the City. Should the Contractor fail to repair such defective materials or workmanship within five working days thereafter, the City may cause the necessary repairs to be made and charge the Contractor with the actual cost of all labor and materials required.

In emergencies demanding immediate attention, the City shall have the right to repair the defects and charge the contractor with the actual cost of all labor and materials required. Any repair work performed as herein specified shall be done under the provisions of the original work specifications.

SECTION 2 – DESIGN GUIDELINES

2-01 GENERAL

Establishing realistic design criteria is paramount to evaluating the existing water system's adequacy and planning for future water system improvements. Minimum design criteria for the City of Fullerton water system are in accordance with the standards and requirements put forth by the U.S. Environmental Protection Agency, State Water Resources Control Board (SWRCB), California Plumbing Code, California Building Code, California Fire Code, and American Water Works Association (AWWA).

Minimum design criteria addressed in this section include water supply requirements, storage volume, distribution system and transmission main capacity, and water quality standards. These criteria will be utilized to determine existing deficiencies in the water system and projected water system requirements for the City of Fullerton's water system. These criteria are in addition to the City's Water Utility Specifications, Water Rates, Rules, and Regulations, Standard Drawings, City Municipal Code and City Ordinance.

2-02 PLANNING CONSIDERATIONS

Public water systems should be designed to provide firefighting capability in accordance with the requirements of the jurisdiction(s) within which the utility operates.

Phased development is permitted where full development will take several years.

2-03 RELIABILITY CONSIDERATIONS

Multiple water sources are recommended in combination with adequate emergency reserve in gravity storage to allow for interruption of supply at one point, while still maintaining water supply to the system at the design rate.

Pumping stations are to contain multiple booster pumps of sufficient capacity to meet the maximum day demands with the largest pump out of service.

Auxiliary power is required where adequate gravity storage is not provided.

2-04 GENERAL FACILITY PLACEMENT

All piping, pumping, source, storage and other facilities, shall be located in public rights-of-way, dedicated utility easements, or on City-owned property. Utility easements must be a minimum of 20 feet in width, and piping shall be installed no less than 5 feet from the easement's edge. Unrestricted access shall be provided to all public water system lines and their appropriate appurtenances and all public fire hydrants.

Where existing utilities or storm drains are in place, new facilities shall conform to these standards as nearly as practicable and still be compatible with the existing installations.

Mains shall at a minimum be extended to the furthest boundary of the Developer's property to allow for future extension by others, unless a more limited extension is approved by the City.

2-05 SYSTEM ANALYSIS

The Developer will be required to submit an analysis of anticipated flow demands: peak hour flow, minimum hour flow, and maximum day plus fire flow. The City shall accept or request modifications to the submitted analysis. The proposed water system shall be analyzed for the following three conditions:

2-05.01 Peak hour demands

For the peak hour demand flow analysis, the pressure at each node shall be a minimum of 40 psi and a maximum of 120 psi. The maximum velocity in the pipelines shall be 7.5 feet per second (certain exceptions may apply). The wells/pump stations are on.

2-05.02 Minimum hour demands

For the minimum hour demand analysis, the maximum velocity in the pipelines shall be 5.0 feet per second (certain exceptions may apply) and the maximum pressure at each node shall be 120 psi. The demand will be 10% of peak hour demand. The wells/pump stations are on.

2-05.03 Maximum day demand plus fire flow

For the maximum day demand plus fire flow analysis, fire flow should be selected for the worst-case scenario (typically the hydrant furthest from the connection(s) to the City's distribution system or the hydrant at the highest system elevation) and as directed by City staff. Analysis at multiple hydrants may be required. The pressure at each node shall be a minimum of 20 psi and the maximum velocity in the pipelines shall be 7.5 feet per second (certain exceptions may apply). The capacity in the pipes to any individual hydrant shall have a combined minimum of 1500 gpm or as dictated in the latest version of the California Fire Code, whichever is greater. The wells/pump stations are off.

2-06 WATER PRESSURE

Water systems shall be designed to provide an adequate quantity of water at a positive pressure of at least 40 psi under peak hour demand flow conditions, measured at any customer’s water meter.

For fire flow, the distribution system shall be designed to provide the required fire flow at a residual pressure of 20 psi throughout the system during fire flows under peak hour flow conditions.

Water pressures exceeding 80 psi require installation of a pressure reducing valve(s) in accordance with the California Plumbing Code, as directed by the City Engineer.

2-07 CONSERVATION REQUIREMENTS

The developer shall conform to any drought requirements as part of the design. In the event that no drought requirements are in place, the developer shall strive to promote water conservation through water-efficient landscaping, efficient fixtures, water use management and water conservation via the use of water-efficient landscaping, wise use of turf areas and appropriate use of irrigation technology and management.

2-08 MATERIALS

All materials used in the water distribution system shall be in accordance with the City's Approved Materials List. Materials not listed on the City's Approved Materials List must be approved by the City prior to use. All materials shall be installed in accordance with the installation procedures provided by the manufacturer.

Distribution water mains are typically PVC C900. Where ductile iron is being proposed, polyethylene encasing shall be utilized. Soil samples may be required prior to final plan approval, at the City's discretion, to determine soil corrosiveness that may affect the life of the pipeline. Based on the soil sample results, additional protection as determined by the City shall be installed.

2-09 PIPE DESIGN

Minimum water distribution pipe diameter is 8 inches nominal inside diameter in locations that include fire hydrants. In other locations, as approved by the City, pipe diameter may be no smaller than 4 inches nominal inside diameter. All pipelines shall be designed and constructed for ultimate domestic and fire flow conditions as determined by the City. 10, 14, and 20 inch pipes are no longer acceptable sizes for mains.

Water main size shall be adequate to deliver required fire flows and the maximum day demand while maintaining minimum system pressures of 20 psi.

Distribution systems are to be sized to provide peak hourly demand flow.

Maximum velocity in distribution pipelines is not to exceed 7.5 feet per second under peak hour demand conditions.

Dead-end mains are generally not accepted by the City, except in phased development projects or where no potential for future interconnection of facilities exists. Approved dead-end mains that will not serve fire hydrants may be sized as hydraulically appropriate in residential areas and 8 inches in commercial areas.

Lateral runs from main line to standard hydrants less than 50 feet in length must be a minimum of 6 inches in diameter. Lateral runs from main line to standard hydrants more than 50 feet in length must be a minimum of 8 inches in diameter.

Minimum cover over pipes shall be 42 inches from top of pipe to the finished grade.

Installation of piping and backfill materials shall be in accordance with the City's Standard Drawings, Water Utility Specifications, and the City's Approved Materials List.

No native backfill may be used for the installation of a new water main.

Water source pumping facilities and storage facilities must be designed so that, in combination, they can supply the maximum instantaneous flow demand at any time in all parts of the system.

Water lines installed in dedicated residential easements shall avoid installation of horizontal and vertical bends (45°, 90°, etc).

2-10 SEPARATION REQUIREMENT

To prevent the contamination of the public water supplies from nearby sanitary sewers/storm drains, the following California Department of Public Health (CDPH) criteria shall be required.

2-10.01 Basic Separation Standards

The "California Waterworks Standards" sets forth the minimum separation requirements for water mains and sewer lines/storm drains. These Standards, contained in Section 64572, Title 22, California Administrative Code, specify:

Parallel Construction: The horizontal distances between pressure water mains and sewer lines shall be at least 10 feet. The horizontal distances between pressure water mains and storm drain lines shall be at least 4 feet.

Crossing Construction: Pressure water mains shall be no less than 45 degrees to and at least one foot above sanitary sewer and storm drain lines where these lines must cross. No connection joints shall be made in the water main within eight horizontal feet of the sewer main.

Separation distances shall be measured from the nearest edges of the facilities (i.e., dimensions are from outside of water main to outside of sewer/storm drain line or manhole).

Refer to Figure 1 and Figure 2.

Common trench: Water mains and sewer/storm drain lines must not be installed in the same trench.

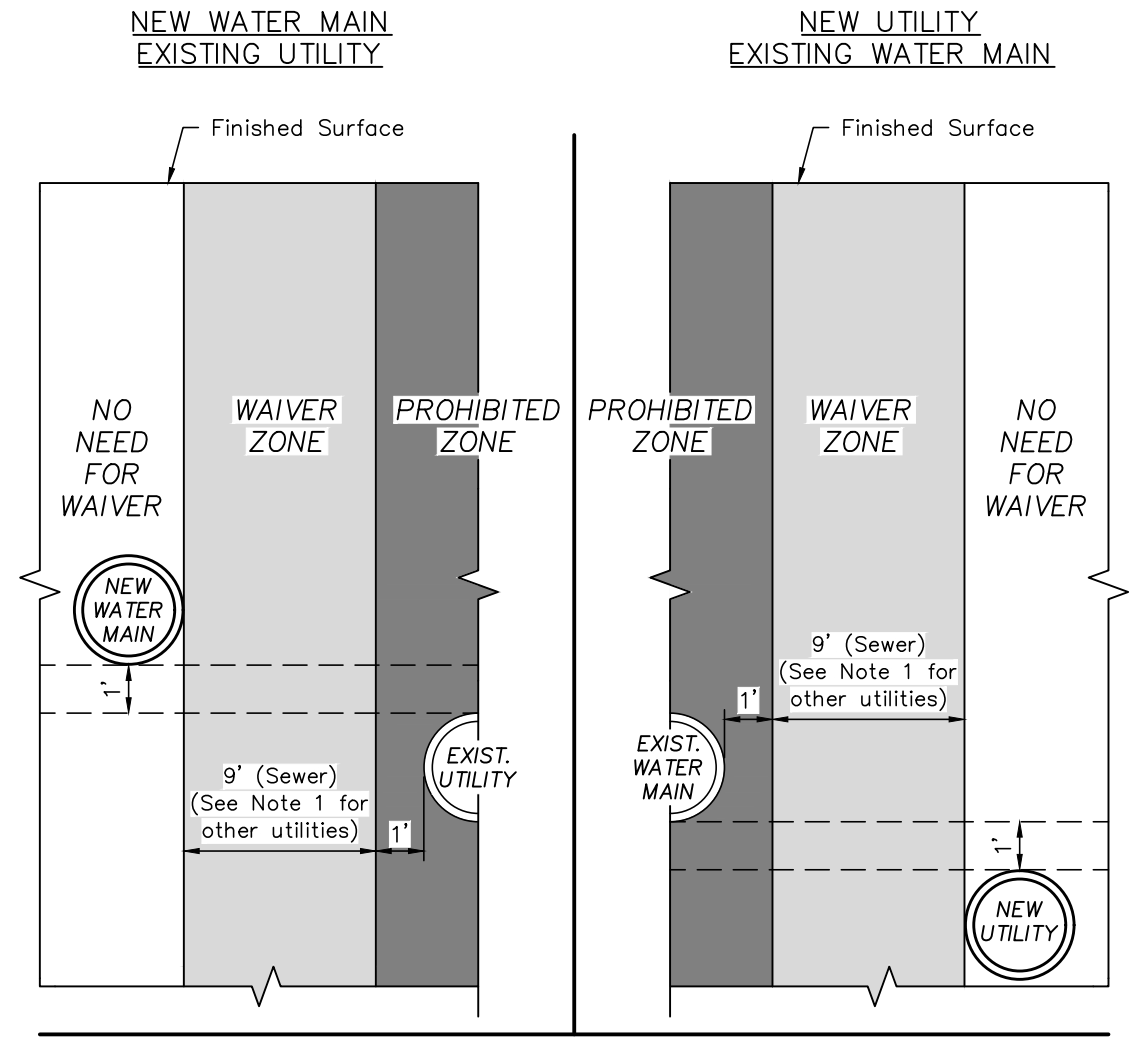
The lack of separation between water mains and sanitary sewers/storm drains results in an increased potential for contamination of the water supply. Therefore, when adequate physical separation cannot be attained, an increase in the factor of safety should be provided by increasing the structural integrity of both the pipe materials and joints required herein.

A waiver must be obtained from the SWRCB Division of Drinking Water for installations that do not meet the separation requirements.

2-10.02 Exceptions To Basic Separation Standards

Local conditions, such as available spaces, limited slope, existing structures, etc., may create a situation where there is no alternative but to install water mains or sewer lines at a distance less than that required by the Basic Separation Standards. Exceptions must be approved by both the City Engineer and the SWRCB Division of Drinking Water.

Water mains and sewers of 24 inch diameter or greater may create special circumstances because of the large volumes of flow. Therefore, installations of water mains and sewer lines 24-inch diameter or larger should be reviewed and approved by the regulatory agency prior to construction.



NOTE:

1) Refer to Section 64572, Title 22, of California Code of Regulations for separation requirements.
2) A waiver must be obtained from the SWRCB Division of Drinking Water for installations that do not meet the separation requirements.
3) Zones are identical on either side of pipe.

Figure 1 – PARALLEL CONSTRUCTION

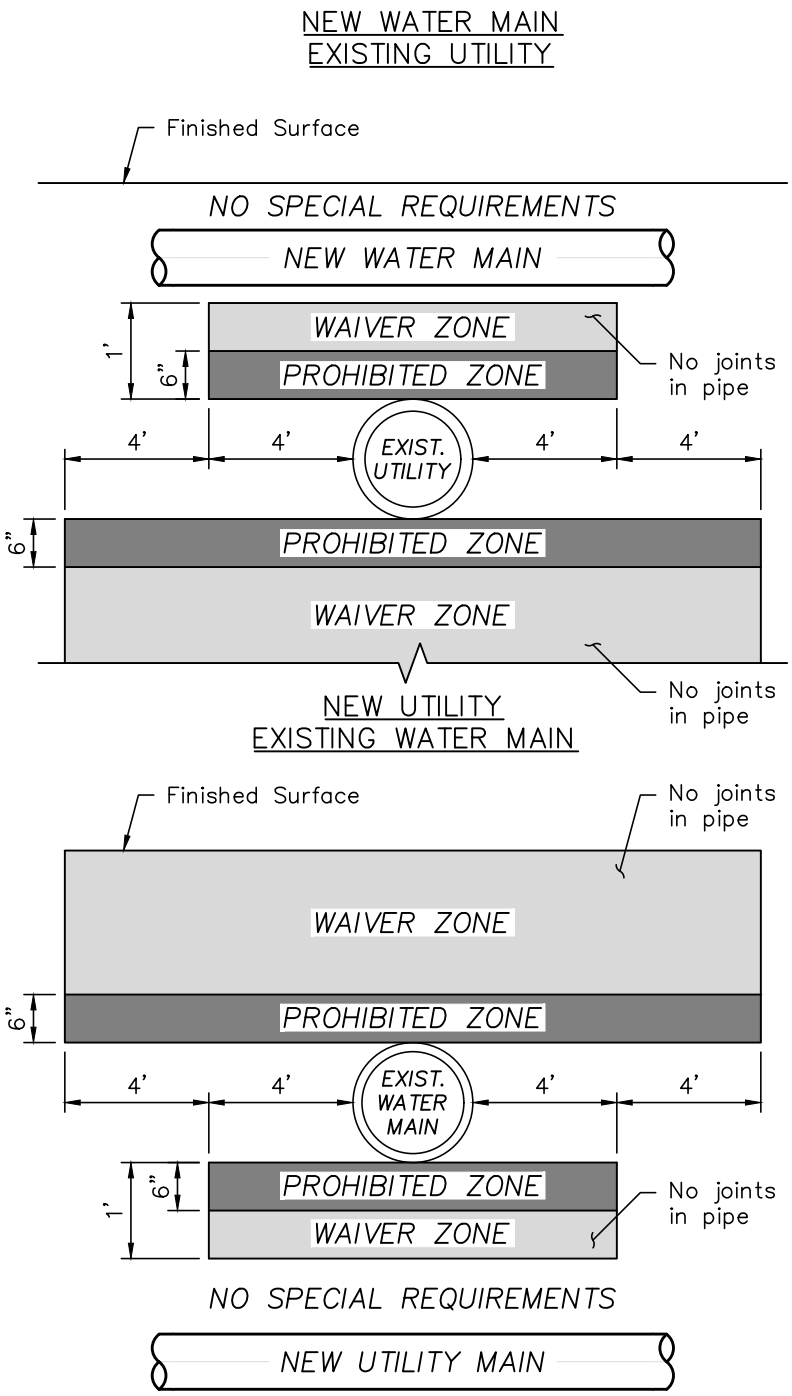


Figure 2 – CROSSING CONSTRUCTION

2-11 CROSS-CONNECTION CONTROL

Where the possibility of contamination of potable water exists, water services shall be equipped with appropriate cross-connection control assemblies in accordance with State requirements and the "Cross-Connection Control Manual, Accepted Procedure and Practice," published by the American Water Works Association. The need, size, location, and type of cross-connection assemblies shall be determined by the City and shall be installed in accordance with the City's Standard Drawings and Section 3.

2-12 SYSTEM CONNECTION – INFRASTRUCTURE TIE-INS

New sections of water main must be flushed and disinfected in accordance with these Specifications.

A hot tap method in accordance with the Standard Drawing 701 shall be used when tapping into the live water system.

Where an existing cap, tee, stub out or other connection is present, the connection shall be utilized unless directed otherwise by the City.

2-13 VALVES

Installation shall be in accordance with City Standard Drawing 650.

Valves 12 inch and smaller shall be resilient wedge gate valves. Valves larger than 12 inches shall be butterfly or as otherwise directed by the City.

Valves shall be installed in a configuration that permits isolation of individual lines.

Valves should be installed at intersections with normal maximum spacing at 500 feet in commercial, industrial, and multi-family areas; 800 feet in residential areas; and 1/4 mile in transmission mains. Valve shall be spaced so that no more than 20 lots are to be out of service at one time. Additional isolation valves may be required by the City and will be determined on a case-by-case basis.

Zone isolation valves shall be installed at pressure zone boundaries to permit future pressure zone realignment without the need for pipeline reconfiguration.

Air relief valves are to be installed, per City Standard Drawing 627, at appropriate high elevation points in the system. All piping in the system shall be sloped to permit escape of any entrained air.

A blow-off assembly or fire hydrant shall be installed on all dead-end runs and at designated points of low elevation to provide a means for adequate flushing of the system. The blow-off assembly shall be installed in a utility right-of-way, unless a written access and construction easement is provided to the City.

Pressure Reducing Stations may be required by the City, including pressure relief valves or various other types of control valves, and shall be individually designed for their application.

2-14 HYDRANTS

Maximum spacing for hydrants shall be dictated by the latest version of the California Fire Code, or as directed by the City of Fullerton Fire Chief.

The plans shall designate either a Standard or Steamer type hydrant. A Standard hydrant shall have one 2½ inch hose outlet and one 4 inch pumper outlet. A Steamer hydrant shall have two 2½ inch hose outlets and one 4 inch pumper outlet.

Unless required by the Fire Marshall and/or City Engineer, fire hydrants installed in Single Family Residential areas shall be Standard type. Fire hydrants installed in all other locations shall be Steamer type.

2-15 THRUST RESTRAINT

Thrust restraints are required at all changes in direction or as determined by the City.

Thrust restraints are required at all dead ends. All valves shall be considered dead ends in either direction.

The use of internal restraints is preferred over externally restrained harnesses or thrust blocks. Use of externally restrained harnesses or thrust blocks must be approved by the City.

Installation shall be in accordance with the City's Standard Drawings.

2-16 GUARD POST

Where required by the plans or by the City if field conditions so dictate, guard posts shall be installed. The number, size and specific location of such posts will be determined by the City if not shown on the plans.

2-17 WATER SERVICES / METERS / METERS BOXES

Installation shall be in accordance with the City's Standard Drawings.

Service line sizes shall be 1, 2, 4, 6, or 8 inch, depending on water demand.

Manifolding, combining, or connecting several smaller meters to meet a flow demand that could be provided by a single larger meter is not allowed. There shall be one meter per service line.

Domestic water service taps are prohibited on any large diameter laterals or any laterals primarily designed to service fire sprinkler systems and/or fire hydrants.

Water service taps shall have a minimum 2 feet separation between taps or to joints.

Service tapping to concrete cylinder pipes shall only be made under special approval by the City.

Water meter type shall be determined by the City based on application.

Meter boxes should be installed in areas accessible at all times. They should not be located in driveways, manmade or natural drainage channels, retention basins, etc. Meter boxes should avoid being installed in sidewalks, behind fences, or near trees.

Where a water main is installed in a residential easement (typically at cul-de-sacs for providing proper looping), water service taps shall be installed before any isolation valves.

In the case where a meter must be relocated, it may be relocated a maximum of 5 feet from the original location. If the location is greater than 5 feet, the service line must be severed at the corporation stop and a new service line installed.

2-18 FIRE LINES

A dedicated fire line must be installed where required by the Fire Marshal, California Fire Code, or California Building Code. Fire lines should be installed in areas accessible at all times.

2-19 WATER QUALITY STANDARDS/MONITORING

The maximum contaminant levels allowed in drinking water supplies are as put forth by California Division of Drinking Water and the federal SDWA (Safe Drinking Water Act). The City recognizes that additional monitoring requirements are forthcoming and will comply with such requirements as they are implemented in the State of California. Similarly, the City recognizes the SDWA requires a variety of source monitoring for water supplies and that the California Division of Drinking Water may require additional monitoring via online monitoring. The developer will incur all expenses including, but not limited to, design and installation of any additional monitoring to meet state requirements as part of the development, as required.

2-20 STORAGE

Impacts on storage requirements will be evaluated on an individual basis. At the Developer's expense, as required by the Director of Public Works, a new storage facility or enhancements to existing storage facilities may be required.

2-21 PUMP STATIONS

Need for additional pumping capacity will be evaluated on an individual basis. At the Developer's expense, as required by the Director of Public Works, a new pump station or enhancements to existing pump stations may be required.

Pump stations shall contain multiple booster pumps of sufficient capacity to meet the maximum day demands of the service area with the largest pump out of service.

2-22 TELEMETRY

At the developer's expense, in the determination of the City, when installations may impede with existing telemetry systems, the developer shall reimburse the City for any costs associated with evaluating and/or implementing required modifications.

SECTION 3 – BACKFLOW PREVENTION ASSEMBLIES AND FIRELINES

3-01 PUBLIC WATER SYSTEM PROTECTION

All water services, other than residential, connected to the public water system shall be required to include an approved backflow prevention assembly; the type to be designated by the Engineer. Certain types of residential services may be required to have an approved backflow prevention assembly. The type of protection approved shall be based on the existing or potential degree of hazard that exists on the user's premises, in the opinion of the Engineer. All assemblies shall be approved by the State Water Resources Control Board (SWRCB).

3-02 APPROVED BACKFLOW PREVENTION ASSEMBLIES

Approved manufactures/models of backflow prevention assemblies, including fire lines as mentioned elsewhere in this Section, are those approved by the SWRCB, as shown in its latest edition of "Approved Backflow Prevention Devices". The City Engineer will provide final approval of the device to be used. Contact the Water Engineering Division for SWRCB's list of approved assemblies.

Four inch and larger approved backflow prevention assemblies, including fire lines, have two gate valves and four test cocks. Gate valves for fire lines must be of the Outside Stem & Yoke (OS&Y) type with rising stems and tamper switches.

Four-inch and smaller backflow assemblies, other than fire lines, shall be installed in conformance with City of Fullerton Standard Drawings 603 and 604.

The horizontal run of all backflow assemblies shall be installed in a level position.

3-03 TESTING

The Owner/Developer or Contractor shall be responsible for the installation, initial test and certification of all new backflow prevention assemblies. Thereafter, backflow prevention assemblies will be maintained and tested annually by the owner or water user. All testing shall be done by a certified backflow device tester possessing a valid certification issued by the Orange County Environmental Health Agency and an active Fullerton business license. Contact the Public Works Water Operations Division for a list of certified testers.

3-04 LOCATION OF ASSEMBLIES

Backflow prevention assemblies shall be located as close as practical to the meter, a minimum 12 inches behind the property line and subject to approval by the Engineer. The assemblies shall be at least 12 inches from walls, buildings, obstructions, or other devices, readily accessible for testing, maintenance, and repairs. The lowest part of any reduced pressure principle backflow assembly shall be installed between 12 and 18 inches above finished grade. The above ground horizontal run segment of a backflow assembly shall be installed in a level position.

Backflow prevention devices shall be installed at locations other than immediately behind the water meter when required by law or when determined by the Engineer and regulatory agency that such additional devices are necessary to adequately protect the water supply.

There shall be no direct connections between the meter and the backflow assembly.

3-05 FIRELINES

All fire lines shall require a detector check meter (by-pass meter) and backflow protection; type and size determined by the Engineer. The standard fire line shall have a double check detector backflow assembly. When a higher degree of hazard exists, a reduced pressure principle detector backflow assembly is required. All fire lines shall be installed in conformance with City of Fullerton Standard Drawings 701 and 721.

The detector (by-pass) check meter shall be per the City's Approved Materials List.

The above ground horizontal run segment of a fire line assembly shall be installed in a level orientation.

3-06 AESTHETICS

The Owner/Developer is encouraged to locate all above ground large services, backflow prevention assemblies, and fire lines in a manner that is aesthetically pleasing. If a method of concealment is used, it shall not obscure the Fire Department's pumper connection, OS&Y rising stems, hinder access to the connection, or obscure the testing of the device.

SECTION 4 – OPEN TRENCH OPERATIONS: EXCAVATION, BEDDING, BACKFILL AND RESURFACING

4-01 OPEN TRENCH OPERATIONS

Open trench operations, excavation, bedding, backfill, and resurfacing shall conform to the applicable requirements of these Specifications, the Standard Specifications, and City of Fullerton Standard Drawings, 312 and 313.

4-01.01 Traffic Control

The Contractor shall conduct their operations to cause the least possible obstruction to traffic inconvenience to the public. On arterial highways, lane closures require a traffic control plan completed by a registered civil or traffic engineer subject to approval from the City Traffic Engineer. Lane closures are restricted to the hours between 8:30 a.m. and 3:30 p.m. At least one lane of traffic must be maintained in each direction between these hours. All traffic lanes shall be open to traffic during all other hours. On minor residential streets, one lane of traffic shall be maintained for each direction at all times. If two travel lanes cannot be maintained, the roadway may be reduced to one 14-foot-wide lane between the hours of 8:00 a.m. and 4:00 p.m. Adequate flaggers, no less than two, whose sole duties shall consist of directing traffic, shall be provided at such times as the street is restricted to one lane of traffic. At least one 14-foot-wide lane controlled by flaggers shall be provided on all intersecting minor streets. A separate permit is required from the Department of Public Works for all work in public streets.

The City Traffic Engineer reserves the right to alter the above traffic conditions as required during construction.

The Contractor shall be required to provide and maintain all barricade delineators, flashers, signs, including temporary “No Parking” signs, and other safety equipment as set forth in the latest edition of Caltrans “California Manual on Uniform Traffic Control Devices” (CA MUTCD) and the “Work Area Traffic Control Handbook” (WATCH). All necessary traffic control devices shall be in place prior to the start of work.

On all designated or striped bicycle routes the Contractor shall install standard warning signs per the WATCH Manual at locations approved by the City Traffic Engineer.

Where traffic must cross open trenches, the Contractor shall provide suitable bridges at street intersections and driveways. Hydrants under pressure, valve pit covers, valve boxes, meter boxes, fire or police call boxes, or other utility controls shall be left unobstructed and accessible during the construction period.

4-01.02 Surveying

The Contractor shall provide equipment, methods, and labor to accurately locate all proposed water facilities in accordance with the Standard Specifications and as modified herein. The Contractor shall guarantee the accuracy by constructing curb and gutter prior to the beginning of any water improvements in new developments or where the installation of curb and gutter is included as part of the work scope. The Contractor shall also be responsible for the preservation of existing survey monuments.

4-01.03 Potholing

The plans show the position of pipes, conduits, poles and other structures as they are believed to exist. The Contractor, before commencing any excavation shall determine from records, potholing, uncovering, or otherwise, the existence, exact position, and ownership of these or other facilities. It is the Contractor's responsibility to protect any pipes, conduits, poles, or any other existing improvements.

Potholing shall be done a minimum of 10 working days in advance of commencing any excavation and sub-structure information forwarded to the Engineer for review.

4-01.04 Sheeting and Shoring

All trench excavations shall be adequately secured to provide safe working conditions, and protection to adjacent facilities and structures. The contractor shall comply with all rules, regulations, and orders of Occupational Safety and Health Administration (OSHA).

Prior to any trench excavation where the depth of trench is greater than five feet, the Contractor shall submit to the Engineer a detailed shoring plan prepared, stamped and signed by a Civil or Structural Engineer registered in the State of California. The shoring plan shall show the design of shoring, bracing, sloping, or other provisions to be made for the workers' protection from the hazard of trench failure. Excavation shall not begin until the Engineer has accepted the plan and received a copy of the OSHA permit.

Sheeting and shoring shall not place any undue strains on existing utilities or structures, nor on completed sections of construction. Sheeting and shoring may be removed during backfilling, provided adequate protection is provided at all times. The Contractor shall be responsible for any damages to existing utilities or structures due to placement, removal or failure of any sheeting and/or shoring system. The Contractor shall repair or have repaired any damages as soon as practical.

4-01.05 Secured Trenches

Pipe trenches or other large excavations shall be backfilled or securely covered at the close of each working day, to the satisfaction of the Engineer. The Contractor shall fence any trench excavations that are necessary to be left open at night. Any trench that is left open shall be permitted only upon review and approval by the Engineer.

Covering of trenches with steel traffic plates shall be done in accordance with City of Fullerton Specifications and as directed by the Engineer. All steel plate covers shall be skid resistant and shall be installed flush with adjacent pavement in accordance with City Standard No. 314.

No backfill material or construction equipment may be stored on any City street without prior approval from the Engineer.

4-01.06 Tie-Ins

All tie-ins shall be excavated one working day in advance and covered with traffic plates or as required by the Engineer.

4-01.07 Interruption of Water Service

No valve or other control on the existing water system shall be operated for any purposes by the Contractor without approval of the Engineer. All consumers affected by such operation shall be given a notice letter by the Contractor at least three working days before the operation advising of water service outage and the probable time when service will be restored. The notice letter template will be provided by the Engineer to the Contractor. The Contractor shall complete the notice letter and submit to the Engineer for approval at least 5 working days before it is distributed.

4-02 TRENCH EXCAVATION

Trench excavation shall be in accordance with the details shown in the City of Fullerton Standard Drawings 312 and 313 and in accordance with the Standard Specifications.

The maximum length of open trench shall be the distance of pipe installed in one day. Shorter lengths of open trench may be necessary and may be ordered by the Engineer to meet traffic, weather, and other safety requirements.

In areas of new development, water main installation will not be permitted until the sub grade is established and the storm drain and sewer installation has been completed. Pipe shall be placed to the grade and depth specified on the plans. When not specified, pipe shall have a 42-to-48-inch cover from finished grade.

4-02.01 Removal of Surface Improvements

Bituminous pavement, concrete pavement, curbs, sidewalks, or driveways removed in connection with construction shall be removed in accordance with City of Fullerton Standard Drawings 312 and 313 and the Standard Specifications.

If the width of the remaining pavement between the final saw cut edge of the trench and the edge of the gutter is less than 36 inches, removal and new pavement limits shall extend to the edge of gutter.

Concrete sidewalk removal done in connection with water system work shall be saw cut to the nearest score marks. Concrete curbs, gutters and cross gutters shall be tunneled whenever possible. With prior approval of the Engineer, the concrete may be saw cut in such a manner in which there shall not be less than six feet to the nearest cold joint or expansion joint.

4-02.02 Abandoning Structures

Whenever existing pipes, culverts, or conduits are cut and abandoned, their open ends shall be securely closed by either a solid mechanical cap, a wall of concrete no less than six inches thick, or as directed otherwise by the Engineer.

4-02.03 Protecting and Replacing Existing Structures

Insofar as practicable during the progress of the work, any public or private property and/or improvements, at or below grade, shall be maintained in good operating condition at the expense of the Contractor. Wherever in the judgment of the Contractor, the economical performance of the work requires a temporary or permanent removal of any of the property named above in this section, the Contractor shall make arrangements with the owner of the same for its temporary or permanent removal, or for other changes that may be necessary in order to perform the work more readily. All expenses for maintenance, removal reconstruction, and repair of and such property shall be borne by the Contractor.

Whenever the Contractor makes agreements with owners for the removal and restoration of said property, the materials furnished and the methods of making such removal and restoration shall be satisfactory to the owner and the Engineer. In the event the Contractor disturbs, disconnects, or damages any of said property prior to making the necessary arrangements with the owners thereof, the Contractor shall immediately give notice to the property owner and the Contractor shall assume all responsibilities connected therewith. All property removed shall be reconstructed or restored promptly as is reasonably possible in approximately its original location and in condition as good as when removed and subject to the inspection of the owners or governing body having jurisdiction over same.

4-02.04 Excess Excavating Material

All excavated materials in excess of that required in the finished work shall immediately be hauled away and disposed of at a legally permitted site. The Contractor shall be responsible for all damages and claims that may arise from the disposal of the excess material. The contractor shall provide a signed release from the property owner.

4-03 TRENCH BEDDING

The pipe bedding and up to 12” above the pipe, shall be sand with S.E. = 30, as per City of Fullerton Standard Drawings 312 and 313. Jetting of trench bedding is subject to the approval of the Engineer.

4-04 TRENCH BACKFILL

Trench backfill shall be placed in accordance with the requirements shown in City of Fullerton Standard Drawings 312 and 313 and in accordance with the Standard Specifications. No native material shall be used for backfill. All backfill material shall be imported.

The Contractor shall compact the trench backfill material to the bottom of the structural section within one day after installation of the pipe. No flooding or jetting of the backfill will be allowed to achieve compaction.

If the Engineer determines that the Contractor is not able to obtain the required compaction in areas under curbs, cross gutters or other structures, trench backfill underneath these structures shall be 1-sack cement sand slurry or as specified by the Engineer.

4-05 COMPACTION TEST

Compaction tests will be taken along the pipelines, in the pipe zone, above the pipe zone, and at ground surface or subgrade at 200-foot intervals or less, or as directed by Engineer, and along all large service and fire hydrant laterals. The Engineer must be present when compaction tests are taken.

4-06 TEMPORARY RESURFACING

Temporary resurfacing, a minimum of two inches thick or as otherwise specified, shall be placed and properly maintained by the Contractor as determined by the Engineer unless permanent resurfacing is to be placed immediately.

Temporary resurfacing shall be placed in accordance with the Standard Specifications and shall be placed as soon as trench backfill is complete and shall remain in place until permanent resurfacing is placed. Prior to permanent resurfacing, temporary resurfacing shall be removed and discarded at a legal disposal site at Contractor's expense. Temporary asphalt paving as specified above shall be a minimum two inches thick or as specified by the Engineer.

At the end of each day, temporary striping shall be placed complying with the plans, as specified or as directed by the Engineer. Temporary striping shall conform to the Standard Specifications.

4-07 TRENCH RESURFACING

Trench resurfacing shall be placed in accordance with the requirements shown in the City of Fullerton Standard Drawings 312 and 313 and in accordance with the Standard Specifications.

Contractor shall place structural section other than surface course within five days of completion of backfill.

Concrete sidewalks, curbs and gutters, driveways and other structures shall be replaced in accordance with the applicable requirements in the Standard Specifications and the City of Fullerton Standard Drawings.

SECTION 5 – INSTALLATION OF DUCTILE IRON AND PVC PIPE, VALVES, FITTINGS, FIRE HYDRANTS, AND APPURTENANCES

5-01 GENERAL

Installation of Polyvinyl Chloride (PVC) Pressure pipe shall conform to the requirements of AWWA Standard C605, "Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water". Installation of ductile iron pipe, valves, fittings, fire hydrants, and appurtenances shall conform to the applicable requirements of AWWA C600, "Installation of Ductile-Iron Water Mains and Their Appurtenances," and the applicable provisions of the Ductile Iron Pipe Research Association (DIPRA) "Guide for the Installation of Ductile Iron Pipe."

The Contractor shall furnish all labor, equipment and materials required to construct, install, and complete the pipelines, connections, valves, fittings, fire hydrants, thrust restraints, and all other appurtenances as shown on the plans and specified herein.

5-02 CONSTRUCTION MATERIALS

The Contractor shall furnish only approved materials per Section 7 and Section 8 of these Specifications. All materials shall be new and of the best quality for their intended use. All like materials shall be of one manufacturer for any particular project.

5-03 INSTALLING WATER MAIN PIPE

The pipe and fittings shall be inspected for defects prior to lowering in trench. All lumps, blisters, excess coating, and other foreign materials shall be removed from the bell and spigot ends of each pipe. The outside of the spigot and the inside of the bell shall be wiped clean and dry and shall be free from oil and grease before the pipe is laid.

Pipe shall be lowered into the trench with fabric or other approved slings. Under no circumstances shall pipe be dropped, pushed off the bank, or allowed to fall into the trench. Every precaution shall be taken to prevent foreign materials from entering the pipe while it is being placed in the trench. If the pipe-laying crew cannot put the pipe into the trench and in place without getting soil into it, the Utility may require that before lowering the pipe into the trench, a temporary plug be placed over each end and left there until the connection is to be made to the adjacent pipe. During laying operations, no debris, tools, clothing or other materials shall be placed in the pipe. No pipe or appurtenances shall be laid in water or when, in the opinion of the Engineer, trench or weather conditions are unsuitable for such work.

Except where necessary in making connections with other water pipelines, or where otherwise authorized by the Engineer, pipe shall be laid with the bells facing in the direction of installation. For lines on appreciable slopes, bells shall face upgrade.

At times when pipe laying is not in progress, the open ends of pipe shall be closed by watertight plug or other means approved by the Engineer. This provision shall apply during lunch-hour breaks as well as overnight. If water is in the trench, the seal shall remain in place until the trench is pumped completely dry.

5-03.01 Laying Ductile Iron Pipe, Bends, and Fittings

Whenever it is necessary to deflect pipe from a straight line either in the vertical or horizontal plane to avoid obstructions or where long radius curves are required, the amount of deflection allowed shall not exceed that required by DIPRA for a satisfactory joint and shall be approved by the Engineer. Short lengths of pipe may only be used at locations where fittings are to be installed or in situations where adequate total horizontal and/or vertical joint deflection may not be obtained by using a standard length of pipe.

After pipe has been set in trench, exterior of spigot and interior of bell shall be thoroughly cleaned. A water-soluble, NSF 61 approved and nontoxic lubricant as approved by pipe manufacturer shall be applied to rubber gasket. Pipe ends shall be aligned, and spigot shall be pulled into bell with come-along devices, or hoists with chains and slings. If a pry bar is used, a timber header shall be placed between the pipe and the pry bar before the spigot is pushed into bell.

Warning tape shall be installed 12 inches above the top of pipe.

5-03.02 Laying PVC (C900) Pipe

PVC bends and fittings are not allowed with the exception of high deflection couplings. The Uni-Bell Handbook of PVC Pipe-Design and Construction shall be used for details of pipe installation practice except as follows and were noted otherwise on plans. Contractor shall take measures to prevent over-insertion of pipe.

Tracer wire shall be installed and secured to the top of all PVC pipes as it is being laid. The tracer wire shall be grounded to the valve, to each service (grounded to the corporation stop), to all appurtenances and to all hydrants (grounded to the bury). Tracer wire shall be secured to the top of the pipe, at minimum of 10-foot intervals, with plastic adhesive tape.

The wire shall be electrically continuous throughout the entire piping system. All splices of the wire shall be made securely and covered thoroughly with an approved splice kit. The Contractor shall schedule a conductivity test (conducted by the City) on completion of the water main installation and prior to the final pavement. If the conductivity test fails, the Contractor shall be responsible for making the necessary repairs, until passing results are achieved.

Warning tape shall be installed 12 inches above the top of pipe.

5-03.02.01 Installation of Curvature

Bending of the PVC is not allowed. Any directional changes shall be accomplished through manufacturer approved 1 degree deflection of high deflection couplings, or ductile iron bends and fittings. Where required deflection is between one and five degrees, high deflection couplings shall be used. Contractor shall not exceed the manufacturer's recommendation for deflection for the couplings.

5-03.03 Cutting Pipe

The cutting of ductile-iron and PVC pipe for installing tees, fittings, or for other reasons shall be done in a neat manner without damage to the pipe or cement lining so as to leave a smooth end at right angles to the axis of the pipe. All such cutting of ductile iron and PVC pipe shall be done with a special cutting tool specifically made for cutting and machining pipe. Cut ends and rough edges shall be ground smooth and for push-on joints beveled at angles recommended by manufacturer.

5-03.04 Polyethylene Protective Wrapping

Polyethylene protective wrapping (Polywrap) for ductile iron pipe shall be furnished and installed on all buried water lines, except where water lines are within steel casing pipe, in accordance with the requirements of AWWA Standard C105, "Polyethylene Encasement for Ductile Iron Pipe Systems," Section 8 of these Specifications, and as supplemented herein. Polywrap shall be installed so as to prevent any sections of the pipe, fittings, valves, services, or appurtenances from contacting the soil. The polywrap shall be taped to provide a snug fit along the pipe.

Any punctures, tears or other damages shall be patched with polyethylene wrap and tape. Openings for service taps, blow offs or similar appurtenances shall be cut in the polywrap during backfilling of the trench. Rock or other materials that could damage the wrapping shall not be allowed in the backfill.

5-03.05 Protection of Metal Surfaces

All exposed metal surfaces of the valves, flanges, bolts, nuts, tie-rods, turn buckles, etc., in contact with the earth and backfill materials shall be coated with a minimum of 30 mils of bitumastic coating prior to backfilling. In addition to this coating, the main and fittings shall be encased in polyethylene wrapping as described in Section 5-03.04.

5-03.06 Thrust Restraints

Thrust restraints shall be required at all bends, tees, valves, pipe ends, and fire hydrant bury. Thrust restraints through other mechanical means as specified in Section 2-15 of these Specifications shall also be incorporated.

Where restrained joints are indicated on the plans or on Standard Drawings, push-on joints shall be restrained in accordance with the requirements of Section 2-15 of these Specifications.

5-03.07 Flushing

After the pipeline has been completely installed, flushing of the pipeline shall be done per the requirements of Section 6 of these Specifications.

5-04 VALVE BOX ASSEMBLY

Installation of a valve box assembly shall conform to the requirements of City of Fullerton Standard Drawings 650. All buried gate and butterfly valves shall be boxed with the valve cover flush with the finish street pavement grade. The valve box riser shall rest on the bonnet of the gate valve and shall be cut to the required length to assure a level and/or flush fit to finish grade. The valve box shall be installed so as not to transmit shock loads or stress to the valve. All valve boxing shall be installed straight and plumb and centered over the valve operating nut. All active valves shall be accessible at all times during construction operations.

A valve stem extension shall be installed as required per City of Fullerton Standard Drawing 651.

Excavation and backfill for a valve box assembly shall be per Section 4 of these Specifications.

5-05 FIRE HYDRANT ASSEMBLY

The installation of a fire hydrant assembly shall conform to City of Fullerton Standard Drawing 610. Hydrants shall be set plumb and at such elevation that the lateral and main shall have approximately the same depth of cover.

Fire hydrants shall be placed where shown on the plans. Locations shall provide complete accessibility and adequate pedestrian clearance in accordance with the Americans with Disabilities Act (ADA) requirements and minimize the possibility of damage from vehicles.

Where required by the plans or as directed by the Engineer, fire hydrant guard posts shall be installed per City of Fullerton Standard Drawing 615.

All hydrants not in service shall be bagged or otherwise identified as directed by the Engineer.

If required by the Engineer the Contractor shall field paint the fire hydrant barrel and guard posts in accordance with the applicable field painting requirements in Section 5-10.

5-06 LARGE SERVICE LATERALS, BACKFLOW ASSEMBLIES, AND FIRE LINES

Installation of large service laterals (3 and larger) shall conform to City of Fullerton Standard Drawings 603 and 701.

The Owner/Developer or Contractor shall be responsible for preparation of the necessary design plan showing the proposed large service installation together with meter and appurtenances, backflow assemblies and fire lines. The plan shall be submitted to the Engineer for review and must be approved prior to the beginning of construction. All licenses and permits, and other requirements shall be in accordance with the requirements of Section 1 of these Specifications.

The horizontal runs of all above ground large services, backflow assemblies, and fire lines shall be installed in a level position.

No sewer and water laterals shall be laid in the same trench.

Contractor shall field paint all aboveground, bare, or exposed piping and appurtenances of large services, backflow assemblies, and fire lines in accordance with the applicable field painting requirements addressed later in this Section.

5-06.01 Meters

The meter will be provided by the City and installed by the Contractor. The Contractor shall pay all associated fees. In certain situations, the meter may be required to be provided by the Contractor. All 3 inch and larger meter installations shall include provisions for a temporary bypass line. Meters shall conform to size, type and manufacturer as required by the City. The Engineer reserves the right to specify the type of meter if, in the Engineer's sole opinion, a specific type of meter is best suited for the proposed application. Meters shall read in US gallons.

5-06.02 Backflow Assemblies

All larger service installations shall include backflow assemblies per Section 3 of these Specifications.

5-06.03 Fire Lines

Installation of fire lines shall conform to City of Fullerton Standard Drawings 701 and 721.

5-07 SMALL SERVICE LATERALS

For one-inch and two-inch diameter service laterals, all materials except for the meter shall be supplied and installed by the Contractor per City of Fullerton Standard Drawings 601 and 602, respectively. The meter will be provided and installed by the City. The Contractor shall pay all associated fees. In certain situations, the meter may be required to be provided and/or installed by the Contractor. The service lateral shall consist of a double strap service saddle, corporation stop, copper tubing, curb stop, meter, customer valve, and meter box assembly.

If reconnecting to private plumbing it shall also include materials necessary to reconnect existing (customer) house pipe. Reconnection of house pipe shall be with like material. Reconnected copper pipe shall have soldered connections. Reconnected galvanized pipe shall include dielectric union at the brass nipple connection, downstream of meter box.

Service laterals shall be installed perpendicular to the centerline of the street with a four inch "W" letter chiseled into the curb face opposite the location of the corporation stop.

Meter boxes shall be brought to grade upon construction of concrete sidewalks and grading of parkway. Meter boxes for 1 inch service laterals located in areas subject to traffic loading or located behind rolled curbs shall be installed with traffic bearing covers. Regardless of location, all meter boxes for 1½ inch and 2-inch meters shall be installed with traffic bearing covers.

No sewer and water laterals shall be laid in the same trench.

All new services shall be installed before new mains are pressure tested and chlorinated.

5-07.01 Backfill Compaction

Backfill and compaction requirements in the area adjacent to the copper tubing service lateral shall conform to Section 4 of these Specifications. Compaction of

backfill materials by mechanical means directly over the exposed service tubing shall not be allowed.

5-07.02 Backflow Assemblies

Installation of backflow assemblies for small installations shall conform to City of Fullerton Standard Drawing 604 and Section 3 of these Specifications.

5-08 CONNECTION TO THE EXISTING DISTRIBUTION SYSTEM

Proper hydrostatic testing, disinfecting, and flushing of new facilities must take place per Section 6 of these Specifications prior to permanent connections. The Contractor shall make the connection to the existing distribution system as shown on plans or as directed by the Engineer. All connections must be made in the presence of the Engineer.

5-08.01 Hot Tapping

The Contractor may tap cast iron, ductile iron, and PVC C900 distribution mains under pressure. The exterior surface of the pipe shall be cleaned to provide a smooth surface for the tapping sleeve. The tapping sleeve shall be secured to the pipe to prevent movement during the tapping process.

Hot tapping of concrete cylinder pipe requires prior written approval by the Engineer.

5-08.02 Shutdown of Main

All work necessary to shut down an existing distribution main for the benefit of the Contractor shall be accomplished by the Public Works Department. No valves or other controls on the existing distribution system shall be operated for any purpose by the Contractor without the approval of the Engineer.

It shall be the Contractor's responsibility to coordinate the necessary shutdown schedules through the Engineer assigned to the project. Two working days are required for scheduled shutdowns to allow City personnel to review, approve, and develop an appropriate program. Shutdowns shall not be scheduled on City's scheduled Friday closures.

The City will make a concerted effort to isolate the system as planned with the Contractor. If a water-tight shut down cannot be achieved, the Contractor shall be prepared to employ necessary pumping equipment to remove the water from the trench. City shall not be responsible for any delays due to system shutdown and isolation.

All emergency situations shall be reported immediately to the Engineer. When an extensive and/or lengthy main shutdown is required, the Engineer will determine what temporary service connections may be required. The Contractor shall furnish all necessary hoses, piping, valves, tank trucks and associated labor required to provide such temporary service at no cost to the City. All piping, hoses, and associated equipment used in temporary service connections shall be flushed and disinfected in accordance with Section 6 of these Specifications.

In making connections to existing mains, the Contractor shall perform the work in the shortest time possible and shall do the work in such a manner and as such time that will cause the least inconvenience to water users because of shutoff water services. All consumers affected by such operations shall be notified in writing by the Contractor at least three working days before the operation and advised of the probable time when the service will be restored. The written notification must be approved by the Engineer prior to use/distribution. This notification shall occur only after the hydrostatic testing and disinfecting requirements of these Specifications have been met and approved by the Engineer.

All tie-in locations shall be excavated a minimum of one working day in advance of final connection to expose the affected portions of existing pipelines and to allow time for the necessary measurements, assembly of materials and equipment, and assuring that all pre-assembled piping and fittings will be compatible with the existing main.

The Engineer may postpone or reschedule any shutdown operations if for any reason they feel that the Contractor is improperly prepared with competent personnel, equipment, or materials to proceed with connection work. If it appears the connection to the existing distribution main cannot be made in the time specified, the City shall order necessary corrective measures at the Contractors expense.

5-08.03 Transfer of Jurisdiction of Completed Work

The Contractor shall be aware that once a physical connection is made to the City's system, the valves and appurtenances are under the City's jurisdiction and shall only be operated by authorized City personnel on a prearranged program schedule. The transfer of jurisdiction does not relieve the Contractor of any responsibilities for the quality of work or materials.

5-09 ABANDONMENT OF EXISTING WATER MAINS, VALVES, AND APPURTENANCES

Existing water mains, valves and appurtenances shall be abandoned at the locations as shown on the plans. Contractor shall abandon the existing water main facilities after transferring of jurisdiction of the new main to the City. Contractor shall install plug and thrust restraints at the locations shown on the plans or as directed by the Engineer.

5-10 FIELD PAINTING

The Contractor shall field paint all above ground, bare, or exposed piping and appurtenances, or damaged factory coating, in accordance with the applicable specifications and plans. Painting of water system installations as identified below shall conform to the applicable requirements of the Standard Specifications and in accordance with manufacturer's recommendations. Contractor shall not spray paint during windy conditions.

5-10.01 Surface Preparation

Care should be taken to protect OS&Y valve stems, meter registry, glass, brass test cocks, I.D. tags and other surfaces identified by the Engineer during surface preparation. These items should be masked off and not receive any primer finished coat.

5-10.02 Primer

All installation surfaces shall be primed with an aerosol primer as required by the manufacturer's recommendations.

5-10.03 Finished Coat

The following installations shall have finished coats applied per manufacturer's recommendation. Listed below are installations and associated colors. Refer to the Approved Materials List for specific part numbers:

Dark Green	Fireline Assemblies Large Meter Assemblies Backflow Assemblies
Black	Steel Plate Meter Box Covers Valve Stem Extensions
Safety Red	Private Fire Hydrants Fire Dept. Connections
Safety Yellow	Public Fire Hydrants Air Release Assembly Covers Guard Posts

SECTION 6 – PIPELINE FLUSHING, HYDROSTATIC TESTING, AND DISINFECTING

6-01 GENERAL

The following are guidelines in accordance with these Specifications, Standard Drawings, Approved Materials List, and American Water Works Association (AWWA) recommendations and procedures.

Hydrostatic pressure testing and disinfection of newly laid pipelines and appurtenances must be completed before the pipelines can be connected to the existing water distribution system. **Pipelines and appurtenances shall remain isolated (disconnected) from the existing water distribution system, during hydrostatic testing and disinfecting. A temporary connection to the water distribution system through a City provided meter and backflow prevention assembly is allowed only during filling and flushing activities.**

6-02 TEMPORARY PIPING AND APPURTENANCES FOR FLUSHING, TESTING, AND DISINFECTING

The Contractor and/or subcontractor shall supply all materials, equipment, and labor necessary for pressure testing, chlorinating, and flushing of the newly laid pipeline.

6-03 FLUSHING

Heavily chlorinated water must be neutralized to a level so as not to cause harm or damage to the environment. Flushing shall take place until chlorine measurements show that the concentration of the water leaving the new water main is no higher than that generally prevailing in the distribution system or that is acceptable for domestic use.

6-04 HYDROSTATIC PRESSURE TESTING

The Contractor shall utilize a licensed independent subcontractor to conduct the required hydrostatic testing of newly laid pipelines. The subcontractor must bring their own calibrated equipment with proof of calibration. After completion of the hydrostatic testing, the subcontractor shall provide a signed copy of all test results to the Engineer. The Contractor and Engineer shall be present during the testing.

6-04.01 Preparation for Hydrostatic Test

The amount of pipeline to be tested at one time shall be determined by the Engineer and shall not exceed 1,200 feet in length. Testing against closed valves is not permitted.

6-04.02 Procedures for Hydrostatic Testing

Each section of pipeline and all fire hydrants, services, and appurtenances connected thereto, shall be subjected to the hydrostatic test.

After the entire section under test has been inspected and no leaks found, the test pressure shall be set at 1.5 times the static pressure at the lowest point along the test section (Engineer to furnish system static pressure data) with a minimum of 180 psi.

6-04.03 Repetition of Hydrostatic Test

If leakage in the section of pipeline tested exceeds the maximum allowable rate as specified by AWWA, such section will be considered defective. The Contractor shall determine the points of leakage and make the necessary repairs at no cost to the City. The subcontractor will then conduct another hydrostatic test. This procedure shall be continued until the leakage falls below the allowed maximum.

6-04.04 After Satisfactory Hydrostatic Test

After test sections have successfully met the hydrostatic test requirements to the satisfaction of the Engineer, the entire pipeline or each test section shall be filled or shall remain filled with potable water until the pipeline is disinfected.

Regardless of the hydrostatic test results, the Contractor shall repair all detectable leaks.

6-05 DISINFECTING

The Contractor shall supply the materials, labor, equipment and methods necessary to disinfect the water main. The Contractor shall hire a state certified laboratory to perform the required bacteriological tests.

6-05.01 Preparation For Disinfecting Pipe Lines

Contractor shall tightly shut off every service connection served by the pipeline being disinfected at the curb stop before water is applied to the pipeline. Care should be taken to expel all air from the main and services during the filling operation.

6-05.02 Retention Period Required and Required Residual

Chlorinated water shall be retained in the pipeline for a minimum of 24 hours. After the chlorine-treated water has been retained for the 24 hours, the chlorine residual shall be tested at the pipeline extremities and at other representative points and meet the minimum chlorine residual requirements. If the tests show less than the required residual, the water main and appurtenances shall be rechlorinated and held for another 24 hour period.

During the retention period, all valves and other appurtenances shall be operated to insure internal exposure with the heavily chlorinated water.

6-05.03 Final Flushing

Following the chlorination period of 24 hours and after confirming the minimum chlorine residual, the newly laid pipeline shall be thoroughly flushed to remove the chlorinated water and any foreign materials. A minimum flushing velocity of 2½ feet per second is required for each section of the pipeline. Water shall be flushed from the

line at its extremities and at all outlets until the chlorine residual of the section being flushed is equal to or less than the distribution system level.

The disposal of the flushed chlorinated water is described later in this Section.

6-05.04 Bacteriological Tests

Bacteriological test requires that two sets of samples are collected at least 16 hours apart.

The Contractor shall have a State certified laboratory perform the bacteriological tests. Samples shall be taken at the direction of the Engineer with at least one set of samples collected at:

- every 1200 feet of the new water pipeline
- each dead-end main section
- each branch (i.e., laterals 4 inch and larger).

All samples shall show the absence of coliform organisms and a standard heterotrophic plate count (HPC) of 500 CFU/ml or less.

The results of the bacteriological tests must be reviewed and approved by the Engineer prior to connecting the newly laid pipeline to the existing water distribution system. Should the test results from the State certified laboratory disclose that the water from the new pipeline does not meet drinking water bacteriological standards, or is not of equal or better quality to that in the distribution system, the process shall be repeated until it meets the required standard.

At the time of connection to the existing distribution system, a bacteriological sample shall be collected downstream of the nearest point from the final tie in connection on the new water main.

6-06 DISPOSAL OF TEST WATER

The disposal of all water used in flushing, hydrostatic testing, and disinfecting the sections of pipeline shall be the sole responsibility of the Contractor. The disposal of water shall, in all cases, be carried out in strict observance of the SWRCB Division of Drinking Water.

For contracts administered by the City, the Contractor will be authorized to discharge under the National Pollutant Discharge Elimination System (NPDES) permit issued to the City if all requirements and procedures per such permit are followed. For all other projects, including Developer projects, Contractor or Developer shall obtain a NPDES permit and comply with that permit.

The Contractor shall apply a reducing agent to the solution to neutralize residual chlorine or chloramines remaining in the water. In addition, the flow of water from the section of pipeline shall be controlled to prevent erosion of surrounding soil, damage to vegetation, altering of ecological conditions in the area, and damage to any construction or maintenance activities occurring in any ditches or storm drains downstream of discharge.

6-07 CONNECTING TO EXISTING DISTRIBUTION SYSTEM

After all hydrostatic tests and disinfections have been completed and demonstrated to comply with the Specifications, the Contractor shall connect newly laid pipeline to the existing distribution system.

Where connections are to be made to an existing potable water system, swab or spray the interior surfaces of all pipe and fittings used in making the connections with a 5% or greater hypochlorite solution as directed by the Engineer.

As soon as the connection is completed, thorough flushing is required until all discolored water is removed. **A bacteriological sample shall be collected downstream of the nearest point from the final tie in connection on the new water main.**

6-08 REMOVAL OF TEMPORARY PIPING AND APPURTENANCES

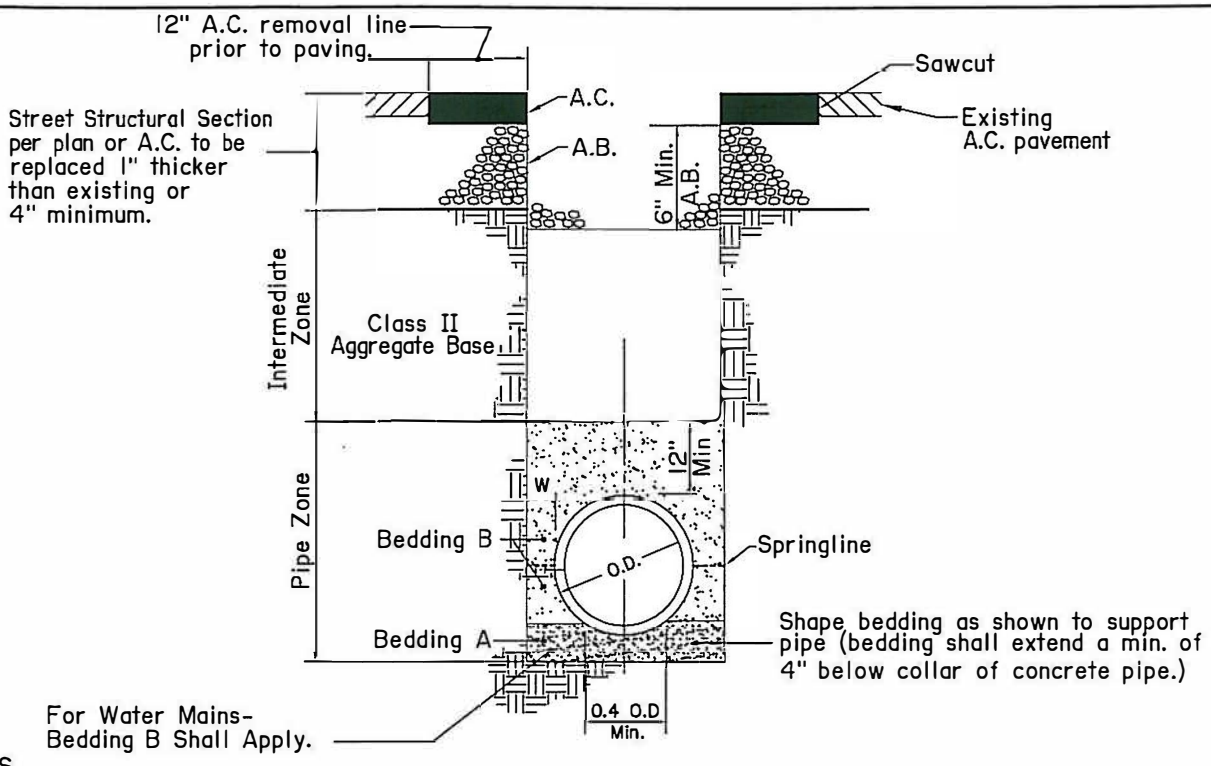
After the newly laid section of pipeline has been approved by the Engineer for connection to the existing distribution system, the Contractor shall disconnect and remove all temporary piping, equipment, fittings, and other appurtenances used for pressure testing, chlorinating and flushing.

Contractor shall remove and replace all stops used for testing and disinfecting of the pipeline with stainless steel repair clamps.

FULLERTON STANDARD DRAWINGS WEBSITE

SECTION 7 – CITY OF FULLERTON STANDARD DRAWINGS

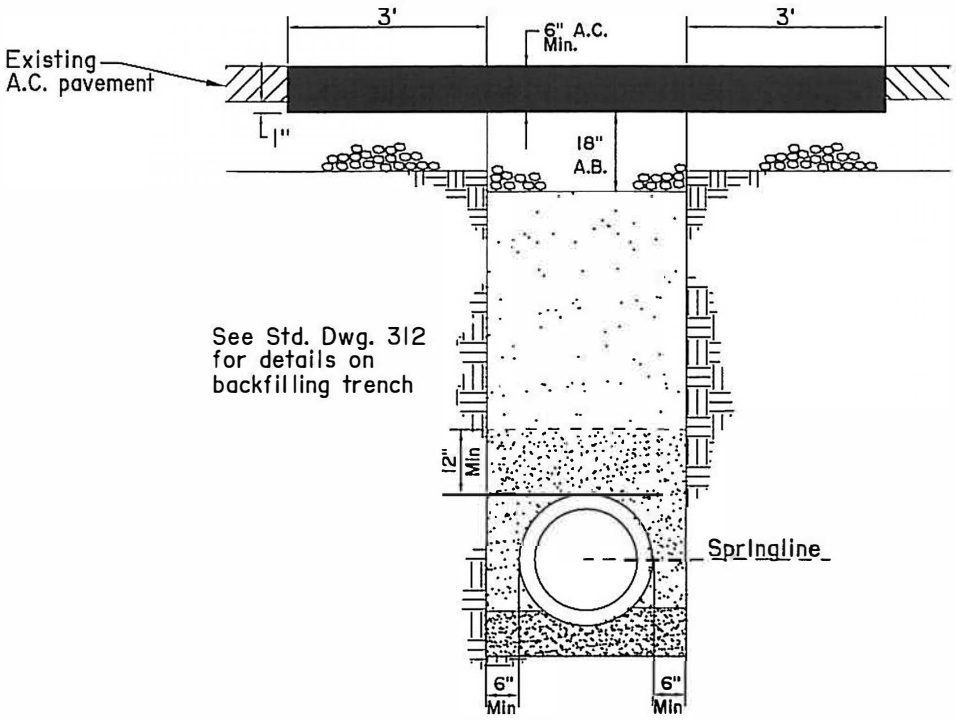
STANDARD	DESCRIPTION
312	RESIDENTIAL STREET PIPE TRENCH BEDDING AND BACKFILL
313	ARTERIAL STREET PIPE TRENCH BEDDING AND BACKFILL
601	⅝" & 1" WATER METER INSTALLATION
602	1½" & 2" WATER METER INSTALLATION
603	3" & LARGER WATER METER INSTALLATION
604	¾" THROUGH 2½" REDUCED PRESSURE BACKFLOW PREVENTION ASSEMBLY
610	STANDARD FIRE HYDRANT INSTALLATION
615	GUARD POST
621	2" BLOW-OFF ASSEMBLY
624	4" SAND BLOW-OFF ASSEMBLY
627	1" AND 2" COMBINATION AIR RELEASE VALVE ASSEMBLY
630	WATER QUALITY SAMPLING STATION
631	UTILITY CROSSING
646	2" AND SMALLER SERVICE LATERAL ABANDONMENT
648	4" THROUGH 12" ABANDONMENT OF FITTINGS AND VALVES
650	STANDARD VALVE BOX ASSEMBLY
651	STEEL VALVE STEM EXTENSION
701	4" THROUGH 12" SERVICE LATERAL AND NEW MAIN INSTALLATION
721	FIRELINE DOUBLE CHECK DETECTOR ASSEMBLY
735	TEMPORARY FIRE HYDRANT METER AND REDUCED PRESSURE BACKFLOW DEVICE

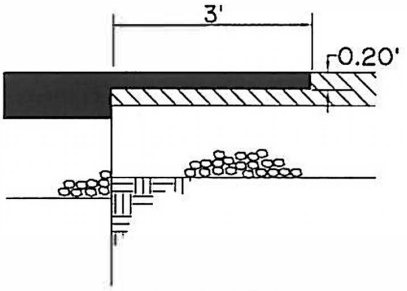


NOTES

1. Bedding A shall be composed of Class 2 Aggregate Base or as approved by the Engineer, and shall be compacted to 90% relative compaction. FOR WATER MAINS SEE BEDDING B.
2. Bedding B shall be composed of sand or other granular material as may be specified or approved by the Engineer and shall have a minimum S.E. = 30 (FOR WATER MAINS S.E. = 60); compacted to a minimum 90% relative compaction unless otherwise specified; placed in two or more lifts for O.D. › 60".
3. The Intermediate Zone backfill shall be class II aggregate base and per Section 306-1.3 of the Standard Specifications, compact lifts shall not exceed 8 inches in height. The Intermediate Zone shall be compacted to a minimum 90% relative compaction.
4. Slurry is not a permitted backfill material.
5. The roadway structural section shall be replaced with 6" Class 2 Aggregate Base compacted to 95% relative compaction and an A.C. section 1" thicker than the existing section (4" minimum).
6. Where the cover is 8 feet or less "W" must be greater than or equal to 6". Where the cover is greater than 8 feet, "W" must be between 6 and 10 inches inclusive for pipes up to and including 96 inches in diameter. For pipes over 96 inches in diameter, "W" must be between 6 and 12 inches inclusive.
7. "W" shall include the thickness of any shoring.
8. Revised bedding methods shall be submitted to the Engineer for approval for any "W" over than those stated above.
9. All sewer and storm drain lines shall be video inspected in addition to other testing required per the Standard Specifications for Public Works. (Ball and flush line shall be at no cost to the city.)
10. Existing pavement shall be sawcut 2" deep minimum.
11. Telephone, Cable T.V., Electrical conduits and wirings, and Gas Mains shall be minimum of 36" below grade. Utilities in the parkway shall be minimum 30" below the flow line of the curb and gutter.
12. Asphalt mix design for the base course shall be Type III/B-2-PG 64-10 (3/4" Course) and the surface course shall be Type III/C2-PG 64-10 (1/2" Course), or as approved by the City.

DRAWN P.L.S. DATE 8/1/95	**CITY OF FULLERTON** **ENGINEERING DEPARTMENT**	REVISED DATE 5/8/97 1/10/02 12/03/08 4/29/09
STD. NO. **312**	**RESIDENTIAL STREET PIPE TRENCH BEDDING AND BACKFILL**	
	APPROVED _____ DIRECTOR OF ENGINEERING DATE 5-12-09	



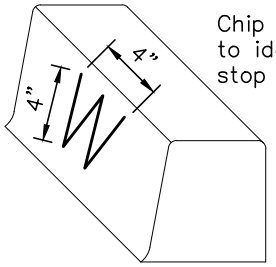


OPTION
PER CITY APPROVAL
IF EXISTING STRUCTURAL
SECTION FOR A.C.
IS MORE THAN 4".

NOTES

1. All open-cut pipe installation crossing arterial streets will require special approval by the Director of Engineering.
2. Unless otherwise approved by the Engineering Department, all utilities crossing arterial streets shall be constructed by jacking or approved boring method. No open transverse utility cuts are permitted.
3. Traffic control to be approved by the City of Fullerton Traffic Engineer prior to any excavation.
4. Existing pavement shall be sawcut 2" deep minimum.
5. An additional 3 foot wide strip on both sides of the trench shall be removed and repaved. OPTION-In lieu of A.C. removal, existing A.C. may be cold planed a minimum depth of 0.20'.
6. The roadway structural section shall be replaced with 18" crushed aggregate base compacted to 95% relative compaction and an A.C. section 1" thicker than the existing section or 6" minimum A.C., whichever is greater.
7. Slurry is not a permitted backfill material.
8. The final A.C. cap shall be placed with a self-propelled paving machine or an approved paving device.
9. Asphalt mix design for the base course shall be Type III/B-2-PG 64-10 (3/4" Course) and the surface course shall be Type III/C2-PG 64-10 (1/2" Course), or as approved by the City.
10. Telephone, Cable T.V., Electrical conduits and wirings, and Gas Mains shall be a minimum of 36" below grade. Utilities in the parkway shall be a minimum 30" below the flow line of the curb and gutter.
11. All sewer and storm drain lines shall be video inspected in addition to other testing required per the Standard Specifications for Public Works. (Ball and flush line shall be at no cost to the city.)

REVISED	CITY OF FULLERTON ENGINEERING DEPARTMENT	DRAWN P.L.S.
DATE 5/8/97 1/10/02 4/28/09	**ARTERIAL STREET PIPE TRENCH BEDDING AND BACKFILL**	DATE 8/1/95 STD. NO. 313
	APPROVED [signature] DIRECTOR OF ENGINEERING DATE 5-12-09	



Chip 4" W in curb face to identify corporation stop location.

LIST OF MATERIALS

1. 1" Double strap service saddle, F–IPT
2. 1" Corporation stop, M–IPT
3. 1" Copper tubing (Type K, soft drawn, see Note 4 Sheet 2)
4. 1" Angle curb stop, 360° turn with padlock wings
5. 1¼" x 1" Meter adapter for ⅝" x ¾" meters
6. Meter
7. 1" Customer ball valve with meter coupling, 360° turn
8. Valve handle 3¼" brass
9. 1" x 12"L Brass nipple, IPT
10. 1" Brass Coupling, F–IPT x F–IPT
11. 1" Male adapter, to be threaded into 1" brass coupling, material to match customer side service lateral
12. 1" Meter box assembly
13. Remove and construct sidewalk (from joint to joint) per City of Fullerton Standard Drawing 122
14. Pea gravel, 8" minimum base

⅝" & 1" WATER METER INSTALLATION

STANDARD DETAIL

601

SHEET 1 OF 2

REVISIONS				
NO.	DATE	NO.	DATE
01	09/03/13	04	08/08/18
02	02/29/16	05	09/24/19
03	02/28/17	06	04/20/22

CITY ENGINEER — 5/9/2022 DATE

PUBLIC WORKS DIRECTOR — 5/24/2022 DATE

CITY OF FULLERTON CALIFORNIA

DEPARTMENT OF PUBLIC WORKS

NOTES

1. Refer to the City of Fullerton's Approved Materials List for approved manufacturers and model numbers.
2. The water service shall extend perpendicular to street center line except in cul–de–sacs, and the tap shall be at least 24" from any adjacent joint or service.
3. Meter register to be set for curbside reading.
4. Copper tubing to be one piece, no splices allowed. Entire piece, from corporation stop to angle curb stop, is to be replaced if there is any damage to the copper.
5. Meter box requirements:
   A. The meter box shall only be placed in concrete if no other locations are available. When meter box is in concrete, install ¼" x 3" expansion joint material around outside of box, as approved by City Engineer. The joint material shall be flush with finished grade.
   B. Meter box cover to be flush with finished grade when in concrete, and ½" above grade in landscaped areas.
   C. Meter boxes shall be a minimum 8" clear from adjacent meter boxes and 7' clear from top of "X" of driveway approaches and sidewalk access ramps.
6. For domestic/fire combination service installations, a 1" check valve is to be installed on–site as instructed by the Building Inspector or Fire Inspector.
8. Water meter to be supplied by City of Fullerton, as determined by City Engineer.
9. Water meter to be installed per manufacturer's requirements.
10. Water meter and meter box shall be installed perpendicular to the curb, or as determined by City Engineer.

⅝" & 1" WATER METER INSTALLATION

REVISIONS			
NO.	DATE	NO.	DATE
1	09/03/13	4	08/08/18
2	02/29/16	5	09/24/19
3	02/28/17	6	04/20/22

CITY ENGINEER — 5/9/2022 DATE

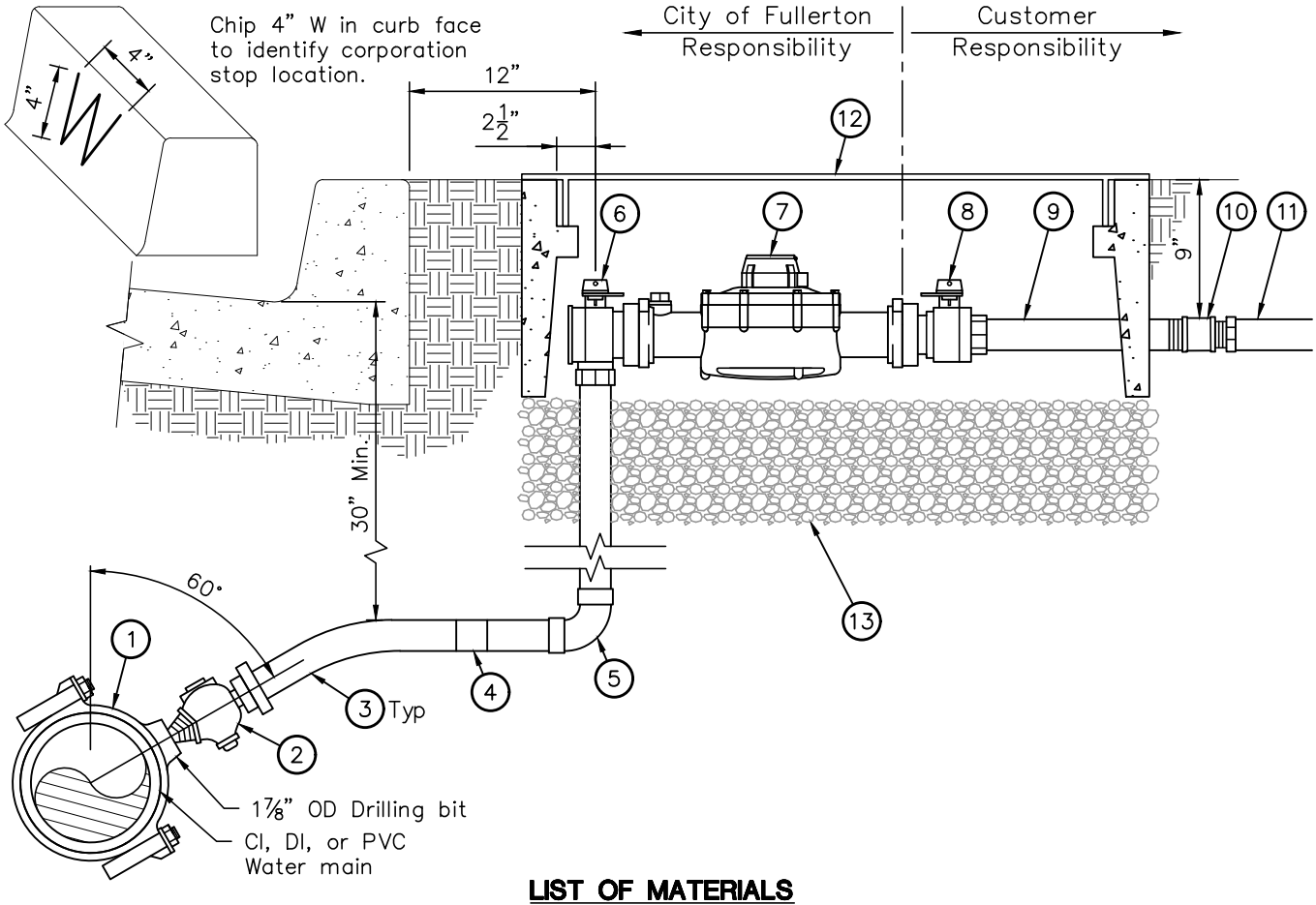
PUBLIC WORKS DIRECTOR — 5/24/2022 DATE

STANDARD DETAIL

601

SHEET 2 OF 2

DEPARTMENT OF PUBLIC WORKS



LIST OF MATERIALS

1. 2" Double strap service saddle, F–IPT
2. 2" Corporation stop, IPT x compression
3. 2" Copper pipe (Type K, soft drawn)
4. 2" Compression coupling. Use when horizontal run of service exceeds 20 ft.
5. 2" – 90° Compression elbow
6. 2" Angle ball valve, F–IPT x oval flange with slotted holes and locking ears
7. Meter
8. 2" Ball valve, F–IPT x oval flange with slotted holes and locking ears
9. 2" Brass nipple, IPT
10. 2" Brass coupling, F–IPT x F–IPT
11. 2" Male adapter to be threaded into 2" brass coupling, material to match customer side service lateral
12. Meter box
13. Pea gravel, 8" minimum base

1½" & 2" WATER METER INSTALLATION

STANDARD DETAIL	REVISIONS			
	NO.	DATE	NO.	DATE
602	1	12/01/00	4	02/28/17
	2	02/11/13	5	09/24/19
SHEET 1 OF 2	3	02/29/16	6	04/20/22

CITY ENGINEER — 5/9/2022 DATE

PUBLIC WORKS DIRECTOR — 5/24/2022 DATE

CITY OF FULLERTON CALIFORNIA

DEPARTMENT OF PUBLIC WORKS

NOTES

1. Refer to the City of Fullerton's Approved Materials List for approved manufacturers and model numbers.
2. Contact the Water Engineering Division for the type of 1½" or 2" meter required.
3. The water service shall extend perpendicular to street center line except in cul–de–sacs, and the tap shall be at least 24" from any adjacent joint or service.
4. Meter register to be set for curbside reading.
5. A traffic load rating cover shall be used in areas without curb, in areas with rolled curb, or where the meter is located within 7' of the BCR, ECR or a driveway approach.
6. Meter box cover to be flush with the finished grade in concrete, and ½" above grade in landscaped areas. Meter boxes shall be a minimum of 8" clear from adjacent meter boxes, and 7' clear from top of "X" of driveway approaches and sidewalk access ramp.
7. For domestic/fire combination service installations, a check valve to be installed on–site as instructed by the Building Inspector or Fire Inspector.
8. Water meter to be supplied by City of Fullerton, as determined by City Engineer.
9. Water meter to be installed per manufacturer's requirements.
10. Water meter and meter box shall be installed perpendicular to the curb, or as determined by City Engineer.

1½" & 2" WATER METER INSTALLATION

CITY OF FULLERTON CALIFORNIA

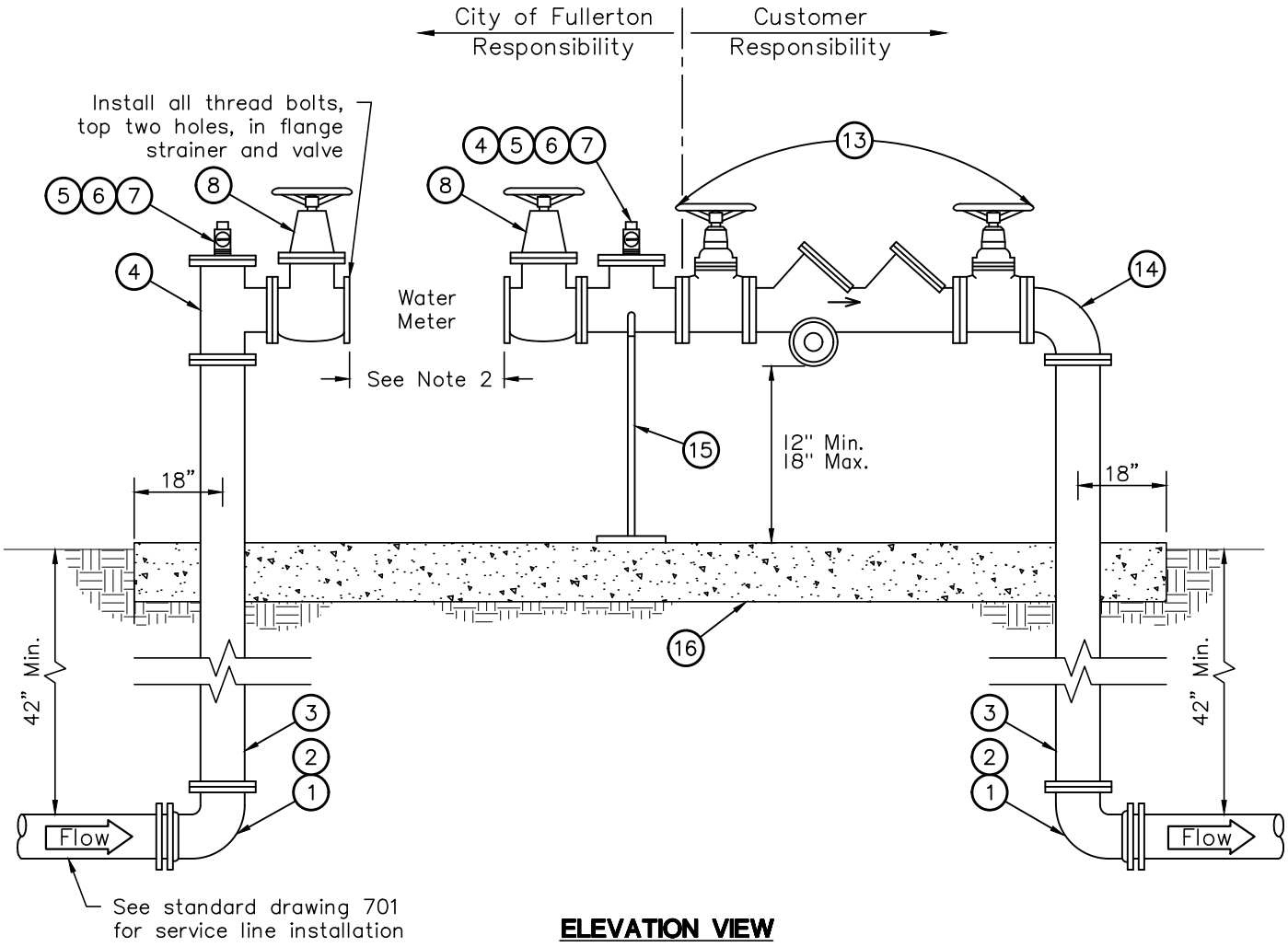
REVISIONS			
NO.	DATE	NO.	DATE
1	12/01/00	4	02/28/17
2	02/11/13	5	09/24/19
3	02/29/16	6	04/20/22

5/9/2022
CITY ENGINEER — DATE

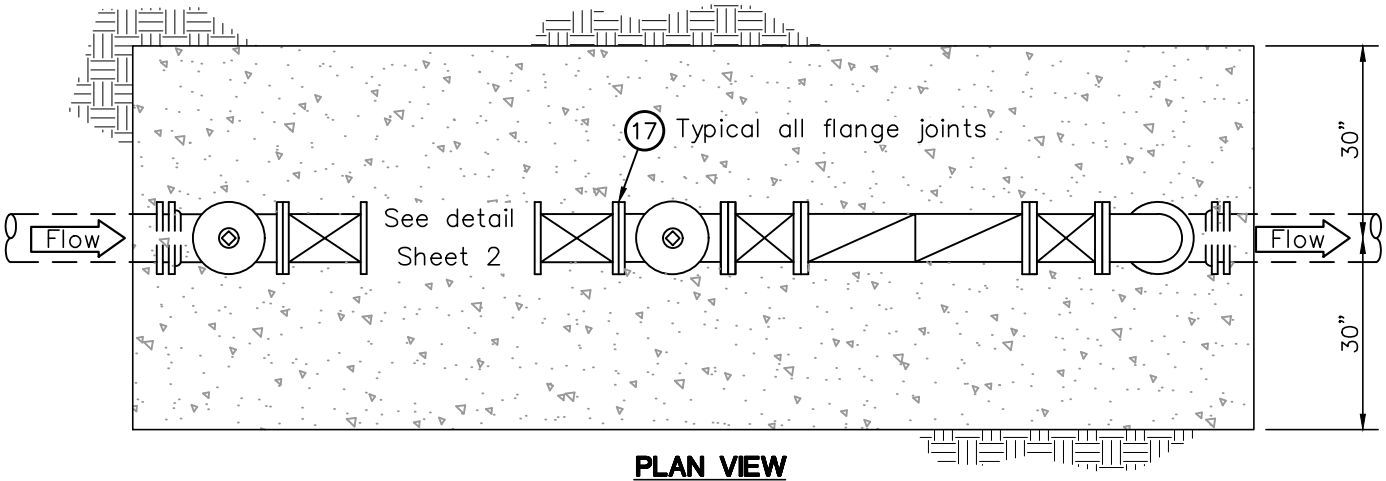
Meg McWade 5/24/2022
PUBLIC WORKS DIRECTOR — DATE

STANDARD DETAIL
602
SHEET 2 OF 2

DEPARTMENT OF PUBLIC WORKS



ELEVATION VIEW



PLAN VIEW

3" & LARGER WATER METER INSTALLATION

STANDARD DETAIL	REVISIONS			
603	NO.	DATE	NO.	DATE
	1	12/01/00	4	02/28/17
	2	02/13/13	5	04/20/22
SHEET 1 OF 2	3	02/29/16		

CITY ENGINEER — 5/9/2022 DATE

PUBLIC WORKS DIRECTOR — 5/24/2022 DATE

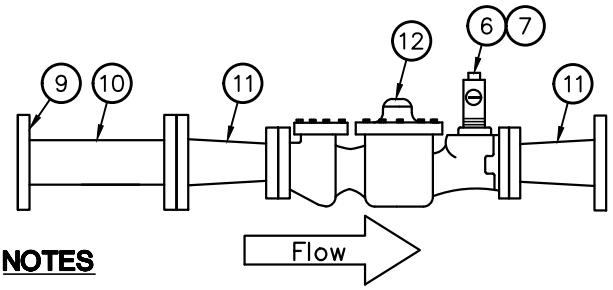
CITY OF FULLERTON CALIFORNIA

DEPARTMENT OF PUBLIC WORKS

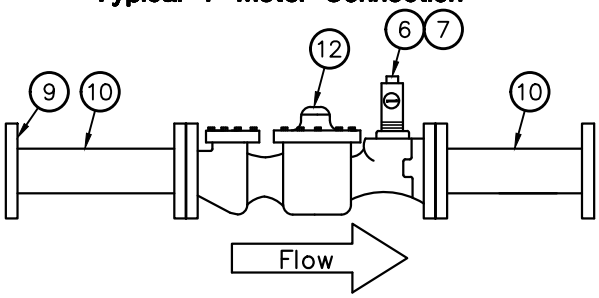
LIST OF MATERIALS

1. 90° DI Elbow, FLG x MJ
2. Restraint device
3. DIP Spool, Class 53, FLG (order to size)
4. Compact DI Tee, FLG
5. 2" x 9" OD Reducing flange
6. 2" Brass ball valve, M–IPT x F–IPT with locking ear, 360° turn
7. 2" Brass plug, IPT
8. Resilient–seated gate valve with hand wheel, non–rising stem, FLG
9. Restrained flange adapter
10. DIP Spool, Class 53, FLGxPE (order to size)
11. 4" x 3" x 8"L DI concentric reducer, FLG
12. Water Meter
13. Reduced pressure principle backflow assembly.
14. 90° Compact DI Elbow, FLG
15. Adjustable pipe saddle support
16. Concrete pad, 4" Slab, Class 520–C–2500 (light broom finish), 2% slope towards sidewalk
17. ⅛" Full face inserted rubber flange gasket

Typical 3" Meter Connection



Typical 4" Meter Connection



NOTES

1. Refer to the City of Fullerton's Approved Materials List for approved manufacturers and model numbers.
2. Install water meter per manufacturer's specifications.
3. All steel bolts and nuts to have electrodeposited coating of zinc.
4. See Section 5–10 of these specifications for painting requirements.
5. Large meter assemblies installed in easements, roads and streets without curbs or with rolled curbs shall be protected by guard posts as shown on plans or as directed by Engineer per Standard Drawing 615.
6. Location of the large meter/backflow device assembly, and all parts must be approved by Engineer prior to installation. Failure to comply may result in project delays to correct all unacceptable/unapproved work. A wye strainer or hose bibb are not allowed to be installed on backflow assembly piping.
7. New backflow must be tested by a Orange County Certified backflow tester.

3" & LARGER WATER METER INSTALLATION

CITY OF FULLERTON CALIFORNIA

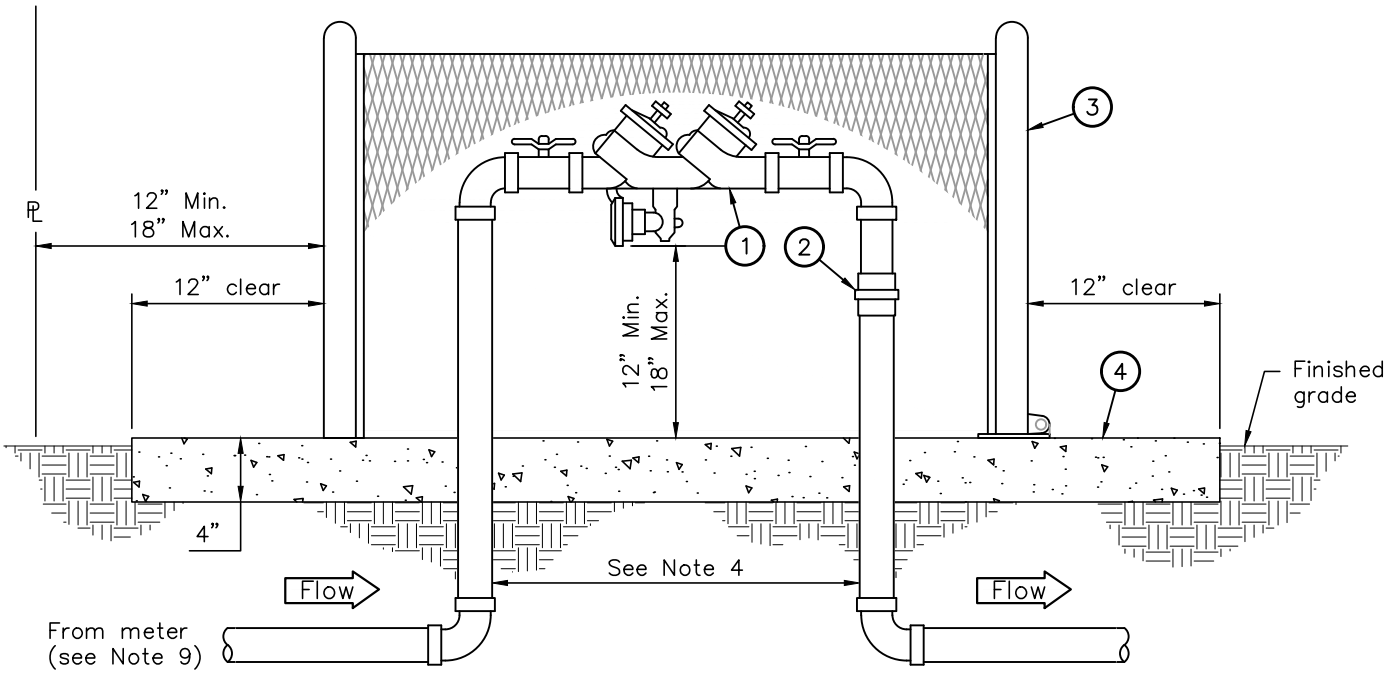
REVISIONS			
NO.	DATE	NO.	DATE
1	12/01/00	4	02/28/17
2	02/13/13	5	04/20/22
3	02/29/16		

5/9/2022
CITY ENGINEER — DATE

5/24/2022
PUBLIC WORKS DIRECTOR — DATE

STANDARD DETAIL
603
SHEET 2 OF 2

DEPARTMENT OF PUBLIC WORKS



LIST OF MATERIALS

1. Reduced pressure backflow prevention assembly, USC approved type
2. Brass union required if threaded fittings (elbows) are used
3. Backflow prevention assembly enclosure per manufacturer's recommendations (see Notes 2 and 3)
4. Concrete pad, Class 520–C–2500
   Must be constructed to ensure 12" clearance around the backflow enclosure

NOTES

1. Refer to the City of Fullerton's Approved Materials List for approved manufacturers and model numbers.
2. See Section 3 of these Specifications for approved testing requirements, placement of backflow assemblies, and other requirements.
3. Proposed location of the backflow device, protective enclosure and all parts must be approved by the Engineer prior to installation. Failure to comply may result in project delays to correct all unaccepted/unapproved work.
4. All fittings and pipe shall be brass or copper with either IPT or soldered connections, respectively.
5. A wye strainer or hose bibb is not allowed to be installed on backflow assembly piping.
6. A pressure reducer, if required, is only permitted at the building and not on the backflow assembly.
7. There shall be no connections between the meter and the backflow assembly.
8. Final placement of the backflow prevention enclosure must be at least 12" behind the public right–of–way.
9. If a new meter is installed, pipe shall be copper from meter to backflow. If there is existing meter, piping may remain per plumbing code.
10. Backflow size to match service size.
11. New backflow must be tested by a certified backflow device tester as possessing a valid certification issued by the Orange County Environmental Health Agency and an active Fullerton business license.

¾" THROUGH 2½" REDUCED PRESSURE BACKFLOW PREVENTION ASSEMBLY

STANDARD DETAIL

604

SHEET 1 OF 1

REVISIONS				
NO.	DATE	NO.	DATE
1	02/29/16	4	04/30/18
2	03/31/16	5	09/24/19
3	02/28/17	6	04/20/22

5/9/2022
CITY ENGINEER — DATE

5/24/2022
PUBLIC WORKS DIRECTOR — DATE

CITY OF FULLERTON CALIFORNIA

DEPARTMENT OF PUBLIC WORKS

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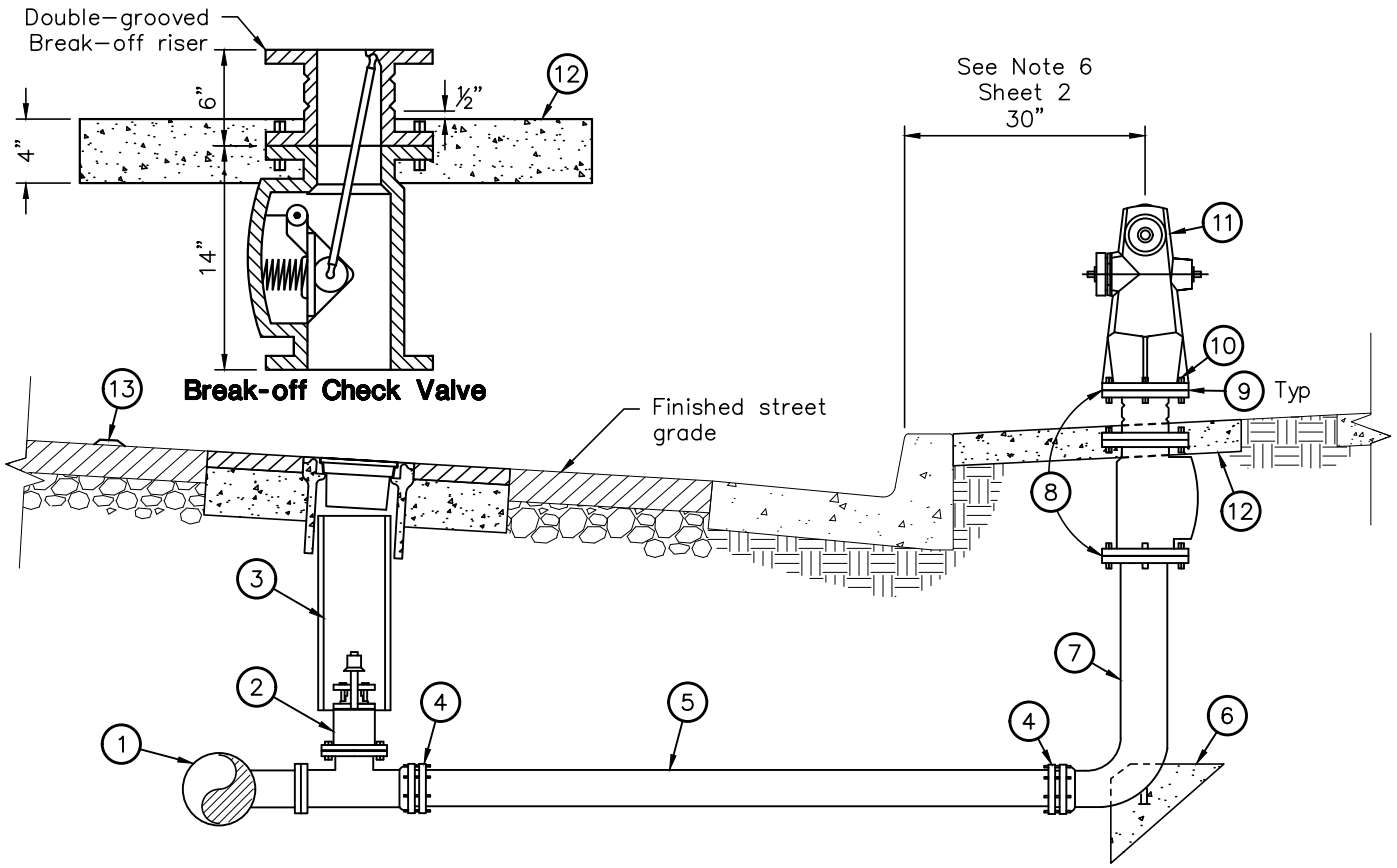
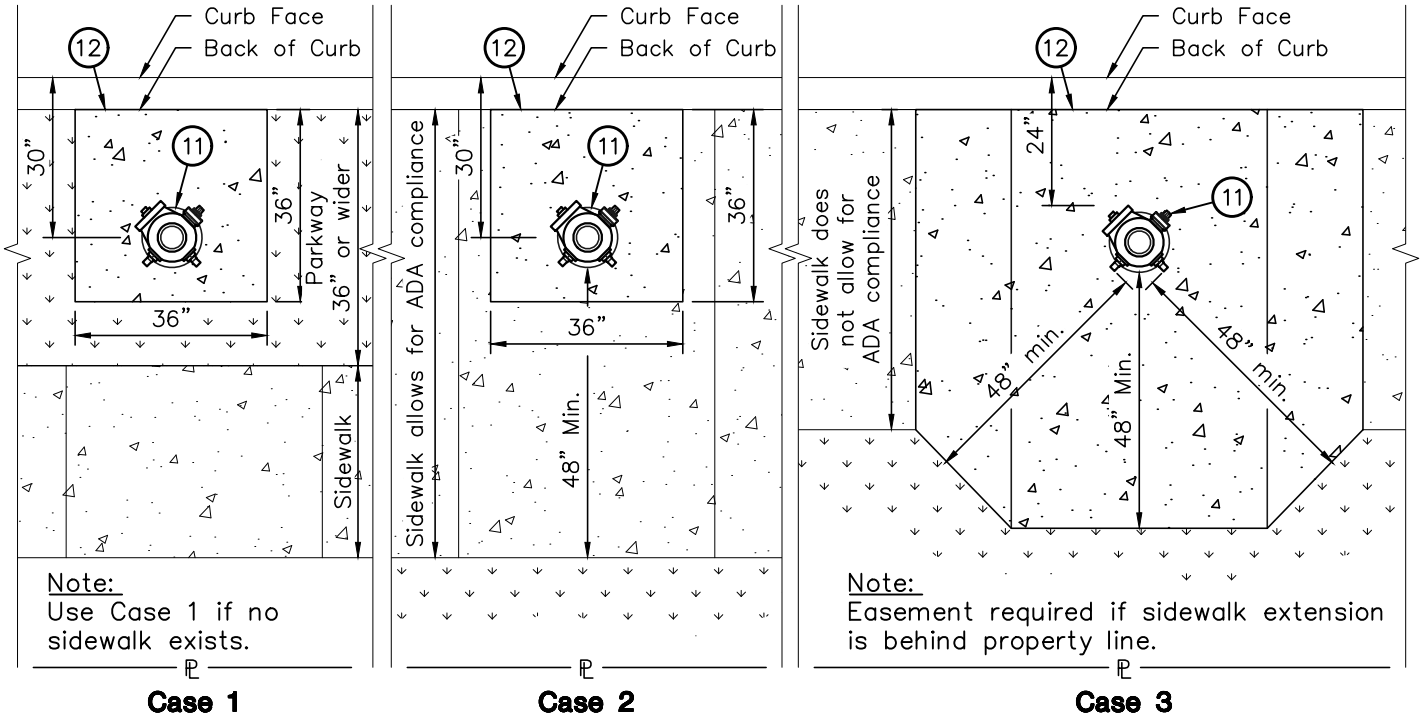




STANDARD FIRE HYDRANT INSTALLATION

STANDARD DETAIL	REVISIONS			
610	NO.	DATE	NO.	DATE
	1	07/15/94	4	02/29/16
	2	12/01/00	5	04/30/18
SHEET 1 OF 2	3	02/11/13	6	04/20/22

5/9/2022
CITY ENGINEER — DATE

Meg McWade
5/24/2022
PUBLIC WORKS DIRECTOR — DATE

CITY OF FULLERTON CALIFORNIA

DEPARTMENT OF PUBLIC WORKS

LIST OF MATERIALS

1. Tee, main size x 6" (MJ x MJ x FLG) for new main installation
   Tapping sleeve, for existing main
2. 6" gate valve (FLG x MJ) resilient–seated
3. Valve box per Standard Drawing 650 and 651
4. Restraint device
5. 6" ductile iron pipe, thickness class 52, with restrained joints
6. Thrust block (see Note 9)
7. 6" x required length DI fire hydrant bury – Restrained MJ Inlets
8. Break–off check valve, see detail on Sheet 1.
9. Gasket
10. Solid bolt, hex head 5/8" x 3" and nut, electrodeposited coating of zinc
11. Wet barrel fire hydrant
12. 4" concrete pad, class 520–C–2500 (see Note 3)
13. 2–way reflecting blue pavement marker (see Note 7)

NOTES

1. Refer to the City of Fullerton's Approved Materials List for approved manufacturers and model numbers.
2. See Section 5–03.04 of these Specifications for polyethylene protective wrapping requirements.
3. Top of concrete pad must match the top of curb and top of sidewalk.
4. See Section 5–10 of these Specifications for hydrant painting requirements.
5. Hydrant cast iron caps and valve stems shall have 1 1/8" pentagon operation nuts.
6. Fire hydrant location:
   A. Hydrant a minimum 7' Clear from BCR, ECR or top of "X" of driveways.
   B. Contractor to verify with Engineer and Fire Department the exact fire hydrant location prior to construction.
7. Two–way reflecting blue pavement marker location:
   A. Two–way streets or roads:
   Place markers 6" from edge of painted centerline on the side nearest the fire hydrant. If the street has no centerline, place the marker 6" from the approximate center of the roadway on the side nearest the hydrant.
   B. Streets with left turn lane at intersection:
   Place markers 6" from edge of painted white channelizing line on the side nearest the hydrant.
   C. Streets with continuous two–way left turn lane:
   Place markers 6" from the edge of the painted yellow barrier line on the side nearest the fire hydrant.
8. Fire hydrants installed in locations without curbs or with rolled curbs or as directed by the City Engineer shall be protected by guard posts per Standard Drawing 615.
9. Thrust blocks maybe required when connecting to an existing hydrant lateral. Thrust blocks are not required when hydrant lateral is fully restrained.
10. Contractor shall use additional restrained bends as necessary to avoid existing or proposed utilities.
11. Fire hydrants must have a tag from the manufacturer that states it meets Fullerton's specifications.

STANDARD FIRE HYDRANT INSTALLATION

CITY OF FULLERTON CALIFORNIA

REVISIONS			
NO.	DATE	NO.	DATE
1	07/15/94	4	02/29/16
2	12/01/00	5	04/30/18
3	02/11/13	6	04/20/22

CITY ENGINEER — 5/9/2022 DATE

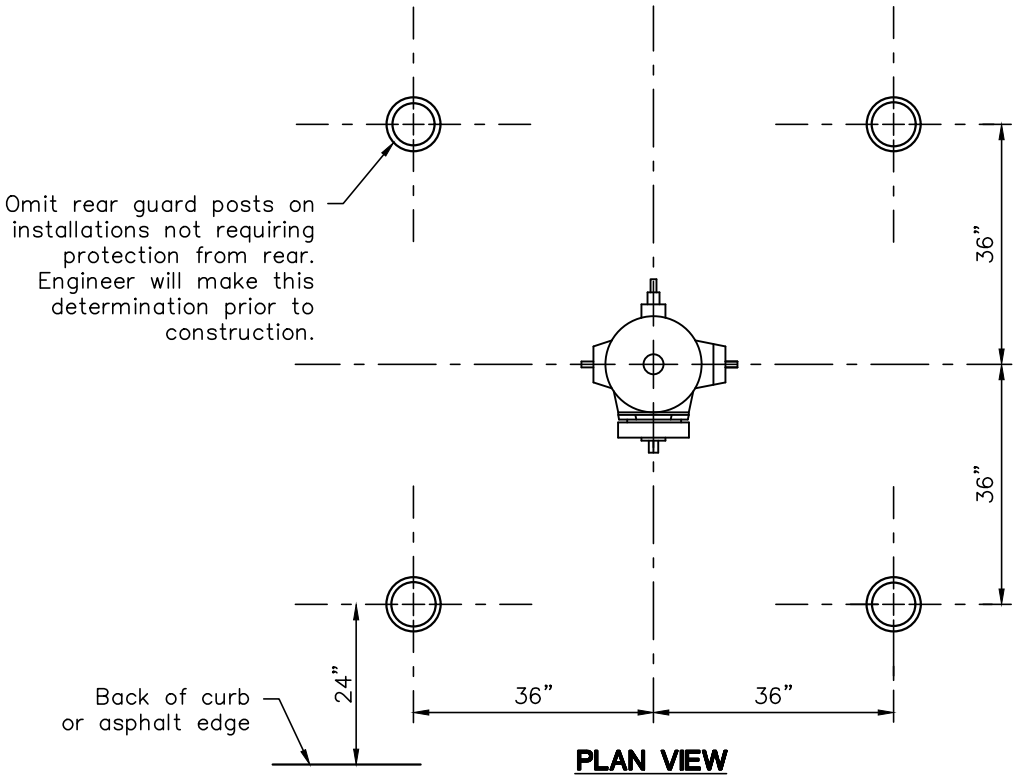
PUBLIC WORKS DIRECTOR — 5/24/2022 DATE

STANDARD DETAIL

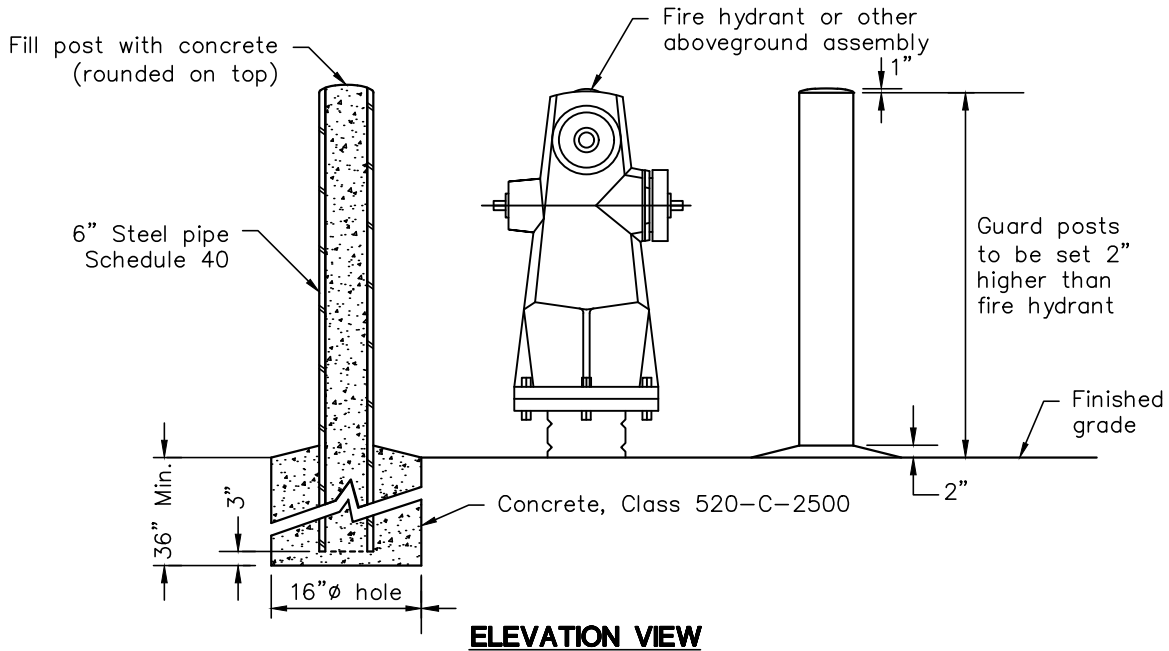
610

SHEET 2 OF 2

DEPARTMENT OF PUBLIC WORKS



PLAN VIEW



ELEVATION VIEW

NOTES

1. See Section 5–10 of these Specifications for painting requirements.
2. Post shall be non–modified type.
3. Thread shall be buried.

GUARD POST

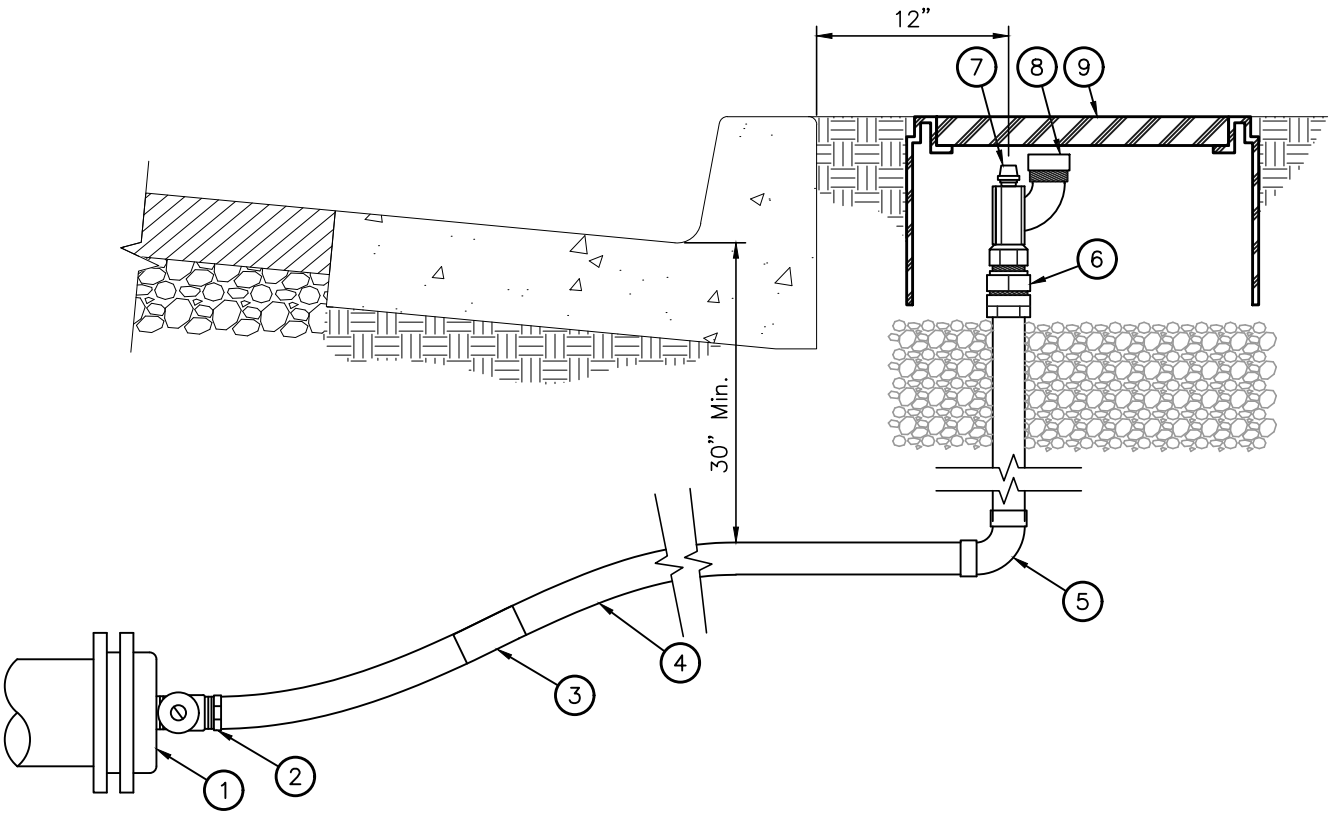
STANDARD DETAIL	REVISIONS			
615	NO.	DATE	NO.	DATE
	1	01/26/94	4	02/29/16
	2	02/12/96	5	04/20/22
SHEET 1 OF 1	3	12/01/00		

CITY ENGINEER — 5/9/2022 DATE

PUBLIC WORKS DIRECTOR — 5/24/2022 DATE

CITY OF FULLERTON CALIFORNIA

DEPARTMENT OF PUBLIC WORKS



LIST OF MATERIALS

1. Main Size x 2" Tapped MJ Cap
2. 2" Corp stop, M–IPTxCompression
3. 2" Copper coupling, compression
4. 2" Copper pipe (Type K, soft drawn)
5. 2" 90° Copper elbow, compression
6. 2" Brass coupling, M–IPTxCompression
7. 2" Blow–off ball valve, F–IPTxM–IPT
8. 2" Cap, F–IPT
9. 1" Meter box per Standard Drawing 601

NOTES

1. Refer to the City of Fullerton's Approved Materials List for approved manufacturers and model numbers.

2" BLOW-OFF ASSEMBLY

REVISIONS				
NO.	DATE	NO.	DATE
1	07/15/94	4	04/20/22
2	12/01/00		
3	02/29/16		

CITY ENGINEER — DATE: 5/9/2022

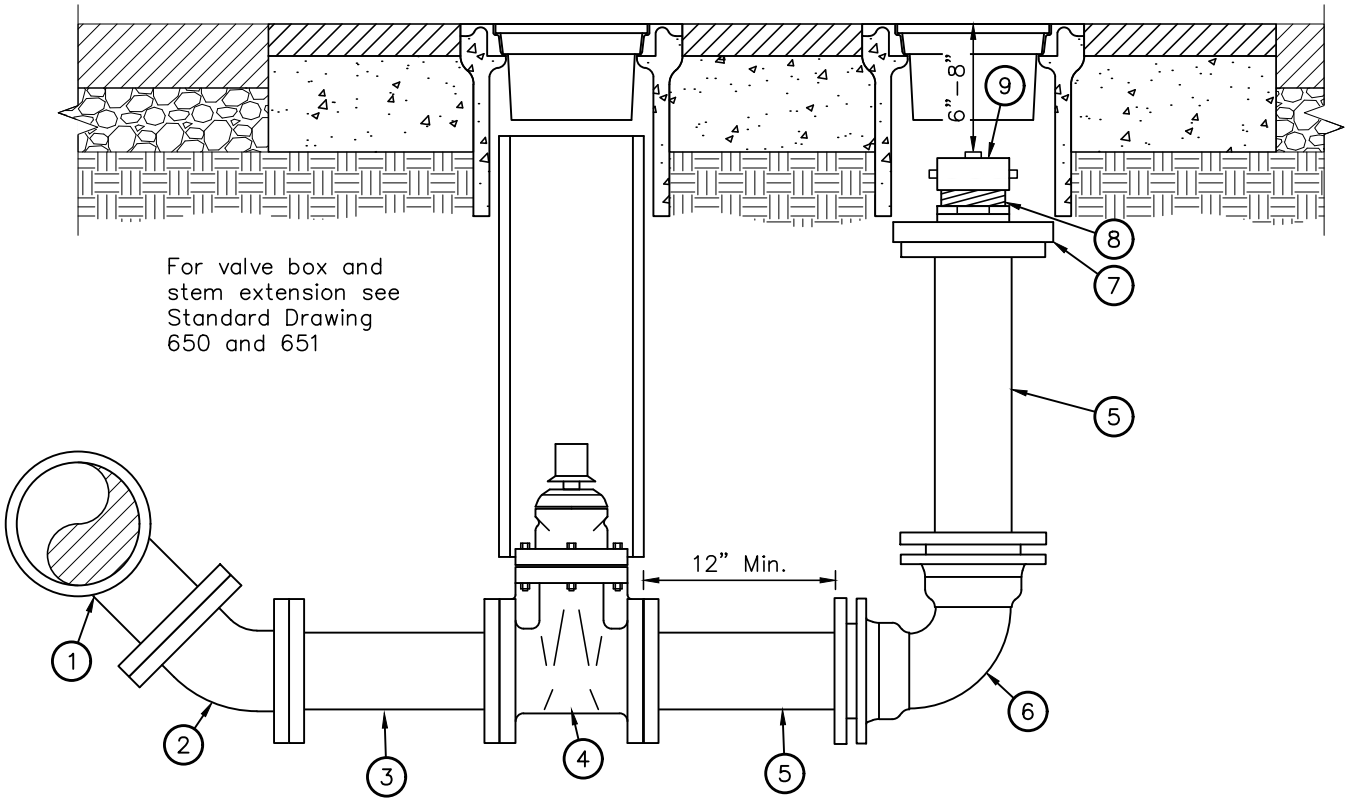
PUBLIC WORKS DIRECTOR — DATE: 5/24/2022

STANDARD DETAIL

621

SHEET 1 OF 1

DEPARTMENT OF PUBLIC WORKS



LIST OF MATERIALS

1. Main size x 4" DI tee, FLG
2. 4" DI 45° elbow, FLG
3. 4" DI pipe or PVC DR14 pipe, FLG, cut to length
   Spool may be omitted and valve shall be flanged to 45° elbow if conditions allow
4. 4" resilient–seat gate valve, FLG
5. 4" DI pipe FLG x PE or PVC DR14 pipe PE x PE with flange adapter, cut to length
6. 4" DI 90° elbow, MJ
7. 4" Companion threaded flange
8. 4" MNPT x MNST brass adapter
9. 4" NST brass cap

NOTES

1. Refer to the City of Fullerton's Approved Materials List for approved manufacturers and model numbers.
2. Pipe material to match main material or as directed by Engineer.

4" SAND BLOW-OFF ASSEMBLY

STANDARD DETAIL

624

SHEET 1 OF 1

REVISIONS			
NO.	DATE	NO.	DATE
1	01/26/94	4	02/26/17
2	12/01/00	5	09/24/19
3	02/29/16	6	04/20/22

CITY ENGINEER — 5/9/2022 DATE

PUBLIC WORKS DIRECTOR — 5/24/2022 DATE

CITY OF FULLERTON CALIFORNIA

DEPARTMENT OF PUBLIC WORKS

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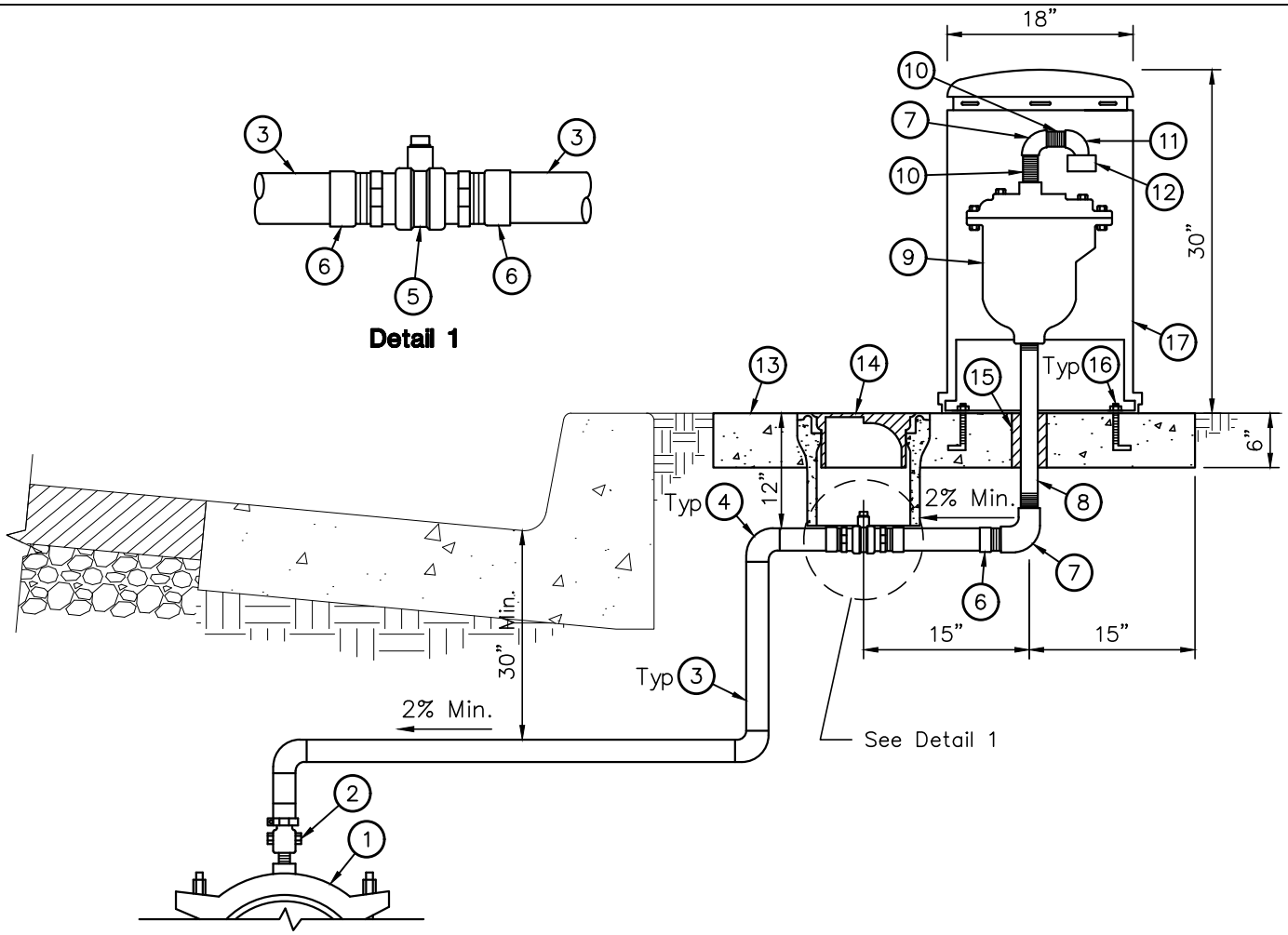
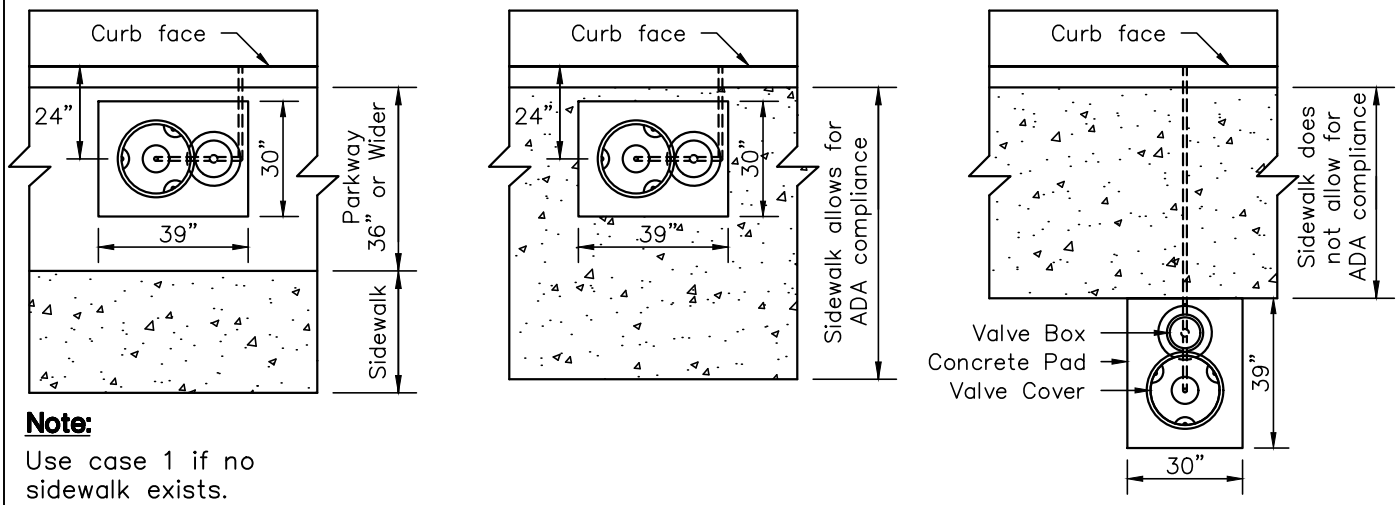


Detail 1



Note:
Use case 1 if no sidewalk exists.

℄ ℄ ℄

Case 1 **Case 2** **Case 3**

1" AND 2" COMBINATION AIR RELEASE VALVE ASSEMBLY

STANDARD DETAIL

627

SHEET 1 OF 2

REVISIONS			
NO.	DATE	NO.	DATE
1	07/15/94	4	04/30/18
2	02/29/16	5	09/24/19
3	02/28/17	6	04/20/22

5/9/2022
CITY ENGINEER DATE

5/24/2022
PUBLIC WORKS DIRECTOR DATE

CITY OF FULLERTON CALIFORNIA

DEPARTMENT OF PUBLIC WORKS

LIST OF MATERIALS

1. Double strap saddle, see Standard Drawing 601 (1") or 602 (2")
2. Corporation stop, see Standard Drawing 601 (1") or 602 (2")
3. 1" or 2" copper tubing, type K, soft
4. 1" or 2" 90° copper compression elbow
5. Bronze ball valve
6. 1" or 2" copper adapter, M–IPT x compression
7. 1" or 2" brass 90° elbow, F–IPT
8. 1" or 2" rigid brass pipe, M–IPT
9. 1" or 2" combination air release valve
10. 1" or 2" brass nipple (order to fit)
11. 1" or 2" brass street elbow
12. Air vent screen/strainer
13. Concrete pad, Class 520–C–2500), (see Note 4 on Sheet 2)
14. Valve box and riser per Standard Drawing 650
15. 10 mil PE wrap around pipe
16. ½" x 5"L anchor bolt with stainless washers, electrodeposited coating of zinc, 3 each
17. Two–piece polyethylene enclosure

NOTES

1. Refer to the City of Fullerton's Approved Materials List for approved manufacturers and model numbers.
2. Assemblies installed in easements, roads and streets without curbs or with rolled curbs shall be protected with guard posts per Standard Drawing 615.
3. Contractor is to verify with Engineer the exact assembly location prior to construction.
4. Corporation stop to be installed at crown of pipe.
5. Top of concrete pad must match the top of curb and top of sidewalk.
6. Assembly shall be located a minimum of 7' from BCR, ECR or driveway approaches.
7. All internal and external ferrous metal surfaces shall be epoxy coated.
8. If assembly extends beyond the City right–of–way, an easement shall be obtained. Otherwise the assembly shall be placed at a different location.

1" AND 2" COMBINATION AIR RELEASE VALVE ASSEMBLY

CITY OF FULLERTON CALIFORNIA

REVISIONS			
NO.	DATE	NO.	DATE
1	07/15/94	4	04/30/18
2	02/29/16	5	09/24/19
3	02/28/17	6	04/20/22

CITY ENGINEER — 5/9/2022 DATE

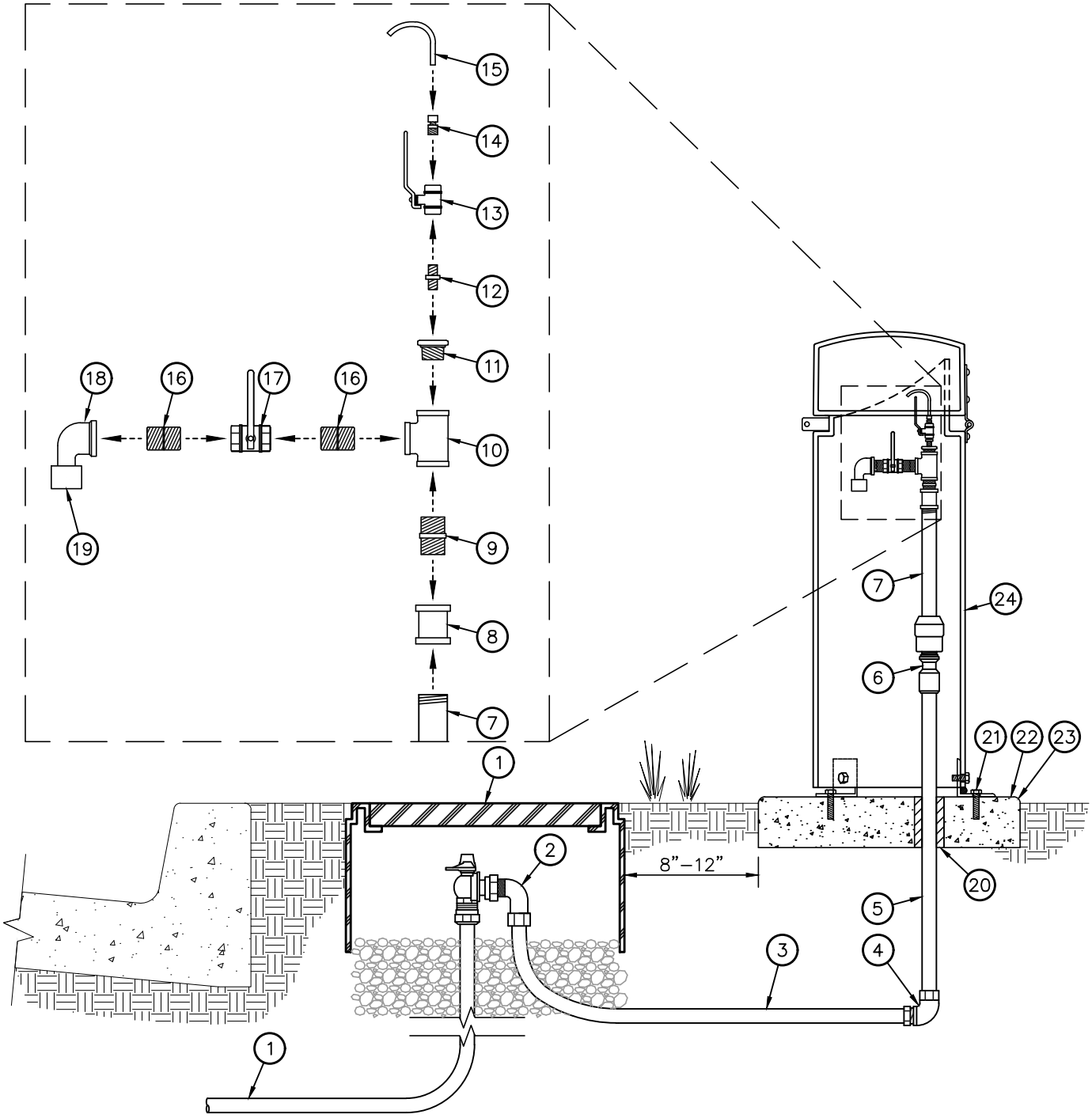
PUBLIC WORKS DIRECTOR — 5/24/2022 DATE

STANDARD DETAIL

627

SHEET 2 OF 2

DEPARTMENT OF PUBLIC WORKS



WATER QUALITY SAMPLING STATION

STANDARD DETAIL

630

SHEET 1 OF 2

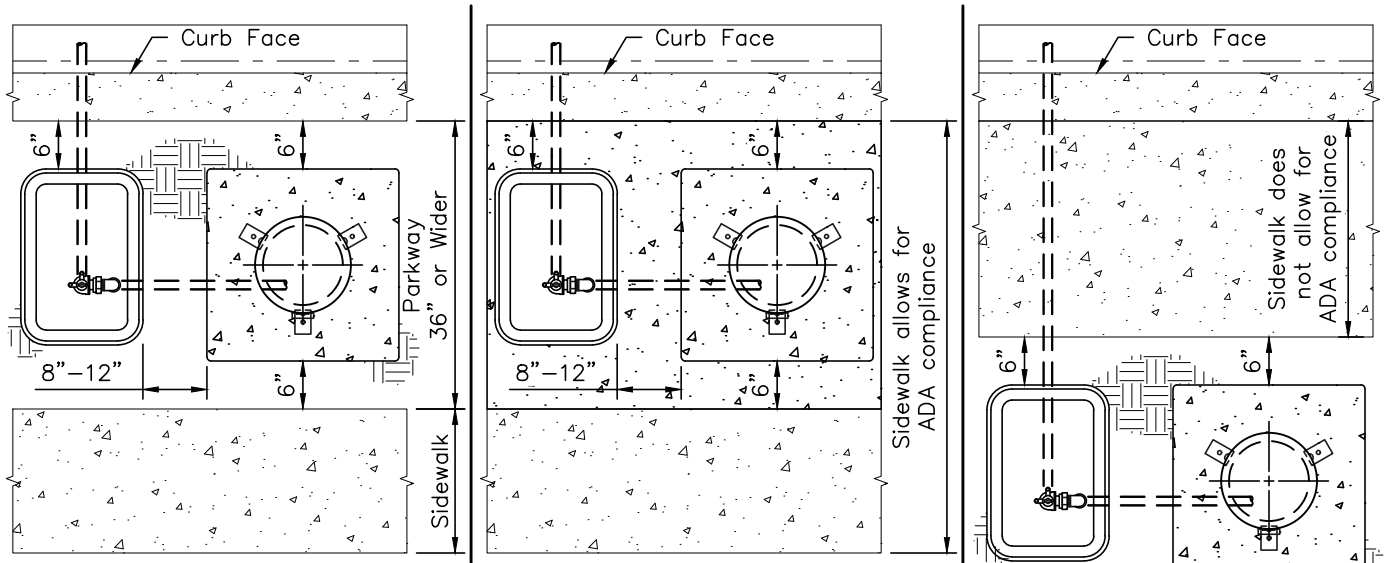
REVISIONS			
NO.	DATE	NO.	DATE
1	12/01/00	4	02/28/17
2	03/22/06	5	09/24/19
3	02/29/16	6	04/20/22

5/9/2022
CITY ENGINEER — DATE

Meg McWade
5/24/2022
PUBLIC WORKS DIRECTOR — DATE

CITY OF FULLERTON CALIFORNIA

DEPARTMENT OF PUBLIC WORKS



Note:
Use case 1 if no sidewalk exists.

℄ ℄ ℄

Case 1 **Case 2** **Case 3**

LIST OF MATERIALS

1. Service saddle, 1" corporation stop, 1" copper tubing, 1" angle meter valve, 1¼" x 1" meter adapter, and 1" Meter box assembly per standard drawing 601
2. 1" – 90° elbow, compression x M–IPT
3. 1" Copper tubing per standard drawing 601
4. 1" – 90° elbow, compression x F–IPT
5. 1" Rigid brass pipe, M–IPT
6. 1" conductive compression connection, FIP x FIP
7. 1" x 12" brass pipe MIP x MIP
8. 1" x ¾" brass reducer FIP x FIP
9. ¾" x 1½" brass nipple
10. ¾" brass tee
11. ¾" x ¼" MIP x FIP brass bushing
12. ¼" brass close nipple
13. ¼" FIP x FIP brass ball valve with handle
14. ¼" x ¼" brass coupling, compression x MIP
15. ¼" copper tube, 4½" length
16. ¾" brass close nipple
17. ¾" FIP x FIP brass ball valve with handle
18. ¾" x ¾" MIP x FIP 90° brass bend
19. ¾" air vent screen
20. 10 mil PE wrap around pipe
21. ⅜" x 5" SS eye bolt, SS lock washer, ⅜" SS nut (typical)
22. Concrete pad, 24" x 24" x 4" slab, Class 520–C–2500 (light broom finish)
23. Finish with ½" radius all around
24. 12" x 36" water sampling station enclosure

NOTES

1. Assemblies installed in easements, roads and streets without curbs or with rolled curbs shall be protected with guard posts per Standard Drawing 615.

WATER QUALITY SAMPLING STATION

CITY OF FULLERTON CALIFORNIA

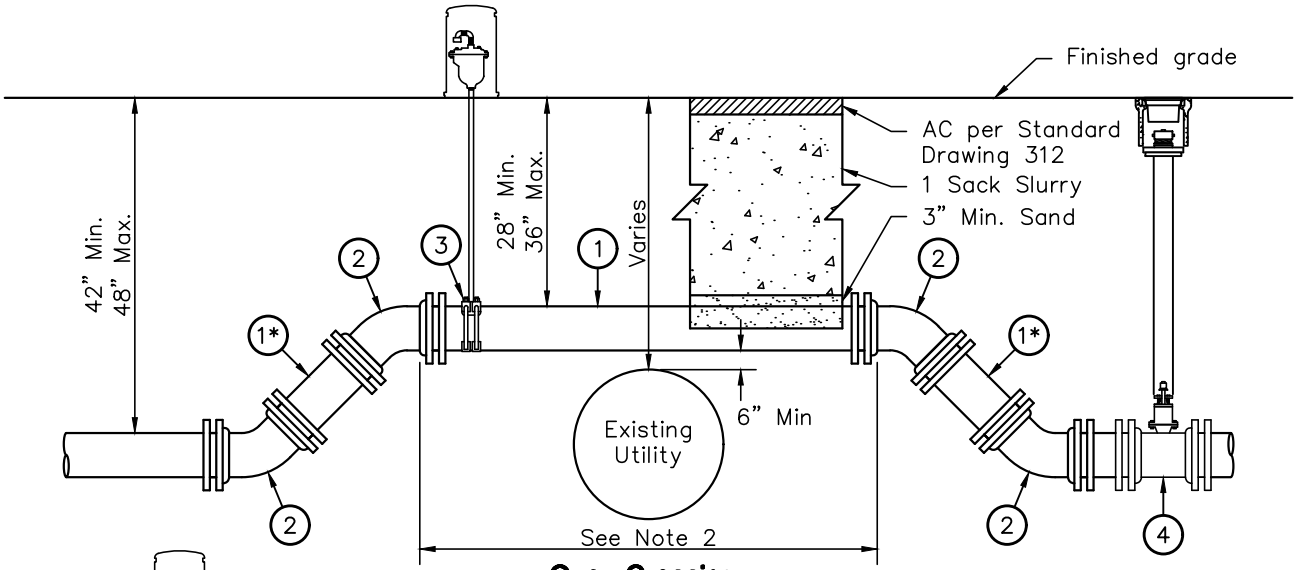
REVISIONS			
NO.	DATE	NO.	DATE
1	12/01/00	4	02/28/17
2	03/22/06	5	09/24/19
3	02/29/16	6	04/20/22

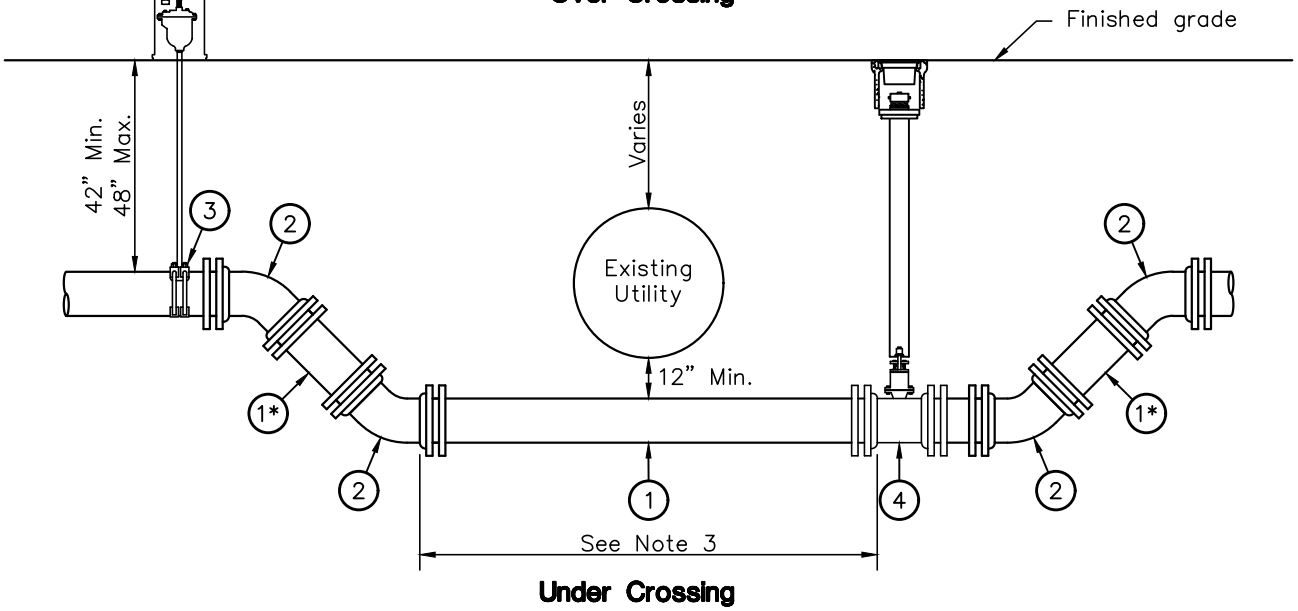
5/9/2022
CITY ENGINEER DATE

5/24/2022
PUBLIC WORKS DIRECTOR DATE

STANDARD DETAIL
630
SHEET 2 OF 2

DEPARTMENT OF PUBLIC WORKS





LIST OF MATERIALS

1. DI Class 53 or PVC DR14 pipe
1* DI or PVC pipe, 18" min
2. 45° DI Elbow, restrained MJ
3. Air Release Valve Assembly per Standard Drawing 627 as required by the Engineer
4. 4" Sand Blow-Off Assembly per Standard Drawing 624 as required by the Engineer

NOTES

1. Use of over crossing must be approved by the City Inspector.
2. For over crossing sewer and storm drains, minimum pipe length is 8' centered on the utility. For all other utilities, minimum pipe length is 4' centered on the utility. No joints in pipe.
3. For under crossing sewer and storm drains, minimum pipe length is one full stick of pipe (18' for D.I., 20' for PVC) centered on the utility. For all other utilities, minimum pipe length is 4' centered on the utility. No joints in pipe.
4. See Section 5-03.04 of these Specifications for polyethylene protective wrapping requirements and Section 5-03.05 of these Specifications for protection of metal surfaces requirements.

UTILITY CROSSING

STANDARD DETAIL

631

SHEET 1 OF 1

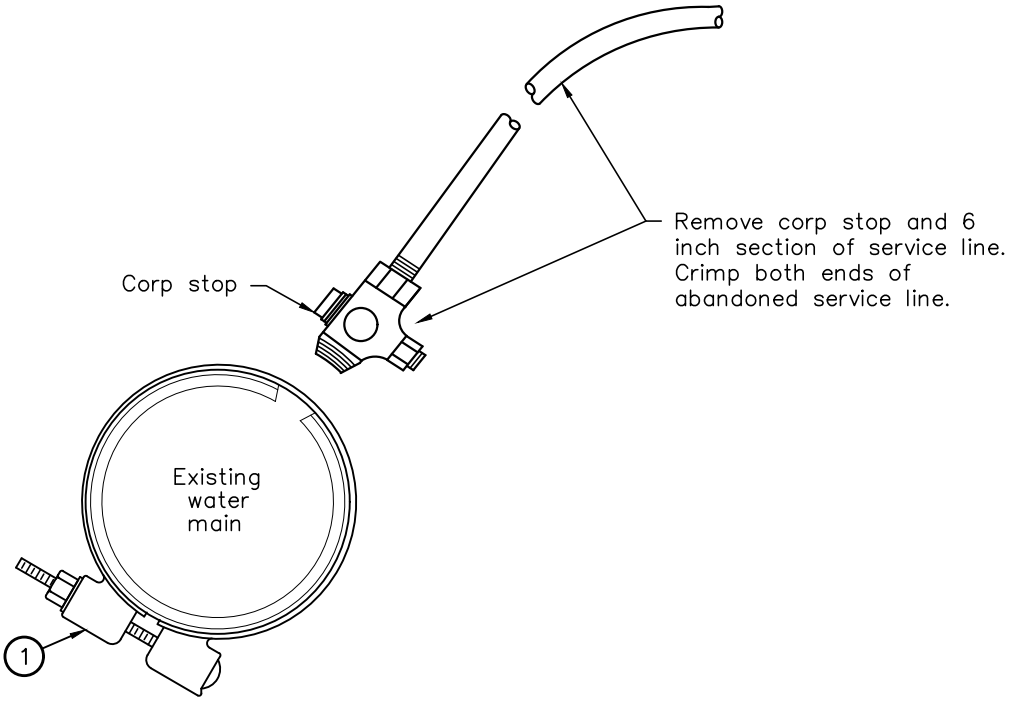
REVISIONS			
NO.	DATE	NO.	DATE
01	02/28/17		
02	04/20/22		

CITY ENGINEER — 5/9/2022 DATE

PUBLIC WORKS DIRECTOR — 5/24/2022 DATE

CITY OF FULLERTON CALIFORNIA

DEPARTMENT OF PUBLIC WORKS



LIST OF MATERIALS

(1) Stainless steel repair clamp

NOTES

1. Refer to the City of Fullerton's Approved Materials List for approved manufacturers and model numbers.
2. City of Fullerton street excavation and water permit or approved set of water plans are required from the Public Works Department – Engineering Division (second floor of City Hall).
3. Customer must close account with Customer Service at (714) 738–6890. Contact the Water Meter Shop before water service is to be abandoned or construction begins. Water meter will be removed by City staff upon scheduling.
4. Location of corporation stop to be determined by Contractor.
5. Remove abandoned angle meter stop.
6. Water meter box to be removed:
   a. Parkway – Fill hole with clean dirt and grade level.
   b. Sidewalk – Sawcut to the closest score mark on each side of meter box and pour sidewalk to meet City Standards.
6. See Section 5–08.02 of these Specifications for shutdown of existing water main.

2" AND SMALLER SERVICE LATERAL ABANDONMENT

REVISIONS			
NO.	DATE	NO.	DATE
1	02/12/96	4	04/20/22
2	12/01/00		
3	02/29/16		

CITY ENGINEER — 5/9/2022 DATE

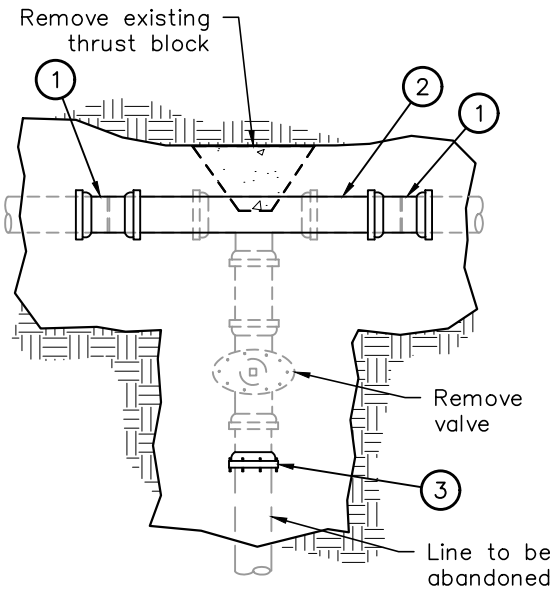
PUBLIC WORKS DIRECTOR — 5/24/2022 DATE

STANDARD DETAIL

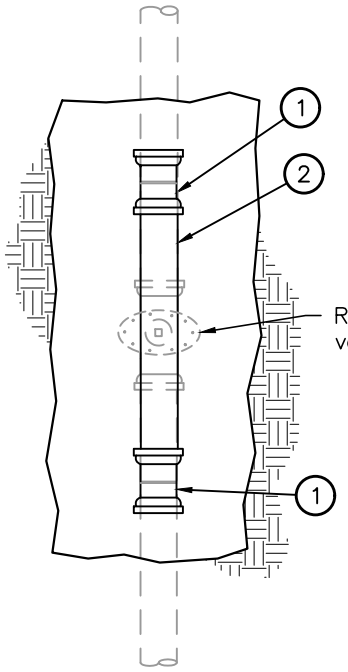
646

SHEET 1 OF 1

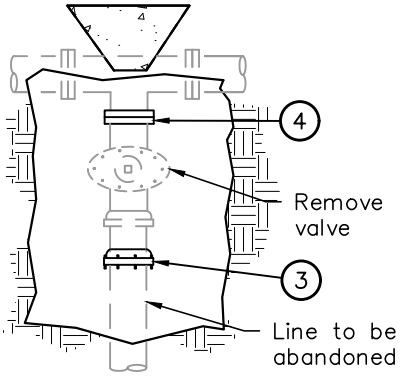
DEPARTMENT OF PUBLIC WORKS



Removal of existing non–flanged tee and valve



Removal of existing inline valve



Removal of existing flanged valve

LIST OF MATERIALS

1. DI restrained coupling
2. Match existing pipe material, cut to fit
3. MJ cap
4. DI blind flange

NOTES

1. Refer to the City of Fullerton's Approved Materials List for approved manufacturers and model numbers.
2. See Section 5–03.04 of these Specifications for polyethylene protective wrapping requirements.
3. Pothole existing valve and tee connection prior to cutting pipe, verify OD of pipe. Contractor shall excavate 1 working day in advance of abandonment and plate excavation per Engineer.
4. Cut existing pipe, remove valve, valve box, and thrust blocks as required. Install pipe with restrained couplings, or as directed by Engineer.
5. An existing flange valve may be removed and a blind flange installed if approved by Engineer. When existing flange bolts are in poor condition and/or the existing tee run joints are caulked, then removal of tee and valve is required per detail above.

4" THROUGH 12" ABANDONMENT OF FITTINGS AND VALVES

STANDARD DETAIL

648

SHEET 1 OF 1

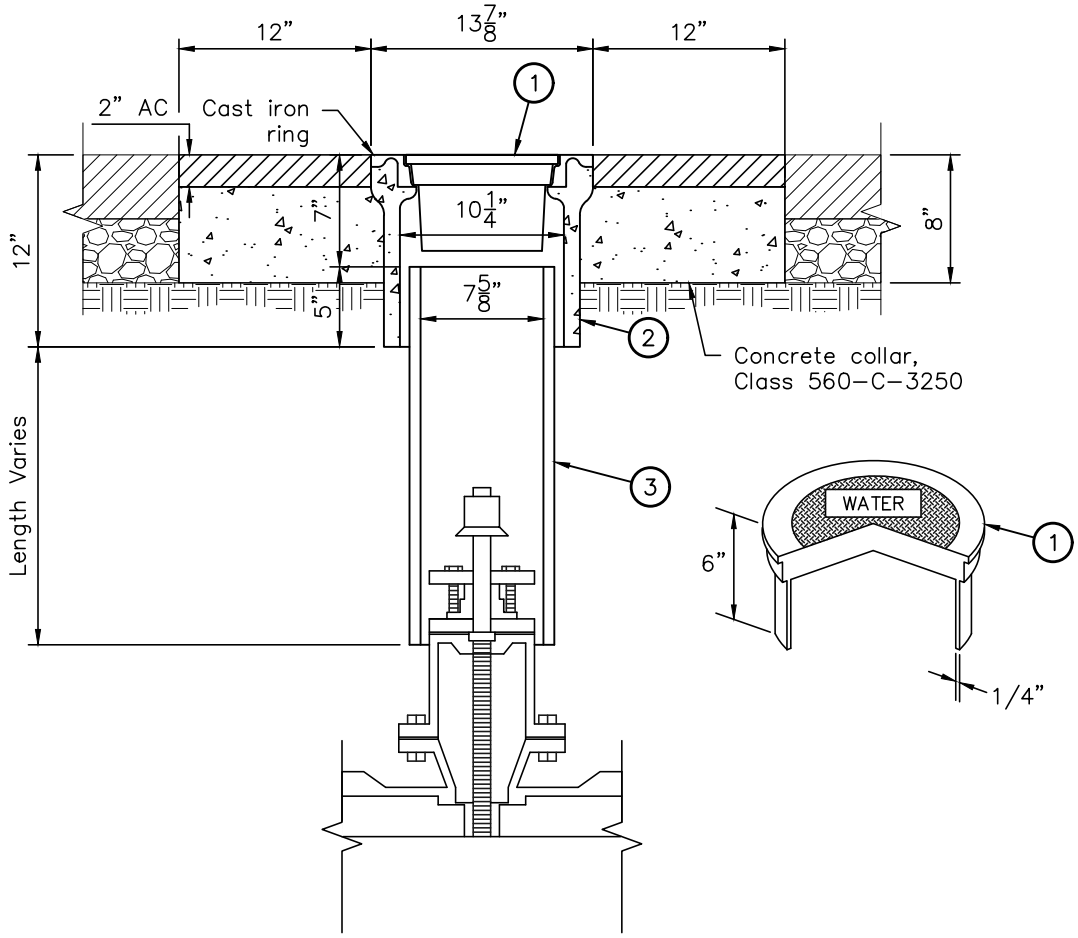
REVISIONS			
NO.	DATE	NO.	DATE
1	12/01/00	4	04/20/22
2	02/29/16		
3	04/30/18		

5/9/2022
CITY ENGINEER — DATE

5/24/2022
PUBLIC WORKS DIRECTOR — DATE

CITY OF FULLERTON CALIFORNIA

DEPARTMENT OF PUBLIC WORKS



LIST OF MATERIALS

1. Cast iron cover with standard cover marking "WATER"
2. Valve box
3. Riser Pipe – 8" PVC (C-900) pipe

NOTES

1. Refer to the City of Fullerton's Approved Materials List for approved manufacturers and model numbers.
2. Backfill and resurface per Section 4 of these Specifications and as directed by Engineer.
3. Valve stem extensions required if depth to valve nut exceeds 4 feet, per Standard Drawing 651. The City shall approve all extensions.

STANDARD VALVE BOX ASSEMBLY

REVISIONS			
NO.	DATE	NO.	DATE
1	02/12/96	4	02/29/16
2	12/01/00	5	02/28/17
3	02/11/13	6	04/20/22

CITY ENGINEER — DATE: 5/9/2022

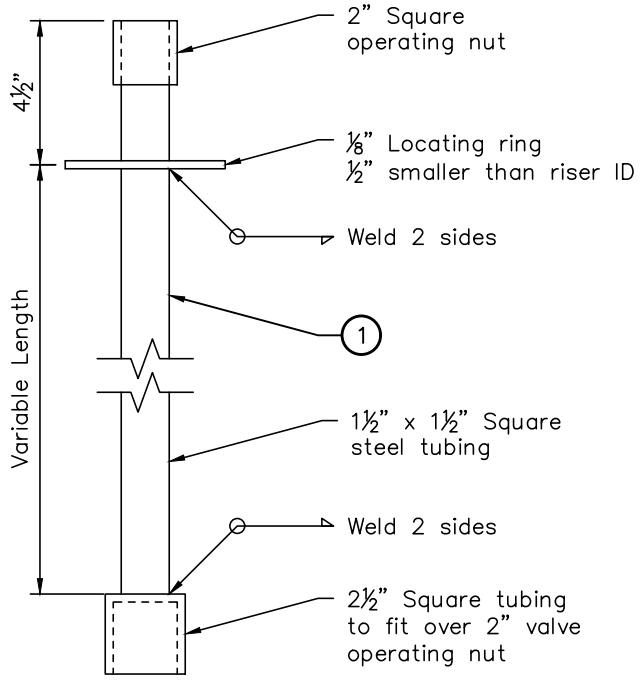
PUBLIC WORKS DIRECTOR — DATE: 5/24/2022

STANDARD DETAIL

650

SHEET 1 OF 1

DEPARTMENT OF PUBLIC WORKS



LIST OF MATERIALS

(1) Steel valve stem extension

NOTES

1. Refer to the City of Fullerton's Approved Materials List for approved manufacturers and model numbers.
2. Provide valve stem extension as required by Engineer.
3. Terminate extension 24" to 36" from finished grade.
4. No valve stem extension shall be less than 2 feet in length.
5. Fabricate extension to field measurement.
6. Provide additional locating ring when distance to bottom socket exceeds 5 feet.
7. The valve stem extension shall be of solid design, pinned couplers are unacceptable.
8. Stem shall not be pinned or attached by any other means to the valve nut.
9. See Section 5–10 of these Specifications for painting requirements.

STEEL VALVE STEM EXTENSION

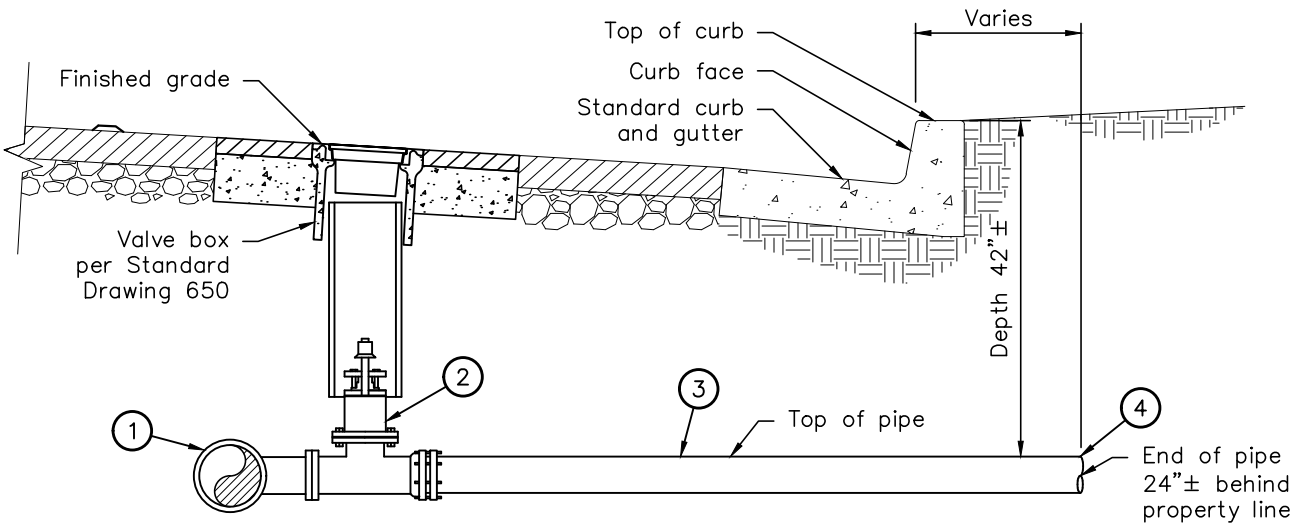
STANDARD DETAIL	REVISIONS			
	NO.	DATE	NO.	DATE
651	1	04/30/18	4	04/20/22
	2	02/29/16		
SHEET 1 OF 1	3	12/01/00		

CITY ENGINEER — 5/9/2022 DATE

PUBLIC WORKS DIRECTOR — 5/24/2022 DATE

CITY OF FULLERTON CALIFORNIA

DEPARTMENT OF PUBLIC WORKS



LIST OF MATERIALS

1. Tee (main size x lateral size) (MJ x MJ x FLG) for new main installation. For existing mains use stainless steel tapping sleeves
2. Gate valve, (FLG x MJ) (pipe size)
3. DI pipe
4. If above ground service installation is not immediately installed with lateral installation, then 2" blow–off assembly will be required per Standard Drawing 621

NOTES

1. Refer to the City of Fullerton's Approved Materials List for approved manufacturers and model numbers.
2. All mechanical and push joints between main line and above ground service installation shall be restrained.
3. 45° elbows (M.J.) may be necessary to attain desired elevation behind curb. When fittings are needed to change elevation, restrain per Section 4–04 of these Specifications.

4" THROUGH 12" SERVICE LATERAL AND NEW MAIN INSTALLATION

REVISIONS			
NO.	DATE	NO.	DATE
1	12/01/00		
2	02/29/16		
3	04/20/22		

CITY ENGINEER — DATE: 5/9/2022

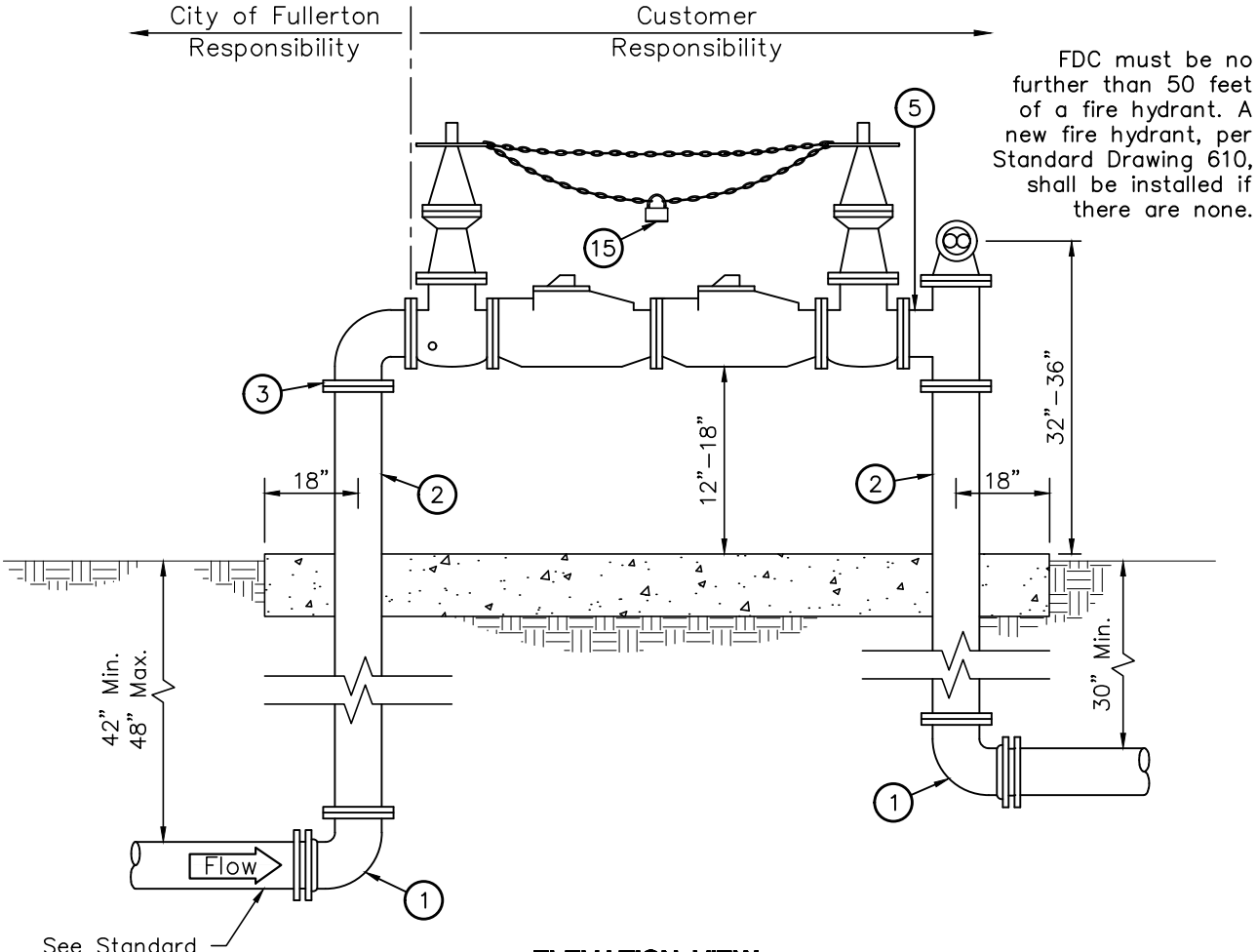
PUBLIC WORKS DIRECTOR — DATE: 5/24/2022

STANDARD DETAIL

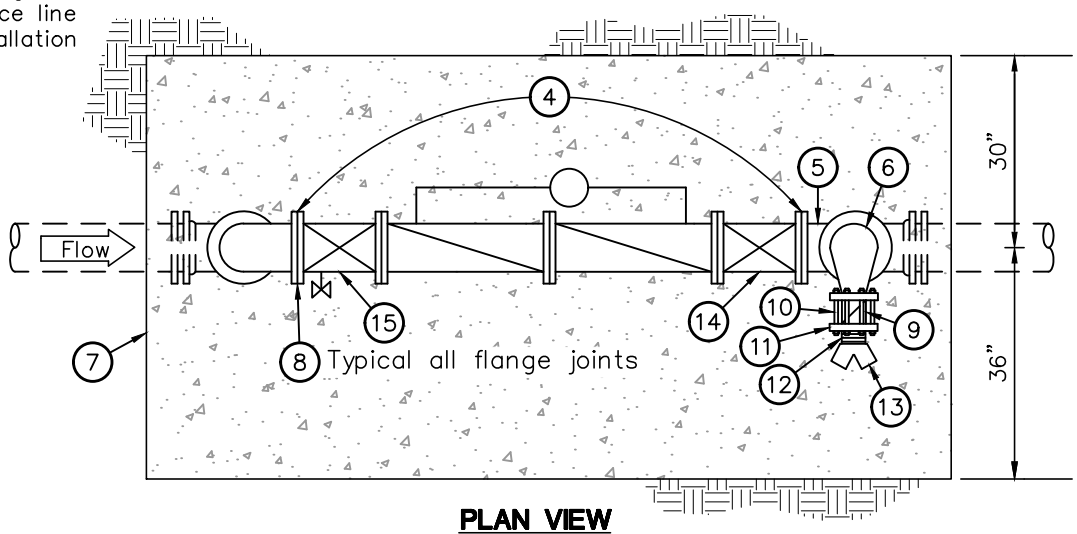
701

SHEET 1 OF 1

DEPARTMENT OF PUBLIC WORKS



ELEVATION VIEW



PLAN VIEW

FIRELINE DOUBLE CHECK DETECTOR ASSEMBLY

STANDARD DETAIL	REVISIONS			
	NO.	DATE	NO.	DATE
721	1	12/01/00	4	04/30/18
	2	05/05/13	5	04/20/22
SHEET 1 OF 2	3	02/29/16		

5/9/2022
CITY ENGINEER — DATE

5/24/2022
PUBLIC WORKS DIRECTOR — DATE

CITY OF FULLERTON CALIFORNIA

DEPARTMENT OF PUBLIC WORKS

LIST OF MATERIALS

1. 90° DI elbow, FLG x MJ
2. DIP spool, class 53, FLG (order to size)
3. 90° compact DI elbow, FLG
4. Double detector check assembly
5. Compact DI Tee, FLG
6. Pipe size x 4" – 90° DI reducing elbow, FLG (see Note 3 hereon)
7. Concrete pad, 4" Slab, Class 520–C–2500
8. ⅛" full face cloth inserted rubber flange gasket

The following items must have final approval and inspection by the Fullerton Fire Marshal

9. 4" UL/FM wafer rubber–seated check valve
10. 8⅝" x 7" L threaded–studs with 16 nuts, plain
11. 4" x 9" DI threaded companion flange
12. 4" x 4"L galvanized nipple, IPT
13. 4" x (2) 2½" Y bronze–straight pattern fire dept connection (FDC) with plastic caps
14. Tamper switch, per California Fire Code and National Fire Protection Association Standards
15. Owner's chain and breakaway padlock(s)

NOTES

1. Refer to the City of Fullerton's Approved Materials List for approved manufacturers and model numbers.
2. See Section 3 of these Specifications for testing requirements, locations of assemblies and other requirements.
3. See Section 5–10 of these Specifications for fire line assembly painting reaaquirements.
4. All bolts and nuts except item 10 on sheet 1 are to be zinc plated (brass is not acceptable).
5. Contractor shall submit to Engineer for approval the proposed location of fire line assembly prior to construction. Assembly shall be visible from street and within 50 feet of an area accessible by fire department vehicles.
6. Fire line assembly installed in easements road and streets without curbs or with rolled curbs shall be protected by guard posts per Standard Drawing 615. The number and specific location of such posts will be determined by the Engineer if not shown on the plans.
7. See Section 5–03.04 of these Specifications for polyethylene protective wrapping requirements.
8. New or updated address signage may be required by fire department.
9. New backflow must be tested by a certified backflow device tester as possessing a valid certification issued by the Orange County Environmental Health Agency and an active Fullerton business license.

FIRELINE DOUBLE CHECK DETECTOR ASSEMBLY

CITY OF FULLERTON CALIFORNIA

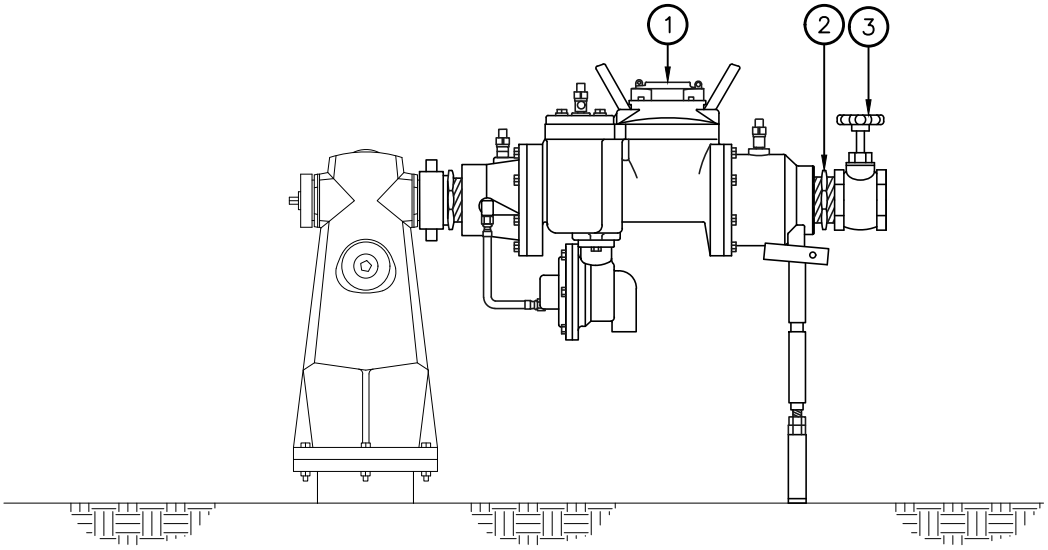
REVISIONS			
NO.	DATE	NO.	DATE
1	12/01/00	4	04/30/18
2	05/05/13	5	04/20/22
3	02/29/16		

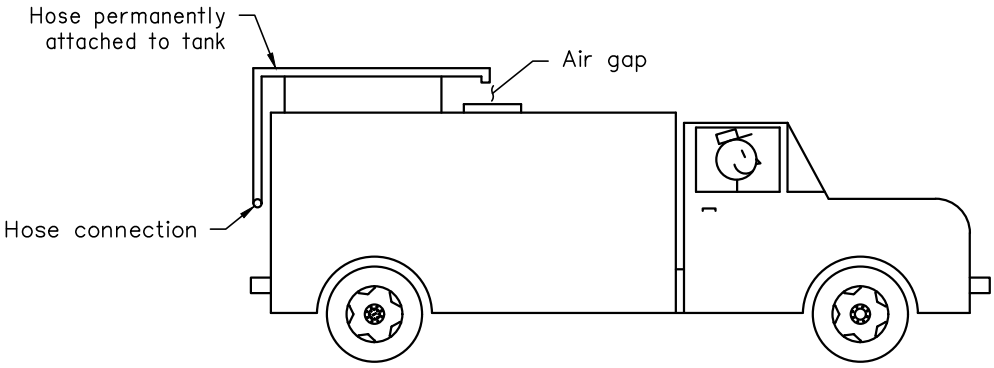
5/9/2022
CITY ENGINEER — DATE

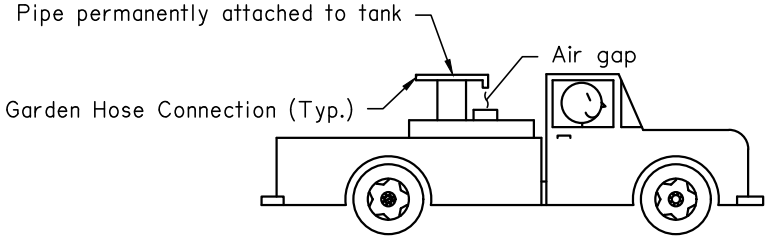
Meg McWade 5/24/2022
PUBLIC WORKS DIRECTOR — DATE

STANDARD DETAIL
721
SHEET 2 OF 2

DEPARTMENT OF PUBLIC WORKS







LIST OF MATERIALS

1. Temporary water meter and backflow preventer (to be installed by City).
2. 3" MIP x 2½" MIP hydrant adapter (to be installed by City).
3. Globe valve (to be installed by City).

TEMPORARY FIRE HYDRANT METER AND REDUCED PRESSURE BACKFLOW DEVICE

STANDARD DETAIL	REVISIONS			
	NO.	DATE	NO.	DATE
735	1	04/20/22		
SHEET 1 OF 1				

CITY ENGINEER — 5/9/2022 DATE

PUBLIC WORKS DIRECTOR — 5/24/2022 DATE

CITY OF FULLERTON CALIFORNIA

DEPARTMENT OF PUBLIC WORKS

SECTION 8 – APPROVED MATERIALS LIST

8-01 REQUIREMENTS

All materials installed in the City water system shall meet all state and federal standards, as well as standards developed by nationally recognized organizations such as AWWA, ANSI, and NSF. In order to protect human health, all materials, chemicals, lubricants, and products in contact with drinking water shall be certified as meeting NSF/ANSI Standard 60 (Drinking Water Treatment Chemicals-Health Effects) and NSF/ANSI Standard 61 (Drinking Water System Components-Health Effects). In addition, all materials coming in contact with potable water must be lead-free per California Health & Safety Code Section 116875. All materials are required to be certified as lead-free by NSF or other ANSI accredited certifier per SB 1334.

All like materials shall be of one manufacture for any particular project, unless approved by the Engineer. All materials shall be subject to inspection. No materials shall be installed until accepted by the Engineer. Upon request, a copy of the invoice for of any materials furnished by the Contractor shall be provided to the Engineer.

8-02 DEVIATIONS

Any deviation from these specifications shall be submitted in writing by the Contractor to the Engineer. Said submittals shall be delivered to the Engineer to allow sufficient time for review. The Engineer's determination will be provided in writing within 10 working days.

8-03 CERTIFICATION

All water system materials furnished for installation by Contractor shall be provided with clear manufacturer's markings and labeling indicating that the material furnished meets the standards and requirements of these Specifications. All materials shall be new, not previously used, and of current manufacture. In addition, the Engineer may request that a written manufacturer's statement be provided indicating that a material conforms to the standards and requirements of these Specifications.

APPROVED MATERIALS LIST

This form is intended for use by developers or contractors constructing potable water facilities within the City of Fullerton (City) service area. An authorized representative of the developer shall check box(es) per item for materials to be used in conjunction with the project, shall fill out this form in its entirety, and shall sign the certification statement herein. Please contact the City if part numbers or models indicated within the Approved Materials Checklist are no longer available. When the notation "Full Submittal Required" appears within this Approved Materials List, or when required materials do not appear within this Approved Materials List, complete shop drawing submittals are required.

RESET INFORMATION

CITY OF FULLERTON APPROVED MATERIALS LIST
FOR USE ON CITY WATER FACILITIES

Project Name

Project #

DEVELOPER INFORMATION

Name of Developer (Company)

Contact Person

Mailing Address

City, State, Zip

Telephone

Email Address

CONTRACTOR INFORMATION

Name of Contractor (Company)

License Number/Classification

Contact Person

Mailing Address

City, State, Zip

Telephone

Email Address

SUPPLIER INFORMATION

Name of Supplier (Company)

Contact Person

Mailing Address

City, State, Zip

Telephone

Email Address

I hereby certify that the specific products indicated within the attached Approved Materials Checklist represent a true list of materials to be used within the project indicated above, and I acknowledge understanding of the requirements that follow. Any and all specific requirements detailed within the Standard Specifications shall apply to all materials proposed for use on this project. All materials supplied to the job site shall conform in all ways to the requirements of the Standard Specifications.

Signature of Developer or Contractor Representative

Print Name | Company | Date

CITY OF FULLERTON APPROVED MATERIALS LIST
FOR USE ON CITY WATER FACILITIES

TABLE OF CONTENTS

TABLE OF CONTENTS

CITY OF FULLERTON APPROVED MATERIALS LIST FOR USE ON CITY WATER FACILITIES

RESET ALL BOXES

Item Name	Size	Other Common Name(s)	Description	Manufacture/Part #	Used In STD DWG
WATER MAINS					
Water Main - DI Pipe	4"+	Ductile Iron (DI or DIP)	Conform to the requirements of AWWA Standard C151. Size 4 inch through 12 inch Shall be Pressure Class 350. Pipes greater than 12 inch up to 24 inch in diameter shall be Thickness Class 52. Pipes larger than 24 inches in diameter and all above ground pipes shall be Thickness Class 53. Special order pipe sizes, such as 10 inch and 14 inch are not allowed. Furnished in 18 foot nominal laying lengths and shall be bell and spigot type having a push-on joint employing a single rubber gasket, made of EPDM, to effect the joint seal, in accordance with AWWA Standard C111. Factory cement mortar lined with seal coat in accordance with AWWA Standard C104, "Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water" and coated with bituminous material as specified in AWWA C151. Mortar lining of pipe or fittings in the field is not permitted.	☐ **American Pipe** Fastite ☐ **U.S Pipe** TYTON	Various
Water Main - PVC Pipe	4"-16"	Polyvinyl Chloride (PVC), C900	Conform to the requirements of AWWA Standard C900 "Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 inch through 60 inch". Shall be Pressure Class 305 (DR 14). Furnished in 20 foot nominal laying lengths and have bell-end push-on joints employing a single elastomeric gasket in accordance with AWWA Standard C900. Legibly and permanently marked in ink with the following information: •Manufacturer and Trade Name •Nominal Size and DR Rating/Pressure Class •Hydrostatic Proof Test Pressure •[NSF-61] •Manufacturing Date Code	☐ **Diamond Plastics** ☐ **JM Eagle** Blue Brute ☐ **North American Pipe**	Various
Tracer Wire	-		#10CCS High Strength insulated copper, blue in color.	☐ FULL SUBMITTAL REQUIRED **Copperhead Industries**	Various
Polyethylene Encasement	-	Polywrap	Conform to the requirements of AWWA/ANSI Standard C105/A21.5. 8 mils thick (minimum) tubing of virgin polyethylene. Color to be clear.		Various
Warning Tape	-		6 inches wide, blue in color, and marked "Caution Water Line Below".	☐ FULL SUBMITTAL REQUIRED	Various

TABLE OF CONTENTS

CITY OF FULLERTON APPROVED MATERIALS LIST FOR USE ON CITY WATER FACILITIES

Item Name	Size	Other Common Name(s)	Description	Manufacture/Part #	Used In STD DWG
Water Main Fittings	4"-16"	Tees, Crosses, Elbows, Bends, 90s, 45s, 22s	All fittings shall be ductile iron fittings for DI and PVC pipe installations. Conform to the requirements of AWWA Standard C110, “Ductile-Iron and Gray-Iron Fittings, 3 inch through 48 inch for Water and Other Liquids”. Short body type fittings conforming to AWWA Standard C153 “Ductile-Iron Compact Fittings 3 inch through 24 inch for Water Service” may be used. Cement mortar lined in accordance with AWWA Standard C104, ‘Cement Mortar Lining for Ductile – Iron Pipe and Fittings for Water.” Coated with a bituminous material as specified in AWWA Standard C151. All fittings shall have mechanical joints unless otherwise specified. Fittings up to 24 inch size shall be 250 psi pressure ratings and over 24 inch size shall be 150 psi pressure rating.		Various
Push-On Pipe Joints	4"-16"		All pipe joint restraints are required to be internally restrained. The first two full pipe joints upstream and downstream of tie-ins, confluences, bends, and valves shall be restrained. Restrained joint pipe is an acceptable option for restraint of push-on joint pipe. Restrained push-on joint pipe and fittings shall be capable of being deflected after assembly.	**DI Pipe Manufacturers** **American Pipe** ☐ Flex-Ring **U.S. Pipe** ☐ FIELD LOK ☐ TR Flex **PVC Pipe Manufacturers** **Diamond Pipe** ☐ LOK-21 **JM Eagle** ☐ Eagle Loc **North American Pipe** ☐ Certa-Lok	Various

TABLE OF CONTENTS

CITY OF FULLERTON APPROVED MATERIALS LIST
FOR USE ON CITY WATER FACILITIES

Item Name	Size	Other Common Name(s)	Description	Manufacture/Part #	Used In STD DWG
Mechanical Joints	4"-16"		Conform to the requirements of AWWA Standard C111, "Rubber-Gasket Joints for Ductile Iron Pressure Pipe and Fittings." All mechanical joints to be restrained, thrust restraining devices shall be ductile iron and withstand a working pressure of at least 250 psi with minimum safety factor of 2.	**4"-12"** **Ford Meter Box Co., Inc.** ☐ Uni-Flange 1300 ☐ Uni-Flange 1500 **Romac Industries, Inc.** ☐ GripRing **14"-48"** **EBBA IRON, Inc.** ☐ (DIP) 1100 MEGALUG ☐ (PVC) 2000 MEGALUG **Ford Meter Box Co., Inc.** ☐ Uni-Flange 1300 **Romac Industries, Inc** ☐ RomaGrip **Smith-Blair** ☐ Cam-Lock	Various
Flanged Joints	4"-16"		Conform to the requirements of AWWA C110 or C153. Flanges shall be drilled to ANSI B16.1, 125lb. standard bolt template. The 250 lb. flanges, when required, shall be drilled to ANSI B16.1, 250 lb. standard bolt template.		Various
Gaskets (Flanged Joints)	-		Conform to the requirements of AWWA C111 "Rubber-Gasket Joints for Ductile Iron Pressure Pipe and Fittings" and ANSI A21.11 and ANSI B16.21. Gaskets for flanged joints shall be made of EPDM rubber, either ring or full-faced, ⅛ inch thick, and bolt holes pre-punched. At blind flanges, the gasket shall cover the entire inside and be cemented to the surface of the blind flange.	☐ **FULL SUBMITTAL REQUIRED**	Various

TABLE OF CONTENTS

CITY OF FULLERTON APPROVED MATERIALS LIST FOR USE ON CITY WATER FACILITIES

Item Name	Size	Other Common Name(s)	Description	Manufacture/Part #	Used In STD DWG
Nuts and Bolts (Mechanical Joint and Flanged Joints)	-		Conform to the requirements of ASTM A307, Standard Specifications for Carbon Steel Bolts, Studs, and Threaded Rod 60,000 psi Tensile Strength, Grade A. Tee-head bolts and hexagonal nuts for all mechanical joints shall be high strength, low alloy steel. Hexagonal bolts, nuts and washers for flanged fittings shall be zinc plated, high strength, low-carbon steel. Shall be coated with a minimum 30 mils of JS160H Mastic manufactured by Protecto Wrap Co., 30 mils of Bituminous Mastic 50-HT by Utility Coating Company, or approved equal. In addition to this coating, all metal surfaces shall be encased in 8 mils polyethylene protective wrapping and tape wrapped to the pipe barrel in accordance with AWWA C-105	☐ **FULL SUBMITTAL REQUIRED**	Various
Flanged Coupling Adapters	4"-16"		Ductile iron conforming to the requirements of ASTMA536. Bolt circles and bolt holes conforming to the requirements of ANSI B16.5 - Class 125 (DI) or Class 150 (Steel). Shall be fully restrained. Outside and inside surfaces shall be epoxy coated.	**EBAA IRON, Inc.** ☐ 2100 MEGAFLANGE **Krausz** ☐ Hymax Grip Flange Adapter **Romac Industries,Inc.** ☐ (DIP) Field Flange ☐ RFCA or RFCA-PVC **Smith-Blair** ☐ Flange-Lock	Various
DI and PVC Water Main Coupling	4"-16"		Sleeve-type couplings shall provide a flexible, watertight connection between two plain ends of pipe as shown on the construction plans or as directed by Engineer. Couplings shall be designed to be installed through the operation of two bolts to minimize installation errors and expedite installation.	**Krausz** ☐ Hymax Grip Wide-Range Coupling **Romac Industries, Inc.** ☐ Alpha Restraint Coupling	Various
Steel Water Main Coupling	-		Shall be standard steel couplings, with body no less than seven inches long. Bolts for exposed steel couplings shall be hot-dip galvanized. Bolts for buried steel couplings shall be Type 316 stainless steel. The Contractor shall strictly follow the torque limitations and shall use N-5000 Loctite® anti-seize/rust preventer lubricant manufactured by the Henkel Company, or approved equal. All sleeve type couplings shall be fusion bonded epoxy lines and coated with Scothkote 6233, as manufactured by 3M/Corrosion Protection Products, or approved equal. Buried metal surfaces shall receive additional protective coating and wrapping after they are assembled per "Protection of Metal Surfaces" standard.	**Romac Industries, Inc.** ☐ Model XR501 **Smith Blair, Inc.** ☐ 411 Steel Couplings ☐ Quantum® Coupling Wide-range	Various

TABLE OF CONTENTS

CITY OF FULLERTON APPROVED MATERIALS LIST
FOR USE ON CITY WATER FACILITIES

Item Name	Size	Other Common Name(s)	Description	Manufacture/Part #	Used In STD DWG
Repair Clamps	4"-16"		Repair clamps shall have a full circle (one-section) band with removable drop-in bolts. The band shall be 18-8 type 304 stainless steel. Bolts, washers, and nuts shall be high strength, low alloy steel per ASTM A242 and AWWA C111. Clamp shall have a lap type EPDM gasket with molded tapered ends to provide equalized sealing at the lap joint on any pipe within the clamp's range. The clamps shall have a built-in outside diameter (O.D.) range that fits several pipe-outside diameters within the clamp's nominal pipe size range.	☐ **Ford Meter Box Co., Inc.** F1 ☐ **Romac Industries, Inc**. CL1 ☐ **Smith Blair, Inc.** 226	Various
Tapping Sleeves	4"-16"		Shall have a stainless steel body with removable bolts. The outlet, body, flange, bolts, and nuts shall be 18-8 type 304 stainless steel. All welds shall be fully passivated to restore stainless characteristics. Flange shall conform to AWWA Standard C207, Class D ANSI 150 lb. with drilling recessed to accept standard tapping valves per MSS-SP 60. Bolt holes shall straddle pipe centerline. Shell gasket shall seal the full circumference of the pipe.	☐ **Ford Meter Box Co., Inc.** FTSS ☐ **JCM** Model# 432 ☐ **Mueller** Model H-304SS ☐ **Power Seal** Model 3490 ☐ **Romac Industries, Inc.** SST III	Various
Metal Coating	-		All buried metal surfaces on valves, flanges, bolts, nuts, tie rods, turn buckles, restraint devices, couplings, and other appurtenances in contact with the earth and backfill materials shall be coated. In addition to this coating, all metal surfaces previously described, shall be encased in 8 mils polyethylene protective wrapping and tape wrapped to the pipe barrel in accordance with AWWA C-105 and this list.	☐ **Protecto Wrap Co.** JS160H Mastic (min 30 mils) ☐ **Northtown Company** Bituminous Mastic 50 HT (min 30 mils)	Various

TABLE OF CONTENTS

CITY OF FULLERTON APPROVED MATERIALS LIST FOR USE ON CITY WATER FACILITIES

Item Name	Size	Other Common Name(s)	Description	Manufacture/Part #	Used In STD DWG
FIRE HYDRANTS					
Fire Hydrants	-		Conform to the requirements of AWWA C503, “Wet-Barrel Fire Hydrants.” Fire hydrants must have a tag from the manufacturer that states it meets Fullerton’s specifications. Wet-barrel epoxy coated, one-piece, ductile iron body type, colored Safety Yellow. Must be connected to a break-off check valve and a one-piece bury section with a nominal ID six inch bolted flange joint. The flange shall have a bolt pattern of six equally spaced bolt holes of ¾ inch diameter. All ferrous surfaces inside the body shall be fusion-bonded epoxy coated conforming to the requirements of AWWA C550. The outlet threads shall conform to ANSI – B26 “National Standard Fire-Hose Coupling Screw Threads.” Hydrants shall be equipped with cast or ductile iron outlet nozzle caps fitted with appropriate neoprene rubber gaskets and safety chain. The valve-operating stem and outlet-nozzle cap nuts shall be pentagonal, with 1⅛” from point to flat, and the length of the pentagon shall be no less than one inch. The hydrant cap is removed and the valve opened by turning left (counter-clockwise). Operating stem must have free spinning "clutch" design on the pumper valve seat. A Standard hydrant shall have one 2½” hose outlet and one 4” pumper outlet. A Steamer hydrant shall have two 2½” hose outlets and one 4” pumper outlet.	**Clow** ☐ (Standard) 850D ☐ (Steamer) 860D	610
Hydrant Bury and Extensions	-		Fire hydrant buries shall be cast or ductile iron, asphalt coated and cement lined. The base of the bury shall have a mechanical joint conforming to AWWA C110. When shown on the plans or approved by the Engineer an extension (spool) may be inserted between the hydrant body and bury. The spool shall be a non-break away and shall be cast or ductile iron, asphalt coated and cement lined.		610
Break-Off Check Valve	-		With 1/16" witness hole, epoxy lined ductile iron	**Clow** ☐ 400A	610
Hydrant Reflectors	-		Markers shall be blue, dual-face and reflective, conforming with the State of California Department of Transportation S.T.O. Specification, Section 85-1.05. Epoxy to permanently mount the marker shall be two parts, standard set.		610

TABLE OF CONTENTS

CITY OF FULLERTON APPROVED MATERIALS LIST FOR USE ON CITY WATER FACILITIES

Item Name	Size	Other Common Name(s)	Description	Manufacture/Part #	Used In STD DWG
VALVES					
Gate Valves	4"-12"		12 inch and below shall conform to the requirements of AWWA Standard C509. Shall be ductile-iron body equipped with double O-ring stem seals, EPDM O-rings, and stainless steel bolts. All buried gate valves installed at fittings shall be flanged by mechanical joints, with the flange abutting the fitting. Turn left to open. Operating with 2"x2" square nut.	**American AVK** ☐ Series 45 **Mueller** ☐ A-2362	Various
Butterfly Valves	16"+	BFV	Shall conform to the requirements of AWWA Standard C504. Valves shall have a minimum working differential pressure across the valve disc of 150 psi for class 150B valves and 250 psi for class 250B valves. Valves shall be flanged short-body or restrained mechanical joint as indicated per the Construction Drawings. Flanges for both Valve Class 150B and 250B shall be drilled per ANSI B16.1, 125-lb. standard bolt pattern. Valves shall be designed for buried installation. Valve seat material shall be peroxide cured EPDM rubber seat and shall be fastened integrally with the valve body. The valve disc shall be furnished with a stainless steel seating edge to mate with the rubber seat in the valve body. Valves with the seat located on the disc shall not be accepted. The ductile iron interior and exterior shall be factory coated with NSF 61 approved 16 mils DFT high solids 2 part epoxy of no less than 65% conforming to AWWA standard C550, as manufactured by Amerlock® 400, Tnemec 141, or approved equal. Valve operators shall be the manual type. Valve actuator shall be supplied and installed on the valve by the valve manufacturer. Gear actuators shall be for buried service applications and shall come furnished with a standard 2" AWWA operating nut. The operators shall be of travelling nut type with adjustable stops for valves smaller than 24 inches in size. The operator for valves 24 inches and larger shall be worm gear type.	**Mueller** ☐ (150B) Lineseal III ☐ (250B) Lineseal XPII **Pratt** ☐ (150B) Groundhog ☐ (250B) HP 250	Various
Valve Box & Lid	-	Valve Can	Circular cover with standard marking "WATER", cover to be cast iron with 4" (minimum) skirt.	FULL SUBMITTAL REQUIRED **Bingham & Taylor** **Box** ☐ #CUL10RHVYF **Lid** ☐ #CUL10LHVY4W	650

CITY OF FULLERTON APPROVED MATERIALS LIST FOR USE ON CITY WATER FACILITIES

Item Name	Size	Other Common Name(s)	Description	Manufacture/Part #	Used In STD DWG
AIR RELEASE / BLOW OFF					
See Services section for other required materials.					
Combo Air/Vacuum Release Valve	1", 2"	ARV	Combination air release valves shall be manufactured to meet or exceed the requirements of AWWA Standard C512. There shall be a downward facing screen vent on the valve outlet that meets OSHA requirements.	**A.R.I.** ☐ (1") D-040 ☐ (2") D-040	627
Combo Air/Vacuum Release Valve Assembly Cover	-		Two-piece polyethylene enclosure (sandstone color)	**Pipeline Products** ☐ VCAS-1830	627
2" Blow Off Assembly	2"	BO	Compression style inlet.	**Ford Meter Box** ☐ BLA18-777-TA-NL	621
SERVICES					
All parts in this section, from the main to the meter, shall conform to the requirements of AWWA Standard C800, “Underground Service Line Valves and Fittings,” and meet the California Health and Safety Code Section 116875. Materials in contact with potable water shall be lead free per SB1334.					
Service Saddle	-		For 1 inch and 2 inch service taps, service saddles are required for all types of pipe. Service saddle outlets shall be tapped as specified by AWWA C800. Outlet threads for 1 inch and 2 inch service saddles shall be iron pipe threads (IP). All service saddles for CI or DI Pipe shall be bronze conforming to ASTM B-62 with brass double straps. All service saddles for PVC Pipe shall be of bronze conforming to ASTM B-62, with stainless steel straps.	**Ford** ☐ (DI) 202B ☐ (PVC) S912 **Jones** ☐ (DI) J-979 ☐ (PVC) J-969 **AY McDonald** ☐ (DI) 73826 ☐ (PVC) 73856 **Mueller** ☐ (DI) BR2B Series ☐ (PVC) BR2S Series	Various
Corporation Stops	1", 2"	Corp Stop	All corporation stops shall have inlet iron pipe (IP) threads as specified by AWWA C800 with outlet being a compression connection for copper tubing.	**Ford** ☐ FB1100-4-Q-NL **Jones** ☐ E-1935SG **AY McDonald** ☐ 74704BQ **Mueller** ☐ B-25028N	Various

TABLE OF CONTENTS

CITY OF FULLERTON APPROVED MATERIALS LIST FOR USE ON CITY WATER FACILITIES

Item Name	Size	Other Common Name(s)	Description	Manufacture/Part #	Used In STD DWG
Copper Pipe	1", 2"		Copper tubing for service laterals shall be one inch or two inches seamless, annealed, Type "K" meeting the requirements of ASTM B-88. Coils shall be wound in a single layer flat with a minimum 24 inch inside diameter.	**1" Coils** ☐ 60' to 100' **2" Straight Lengths** ☐ 20'	Various
Water Service Coupling	1", 2"		All water service couplings shall be compression type. Water service couplings shall not be used on new 1" services, only for joining to existing services.	**Ford** ☐ (1") C44-44-Q-NL ☐ (2") C44-77-Q-NL **Jones** ☐ (1") E-2623SG ☐ (2") E-2609SG **AY McDonald** ☐ 74758Q **Mueller** ☐ 15403N	Various
Curb Stop	1", 2"	Angle Meter Valve	All curb stops shall be full port "ball" type, have a locking wing on the key operator, and with full 360 degrees rotation of tee head (less stop). All valves for ⅝ x ¾ inch and 1 inch meters shall have a compression inlet and a meter swivel nut outlet. All 2 inch valves shall have a compression connection inlet for two 2 inch copper tubing and a meter flange outlet slotted to accommodate 1½ inch and 2 inch meters. Slots should not extend to the outside edge of flange – open slots are not accepted.	**Ford** ☐ (1") BA43-444WR-Q ☐ (2") BFA13-777WR **Jones** ☐ (1") E-1963WSG (L/S) **AY McDonald** ☐ (1") 74612BQ ☐ (2") 74614B **Mueller** ☐ (1") B-24258-3-1N ☐ (2") B-24286-3N	601 602
Customer Ball Valve	1"		1" with meter coupling, 360 turn	**Ford** ☐ B13-444WR **Jones** ☐ E-190BW (L/S) **AY McDonald** ☐ 76111MW **Mueller** ☐ B-24351-3-1N	601

TABLE OF CONTENTS

CITY OF FULLERTON APPROVED MATERIALS LIST
FOR USE ON CITY WATER FACILITIES

Item Name	Size	Other Common Name(s)	Description	Manufacture/Part #	Used In STD DWG
Brass Ball Valve	1", 2"		For test ports on large meter assemblies only. M-IPT x F-IPT with locking ear, 360 turn	☐ **Ford** B81-777WR ☐ **Jones** E-190W (L/S) ☐ **Mueller** B-20200-3N	603
Bronze Ball Valve	1", 2"		For Air-Release Valve only. F-IPT x F-IPT	☐ **Ford** (1") B11-444-NL ☐ (2") B11-777-NL ☐ **AY McDonald** 76101 ☐ **Mueller** B-20283N	627
Valve Handle	-		3-1/4" brass	☐ **Ford** HB-34S ☐ **AY McDonald** 76120B 5/8" ☐ **Mueller** B-20298-99000N	Various
Meter Adapter	5/8" x 3/4"		1-1/4" x 1" for 5/8" x 3/4" meters	☐ **Ford** A24-NL ☐ **Jones** E-128HM ☐ **AY McDonald** 710J24 ☐ **Mueller** H-10879	601

TABLE OF CONTENTS

CITY OF FULLERTON APPROVED MATERIALS LIST FOR USE ON CITY WATER FACILITIES

Item Name	Size	Other Common Name(s)	Description	Manufacture/Part #	Used In STD DWG
Water Meter - Positive Displacement	5/8" x 3/4"-1.5"		Meters 1½ inch or less in size are classified as small meters and shall conform to AWWA C700 Standard Specifications for "Cold Water Meters – Displacement Type, Metal Alloy Main Case." All meters shall consist of a metal alloy main case with serial numbers stamped on the main case. All meters shall be read in gallons.	**Neptune** ☐ (5/8 x 3/4"-1.5") T-10 **Badger** ☐ (5/8 x 3/4") M25LL ☐ (1") M55LL ☐ (1.5") M120LL **Mueller** ☐ (5/8 x 3/4") 420 ☐ (1") 452 ☐ (1.5") 562 D	601
Water Meter - Positive Displacement	2"		Meters 2 inch or more in size are classified as large meters and shall conform to AWWA C700 Standard Specifications for "Cold Water Meters – Displacement Type." All meter installations shall include a strainer. All meters shall be read in gallons.	**Badger** ☐ M170	602
Water Meter - Turbo	2"-12"		Meters 2 inch or more in size are classified as large meters and shall conform to AWWA C701 Standard Specifications for "Cold Water Meters – Turbine Type." All meter installations shall include a strainer. All meters shall be read in gallons.	**Sensus** ☐ OMNI T2	Various
Water Meter - Compound	2"-12"		Meters 2 inch or more in size are classified as large meters and shall conform to AWWA C702 Standard Specifications for "Cold Water Meters – Compound Type." All meter installations shall include a strainer. All meters shall be read in gallons.	**Sensus** ☐ OMNI C2	Various
Fire Meters and Dom./Fire Combination Meters	-		All meter installations shall include a strainer. All meters shall be read in gallons.	**Mueller** ☐ (1") RFM 50 **Sensus** ☐ (1") iPERL™ (Fire) ☐ (2") OMNI C2	Various
Water Meter - Detector Check	-		For RPDA/DCDA fireline bypass. All meter installations shall include a strainer. All meters shall be read in gallons.	**Badger** ☐ M25 LL **Sensus** ☐ iPERL™ (Fire)	Various

TABLE OF CONTENTS

CITY OF FULLERTON APPROVED MATERIALS LIST FOR USE ON CITY WATER FACILITIES

Item Name	Size	Other Common Name(s)	Description	Manufacture/Part #	Used In STD DWG
Backflow Preventer	-		Must have OS&Y valves. Per approved University of Southern California Foundation for Cross Connection Control and Hydraulic Research list. Excludes the following models: - AMES Colt 3000 series - AMES Colt 5000 series - Deringer DCDA Type 2	☐ FULL SUBMITTAL REQUIRED	721
Brass Pipe & Fittings	-	Brass Nipple	Brass pipe shall conform to the requirements of the "Specifications for Seamless Red Brass Pipe, Standard Sizes" ASTM Specification B-43, and referenced in the appendix to AWWA Standard C800.		Various
Meter Box	5/8" x 3/4" - 1"		Where required, meter boxes shall have traffic loaded rating covers.	FULL SUBMITTAL REQUIRED **DFW Plastics** ☐ (Box) DFW486WBC4-12-BODY ☐ (Cover) DFW486C-4F NHK-LID	601 630
Meter Box	1.5" - 2"		Where required, meter boxes shall have traffic loaded rating covers.	FULL SUBMITTAL REQUIRED **DFW Plastics** ☐ (Box) DFWB40WBC4-14-BODY ☐ (Cover) DFWB40C4LID	602
MISC					
Paint	-		Hunter Green • Fire Line Assemblies • Large Meter Assemblies • Backflow Assemblies Gloss Black • Steel Plate Meter Box Covers • Valve Stem Extensions Safety Yellow • Public Fire Hydrants • Guard Posts Safety Red • Private Hydrants • Fire Department Connections	**RUST-OLEUM®** ☐ V2138838 Hunter Green ☐ V2143838 Safety Yellow ☐ V2179838 Gloss Black ☐ V2163838 Safety Red	Various
Backflow Enclosure	1" - 2"		Tubular Shape, green thermoplastic polymer alloy coating, hinged with standard lock bracket.	**GuardShack** ☐ (1") HGS-1 ☐ (1.5") HGS-2 ☐ (2") HGS-3	604
Water Quality Sampling Station	-			**Armorcast** ☐ 12" x 36" P6002010	630