MICHIGAN

DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION

FOR

**WATER MAIN MATERIALS AND CONSTRUCTION**

TRV:LCP 1 of 4 APPR:RPB:CJD:05-26-25

**a. Description.** This work consists of installing the following materials as part of the Green Lake Township water system. Unless otherwise noted below, ensure all work, materials, construction requirements, and methods of measurement and payment are in accordance with the standard specifications, *AWWA* and as shown on the plans. This work includes trench excavation, water main installation, appurtenances, dewatering, sheeting and/or bracing, gaskets, backfilling, disinfecting and testing of the pipe, disposal of waste materials, connections to existing systems, maintaining drinking water service, furnishing as-built plans and any related work necessary to complete the water main installation.

**b. Submittals.** Submit PDF product data consisting of shop drawings and manufacturer’s literature to the Engineer for approval at least 10 working days prior to construction.

**c. Materials.** Furnish the materials listed below in accordance with current *AWWA* and *ASTM* standards, the standard specifications, and Green Lake Township Specifications. The specific items listed conform to the Green Lake Township water system requirements and substitutions are only permitted if approved by the Engineer.

1. Pipe. Ensure HDPE is manufactured from PE 4710 in accordance with *AWWA C906* and *ASTM F714*, ductile iron pipe size (DIPS), and a dimension ratio (DR) of 11 or less. Design the pipe for a laying depth of a minimum of 6 feet and meet the following conditions: Be rated at a working pressure of 200 psi and have a surge pressure rating of at least 300 psi. Pipe must meet the requirements of *NSF* Standards *14* and *61*. The exterior wall print line of all pipe proposed for installation and potable use must bear the *AWWA* and *NSF-PW* identification.

Ensure DI pipe is thickness Class 52 in accordance with *ANSI/AWWA* *C150/A21.50* and *C151/A21.510*.

2. Mechanical Joints and Gaskets. Ensure joints for water main pipe are in accordance with following:

Ensure mechanical joints are in accordance with *ANSI/AWWA C110/A21.10*. Ensure gaskets are in accordance with *ANSI/AWWA C111/A21.11* and manufacturer's standards. Ensure gaskets for water main are comprised of chemically resistant material such as nitrile or fluroelastomer (FKM).

Furnish mechanical joints with retainer glands for tees, bends, crosses, valves, and all connection fittings.

Connections between HDPE pipe and DI pipe require the utilization of an HDPE/DI transition section with stainless steel ring stiffener and a raised ring to allow for a restrained mechanical joint adapter connection as shown on the plans.

3. Gate Valves and Valve Boxes. Ensure gate valves are in accordance with *AWWA C515*. Design valves for not less than 250 psi working pressure and tested for leakage and distortion under a hydraulic pressure of not less than 500 psi. Under such pressure, the valves must show no leakage or distortion.

Furnish EJIW Flowmaster resilient wedge gate valves. Valves must have a clear waterway equivalent in area, when open, to that of the connecting pipe. Ensure valves are made to open when turned to the right or clockwise. Ensure all valves are operated by non-rising stems and have square wrench nuts.

Ensure valve boxes are cast-iron, 3-piece, adjustable with 5¼-inch inside diameter shaft. Furnish valve boxes similar to that as manufactured by East Jordan Iron Works or Engineer approved equal. Furnish valve boxes with finger holes and marked “Water”. Adjust valve boxes to meet finish grades once finish grades are established.

4. Fire Hydrants. Furnish hydrants in accordance with *AWWA C502*. Furnish EJ 5BR250 Traffic model. Install hydrants with 6 feet minimum of cover over the connection. Ensure the diameter of the valve port in the hydrant is at least 5 inches. Equip the hydrant with one 4-inch pumper connection and two 2½-inch hose connections. Ensure threads conform to national standard threads and have 1½-inch point-to-flat pent nuts. Hydrants must close when turned to the right or clockwise.

Furnish break flange traffic type hydrants. Ensure the hydrant is designed so that all working parts, including valve and drip mechanism, may be removed from any hydrant through the barrel without the necessity of excavation. The hydrant must have a working pressure of 250 psi.

5. Conductivity. Ensure all water main is laid with continuous tracer wire. Furnish #10 solid copper insulated tracer wire to be brought up to valve boxes and to tracer wire boxes at 400-foot intervals. Furnish tracer wire boxes, as distributed by USA Blue Book, Copperhead, Kirstech, or Engineer approved equal. All underground splices to be butt spliced, sealed, and waterproofed using the heat shrink method, electrical coating, or approved equal.

6. Identification. Furnish underground caution tape reading “Caution Water Main Buried Below”. Caution tape is to be placed along the length of and immediately above the water main at a minimum depth of 1 foot and no more than 2 feet below finished grade. Furnish flexible rebounding marking posts, to be installed at every tracer box. Furnish 4-inch-wide fiberglass blue marking posts at each mainline valve. Use Rhino Fibercurve, Seton, Copperhead or Engineer approved equal. Marking posts must extend 3 feet above ground and have a width of at least 4 inches. Marking posts must have a permanent decal applied indicating “Warning Water Main Pipeline”.

**d. Construction.** Ensure construction is in accordance with the standard specifications, *AWWA* and as shown on the plans. Construct water system piping at a depth no less than 6 feet.

Make HDPE pipe joints using heat fusion in accordance with *ASTM F2620* and *AWWA M55* procedures and equipment recommended by the manufacturer and approved by the Engineer. Accurately time the "melt" time of all joint welds. Furnish to the Engineer, on request, sample joints to verify a smooth and completely "rolled" internal joint bead. Contractor may also use electrofusion couplings for pipe joints. Submit a data logger log fusion process report for each joint.

Ensure fittings at bends in the pipeline are firmly wedged against the undisturbed vertical face of the trench to prevent the fittings from being blown off the lines when under pressure. Furnish concrete thrust blocks as shown on the plans or as directed by the Engineer.

Where pipe ends are left for future connections, ensure they are valved, plugged, or capped as called for on the plans. Where connections are made between new work and existing mains, furnish special pipes and fittings as required to suit the actual conditions.

Restrain all temporary and permanent water main stubs with Field-Loc, Fast-Grip or Engineer approved equal gasket for at least three pipe joints prior to the stub end, including mechanical fittings. This will allow for a connection to the main without removing or reducing the existing water pressure.

Hydrostatic testing, disinfection, and water analyses of all water mains installed by the Contractor are required. Ensure hydrostatic testing, disinfection, and water analyses is coordinated with other water main work and is performed in accordance with current *AWWA* standards and the standard specifications, except that the HDPE pressure test must include an initial expansion phase prior to testing, allowable leakage is zero and disinfecting solutions must not exceed 12 percent active chlorine in accordance with the *Plastics Pipe Institute “Handbook of Polyethylene Pipe”* and *AWWA Manual M55*. Collect water samples at each branch, every 1200 feet, and at the pipe installation ends per *AWWA C651*.

Continuity Test. Test the system (pipeline and hydrants) for electrical continuity and current capacity. Furnish electrical current of 400 to 500 amperes for the tests. Perform the electrical test after the hydrostatic pressure test and while the line is at normal operating pressure. Backfilling must have been completed. The line may be tested in sections of convenient length as approved by the Engineer. Ensure direct current of 400 amperes plus 10 percent is passed through the pipeline for 5 minutes. Measure current flow through the pipe continuously on a suitable ammeter. Current must remain steady without interruption or excessive fluctuation throughout the 5-minute test period. Insufficient current or intermittent current or arcing, indicated by large fluctuation of the ammeter needle, is evidence of defective electrical contact in the pipeline. Isolate the cause and correct. Repeat testing and repair of the section in which the defective test occurred until the testing requirements have been met.

As Built Plans. Furnish as built dimension and erection drawings and details of the water main and other appurtenances. Ensure complete as-built details of all pipe deflections and ties to adjoining pipe are submitted to the Engineer for approval.

**e. Measurement and Payment.** The completed work, as described, will be measured and paid for at the contract unit price in accordance with subsection 823.04 of the Standard Specifications for Construction except as follows: in addition to the items listed in section 823, the unit prices of HDPE and DI water main includes the cost of furnishing and installing the conductivity straps, identification items and specialty gasket materials. The following pay items will be measured and paid for as follows:

**Pay Item Pay Unit**

Water Main, HDPE, \_\_ inch, Tr Det\_\_ Foot

Connect to Existing, \_\_ inch Each

1. **Water Main, HDPE, \_\_ inch, Tr Det\_\_** will be paid for at the contract unit price per foot for installation of HDPE water main and includes all fittings, gaskets and accessories including HDPE/DI transition section and restraints, tracer wire, boxes and identification, all utility location, excavation, backfill, sheeting and bracing, dewatering, testing, disinfection and flushing, cleanup, as-built plans and all other miscellaneous items of work necessary to install the HDPE pipe. The HDPE installation will be measured along the centerline of the pipe with no deductions for fittings. No payment will be made on any section of water main until it has been pressure tested as specified herein and the initial site restoration has been performed.

2. **Connect to Existing, \_\_ inch** will be paid for at the unit price each for the connection size required and includes the cost of providing and installing the HDPE water main, making the connection, and all necessary restraints, complete and ready to use. This work includes the complete connection to an existing connection point/water system and procedures as applicable.