

### **Conditions of Use/ Responsibility of Data**

These “guideline” specifications are to be used by the A/E as a base document in the development of project/site-specific Division 2 – SITE WORK specifications for Montgomery County Public Schools Construction Projects. They may or may not be complete, correct and/or appropriate for use for any given project. It is the responsibility of the A/E to review these “guideline” specifications and to edit and/or supplement them as required to ensure that they represent the full, complete, correct and code-compliant specifications required for all construction of the project to which they apply. The use of these “guideline” specifications, and/or any information herein, in no way releases the A/E from their Contractual responsibility to prepare and provide the full, complete and correct code-compliant Contract documents, plans and/or specifications required for construction.

Review and editing of these “guideline” specifications shall be performed by appropriately licensed Maryland professional engineer. Specifications are to be prepared in Microsoft Word, edited using the “Track Changes” feature of that software and submitted to MCPS electronically on a compact Disk for review.

## **SECTION 02226 – WATER DISTRIBUTION SYSTEM**

### **PART 1 - GENERAL:**

#### **1.1 RELATED DOCUMENTS:**

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions, and Division 1, Specification Sections apply to work in this section.

#### **1.2 DESCRIPTION OF WORK:**

- A. This section specifies materials and work required to construct water distribution system.

#### **1.3 RELATED SECTIONS:**

- A. Refer to Section 02000 “Clearing”, Section 02100 “Earthwork and Grading” and Section 02200 “Utility Standards”.

#### **1.4 STANDARDS:**

- A. Washington Suburban Sanitary Commission's (WSSC) current "General Conditions and Standard Specifications" and "Standard Details".
- B. Washington Suburban Sanitary Commission's current "Regulations Governing Installation of Plumbing and Sewer Cleaning in Washington Suburban Sanitary District".
- C. Washington Suburban Sanitary Commission's current Plumbing and Gasfitting Regulation.
- D. American Water Works Association (AWWA).

#### **1.5 SUBMITTALS:**

- A. Refer to Section 02200 "Utility Standards" and as noted.
- B. Products: Submit product manufacturer's specifications and installation instructions and certificates of compliance signed by Manufacturer and Contractor stating that products comply with this specification to Architect. Certificates of compliance must be notarized, signed by an officer of Manufacturer, and shall include WSSC Contract Number or On-site number, job location, Contractor's name, types, classes and strengths of pipe and fittings, and Manufacturer's name.
- C. Submit As-built drawings to Architect.
- D. Service Connection Permit: Contractor shall submit to Architect all items required by WSSC to obtain a Service Connection Permit, including but not limited to: All required WSSC Bonds, Letter indicating Utility Contractor, and Certificate of Insurance. Architect will obtain Service Connection Permit once these items are received.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING:

- A. Refer to Section 02200 "Utility Standards", and as noted.

1.7 PROJECT CONDITIONS:

- A. Refer to Section 02200 "Utility Standards", and as noted.
- B. Jurisdiction Standards: Site is located within WSSC jurisdiction. On-site fire hydrants shall be "Supervised Fire Hydrants".
- C. On-site construction and materials shall be in accordance with latest edition of WSSC General Conditions and Standard Specifications, Design Manual, Standard Details and Plumbing and Gasfitting Regulations.

1.8 CONSTRUCTION SURVEYS:

- A. Provide survey equipment and qualified personnel for construction surveys. Provide combined horizontal and vertical alignment stakes for system construction. Horizontal stake interval to be 50 feet and at appurtenances (e.g. fittings, valves, etc.). Provide construction cut sheet preparation as required.

1.9 SPECIAL INSPECTIONS, TESTING OBSERVATION AND CERTIFICATIONS:

- A. Special utility inspections, testing observation and certifications are those services specifically required by government agencies and/or utility purveyors, and that must be performed by Engineer of Record.
- B. WSSC ON-SITE WATER SYSTEM: In accordance with requirements and regulations of Washington Suburban Sanitary Commission (WSSC), Owner has retained services of Engineer of Record to provide following special inspection, testing observation and certification services in connection with construction of WSSC On-Site water lines and appurtenances.
  1. Three (3) Three (3) hour inspection visits for on-site water line construction
  2. One (1) Four (4) hour visit to observe mandatory 2- hour pressure test
  3. Two (2) Three (3) hour inspection visits to observe construction of thrust blocking
  4. One (1) time preparation of As-Built Drawings and Certifications, based-upon as-built information and test result documentation provided by Contractor, to be performed upon completion of construction and successful testing of WSSC On-Site Water and Sewer lines and appurtenances.

- C. ADDITIONAL INSPECTIONS, OBSERVATIONS AND CERTIFICATIONS: It shall be responsibility of Contractor to hire Engineer-of-Record to perform additional special inspections, testing observations and certifications required beyond those specific services identified herein as being provided by Owner.

## **PART 2 - PRODUCTS:**

### 2.1 MATERIALS:

- A. Materials shall be WSSC Standards and shall meet WSSC requirements indicated.
- B. Valve Boxes: Cast iron two-piece valve boxes, screw type box, bell base section, 5-1/4 inch shaft, round drop cover with "W" marking.

### 2.2 FIRE HYDRANTS:

- A. WSSC Standard. Fire Hydrants shall be Supervised type hydrants. Provide all coordination, materials and equipment necessary for the supervision system.

### 2.3 CONCRETE PADS: Class 'A' Portland cement.

### 2.4 CONCRETE ANCHORS: WSSC Standards indicated and specified. Class 'A' Portland cement concrete, Section 02200 "Utility Standards".

### 2.5 STRAPS AND RODS:

- A. Clamps, Straps and Washers: Steel, ASTM A 506.
- B. Rods: Steel, ASTM A 575.
- C. Rod Couplings: Malleable-Iron, ASTM A 197
- D. Bolts: Steel, ASTM A 307
- E. Cast-Iron Washers: Gray-iron, ASTM A 126

### 2.6 MISCELLANEOUS PRODUCTS:

- A. Underground Identification Tape: Manufactured by Allen Systems, Houston, Texas.
  - 1. Type: "Markline".
  - 2. Color: Precaution Blue.
  - 3. Legend: Caution water line buried below.
  - 4. Tape Width: Three inches.
- B. Disinfection Products: W.S.S.C. standards indicated and specified. For continuous feed disinfection method, use Calcium Hypochlorite: AWWA B 300, granular form.
  - 1. Contractor's Option: AWWA B 301 Liquid Chlorine.
  - 2. Contractor's Option: AWWA B 303 Sodium Chloride.
  - 3. Water: Potable.

## **PART 3 - EXECUTION:**

### 3.1 PROTECTION AND RESTORATION:

- A. Refer to Section 02200 "Utility Standards".

### 3.2 DEWATERING, EXCAVATION, OVER-EXCAVATION AND UNSUITABLE EARTH:

- A. Refer to Section 02200 "Utility Standards".

### 3.3 PIPE:

#### A. General:

1. Install in accordance with pipe manufacturer's installation instructions, WSSC standards and requirements and as noted.
2. Inspect each pipe laying length, pipe joint materials and fittings for defects. Remove defective products from project site. Install pipe to horizontal and vertical alignment indicated. Place fittings at changes in horizontal and vertical alignment as indicated. Construct concrete anchors at each fitting as indicated. Place concrete to permit access to joints for inspection and maintenance. Apply liberal coat of coal tar pitch to exposed steel and hardware. Field cut pipe only where required to complete closures or to install fittings, valves or fire protection equipment. Cut pipe to smooth square end with equipment designed for cutting pipe.

#### B. Ductile Iron Pipe:

1. Install pipe in accordance with AWWA C 600 and as noted.
2. Install with bell ends facing in direction of laying operations. Begin installation of pipe, with vertical gradient exceeding 10 percent, at lowest elevation and proceed upgrade. Place identifying mark on pipe not provided with spigot depth mark. Clean interior and exterior surfaces of bell and spigot removing oil, grit, excess coating and foreign matter. Lubricate pipe ends and gasket in accordance with pipe manufacturer's instruction.

- C. Ductile Iron Push-On Pipe: Position each laying length in previously installed pipe and push or pull joint tightly together with mechanical device designed for pipe jointing. Grind or file spigot end of field cut pipe to resemble manufactured spigot end. Place spigot identifying depth mark as specified. Pipe joint deflection not to exceed the limits specified in Table 2, AWWA C 655.

### 3.4 BURIED VALVES:

- A. Install valves in accordance with valve manufacturer's installation instructions, and WSSC requirements.

### 3.5 FIRE HYDRANTS:

- A. General: Install fire hydrants at locations indicated, in accordance with AWWA M17 "Installation, Operation and Maintenance of Fire Hydrants", manufacturer's installation instructions, and WSSC standards and requirements.

- B. On-site fire hydrants installed within WSSC jurisdiction shall be "Supervised Fire Hydrants". Contractor shall be responsible for coordinating fire hydrant acquisition and installation with a WSSC approved monitoring company. Contractor shall also coordinate installation with mechanical and electrical Contractors for required connections, panels or power supplies. Required monitoring equipment, connections, power supplies, testing and incidentals shall be provided, at no increase to the Contract Sum, for a completed and approved monitoring system.

### 3.6 BACKFILL:

- A. Refer to Section 02200 "Utility Standards" and as noted.
- B. Water mains 4-inches and larger must be inspected by Engineer of Record prior to completion of backfill operations. Contractor shall provide a minimum of 48 hours notice to Engineer of Record before completion of backfill operations.
- C. Valve Box Installation: Install valve box for each buried gate valve during backfill operations. Install boxes to prevent shock or stress transmission to valves or pipe and center over valve operating nut plumb to 1/4 inch in five feet. Adjust box cover flush to finished grade.
- D. Underground Identification Tape: Install tape during backfill operations. Tape shall be centered over pipe, located 24 inches below finished grade.

### 3.7 SYSTEM TESTING:

- A. General: Provide materials, equipment (e.g. pumps, gauges, etc.) and labor required to test system. Do not conduct tests until concrete anchors cure and set seven calendar days. Provide a minimum of 48 hours notification of planned testing. Test observation by Architect and local governing water authority personnel. Test system in accordance with AWWA C 600 and as noted.
- B. Hydrostatic Pressure Tests: Conduct hydrostatic pressure tests, upon completion of Phase I backfill operations. Fill systems or valved section of system with water. Expel air from pipe. Slowly apply test pressure. Test pressure as shown on the approved drawings. Test duration to be two hours. Test pressure shall not vary more than +5 psi for the duration of the test. Examine system joints. Correct defective products or improper system installation as directed by Architect and local governing water authority personnel.
- C. Hydrostatic Leakage Tests: Conduct hydrostatic leakage tests upon completion of Phase II backfill operations. Test procedure as specified for hydrostatic pressure tests, except as noted. Test pressure @ 110 PSI. Test duration 24 hours. Allowable leakage for ductile iron pipe is not to exceed the limits specified in Table 3, AWWA C 600. Correct system installation exceeding allowable leakage specified as directed by Architect and local governing water authority personnel.

### 3.8 INSPECTION AND CERTIFICATION:

- A. Retain services of a Maryland-Registered Professional Engineer for inspection of system construction and certification that system complies with standards specified. In accordance with the requirements on the approved WSSC drawings, inspecting engineer must be engineer of record for approved WSSC drawings.

### 3.9 SYSTEM DISINFECTION:

- A. Disinfect system in accordance with AWWA C 651, W.S.S.C. standards specified, and as noted. Provide materials, equipment (e.g. pumps, etc.) and labor required to disinfect system.
- B. Disinfection Method: Continuous feed.
  - 1. Preliminary and final flushing velocity to be 2.5 fps. Solution concentration as specified. Maintain 50 MG/L available chlorine during 24-hour disinfection period. Bacteriologic test interval every six hours. Flushing and drainage locations where directed by Owner's Representative.

3.10 DISINFECTION TESTING:

- A. Conduct chlorine residual tests upon completion of final flushing operations. Repeat disinfection operation until satisfactory chlorine residual quality tests are obtained.

3.11 WATER BACTERIOLOGIC QUALITY TESTING:

- A. Retain services of an independent testing laboratory to conduct water bacteriologic quality testing.
- B. Provide test on main waterline, if branch from the mainline is greater than 50' long, provide additional testing on said line.

3.12 CERTIFICATIONS, INSPECTIONS AND AS-BUILT DOCUMENTS: Contractor shall provide "as-built" plans of on-site water system by a State of Maryland Licensed Surveyor, or Professional Engineer. Contractor shall notify Architect within 15 calendar days of Contract signature, the name of Licensed Surveyor or Registered P.E. who will certify as-built water plan. Show any changes and include ties for location of valves, bends, manholes, fire hydrants, and laterals accompanied by qualifying test date and certification of compliance. See Division One "Project Record Documents" for format of "as-built" drawings.

**END OF SECTION**