SECTION 33 1419 – VALVES AND FIRE HYDRANTS (BMU)

PART 1.0 - GENERAL REQUIREMENTS

1.1 SCOPE OF WORK

A. The Contractor shall furnish all the necessary labor, materials, equipment, tools, and supplies that are necessary to install a gate valves and fire hydrants, as shown on the plans, standard plates and/or called for in these specifications or its addenda.

1.2 SECTION INCLUDES

A. Gate Valves

B. Valve Box and Cover

C. Valve Box Riser

D. Valve Box Adapter

E. Fire Hydrant

F. Fire Hydrant Marker

1.3 RELATED REQUIREMENTS

A. SECTION 01 3000 – ADMINISTRATIVE REQUIREMENTS

B. SECTION 31 1000 – SITE CLEARING (BMU)

C. SECTION 31 2319 – DEWATERING (BMU)

D. SECTION 31 2333 – TRENCHING AND UTILITY BACKFILLING (BMU)

E. SECTION 33 1000 – WATER UTILITIES (BMU)

F. SECTION 33 1900 – WATER UTILITY METERING EQUIPMENT (BMU)

1.4 PRIOR APPROVAL

A. Approval prior to bidding is necessary if it is intended to use materials and equipment other than those specifically named in Approved Manufacturers. Instructions for obtaining such approval are specified in the General Requirements. Prior approved manufacturers shall be named by Addendum.

1.5 REFERENCES

A. Materials and installation shall be in accordance with the latest revisions of the following codes, standards and specifications, except where more stringent requirements have been specified herein:

1. American Society for Testing and Materials (ASTM)

2. American Water Works Association (AWWA)

1.6 BMU FURNISHED MATERIALS

A. If indicated on the project plans and/or as indicated on the project bid form, BMU shall furnish fire hydrants and isolation valves to the Contractor to install.

B. BMU provided fire hydrants and isolation valves shall only be used for the operation of BMU water mains in utility easements or public right-of-way as identified in the executed Application to Connect.

1. BMU Provided Fire Hydrants, Gasket and Bolts

a. On projects that BMU is providing the fire hydrants, BMU shall be responsible for providing fire hydrants, gasket and bolts for each hydrant identified in the plans. BMU shall be responsible for providing fire hydrants with bury depths as indicated in the project plans.

b. If a hydrant extension is needed to accommodate the indicated bury depth, BMU will provide and install the hydrant extension.

c. Concrete blocking, tracer wire, grounding rod, restrain joint, hydrant markers and other associated hardware shall be furnished and installed by the Contractor.

d. Contractor is responsible for including any and all taxes, included but not limited to excise tax, sales tax, and use tax, in the established bid price for all BMU provided fire hydrants.

2. BMU Provided Valves

a. On projects that BMU is providing the isolation valves, BMU shall be responsible for providing only the valve for each location identified in the plans.

b. Gaskets, bolts, concrete blocking, restrain joints, valve boxes, lids and other associated hardware shall be furnished and installed by the Contractor.

c. Contractor is responsible for including any and all taxes, included but not limited to excise tax, sales tax, and use tax, in the established bid price for all BMU provided fire hydrants.

1.7 QUALITY CONTROL

A. Testing and/or retesting of materials because of nonconformance to the specified requirements shall be performed by an independent firm as per the instructions of the Engineer of Record.

B. Payment for retesting performed during the Contract period and during the warranty period will be the responsibility of the Contractor.

1.8 SUBMITTALS

A. The Contractor shall submit the number of copies that the contract requires plus one copy that the Engineer of Record will retain. The Contractor shall obtain shop drawing approval before any of the work related to that material is performed.

B. Shop drawings and data shall be submitted for, but not be limited to, the following items:

1. Pipe, pipe fittings, bedding material, stabilization material, road topping material, and any other pertinent information concerning construction materials that the Engineer of Record deems necessary for the review of the materials used on the project in accordance with the specifications and drawings.

C. The Contractor shall submit appropriate documentation to the Engineer of Record for any materials not listed in these specifications. The Engineer of Record may forward any shop drawing to the BMU Engineer for consideration. Correspondence shall indicate any discrepancies between the BMU specification requirements and the Contractor provided submittal.

1. BMU Engineer reserves the right to reject any and all materials that do not meet the requirements for water mains as indicated in these standard specifications.

PART 2.0 - PRODUCTS

2.1 GATE VALVES

A. Resilient wedge gate valves (4-inches to 30-inches) shall utilize ductile iron components and be manufactured in full conformance with the most current edition of AWWA C515. The valve seat shall be rated for 250 psi cold water working pressure.

B. Valves shall have a ductile iron 2-inch ductile iron operating nut and open left (counter-clockwise).

C. Gate valves shall be provided with mechanical joint connections meeting the requirements of AWWA C111.

D. All valves supplied shall meet the requirements of NSF/ANSI Standard 61: Drinking Water System Components-Health Effects and NSF/ANSI 61 Annex G, NSF/ANSI 372.

E. Valves shall have a ductile iron wedge encapsulated with nitrile rubber or an EPDM rubber compound. Wedge shall be symmetrical and seal equally well with flow in both directions. Resilient seats shall be bonded or mechanically attached to the gate.

F. Stems shall be non-rising, bronze or stainless steel, and shall be sealed by three O-rings.

G. All exterior bolting, including but not limited to bonnet and stuffing box bolts, shall be 304 stainless steel. Seal between bonnet and valve body shall utilize a flat gasket with integral O-ring; therefore, allowing bolting to pass through and hold the gasket in place.

H. All internal and external ferrous surfaces shall have a 100% fusion bonded epoxy coating applied electrostatically prior to assembly meeting the requirements of AWWA C550.

I. Tapping valves shall meet all the requirements specified within this section. Tapping valves shall have a mechanical joint end and a flanged end to correspond to the branch flange of the tapping sleeve

J. Acceptable Manufacturers are Waterous, Clow, American AVK, American Flow Control (AFC), Mueller or prebid BMU Engineer approved equal.

2.2 VALVE BOXES AND COVER

A. Valve box shall be a two (2) or three (3) piece cast iron valve box for 4-inch to 12-inch gate valves. Valve box shall be adjustable for required trench depth.

B. Valve boxes shall be domestic (heavy wall) cast iron and shall include all pieces as required for installation. The valve boxes shall meet the following requirements:

1. 5 1/4-inch shaft.

2. Standard drop covers marked "WATER."

3. Screw-type.
4. Circular base for 8-inch valve.
5. Heavyweight 35,000-pound tensile strength.
6. Adjustable for trench depth.
7. Covers shall have a skirt length of 1 1/2-inch.
8. Extensions shall be in lengths shown and be compatible with the valve boxes bid.

C. The valve box top section extensions and caps shall be compatible with the above valve box specifications.

D. Acceptable Manufacturers for valve box and covers are Sigma, Star, Tyler or prebid BMU Engineer approved equal.

2.3 VALVE BOX RISER

A. Valve box riser shall be manufactured from cast iron and fit into standard 5-1/4-inch lids. Manufacture shall make all sizes ranging from 1” to 6” and fit into the top section of Tyler, Bingham & Tayor, Opelika, Foundry, Central Foundry and many other manufactures’ valve box.

B. Acceptable Manufacturers are Trumbull or prebid BMU Engineer approved equal.

2.4 VALVE BOX ADAPTOR

A. Valve box adaptor shall be manufactured from recycled "Green" rubber compound. Adaptor shall be custom-molded for a precise fit on all types and sizes of gate valves 2-inch through 16-inch and can be used with 5 ¼-inch cast iron valve boxes.

B. Valve box adaptor shall be installed between the valve and valve box to eliminate settling and shifting of the valve box over the gate valve, allow proper keying of the valve, and center valve box over the operating nut.

C. Acceptable Manufacturers are VBA-II by Adaptor Inc. or prebid BMU Engineer approved equal.

2.5 FIRE HYDRANTS

A. Fire hydrants shall be open left (counterclockwise), constructed of ductile iron nozzle section, including but not limited to caps, upper/lower standpipes and hydrant base. The hydrant shall be rated for a working pressure of 250-psi.

B. Hydrants shall meet or exceed the following standards:

1. AWWA C502, latest revision,
2. NSF/ANSI Standard 61: Drinking Water System Components-Health Effects and NSF/ANSI 61 Annex G, NSF/ANSI 372.

C. The section of the hydrant above ground shall be painted, internal and external, with epoxy primer and high-gloss urethane coating. Hydrants shall be provided with RED coating.

1. If the fire hydrant is designated for a non-public (private) installation, the hydrant shall be provided with a YELLOW coating. Private hydrants shall be indicated as “PRIVATE” or “NON-PUBLIC” on the plan sheets or bid documents.

D. Hydrants shall be capable of being extended in 6-inch increment (7'6", 8'0", 8'6", 9'0" and 9'6") and shall be equipped with traffic features that include a breakaway flange and stem with a shaft coupling.

E. Nozzle section shall be designed for easy 360 degree rotation by loosening connecting bolts and rotating entire nozzle section.

F. The main valve closure shall be of the compression type, opening against the pressure and closing with the pressure. The main valve opening shall not be less than 5 1/4-inches and be designed so that removal of all working parts can be accomplished without excavating.

G. Hydrant shall be provided with an internal travel stop nut located in the top-housing of the hydrant. A double oil reservoir to lubricate the operating threads of the hydrant and utilize a O-ring to seal interior components from water, moisture and foreign materials.

H. The draining system of the hydrant shall be bronze and be positively activated by the main operating rod.

I. Hydrants shall have two 2 1/2-inch hose nozzles and one 4 1/2-inch pumper nozzle, all located on the same horizontal plane. The centerline of the nozzles shall be 24-inches above the ground line groove (16" upper barrel section). Operating nuts shall be pentagon shaped and measure 1 1/2-inches point to flat. Nozzle cap nuts shall be the same dimension and shape as the operating nuts, and the nozzle caps shall be furnished with security chains.

J. All internal and external threads and bolting shall be National Standard threads and utilize a nut and bolt design. Metric, or allen bolts will not be acceptable. All below grade exterior bolting shall be constructed of 304 stainless steel.

K. Provide fire hydrants with a 6-inch mechanical joint connection. Bolts shall be fluorocarbon coated low alloy corrosion-resistant high-strength steel manufactured in full conformance with the most current edition of ANSI/AWWA C111/A21.11.

L. Acceptable Manufacturers for fire hydrants are Waterous Pacer WB67-250, Contemporary Style, or prebid BMU Engineer approved equal.

2.6 FIRE HYDRANT MARKER

A. Hydrant marker shall be impregnated polycarbonate material, red color with adhesive reflector, and with a flexible galvanized hinge riveted to hydrant marker.

B. Each marker shall be hinge mounted to bonnet with bonnet bolt at 48-inch length and 3-inch width.

C. Fire hydrant markers to be the FH 800 Series American model manufactured by Flexstake or prebid BMU Engineer approved equal.

PART 3.0 - EXECUTION

3.1 OWNER OPERATE

A. No valve, hydrant or other controls on the existing water distribution system shall be operated for any purpose by the Contractor. BMU staff shall be the only authorized operator of existing valves and hydrants.

3.2 WATER PIPE MATERIAL HANDLING & STORAGE

A. All pipe, fittings, valves, hydrants, and accessories shall be loaded and unloaded by a means to prevent shock or damage. Under no circumstances shall such material be dropped.

B. Materials, if stored, shall be kept safe from damage. The interior of all pipe, fittings, and other appurtenances shall be kept free from dirt or foreign matter at all times. Valves and hydrants shall be drained and stored in a manner that will protect them from damage by freezing.

C. Piping shall not be stacked higher than Manufacturers' recommendations according to size. The bottom tier of piping shall be kept off the ground on timbers, rails, or concrete. Pipe in tiers shall be alternated: bell, plain end; plain end, bell. At least two rows of timbers shall be placed between tiers, and chocks shall be affixed to each timber in order to prevent movement. The timbers shall be large enough to prevent contact between the pipes in adjacent tiers.

D. PVC piping and Crosslinked Polyethylene (PEX) piping that has been exposed to more than the Manufacturers' maximum allowed UV exposure (sunlight) shall be rejected.

E. Gaskets for mechanical and push-on joints shall be stored in a cool location, out of direct sunlight. Gaskets shall not come in contact with petroleum products. Gaskets shall be used on a first-in, first-out basis.

F. Mechanical-joint bolts shall be handled and stored in a dry location in a manner that will ensure proper use with respect to types and sizes.

3.3 MATERIAL INSPECTION

A. All pipe and appurtenances are subject to inspection by the Engineer of Record and/or BMU staff. Material found to be defective due to manufacture or damage in shipment shall be rejected and removed from the job site.

B. Prior to being lowered into the trench, each pipe shall be carefully inspected by the Contractor and those not meeting the specified requirements shall be removed from the site immediately. Rejections may be made for any of the reasons as stated in the specifications for each specific type of pipe. Pipe having minor flaws not serious enough to cause rejection shall be installed so as to bring such flaws in the top half of the sanitary sewer. Pipe shall be protected during handling against impact, shocks, and free fall.

C. The Engineer of Record and/or BMU staff may perform tests as specified in the applicable AWWA standard to ensure conformance with the standard. In case of failure of the pipe or appurtenance to comply with such specifications, responsibility for replacement of the defective materials becomes that of the Contractor or Manufacturer, even if piping and appurtenance has already been installed.

D. The Engineer of Record and/or BMU staff may require a test of specimens not to exceed 5-percent of the quantity of pipe to be furnished in order to prove the acceptability of the pipe. The Manufacturer shall provide an approved testing stand near the site of the plant.

3.4 VALVES

A. Valves shall be installed at the locations shown on the plans or as directed by the Engineer of Record. Valves shall be installed in accordance with the most current edition of AWWA C600. Proper precast concrete blocking shall be installed under all valves. Pipe shall be supported in such a manner as to prevent stress on the valve.

B. Valves shall remain exposed until the BMU Engineer or Representative has visually inspected and measured the as-built locations.

C. All mechanical joint valves shall be installed with two restrainer devices per valve.

D. All mechanical joint valve shall not exceed a horizontal or vertical deflection of 5-percent. In no case shall valves be used to bring misaligned pipe into alignment during installation.

E. Valves and associated valve box shall not be located in areas that will be future curb and gutters or valley gutters. Any valve located in these areas will not be acceptable to BMU Engineer and shall be removed and relocated at no expense to BMU.

F. All new dead-end water mains shall be closed with plugs or caps that are suitably restrained to prevent blowing off under test pressure. All dead-end water mains shall be equipped with suitable temporary fire hydrant or blow-off assembly.

G. If a blow-off valve precedes the dead-end plug or cap it shall have two (2) joint restraint devices included, and rodding to a fitting may also be required, to insure the valve does not blow off when extension of the water main resumes.

3.5 VALVE BOXES

A. The Contractor shall adjust the valve boxes to the final grade as shown on the Standard Plates. All buried valves shall be installed with the valve box adapter to allow secure and aligned placement of the valve box on the valve.

B. The Contractor shall furnish and install valve box extensions (additional sections) as needed if the valve box has inadequate adjustment length remaining or if extra depth water main had been installed that requires the use of an extension.

C. The Contractor shall replace existing valve boxes as specified. This work includes excavating to the existing valve and removing the existing valve box. A new valve box shall be installed and the trench backfilled.

D. All valve boxes, new installation and adjustment of existing valve boxes, shall be backfilled with pipe bedding material to a depth as indicated on the BMU Standard Plates. The Contractor shall ensure that valve boxes are plumb prior to and during backfilling.

E. Valve operating nut within valve boxes shall be clear of any debris. BMU Staff shall check valve boxes so they can be freely operated after backfilling operations, prior to paving, and again prior to the completion of the project. It shall be the Contractor sole responsibility to remove any debris or correct any alignment problems that might prevent BMU staff from properly operating the valve.

3.6 FIRE HYDRANTS

A. Fire hydrants shall be installed at the locations and elevations as shown on the plans or as directed by the Engineer and in accordance with the most current edition of AWWA C600.
   1. The centerline of the nozzles shall be a minimum of 24-inches above the finished surface elevation but no higher than 26-inches.
   2. The bottom of the breakaway flange shall be a minimum of 2-inches and a maximum of 4-inches above the finished surface elevation.
   3. Fire hydrants shall be installed 3 to 5-feet behind the back of curb unless otherwise indicated on the plans, stand plumb, and have their nozzles parallel with or at right angles to the street centerline, with the pumper nozzle facing the street.
   4. Hydrants installed near intersections shall be located 5-feet minimum from the intersection sidewalk.

B. The Contractor and/or supplier will be responsible for providing fire hydrants with the appropriate bury depths. If a hydrant is provided with an unacceptable bury depth, supplier shall furnish the necessary hydrant extension to BMU. BMU will be responsible for installing any extensions needed to install the fire hydrant at the appropriate grade and in accordance with BMU standards. BMU may back-charge the Contractor for the labor necessary to install the hydrant extension.

C. Hydrants shall be set on a precast concrete block to prevent settlement. Precast concrete thrust blocks shall be installed against undisturbed soil to prevent movement of the hydrant lead.

D. Hydrant bases shall be backfilled with a minimum of 1/3-cubic yard of pipe bedding material to facilitate drainage from the hydrant weep holes. The bedding material shall be placed at a depth of approximately 36-inches above the hydrant base. Contractor shall install one layer of heavy-duty construction grade plastic at the interface of bedding material and the native backfill material. Plastic material shall be installed to minimize fines from migrating into the bedding material and potentially plugging the hydrant weep holes.

E. Tracer wire and a ground rod shall be installed at each fire hydrant location. Tracer wire and grounding rod shall be installed in strict accordance with BMU requirements indicated in previous sections and standard details.

F. Flushing hydrants installed for testing purposes shall be removed once testing has been completed. If the flushing hydrants will remain in place for the duration of a winter season, they shall be installed behind the existing or proposed curb and gutter.

G. Contractor shall protect the coating on the fire hydrant during installation of fire hydrant. Contractor shall utilize straps to raise and lower the fire hydrant into the trench. Chains on the hydrant shall not be used. Contractor shall install a 55-gallon garbage can, or some other means to protect the hydrant from the falling bedding material, over the hydrant when placing bedding material adjacent to the fire hydrant.

PART 4.0 - MEASUREMENT AND PAYMENT

4.1 X" GATE VALVE

A. Payment for valves with boxes shall be at the contract unit price per each type and size of valve with valve box. Payment shall be full compensation for all materials, labor, equipment, and incidentals necessary to complete the work, included but not limited to valve, joint restraints, valve box, valve box extensions, adapter, lid and concrete blocking.

B. No measurement or individual Bid Item payment will be made for the valve box or valve box extensions. These items are considered incidental to the installation of the valve and valve box installation.

OR

X" GATE VALVE -BMU FURNISHED

A. Payment for valves with boxes shall be at the contract unit price per each type and size of valve with valve box. BMU will furnish ONLY the valve/s to the Contractor for installation. Payment shall be full compensation for all other materials, labor, equipment, and incidentals necessary to complete the work, included but not limited to taxes (excise, sales, use, etc.), joint restraints, valve box, valve box extensions, adapter, lid and concrete blocking.

B. Contractor shall be responsible prior to Bid to determine the cost of the valves being provided by BMU. Contractor shall contact pipe/valve supplier to determine value of each size, type and quantity of valve being provided by BMU and include approximate taxes in Bid price.

4.2 VALVE BOX AND COVER

A. No measurement or individual bid Item payment will be made for valve box and cover. Labor, equipment and materials, including but not limited to valve box, extensions, lid or other associated hardware shall be considered incidental to the installation of the valve.

4.3 VALVE BOX ADAPTOR

A. No measurement or individual bid Item payment will be made for valve box adaptor. Labor, equipment and materials, including but not limited to valve box adaptor or other associated hardware shall be considered incidental to the installation of the valve.

4.4 FIRE HYDRANTS (X'X" DEPTH)

A. Permanent and temporary fire hydrants shall be measured per each unit furnished and installed. Payment shall be full compensation for all materials, labor, equipment, and incidentals necessary to complete the work, included but not limited to hydrant, grounding rods, joint restraints, tracer wire, hydrant marker, crushed stone, tar paper/ heavy plastic, and concrete blocking.

B. No measurement and payment will be made for extensions needed to bring the fire hydrant up to the required grade. This item is considered incidental to the installation of the fire hydrant.

OR

FIRE HYDRANTS (X'X" DEPTH) - BMU FURNISHED

A. Permanent and temporary fire hydrants shall be measured per each unit furnished and installed. BMU will furnish ONLY the identified bury depth fire hydrant/s, gasket/s and bolts to the Contractor for installation. Payment shall be full compensation for all other materials, labor, equipment, and incidentals necessary to complete the work, included but not limited to taxes (excise, sales, use, etc.), joint restraints, grounding rods, tracer wire, hydrant marker, crushed stone, tar paper/ heavy plastic, and concrete blocking.

B. Contractor shall be responsible prior to Bid to determine the cost of the fire hydrants being provided by BMU. Contractor shall contact pipe/hydrant supplier to determine value of each size, type and quantity of fire hydrant being provided by BMU and include approximate taxes in Bid price.

4.5 FIRE HYDRANT MARKER

A. No measurement or individual bid Item payment will be made for the fire hydrant marker. Labor, equipment and materials, including but not limited to fire hydrant marker, nuts, bolts or other associated hardware shall be considered incidental to the installation of the fire hydrant.

END OF SECTION 33 1419