PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. On -site domestic and fire water main distribution system consisting of piping, valves, on-site fire hydrants and related other equipment.

B. Testing and certification.

1.3 REFERENCES

A. N.F.P.A. Standard 24 2013 Edition, Private Fire Service Mains as adopted by serving jurisdictional authority.

B. Serving jurisdictional authority Fire Department fire prevention regulations, including local Fire Department Standard Specifications for materials and installation of the Work pertaining to fire protection systems.

C. Applicable portions of California Plumbing Code for materials and installation of the Work of this Section.

D. Standard Specifications for Public Works Construction (SSPWC) ("Green Book"),, with amendments as adopted by serving jurisdictional authority.

E. Area Regional Standard Drawings, 2006 edition, with amendments as adopted by serving jurisdictional authority as adopted by serving jurisdictional authority.

1.4 QUALITY ASSURANCE

A. Contractor Qualifications

1. Installing Contractor shall have Class A - General Engineering or Class C-16 Fire Protection Contractor license.

2. Installing Company: Company specializing in installation of water line systems, with minimum 5 years documented experience in installation of projects of similar scale and scope.

3. Installing Foreman: Individual specializing in installation of water line systems, with minimum 5 years documented experience in installation of projects of similar scale and scope.

4. Use only staff who are completely familiar with the manufacturers' recommended methods of installation as well as the requirements of this work.

B. Listing Requirements

1. Provide UL listed and FM approved valve assemblies.

1.5 SUBMITTALS

A. Submit Submittals in accordance with the provisions of Section 013300.

B. Materials List: Provide complete list of all proposed materials and accessories, including product data on performance criteria.

1.6 DELIVERY, STORAGE, AND PROTECTION

A. Deliver products to site under provisions of the General Conditions.

B. Store and protect products under provisions of the General Conditions.

1.7 PUBLIC AGENCY STANDARDS

A. Perform all work and related structures and devices indicated, in accordance with the Regional Standards Drawings as indicated on the plans and these specifications and the Standard Specifications for Public Works Construction (SSPWC) "Green Book", 2009 Edition and the latest California Plumbing Code.

B. Provide water main separation per “Guidance Memo No. 2003-02: Guidance Criteria for the Separation of Water Mains and Non-Potable Pipelines” by the State of California Department of Health Services dated October 16, 2003.

1.8 WARRANTY

A. Warranty

1. In addition to the guarantees required in the General Conditions, provide, in Architect approved form, the Owner with a guarantee against the following specific defects or failures for a period of two years after Notice of Substantial Completion:

a. Pavement or landscaping area subsidence, settling, transfer cracking or other surface defects due to improper trench backfilling.

b. Water leakage in any form.

c. Paint coating failure of above grade components.

d. Landscape planting material death.

2. Should defects or failures occur or develop during this period due to defective materials or faulty workmanship, furnish all labor and materials necessary to replace or repair the work without additional cost to the Owner.

3. Immediately correct defective work, including defective work discovered during warranty period, to the satisfaction of the Owner and the Architect.

PART 2 - PRODUCTS

2.1 ON-SITE PIPING

A. Piping:

1. Type: Bell and spigot rubber ring polyvinyl chloride (PVC) water pipe conforming to AWWA C-900 for sizes 4 inch through 12 inch diameter.

2. Type: PVC friction fit pipe conforming to ASTM D 1785, Schedule 40, for sizes less than 4 inches in diameter.

3. Class: Class 150 and 200 per AWWA C-900 standard, U.L. listed.

B. Minimum Coverage: 36 inches for sizes 3 inches and greater in diameter. Provide minimum 24 inch cover for pipe less than 3 inches in diameter.

C. Fittings:

1. Metal: Provide cast iron mechanical fittings from same manufacturer as pipe, Class 150 and 200, meeting AWWA C-110, C-111, and C-153 standard, U.L. listed, for sizes 4 to 12 inches in diameter. Coat with bituminous coating as specified.

2. PVC: Provide solvent weld fittings from same manufacturer as pipe, Schedule 40, conforming to ASTM D 2466 for sizes less than 4 inches in diameter.

2.2 BACKFLOW PREVENTER

A. Manufacturer:

1. Specification is based on products of listed manufacturer. Other manufacturers may be approved per procedures specified in Section 01610, including approval by serving jurisdictional authority.

B. Characteristics:

1. Provide Model

2.3 ON-SITE FIRE HYDRANTS

A. Manufacturer: Jones or approved equal.

1. Characteristics:

a. Provide Model 3775, all bronze, wet barrel units with 6 inch flanged inlet, two 4 inch steamer outlet and one 2-1/2 inch hose outlet conforming to AWWA C-503.

b. Accessories: Provide chained caps and operating wench.

c. Buries: Cast iron unit with 6” mechanical joint inlet and 6” flanged outlet.

2.4 VALVES

A. Manufacturer: Clow-Rich, Mueller, American Darling, Stockham and Kennedy.

B. Characteristics:

1. Provide flanged cast iron gate valve, with resilient seat, bronze N.R.S., and conforming to AWWA C-509 for sizes 3 to 12 inches in diameter. Coat with bituminous coating as specified.

2. Provide bronze gate valve with handwheel shutoff for sizes 2 inches and less.

3. Accessories: Square wrench nut and operating wrench.

C. Meter Box: Provide Brooks or equal, 20 x 36 inch precast concrete meter box, with reading lid.

D. Valve Box: Provide cast iron well cap cover with the word "WATER" cast in cover. Provide minimum 8 inch I.D. cast iron, ductile iron, or PVC Class 150 pipe riser. Coat ferrous materials with bituminous coating as specified

E. Valve Box: Provide Alhambra Foundry A-3000 three piece cast iron valve box with extension and drop cover. Provide the word "WATER" cast in cover.

F. Check Valve: AWWA C508, iron body, bronze trim, renewable disc and seat, flanged ends. Obtain approval of all valves located on fire lines by serving jurisdictional authority.

2.5 CONCRETE MATERIALS

A. Anchor, thrust and valve blocks: Concrete as specified in Section 033010, 2500 psi, installed per Standard Drawing W-17, W-18, and W-19, respectively.

2.6 FIRE DEPARTMENT CONNECTION

A. Manufacturer: GMR Fire Protection, or approved equal

1. Specification is based on products of listed manufacturer. Other manufacturers may be approved per procedures specified in Section 01610, including approval by serving jurisdictional authority.

B. Characteristics:

1. Type: Free standing type, brass finish, with ductile iron pedestal.

2. Outlets: Provide two 2-1/2 inch to suit Fire Department hardware, with threaded dust cap and chain of matching material and finish.

3. Label: “Building (insert building number) Sprinkler - Fire Department Connection.”

2.7 POST INDICATOR VALVE

A. Manufacturer: Mueller or approved equal.

1. Specification is based on products of listed manufacturer. Kennedy, Clow Valve or other manufacturers may be approved per procedures specified in Section 01610, including approval by serving jurisdictional authority.

B. Characteristics:

1. Type: Model A-20806, vertical type, ductile iron body with large window opening indicating OPEN or SHUT valve position. Protect working parts of stem and indicator with weatherproof enclosure. Provide operating nuts and wrench.

2. Provide connection for electrical tamper/monitoring switch. Coordinate with work specified in Division 16.

2.8 WATER METER

A. Manufacturer:

1. Acceptable manufacturers include Mueller/Hershey and Neptune. Specification is based on products of listed manufacturer. Other manufacturers may be approved per procedures specified in Section 01610, including approval by serving jurisdictional authority.

B. Characteristics:

1. Provide Model: 2” horizontal turbine meter with reading in US Gallons

2.9 OTHER MATERIALS

A. Provide all other materials, not specifically described but required for complete and proper installation of this work, as selected by the contractor and subject to the approval of the Architect.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection

1. Prior to work of this section, carefully inspect previously installed work. Verify all such work is complete to the point where this installation may properly commence.

2. Verify that work of this section may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards.

a. Verify that survey benchmark and intended elevations for the Work are as indicated.

b. Identify required lines, levels, contours, and datum.

c. Identify known utilities. Stake and flag locations.

d. Maintain and protect existing utilities remaining which pass through work area.

3. In the event of discrepancy, immediately notify the Architect.

4. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

B. Preparation

1. Provide all staking and field engineering required to implement the work as shown on the drawings.

2. Protect all stakes and benchmarks. Replace all stakes and benchmarks damaged during the course of construction at no cost to Owner.

3. Set grade stakes using instrument technology, at 50 foot grid interval at areas with gradients greater than 2 percent.

4. Set grade stakes, using instrument technology, at 25 foot grid interval at areas with gradients less than 2 percent.

5. Provide all equipment of such type, function and design as required to achieve specified values.

3.2 PIPING INSTALLATION

A. Provide all required excavation, shoring and backfilling required for the proper installation of buried pipe lines and related material and equipment in accordance with this Section and Section 02320.

B. Temporary barricades, warning lights, covers, railings and other protection or warning devices shall be maintained by the Contractor while the trenches are open.

C. See Section 02320 for scheduling and review requirements.

D. See Section 02235 for protection and repair of existing utilities and surfaces. Repair and/or replace all piping, conduits and appurtenances damaged by the work.

E. Separation

1. All new site water mains shall be located 10-foot horizontally from, and one foot vertically above, any parallel sewer or recycled water pipeline.

2. All new site water mains crossing a sewer or recycled water pipelines in a perpendicular fashion shall be located a minimum of one-foot above the crossed line. No connection joints shall be made in the water main within eight horizontal feet of the crossed line.

3. For alternative configurations or where a sewer line crosses above a water main, reference Department of Health Services document per Section 1.4 for additional requirements.

F. Provide clamps and/or concrete thrust blocks at elbows, tees and other points where separation might occur in polyvinyl chloride piping.

G. Anchor valves in polyvinyl chloride pipe with 5/8 inch diameter rods imbedded 18 inches in 8 square foot by 2 foot thick concrete base.

H. Make below grade flanged connections with stainless steel bolts, nuts and washers. Do not bury flanges of valves; form approved pit.

I. Set access boxes flush with finished grade.

J. Coat all below grade boxes, mechanical joints and bolts with two coats of Koppers Bitumastic No. 50 coating.

K. Flush fire service piping in compliance with N.F.P.A. Standard No. 24 in presence of the Fire Department Representative. Notify Fire Department minimum 48 hours prior to the scheduled flushing.

L. Flush and disinfect all domestic and potable water lines in accordance with AWWA C-651. Apply chlorine by continuous feed method

1. Isolate systems requiring disinfection from existing water systems remaining in service with an in-line valving system approved by serving jurisdictional authority and Architect.

M. Deliver Record Drawings in accordance with Section 017700.

N. Provide Fire Department Connection in compliance with serving jurisdictional authority criteria, manufacturer's instructions and NFPA 13.

1. Install buried shut-off check valves, in valve box. Provide post indicator valve.

2. Install post indicator valve with bolts through base flange as recommended by manufacturer. Set valve vertical.

3. Locate fire department connection with sufficient clearance from walls, obstructions or adjacent siamese connectors to allow full swing of fire department wrench handle.

3.3 PAINTING AND MARKING

A. Paint all above grade water service items, including detector check and backflow preventor assembly with VOC approved coatings per jurisdictional authority Department requirements.

B. Paint all above grade fire service items, including fire department connection, post indicator valves and hydrants with VOC approved coatings per jurisdictional authority Department requirements.

C. Where required by Fire Department, provide reflectorized pavement markers at each hydrant, located as directed by Fire Department.

3.4 FIELD QUALITY CONTROL

A. Field inspection will be performed under provisions of Section 014500.

B. Request architect to inspect pipe prior to covering. Notify Fire Department minimum 48 hours prior to the scheduled testing.

C. Test pipe system for leakage prior to covering but after thrust blocking and valves are in place. Allow thrust blocking to cure for minimum 7 days prior to commencing test procedures.

1. Isolate system by closing valves where available and install temporary bulkheads where valves do not occur.

2. Open air valves and fill system with water. Allow system to stand under slight pressure for 24 hours to dissipate trapped air.

3. Correct noticeable leakage at valves, fittings, temporary bulkheads, and other connections.

a. Where leakage continues at valves and bulkheads, provide means of measuring volume of leakage.

4. Induce pressure of 150 psi (for domestic water lines) measured at lowest point of system; maintain pressure for 4 hours. Induce pressure of 200 psi (for fire service lines) measured at lowest point of system; maintain pressure for 2 hours.

    a. Measure volume of water required to maintain pressure

    b. Leakage to be volume required to maintain pressure less volume of leakage at valves and bulkheads.

    c. Allowable leakage not to exceed 25 gallons per inch of pipe diameter per mile per 24 hours.

5. Replace unacceptable sections of pipe, fittings, and appurtenance until subsequent test results fall within allowable limits.

3.5 CLEAN-UP

A. Remove all surplus material, rubbish and debris in accordance with Section 017719.

END OF SECTION