CITY OF FORT WAYNE MASTER UPDATED: 3/9/2017

SECTION

NTS: This section includes appurtenances commonly used for water service, such as valves, fire hydrants, restraint devices, curb stops and corporation stops.

Edit this section to suit project requirements and coordinate edits with related sections.

1. GENERAL
	1. DESCRIPTION
		1. Scope:
			1. Contractor shall provide all labor, materials, equipment, and incidentals as shown, specified, and required to furnish, install, and test water appurtenances for water service Coordination:
		2. Coordination:
			1. Review installation procedures for this and other specification sections and coordinate Work that must be installed with or before Work under this Section.
		3. Related Sections:

NTS: List below only sections covering products, construction and equipment that a user might expect to find in this section, but are specified elsewhere. Do not list administrative and procedural Division 01 sections. Insert at (--1--) any additional section references.

* + - 1. Section 33 05 23.13, Utility Horizontal Directional Drilling.
			2. Section 33 11 00, Water Piping Installation.
			3. (--1--)

NTS: Section “1.2” is to be included if project is Bid on unit price basis. Section to be deleted or revised if project is to be bid on lump sum basis.

* 1. MEASUREMENT AND PAYMENT
		1. Measurement and payment for piping and associated appurtenances shall be included in the measurement and payment of each pipe material, except for the specific Work Items listed separately below and in other specification sections.
		2. Water Service Replacement Short Side
			1. Work Item Number and Title

 **33 12 00-A Water Service Replacement Short Side**

* + - 1. Replacement water services to be measured for payment shall be the actual number successfully installed.
			2. Payment for replacement water services shall be based on the contract unit price.
			3. This item shall include all costs to furnish all labor, materials, tools, and equipment to provide replacement of "Short" or near side water services from the proposed water main to the proposed curb box. The Work includes earth excavation and disposing of existing materials, bracing or shoring, dewatering, disposal of surfaces and spoil where required, furnishing and placement of HDPE tubing, corporation stop, curb box, curb stop and Vadle, adjustment of the curb box, tie-over and reconnection of existing services, removal and disposal of existing curb stop and box, tracing wire, tracing wire waterproof direct bury connector, bedding and backfill placement and compaction, granular backfill and/or special backfill, protection of existing utilities, protection of existing trees, shrubbery, light poles, fences and mailboxes, site restoration, including but not limited to, pavement replacement as required, sidewalk and driveway restoration, mulched seeding, and incidentals for performing all Work as specified.
		1. Water Service Replacement - Long Side
			1. Work Item Number and Title

 **33 12 00-B Water Service Replacement Long Side**

* + - 1. Replacement water services to be measured for payment shall be the actual number successfully installed.
			2. Payment for replacement water services shall be based on the contract unit price.
			3. This item shall include all costs to furnish all labor, materials, tools, and equipment to provide replacement of "long" or water services that cross the street from the proposed water main to the proposed curb box. The Work includes earth excavation and disposing of existing materials, bracing or shoring, dewatering, disposal of surfaces and spoil where required, furnishing and placement of HDPE tubing (installed by trenchless method), corporation stop, curb box, curb stop and Vadle, adjustment of the curb box, tracing wire, tracing wire waterproof direct bury connector, tie-over and reconnection of existing services, removal and disposal of existing curb stop and box, bedding and backfill placement and compaction, granular backfill and/or special backfill, protection of existing utilities, protection of existing trees, shrubbery, light poles, fences and mailboxes, site restoration including but not limited to, pavement replacement as required, sidewalk and driveway replacement, mulched seeding, and incidentals for performing all Work as specified.

NTS: Insert at (--1--) below the project specific water service size. This Work item is used for service connections that are 2-inches and larger. Which are typically non-residential facilities such as; Churches, business schools factories. Delete if not applicable.

* + 1. (--1--)Water Service
			1. Work Item Number and Title

 **33 12 00-C (--1--) Water Service**

* + - 1. Replacement water services to be measured for payment shall be the actual number successfully installed, pressure tested and disinfected.
			2. Payment for reconnection water services shall be based on the contract unit price.
			3. This item shall include all costs to furnish all labor, materials, tools, and equipment to provide replacement of the water service from the proposed water main to the proposed connection point. The Work includes earth excavation and disposing of existing materials, bracing or shoring, dewatering, disposal of surfaces and spoil where required, bedding and backfill placement and compaction, granular backfill and/or special backfill,, furnishing and placement of tee, restraint for all joints, valve and box, adjustment of the valve box, all fittings and couplings necessary, tracing wire, tracing wire waterproof direct bury connector, tie-over and reconnection to existing services, removal and disposal of existing valve box, coordinating and cooperating with Water Maintenance and Service throughout the pressure testing and disinfection process, protection of existing utilities, protection of existing trees, shrubbery, light poles, fences and mailboxes, site restoration including but not limited to, pavement replacement as required, sidewalk and driveway replacement, mulched seeding, and incidentals for performing all Work as specified. All excavations made for service Work need to be backfilled with Special backfill.

NTS: There are seven fire hydrant assembly details, used for various installations. Add in the hydrant assembly type at (--1--) and verify that all the related Work items are included below. Add an additional Work item numbers for each different assembly type used on project.

* + 1. Fire Hydrant Assemblies
			1. Work Item Number and Title

 **33 12 00-D Fire Hydrant Assembly-Type (--1--)**

* + - 1. The number of fire hydrant assemblies to be measured for payment shall be the actual number installed along a water main that is successfully installed, pressure tested and disinfected.
			2. The payment for this item shall be based on the contract unit price. Pressure testing and disinfection shall be included under the items for the water main unless otherwise broken down by the Engineer as a separate Bid item.
			3. These items shall include all costs to furnish all labor, materials, tools, and equipment, both permanent and temporary, to install and maintain complete the fire hydrant assemblies as shown and specified unless otherwise directed by the Engineer. The Work includes, but is not limited to: clearing and grubbing, tree trimming, removing and returning or replacing trees not specified in the Contract Documents, pavement, curb, curb walk, sidewalk, and drive approach removal and disposal, trench excavation, disposal of excavated material, dewatering, granular and/or special backfill, required couplings and specials, bedding, temporary surface, testing of materials, compaction of bedding, temporary sheeting, shoring and bracing, site restoration including but not limited to, pavement replacement as required, sidewalk and driveway replacement, mulched seeding,, protection of existing utilities and structures, protection of trees, shrubbery, light poles, fences and mailboxes, repair of utility service laterals if disturbed, erosion control measures, the main connection, connection piping, fittings, , hydrant, 0.5 cubic yard stone drainage pit at the base of the hydrant, anchorage, gate valve, valve box and extensions, restrained joints, adjustment of valve boxes and the "Not in Service" tagging as necessary and specified. Select and granular backfill shall be included under these items.

NTS: Delete Paragraph 5 below based on project specific requirements. Conduct soil test at project location. Refer to the soil corrosively testing method to score the soil. If soil scores a 10 or greater then polyethylene encasement is required. If not used remove polyethylene encasement reference form Part 2 of this Section.

* + - 1. This Item shall also include polyethylene encasement of hydrant leads.

NTS: Insert at (--1--) below the project specific gate valve size. Add in additional Work items for multiple gate valve sizes. Delete if not applicable.

* + 1. Resilient Seat Wedge Gate Valve and Boxes
			1. Work Item Number and Title

 **33 12 00-E (--1--) Resilient Seat Gate Valve and Box**

* + - 1. The number of gate valves and boxes to be measured for payment shall be the actual number of gate valves and valve boxes installed and adjusted as necessary, on a successfully installed, pressure tested and disinfected water main.
			2. Payment for these items shall be based on the contract unit price.
			3. This item shall include all costs to furnish all labor, materials, tools, and equipment required to install and maintain complete the gate valves and valve boxes as shown and specified unless otherwise directed by the Engineer. The Work shall include, but is not limited to: gate valves and valve boxes (extensions as necessary), adjustment of the valve boxes, and any necessary joint restraining required to overcome the thrust imposed by the respective items.

NTS: Delete Paragraph 5 below based on project specific requirements. Conduct soil test at project location. Refer to the soil corrosively testing method to score the soil. If soil scores a 10 or greater then polyethylene encasement is required. If not used remove polyethylene encasement reference form Part 2 of this Section.

* + - 1. This item shall also include polyethylene encasement of gate valves.

NTS: Butterfly valves are typically used on waterlines larger than 20-inches, if smaller diameters the Resilient Seat Wedge valve is used. As diameters of resilient seat wedge valve become large they require many turns to open and close them. Insert at (--1--) below the project specific valve size. Add in additional Work items for multiple gate valve sizes. Delete if not applicable. Coordinate with sections 2.3 and 2.4.

* + 1. Butterfly Valve and Boxes
			1. Work Item Number and Title

 **33 12 00-F (--1--) Butterfly Valve and Box**

* + - 1. The number of gate valves and boxes to be measured for payment shall be the actual number of butterfly valves and valve boxes installed and adjusted as necessary, on a successfully installed, pressure tested and disinfected water main.
			2. Payment for these items shall be based on the contract unit price.
			3. This item shall include all costs to furnish all labor, materials, tools, and equipment required to install and maintain complete the butterfly valves and valve boxes as shown and specified unless otherwise directed by the Engineer. The Work shall include, but is not limited to: butterfly valves and valve boxes (extensions as necessary), adjustment of the valve boxes, and any necessary joint restraining required to overcome the thrust imposed by the respective items.

NTS: Delete Paragraph 5 below based on project specific requirements. Conduct soil test at project location. Refer to the soil corrosively testing method to score the soil. If soil scores a 10 or greater then polyethylene encasement is required. If not used remove polyethylene encasement reference form Part 2 of this Section.

* + - 1. This item shall also include polyethylene encasement of butterfly valves.
		1. Air Release Structure
			1. Work Item Number and Title

 **33 12 00-G Air Release Structure**

* + - 1. The number of air release structures to be measured for payment shall be the actual number of structures and valves installed and adjusted as necessary, on a successfully installed, pressure tested and disinfected water main.
			2. Payment for these items shall be based on the contract unit price per each structure installed.
			3. This item shall include all costs to furnish all labor, materials, tools, and equipment required to install and maintain complete the air release structures and all equipment within as shown and specified unless otherwise directed by the Engineer. The Work shall include, but is not limited to: structure bedding and backfill, excavation, precast concrete manhole structure, manhole casting and lid, pavement removal and disposal if necessary, disposal of excess excavated material, base stabilization, dewatering, sheeting, riser rings, temporary pavement replacement if necessary, air release valve, shut off valve, mechanical joint tee, and testing. site restoration including but not limited to, pavement replacement as required, sidewalk and driveway replacement, mulched seeding, and incidentals for performing all Work as specified.
	1. REFERENCES

NTS: Retain applicable standards and add others as required.

* + 1. Standards referenced in this Section are:
			1. AWWA C502, Dry-Barrel Fire Hydrants.
			2. AWWA C504, Rubber-Seated Butterfly Valves.
			3. AWWA C508, Swing-Check Valves for Waterworks Service, 2-inch through 24-inch NPS.
			4. AWWA C515, Reduced-Wall Resilient-Seated Gate Valves for Water Supply Service.
			5. AWWA C550, Protective Interior Coatings for Valves and Hydrants.
			6. ANSI/AWWA C105/A21.5, Standard for Polyethylene Encasement for Ductile-Iron Pipe Systems.
	1. QUALITY ASSURANCE

NTS: Edit or delete Paragraph “A” if project requirements prohibit an experience clause.

* + 1. Manufacturer’s Qualifications:
			1. Manufacturer shall be able to provide documentation of at least five installations of substantially similar products to that specified, in satisfactory service for at least five years.
		2. Component Supply and Compatibility:
			1. Specified appurtenances of each type shall be furnished by a single manufacturer.
		3. Regulatory Requirements:

NTS: Some states require valves in contact with potable water or water that will be treated to become potable be certified as suitable for contact with drinking water by an accredited organization per ANSI/NSF 61 requirements. Verify local requirements and delete or edit Paragraph “1” to suit the project.

* + - 1. Drinking Water Requirements: Valves that will be in contact with potable water or water that will be treated to become potable shall comply with ANSI/NSF 61 and the Safe Drinking Water Act.
	1. SUBMITTALS
		1. Action Submittals.
			1. Product Data: Submit the following for each type and size of fire hydrant, valve, and restraint device, curb stop and corporation stop specified:
				1. Product data sheet.
				2. Complete catalog information, including dimensions, weight, and performance data.
		2. Informational Submittals:
			1. Certifications:
				1. Submit documentation from the manufacturer of each product stating that product conforms to applicable referenced standards and specified requirements.
	2. DELIVERY, STORAGE, AND HANDING
		1. Comply with the manufacturer for special handling and storage requirements.
		2. Conform to Section 01 65 00, Product Delivery Requirements and Section 01 66 00 Product Storage and Handling Requirements.
1. PRODUCTS
	1. SERVICE CONDITIONS

NTS: Review Paragraph A below and modify to suit the project.

* + 1. General:
			1. Water appurtenance items shall be suited for services intended.
			2. Water appurtenances that will be in contact with potable water shall be listed in ANSI/NSF 61 as being suitable for contact with potable water.
	1. FIRE HYDRANTS
		1. Fire hydrants shall conform to AWWA C502 and shall be complete with all necessary fittings and accessories. They shall have one 4 ½ inch pump connection and two 2 ½ inch hose connections with NSFH threads of four threads and 7 ½ threads per inch, respectively. The hydrant shall open left (counterclockwise) and be of sufficient length for 5 foot burial.
		2. Contractor shall verify direction of opening with Engineer prior to ordering.
		3. All hydrants shall be properly painted before shipment and after installation in accordance with AWWA C502.
		4. Federal yellow shall be the color used to paint all hydrants. They shall have an auxiliary valve as detailed on fire hydrant assembly standards.
		5. Hydrants shall be for 250 psi working pressure. The hydrant shall be such that the valve will remain closed if the upper portion of the fire hydrant is removed or broken off. The operating nut shall be pentagonal and shall turn counterclockwise to open.
		6. Contractor shall verify direction of opening with City prior to ordering.
		7. The hose caps shall be secured to the hydrant with a chain during shipment. The chains may only be removed after the hydrant is placed into service.
		8. The following fire hydrants are acceptable for use in connection with water main installation, listed by manufacturer and model number:
			1. Clow, Medallion
			2. Mueller, A-423
			3. American Darling/American Flow Control B62B
			4. Kennedy, Guardian
			5. Or approved equal

NTS: Resilient seat gate valves are used for watermain diameters less than 16”. For diameters greater than 24” butterfly valves may be used. Remove Section 2.3 and 2.4 if not applicable to project.

* 1. RESILIENT SEAT GATE VALVES
		1. Mechanical Joint Ends
			1. Valves used in water distribution systems shall be resilient seat gate valves unless the valves are not available in a required size. Butterfly valves may be used in diameters 20-inch and greater.
			2. Buried valves shall have mechanical joints. Valves shall open right (clockwise) and shall be equipped with O-ring packing and a two inch (2”) operating nut and non-rising stem. Contractor shall verify direction of opening with City prior to ordering.
			3. Resilient seated gate valves are to be manufactured in accordance with AWWA C515. Valves shall be ductile iron bronze mounted. Resilient seats shall be applied in accordance with AWWA C515.
			4. Valves shall be designed for a working pressure of 250 psi.
			5. The following resilient seated gate valves are acceptable for use in connection with water main installation, listed by manufacturer and model number, no substitutions:
				1. American Flow Control, 2500 series
				2. Clow, 2639/2640 or 2638
				3. Kennedy, KS-FW or KS-RW
				4. Mueller, 2360 or 2361
		2. Fusible HDPE Joint Ends
			1. Valves used in water distribution systems shall be resilient seat gate valves unless the valves are not available in a required size. Fusible HDPE gate valves are acceptable in 6-inch, 8-inch and 12-inch.
			2. Pipe on the fusible stub ends shall match the mainline pipe size and requirements and be PE4710, suitable for butt fusion of electrofusion and meet AWWA C906.
			3. Valves shall open right (clockwise) and shall be equipped with O-ring packing and a two inch (2”) operating nut and non-rising stem. Contractor shall verify direction of opening with City prior to ordering.
			4. Resilient seated gate valves are to be manufactured in accordance with AWWA C515. Valves shall be ductile iron bronze mounted. Resilient seats shall be applied in accordance with AWWA C515.
			5. Valves shall be designed for a working pressure of 250 psi.
			6. The following resilient seated gate valves are acceptable for use in connection with water main installation, listed by manufacturer and model number, no substitutions:
				1. AVK, Series 66 American

NTS: Resilient seat gate valves are typically used for watermain diameters less than 16”. For diameters greater than 24” butterfly valves may be used. Remove Section 2.5 if not applicable to project.

* 1. BUTTERFLY VALVES
		1. Butterfly valves may be used in diameters 20-inch and greater where resilient seat gate valves are not available.
		2. Butterfly valves are to be manufactured in accordance with AWWA C504 with stainless steel shafts. The shaft seats, bearings, operators, body and discs shall be designed based on Class 150B.
		3. Butterfly valves shall be designed for a working pressure of 250 psi.
		4. Seating ring shall be made of rubber and located in the body or on the disc and shall be adjustable and field replaceable.
		5. Shaft shall be of the through type or stub type and shall be marked on the end to indicate the position of the valve disc with respect to the shaft.
		6. Discs shall be of corrosion-resistant alloy cast iron.
		7. Valves shall be equipped with a stainless steel stop in the body to prevent the disc from rotating through the closed position. The shaft seals shall be of the “split-V” or Chevron type. The operator shall be permanently lubricated and sealed for buried service and shall be equipped with a 2 inch square opening nut. The operator shall be constructed such that the valve will open right (clockwise).
		8. The bolts, screws, and nuts used in the assembly of the valve and exposed to the soil shall be corrosion resistant.
		9. Butterfly valves used in connection with ductile iron pipe shall be equipped with standard mechanical joint ends complete with all accessories as outlined in this chapter.
		10. The following butterfly valves are acceptable for use in connection with water main installation:
			1. Clow, 4500 Series
			2. Mueller, Lineseal XPII
			3. Dezurik, BAW
			4. Kennedy, 1450 Series
			5. Pratt, Triton XR-70
			6. Or approved equal

NTS: Joint restraint products listed in Section “2.5” below are for non-HDPE pipe materials (bell and spigot joints). Joint restraint is typically used on a project for connecting to exiting piping, and closing air gaps. Remove Section “2.5” if not applicable to project.

* 1. RESTRAINED JOINTS FOR WATER APPURTENANCES

NTS: Delete products 2 thru 5 for pipe sizes 16” and larger.

* + 1. Provide restrained joints for water appurtenances by one of the following:
			1. EBBA Iron MegaLug
			2. Sigma One-Lok (SLCE) Wedge restraint
			3. Romac RomaGrip MJ restraining gland
			4. Stargrip Series 4000(G2) MJ wedge action restraint
			5. Ford Uni-Flange Series 1500(R) MJ retainer gland
	1. WATER SERVICE LINES
		1. Provide HDPE pipe for service connections, refer to Section 33 05 38.16 – HDPE Pressure Utility Piping.
		2. All connections and joints shall utilize NL brass mechanical compression fittings that are designed and specified for using with HDPE tubing. The following are acceptable compression connectors:
			1. Mueller 110 Compression Connection.
			2. Ford Quick Joint.
			3. Or approved equal.
		3. Pipe Stiffeners for water service lines:
			1. Insert shall be 304 stainless steel, provided by the following manufacturers:
				1. Mueller
				2. Ford
				3. McDonald
			2. Segmented and non-segmented are acceptable.
			3. Provide flared end stiffeners that extend into the compression fitting and are intended for use with compression style connections.
			4. Stiffeners must match the inner diameter of the service line pipe.
		4. Buried Service Connection Identification
			1. Tracing wire is required for all service lines.
				1. Refer to Section 33 11 00 – Water Piping Installation for buried tracing wire requirements.
			2. Plastic Hose Clamps
				1. Provide non-metallic plastic hose clamps.

NTS: The following products have been updated to the no lead requirement, based on the January 4, 2011 amendment to Section 1417 of the Clean Water Act.

* 1. CURB STOPS
		1. Curb Stops
			1. Curb stops shall be ball type valves of extra heavy, all brass construction. The curb stops shall have a heavy or thick tee-head operator and a 90 degree rotation of the ball. Each stop shall be equipped with a curb box. Ball valves shall have Teflon coated balls and hard or synthetic rubber seat-rings.
			2. The following corporation stops are acceptable for use in connection with water main installations, listed by manufacturer and model number:
				1. Mueller, B-25204N or B-2520938N
				2. Ford, B22-NL or B44-NL
				3. McDonald, 76100 or 76100-22
	2. CURB BOX LOCK
		1. Curb Stops 1 inch in diameter
			1. A curb box lock shall be used on all services.
			2. The following manufacturers and products are approved:
				1. JRC Supplies Inc., Vadle
				2. Or approved equal
	3. CORPORATION STOPS
		1. Corporation Stops
			1. Corporation stops shall be ball type valves of extra heavy, all brass construction. The corporation stops shall have a flat, thick, operating head with a 360 degree rotation. The corporation stop inlet threads shall be machined with standard AWWA tapered threads.
			2. The following corporation stops are acceptable for use in connection with water main installations, listed by manufacturer and model number:
				1. Mueller, B-25000N or B-25008N
				2. Ford, FB-600NL or FB-1000NL
				3. McDonald, 74701B or 74701B-22

NTS: Tapping saddles are used for plastic piping. A direct tap is used for ductile iron pipe.

* 1. TAPPING SADDLES
		1. Tapping saddles shall be used for all service taps.
		2. Saddles for Non-HDPE Pipe
			1. Tapping saddles and hardware shall be ductile iron with epoxy coating, stainless steel or bronze material with AWWA tapered threads. The tapping saddle design shall be hinged or bolted, both with a minimum strap width of 2 inches. 3 piece tapping saddle design is not allowed.
		3. Saddles for HDPE Pipe
			1. Only electrofusion saddles are acceptable for use with HDPE pipe.
			2. Provide electrofusion saddles manufactured in accordance with ASTM F-1055 and conform with the following material requirements:
				1. Pre-Blended resin 4710 which complies with ASTM D3350.
				2. Resin must be acceptable for use with potable water and comply with NSF Standard 61.
			3. The following are acceptable manufacturers:
				1. GF Central Plastics
				2. Plasson USA
				3. Integrity Fusion Products
				4. Or approved equal.
	2. VALVE BOXES AND CURB BOXES
		1. Valve Boxes
			1. Valve boxes shall be cast iron, 2 piece, screw type boxes. The boxes shall be 5 ¼ inch shaft size with a round base. The word “water” shall be cast on the box lid.
			2. Provide a valve box aligner:
				1. Posi-Cap Valve Box Aligner.
				2. Or approved equal.
		2. Curb boxes shall be cast iron 2 piece, Buffalo, screw type boxes. The box shall be 3 inches in diameter with a round base. The word “water” shall be cast on the lid. The lid shall be held in place with a standard brass pentagon head screw.

NTS: Edit Section “2.14 C” below to suit project. Ensure that the detail is included on the Contract Drawings.

* 1. WATER METER BOXES
		1. Provide plastic pit setter water meter box with a frost roof double lid cover and yoke bar.
		2. Manufactures:
			1. Ford Meter Box Company, Inc.
			2. Or approved equal.
		3. Conform to dimensions shown on the Contract Drawings.
	2. AIR RELEASE STRUCTURES
		1. Structure
			1. Provide precast concrete air release structures, using a doghouse style manhole.
		2. Structure Lid
			1. Casting shall be Self-Sealing or water tight.
			2. Lid shall be stamped with the word WATER and have closed pick holes.
		3. Air Release Valve
			1. Valmatic Model #25 VC
			2. Or approved equal

NTS: Edit article 2.17 below based on project specific requirements. Provide standard details on Contract Drawings. Coordinate with Article 3.11 below.

* 1. BACKFLOW PREVENTION DEVICES
		1. All backflow prevention devices must be approved and listed by the Foundation for Cross Connection Control and Hydraulic Research as published by the USC. This listing is available from USC or IDEM’s Drinking Water Branch.
	2. PAINTING OF EXPOSED VALVES, HYDRANTS, AND APPURTENANCES
		1. Exterior steel, cast-iron, and ductile iron surfaces, except machined surfaces of exposed valves, hydrants, and appurtenances, shall be finish painted in manufacturer’s shop. Surface preparation, priming, finish painting, and field touch-up painting shall conform to the coating systems specification.
	3. PAINTING OF BURIED VALVES AND APPURTENANCES
		1. Exterior steel, cast-iron, and ductile iron surfaces, except machined or bearing surfaces of buried valves and appurtenances, shall be painted in manufacturer’s shop with two coats of asphalt varnish conforming to FS TT-C 494.
1. EXECUTION
	1. INSTALLATION
		1. General:
			1. Install water appurtenances as shown, specified, and as recommended by the manufacture.
			2. In the event of conflict between manufacturer’s recommendations and the Contract Documents, request interpretation from Engineer before proceeding.
			3. Location of service connections and insertion valves indicated are approximate. Final location will be established during construction by the Owner.
			4. Do not install service connections until new mains have been successfully tested, disinfected, and placed in service.
			5. Prior to ordering tapping sleeve assembly, expose existing main and verify circumference of existing pipe.
			6. Prior to ordering insertion valve and sleeve assembly, expose existing main at point of installation and verify circumference, actual caliper diameter and roundness of existing pipe. In addition, identify the exterior condition of the pipe with respect to pitting, scaling, electrolysis, or other defects which would affect manufacturing dimensions or exact location of the insertion.
	2. FIRE HYDRANTS
		1. Install hydrants as shown and indicated in the Contract Documents.
		2. Provide suitable adapters when hydrants and piping have different joint types.
		3. Provide thrust restraint at all hydrants located at pipeline terminations.
		4. Set hydrants plumb and to grade of curb, street, alley, highway, or right-of-way with pumper nozzle toward middle line of street, highway, or right-of-way.
		5. Set hydrant elbow and on solid block, place INDOT No. 8 stone (1/2 Cubic YDS Minimum around hydrant elbow (See Detail W-17), place INDOT No. 8 or INDOT No. 53/73 around valve and valve box (See Detail W-17).
		6. Where fire hydrant must be located in a paved area provide a minimum of 5-foot by 5-foot concrete block-out, with expansion joints on all sides.
		7. When Engineer deems it necessary to set a fire hydrant at a greater depth of bury as a result of changing hydrant location from that shown, adjust elevation by furnishing and installing the fire hydrant manufacturer's standard barrel and stem extensions.
	3. VALVES
		1. Install valves, valve boxes, and curb boxes as shown and indicated in the Contract Documents.
		2. Provide suitable adapters when valves and piping have different joint types.
		3. Provide thrust restraint at all valves located at pipeline terminations.
		4. Set valves plumb and on solid bearing.
		5. Place valves within park strip areas (grass area between sidewalk and curb), or as directed by the Engineer.
		6. Assemble, align, and fit tapping sleeve and tapping valve to main using personnel skilled and experienced in making of pressure taps. In the event of mismatch of purchased materials, refit in the field or make necessary arrangements with manufacturer for factory refit. Remove section of severed water main through tapping valve and present to Owner as proof of satisfactory execution of the operation. Owner may retain coupon for further analysis or testing to evaluate the condition of existing water main.
		7. Install insertion valves and sleeves using personnel skilled and experienced in the use of the valve insertion machinery and accessory equipment of the type, design and size corresponding to each valve size installed. Remove section of severed water main and present to Owner as proof of satisfactory execution of the operation. Owner may retain coupon for further analysis or testing to evaluate the condition of existing water main.
	4. WATER SERVICES – INSTALLATION
		1. General
			1. Use an electrofusion saddle for all water service connections to HDPE pipe mainline.
			2. Use a bolted metal saddle for all water service connections to non-HDPE pipe mainline.
			3. Comply with manufacturer’s installation instructions and recommendations.
		2. Electrofusion Saddle Installation Procedures:
			1. Mark location of the electrofusion saddle, scrape pipe to expose clean virgin material. Use an HDPE scrapper tool, do not use a grinder, file, sand paper, or Emory cloth. Completely and evenly remove a 0.007-inch to 0.010-inch of the HDPE pipe surface.
			2. Do not mark the HDPE material with a grease pencil or any petroleum based marker. Use a permanent marker or paint pen.
			3. After scraping clean surface using isopropyl alcohol (min 70%) Allow the fusion zone to completely dry before proceeding. Protect the clean surface from dirt, grease, water and unfavorable weather conditions. Avoid touching, with ungloved hands, the clean pipe surface and inside of the electrofusion fitting.
			4. Correct any mainline pipe flat spots or out of roundness.
			5. Position the saddle onto the clean and dry electrofusion zone and tighten to the mainline pipe, using manufacturer supplied straps or clamps.
			6. Start the electrofusion process with appropriate fusion machines. Protect the electrofusion saddle against movement during the electrofusion process. After fusion is complete, allow the connection to cool based on the saddle manufacturer’s recommended time. Do not move or adjust the saddle until completely cooled.
			7. Visually inspect electrofusion joint for any fusion defects. Repair any defects prior to proceeding to field quality control testing.
			8. Install corporation stop on the tapping saddle, use appropriate saddle thread sealing aids.
		3. Water Service Electrofusion Tapping Saddles – Field Quality Control:
			1. Prior to tapping into the mainline conduct pressure test on all electrofusion saddle joints.
			2. Install an appropriate testing device into the corporation stop. Device shall have a plain end HDPE pipe that directly connects to the service corporation stop and include a pressure gauge, and appropriate testing fitting appurtenance.
			3. Gradually fill the saddle with air to 100 psig. The joint is acceptable if the 100psig is maintained for at least 5 min.
			4. After successful testing of the saddle joint, complete tapping procedures.
			5. If electrofusion saddle joint fails, completely remove the saddle and reinstall according to the listed installation requirements.

NTS: Paragraph “D” includes requirements for installation of bolted tapping saddles. Field quality control testing for the installed saddles is not specified below. If required for project, incorporate air testing as listed for electrofusion tapping saddles, in Paragraphs “B.7” and “C” above.

* + 1. Bolted Saddle Installation Procedures:
			1. Tapping saddles must be used for the installation of a corporation stop in a tapped pipe. The tap saddle is made to a specific inner diameter to match the outer diameter of the pipe. It fully supports the pipe and is sized so that the parts when bolted together cannot be over tightened on the pipe.
			2. Prepare and clean all pipe surfaces that are in contact with the tapping saddle. This includes all surfaces that are in contact when the tapping saddle before, during and after the installation and tapping.
			3. Position the saddle at the tapping location, do not rotate or move the saddle once bolted.
			4. Install the saddle back and tighten nuts evenly and torque per the manufacturer’s recommendations. Do not overtighten.
			5. Visually inspect tapping saddle connection for any defects. Repair any defects prior to proceeding with water service installation.
			6. Install corporation stop on the tapping saddle, use appropriate saddle thread sealing aids.
		2. Tapping Procedures for Water Services:
			1. Use a tapping tool designed and intended for watermain service tapping. Use of an electric drill is not allowed.
			2. Do not make cuts in pipe until the saddle is property connected or fused to the mainline pipe and has successfully passed leakage testing.
			3. Thoroughly clean tapping tool and surfaces prior to conducting the tapping procedures. Use appropriate cutter bit for mainline pipe being tapped.
			4. Conduct the tapping procedure, and close the stop valve.
			5. Completely remove the tapping tool pipe coupon and shavings.
			6. Visually inspect the corporation stop and saddle connection for defects or leakage, repair as required.
			7. Compete the water service line installation.
	1. VALVE BOXES AND CURB BOXES
		1. Install valve box aligner, on to the valve stem.
		2. Center and plumb valve and curb box over valve; set box cover flush with finished grade.
		3. Construct valve box concrete collar; provide expansion joint material around portion of box in concrete pavement or sidewalks.
		4. Curb Stop Valve Box Alignment Device Installation
			1. Place the curb stop valve box alignment device on a properly prepared level sub base under the curb stop.
			2. Install the anti-twist ring over the key of the curb stop, the ring will lock onto the curb stop.
			3. Place the curb box over the curb stop valve box alignment device
			4. Backfill on all side in equal lifts, avoid and displacement of the curb stop and valve box during backfilling.
		5. Install the valve box aligner to keep the valve box in place and secure during backfilling.
	2. AIR RELEASE STRUCTURES
		1. Manholes:
			1. Install structure sections, joints, and gaskets in accordance with manufacturer’s recommendations.
			2. Apply trowelable grade butyl rubber backplaster material 1/4 inch minimum thickness, on the outside of the precast manhole at each joint.
			3. Apply non-shrink grout to the inside of the precast manhole at each joint.
			4. Lifting holes, if used in manhole components, shall be repaired using a conical precast concrete plug, properly sealed into place using a non-shrink cement epoxy grout.
			5. Place the base of the doghouse style precast manhole on concrete blocks with a minimum of 6-inches of INDOT NO. 6 compacted stone.
			6. Encase the waterline in INDOT NO. 8 stone flush with the base of the air release valve.
			7. Join casting frame to structure with a double row of butyl rubber flexible rope joint sealant.
		2. Air Release Valve:
			1. Install air release valves in accordance with manufacturer’s recommendations.

NTS: Edit section below based on project specific service connection installation requirements. Ensure that the standard detail is included in the Contract Drawings. Delete if not applicable.

* 1. SMALL SERVICE CONNECTIONS-( 1INCH THRU 2 INCH)
		1. Trenchless Service Connections
			1. Install pipe under street and highway pavements by pushing or boring, in accordance with Section 33 05 23.13 Utility Horizontal Directional Drilling.
		2. Ensure service connection has a minimum cover of 4 foot.
		3. Install pipe backfill that is free from large rocks, sharp objects or debris.
		4. Install services perpendicular to the right-of-way line. Place the curb stop within 4-feet of a side property line and 7-feet off of the right-of-way line.
		5. Services shall be continuous pipe from the corporation to the curb stop, and from the curb stop to the meter. Only butt fused joints are allowed.
		6. Do not use pipe lubricants or compounds at joints or fittings.
		7. If service line is cut or gouged greater than 5% of wall thickness, replace the entire service line.
		8. Do not stretch service line tight during installation. Provide a minimum 12-inches of slack in the line per 100-feet to allow for expansion and contraction.
		9. Bend pipe in accordance with manufacturer’s recommendations. Do not kink pipe during bending. No bend shall be made within 10 diameters of a fitting.

NTS: Ensure that the appropriate tracing wire standard detail is included in the Contract Drawings.

* + 1. Buried Piping Identification Tracing for Service Connections.
			1. Install tracing wire for service connections in accordance with the Contract Drawings. Refer to Section 33 11 00 – Water Piping Installation for additional installation requirements.

NTS: Edit paragraph K through M below based on project specific requirements.

* + 1. For existing service connections, intercept or extend as shown or noted to connect to new water mains.
		2. For existing service connection pipe to be abandoned, close the exposed end by crimping.
		3. For existing service connections to be abandoned on existing water mains to remain in service, dig up (expose) and turn off the existing corporation stop at the connection to the existing main.

NTS: Edit section below based on project specific service connection installation requirements. Ensure that the standard detail is included in the Contract Drawings. Delete if not applicable.

* 1. LARGE SERVICE CONNECTIONS-( 4 INCH AND LARGER)
		1. Trenchless Service Connections
			1. Install pipe under street and highway pavements by pushing or boring, in accordance with Section 33 05 23.13 Utility Horizontal Directional Drilling.
		2. Minimum cover for services is 4 feet.
		3. Service Connections on New Mainline
			1. Install tee compatible with the mainline material.
			2. Install a standard gate valve and valve box.
		4. Service Connections on Mainlines In Service
			1. Install tapping sleeve compatible with the mainline material.
			2. Install a tapping valve and standard valve box.
		5. Buried Piping Identification Tracing for Service Connections.
			1. Install tracing wire for service connections in accordance with the Contract Drawings. Refer to Section 33 11 00 – Water piping Installation for additional installation requirements.
	2. CONNECTIONS AND INSERTIONS INTO EXISTING MAINS
		1. Existing mains into which valves are to be inserted cannot be shut down or taken out of service. The entire operation of installing the valves shall be accomplished below 100 psig at the point of installation.
		2. Connect new mains to existing mains using proper fittings and in a manner acceptable to Owner and Engineer.
		3. Expose existing mains at connection points 10 days prior to making connections to determine elevation, verify type of pipe, confirm outside diameter of pipe, and identify type of restraints existing.
		4. No cut-ins or connections to existing mains shall be made unless at least 48 hours notice is given to Owner and Engineer.
		5. Plan all connecting Work to reduce number of shutoffs.
		6. Two days prior to shutting valves on existing lines, notify all affected property owners, local official in charge of the water works system, and Engineer of such shutoff.
		7. Keep shutoff time to a minimum and do at off-peak hours.
		8. A representative of Owner shall operate existing valves. Contractor shall not operate existing valves.
		9. Owner and Engineer assume no responsibility for any delay occasioned by special requirements or conditions which must be met in making connections.
		10. Take extreme care in making connections to prevent contamination of existing mains.
		11. Before making cut-ins or connections to existing mains, wash all fittings, valves, and pipe with clean water, and then disinfect by washing with a chlorine solution having a residual chlorine strength of not less than 50 ppm.
		12. Plugs removed from existing mains that are not damaged may be reused within the Project, and those remaining after completion of construction shall remain the property of Owner.
	3. WATER METER BOXES
		1. Install assemblies as shown or noted and with meter pit cover at grade level; comply with component manufacturer’s instructions.
		2. Install meter setters level and plump.
		3. Do not install meter pits in street, parking lots, driveways, or any area where vehicular traffic may occur.

NTS: Backflow prevention devices are typically for business and manufacturing facilities that use the potable water in a process. They are used to protect the main waterline, during a loss of pressure, from siphoning the facilities process water back into the system. Edit section below based on project specific requirements.

* 1. BACKFLOW PREVENTION DEVICES
		1. Install backflow valves in accordance with manufacturer’s recommendations.

+ + END OF SECTION + +