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

5-01 GENERAL

Unless specified differently on the plans or as supplemented herein, 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." 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."

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

The interior of all pipes, valves, fittings, and fire hydrants shall be kept free from dirt and foreign materials at all times during the progress of the work and left clean at the completion of installation.

5-02 CONSTRUCTION MATERIALS

The Contractor shall furnish only approved materials per Section 4, "Materials" and Section 8, "Referenced City of Compton Standard Drawings," 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 Water Utility Division 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 left in the pipe.

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 Water Utility Division. 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

Installation of pipes, bends and fittings shall be in accordance with AWWA Standard C600, "Installation of Ductile-Iron Water Mains and Their Appurtenances". 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.

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 unless directed otherwise by the Engineer.

During laying operations, no debris, tools or other foreign materials shall be placed in the pipe. When pipe lay operation is not in progress, the open ends of pipe shall be kept tightly closed by watertight expandable plugs or other means approved by the Engineer.

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.

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, unless permitted otherwise by the Engineer. 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. A feeler gage shall be used to determine if each joint has been properly assembled.

5-03.02 Laying PVC (C900 & C905) Pipe

Installation of pipe shall be in accordance with AWWA C605 "Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water" and the pipe manufacturer's installation manual. 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. Longitudinal bending of pipe sections is prohibited. Any directional changes shall be accomplished through manufacturer approved 1 degree deflection of push-on joints, 1-5 degree deflection of high deflection couplings, or ductile iron bends and fittings.

Copper tracer wire shall be installed and secured to the top of all PVC pipes as it is being laid. The tracing wire shall be stubbed up at each valve (brought into valve box), to each service (grounded to the corporation stop), to all appurtenances and to all hydrants (coiled around the barrel just below the top flange with 16 inches excess). Tracer wire shall be secured to the top of the pipe, at minimum of 10 foot

intervals, with plastic adhesive tape. The copper wire shall be #10CCS High Strength 600# Break Load with Locking SnakeBite Tracer Wire Connectors, or approved equal.

The wire shall be electrically continuous throughout the entire piping system. All splices of the wire shall be made securely and covered thoroughly with a Direct Bury Splice Kit, 3M DBY/DBR or approved equal. 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. Additional compensation will not be allowed therefore.

Warning/identification tape shall be 6-inch wide, blue in color and marked "Caution Water Line Below". Tape shall be installed directly above "Intermediate Zone". Refer to City of Compton Standard Drawings 312 for zone identification.

Point load set screws in retainer glands and flanges are prohibited; whereas those devices with pads or full circle may be acceptable and subjected to approval by the Engineer.

5-03.03 Cutting Pipe

The cutting of ductile-iron and C900 & C905 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. Unless otherwise authorized by the Engineer, 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

Unless otherwise shown on the plans, 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 4 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

Unless shown differently on the plans or as directed by the Engineer, thrust restraints shall be required at all bends, tees, pipe ends, and fire hydrant bury. Thrust restraints through other mechanical means as specified in Section 4-04 of these Specifications shall also be incorporated.

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

Unless specified differently on the plans or as supplemented herein, installation of a valve box assembly shall conform to the requirements of City of Compton 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 is required when the depth from finished grade to the operating nut is greater than 60 inches. The valve stem extension shall be per City of Compton Standard Drawing 651.

Excavation and backfill for a valve box assembly shall be per Section 2 of these Specifications.

5-05 FIRE HYDRANT ASSEMBLY

Unless otherwise directed by the Engineer, the installation of a fire hydrant assembly shall conform to City of Compton 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, unless otherwise directed by the Engineer. 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 Compton Standard Drawing 615.

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

Contractor shall field paint the fire hydrant barrel and guard posts in accordance with the applicable field painting requirements addressed later in this Section.

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

Unless specified differently on the plans or as supplemented herein, installation of large service laterals (3 and 4 inch) shall conform to City of Compton Standard Drawings 603 and 701. Six inch and larger service laterals shall be designed to meet individual development requirements.

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 sewers 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

All large service installations shall include a meter and provisions for a temporary bypass line. Meters shall conform to size, type and manufacturer as shown on the plan or per City of Compton Standard Drawing 603. 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

Unless specified differently on the plans, all larger service installations shall include backflow assemblies per Section 3 of these Specifications.

5-06.03 Fire Lines

Unless specified differently on the plans or as supplemented herein, installation of fire lines shall conform to City of Compton Standard Drawings 701 and 721.

5-07 SMALL SERVICE LATERALS

All materials for one inch and two inch diameter service laterals shall be supplied and installed by the Contractor per Section 4 and City of Compton Standard Drawings 601 and 602, respectively. The service lateral shall consist of a double strap service saddle, corporation stop, copper tubing, angle meter stop, meter, customer valve, meter box assembly and 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 sewers 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 later shall conform to Section 2 of these Specifications. Compaction of backfill materials by mechanical means directly over the exposed service tubing shall not be allowed unless approved by the Engineer.

5-07.02 Backflow Assemblies

Unless specified differently on the plans or as supplemented herein, installation of backflow assemblies for small installations shall conform to City of Compton Standard Drawing 602, 603, 604, 721 and Section 3 of these Specifications.

5-08 CONNECTION TO THE EXISTING DISTRIBUTION SYSTEM

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. Proper hydrostatic testing, disinfecting and flushing of new facilities must take place per Section 6 of these Specifications prior to permanent connections.

5-08.01 Pressure Tapping

The Contractor may tap cast iron and ductile iron 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.

Pressure 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 operated by the Water Maintenance Division. Under no circumstances shall the Contractor operate valves, hydrants, and other appurtenant equipment on the existing distribution system.

It shall be the Contractor's responsibility to coordinate the necessary shutdown schedules through the Engineer assigned to the project. Scheduled shutdowns shall require sufficient time to allow operation personnel to review, approve, and develop an appropriate program.

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 City at (310) 605-5524 (7 am to 6 pm) and (800) 800-7759 (6 pm to 7 am). 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. 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. 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. 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 reasons he feels 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 in accordance with the applicable specifications and plans. Unless specified differently on the plans or as supplemented herein, painting of water system installations as identified below shall conform to the applicable requirements of Section 310 of the Standard Specifications and in accordance with manufacturer's recommendations. Contractor shall not spray paint during windy conditions.

5-10.01 Surface Preparation

Remove all dirt, grease and oil from surfaces to be painted by washing the surface with cleaner/degreaser, commercial detergent or other approved cleaning methods. Loose rust, scale and deteriorated coatings shall be removed by sandblasting, scraping and wire brushing, or power tool cleaning. Galvanized and non-ferrous surfaces shall be solvent cleaned.

Care should be taken to protect outside screw and yoke (OS&Y) gate 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 Finished Coat

All installation surfaces shall be primed with Gray Primer aerosol spray coating (2 mils). The first finished coat may be applied after primer has dried.

The following installations shall have two finished coats (2 mils each) aerosol spray coating. The second finish coat shall be applied within 1 hour or after 48 hours. Listed below are installations and associated colors and manufacturer's paint catalog numbers:

Dark Green	Black	Safety Red
Fireline Assemblies	Steel Plate Meter Box Covers	Private Fire Hydrants
Large Meter Assemblies	Valve Stem Extensions	Fire Dept. Connections
Backflow Assemblies		

The following installations shall have two finished coats (2 mils each) aerosol spray coating. The second finished coat shall be applied after 24 hours. Listed below are installations and associated colors and manufacturer's paint catalog numbers:

Safety Yellow
Public Fire Hydrants
Air Release Assembly Covers (metal)
Guard Posts