MICHIGAN

DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION

FOR

**WATER MAIN, DIRECTIONAL BORE**

GND:KAP 1 of 3 APPR:NJM:DMG:06-04-24

**a. Description.** This work consists of constructing an underground crossing of a railroad or roadway using the directional bore method to install DI pipe for water main. The work includes excavation, installation, testing, backfilling, and cleanup as shown on the plans and specified herein.

The Contractor may request changes to the proposed vertical and horizontal alignment of the installation and the location of the entry and exit points. Submit proposed changes in writing to the Engineer for approval, a minimum of 10 work days prior to construction.

**b. Submittals**. Submit product data consisting of shop drawings and manufacturer’s literature in PDF for all materials and equipment associated with the DI water main construction to the Engineer and the city of Grand Rapids for approval a minimum of 10 work days prior to construction.

Submit a general work plan outlining the procedure and schedule to be used for installation of the water main.

**c. Materials.** Furnish DI water main pipe manufactured in accordance with the standard specifications and meets all applicable requirements of the *AWWA* and the *ANSI/National Sanitation Foundation (NSF) 61*, of the size shown on the plans. Ensure that the DI pipe is centrifugally cast, thickness Class 53 or higher. Furnish styrene butadiene rubber (SBR) gaskets. Furnish DI pipe equipped with low profile flexible restrained joints such as Flex Ring, TR Flex, or Engineer approved equal. Gripping push-on joint gaskets or restrained joint gaskets are prohibited.

Furnish organically inert drilling fluids appropriate for conditions encountered at the site and with a composition complying with applicable environmental regulations.

**d. Construction.** Ensure that all work is in accordance with the standard specifications and as specified herein. Install all DI pipe in accordance with *AWWA C151* and the standard specifications. Ensure all permits required for the directional boring operation are coordinated and obtained by the Contractor, except the EGLE construction permit that will be obtained by the city of Grand Rapids.

Ensure a representative of the drilling Contractor, who is thoroughly knowledgeable of the equipment and boring procedures and is available to address immediate concerns and emergency operations, is on site. Installation cannot begin until the Engineer agrees that proper preparations have been made. Notify the Engineer a minimum of 2 work days prior to starting the work.

Begin the directional bore with a pilot hole drilled along the proposed bore alignment. Monitor and furnish directional information to the drilling operator using navigation equipment on the surface. A reverse drilling reamer is attached to expand the pilot hole to allow for the DI pipe installation. Pump bentonite slurry through the drill steel where it is mixed by the reamer to stabilize and lubricate the wall lining of the bore hole and protect the DI pipe.

Furnish and maintain instrumentation that accurately locates the pilot hole and measures drilling fluid flow and pressure at all times.

After the DI pipe has been installed within the bore, ensure cleaning pigs of the appropriate size are used to remove residual water and debris. The Engineer must witness the cleaning.

Contain drilling fluids within the drilling area and clean up within 48 hours following completion of DI pipe installation. Dispose of excess drilling fluids at a landfill site complying with the regulations required to properly dispose of the fluids.

Ensure deflections in DI pipe are made by joint deflections in accordance with the recommendations of the pipe manufacturer. Install horizontally directional bored DI pipe in accordance with the *Ductile Iron Pipe Research Association (DIPRA) Horizontal Directional Drilling with Ductile Iron Pipe Handbook* with strict adherence to maximum joint deflection allowance.

Repair any damage caused by heaving, settlement, escaping drilling fluid (frac-out), or the drilling setup and operation.

If an obstruction is encountered during boring that prevents completion of the installation in accordance with the design location and specification, the DI pipe may be abandoned and left in place with approval of the Engineer. If the DI pipe is approved to be left in place, ensure it is immediately filled with flowable fill and bulkheaded. Submit a revised plan prior to beginning another boring for approval by the Engineer. If, during construction, damage is observed, cease all work until a plan to minimize further damage and for restoration is approved by the Engineer.

If conditions warrant removal of any materials installed in a failed bore path, as determined by the Engineer, it will be at no additional cost to the contract.

Hydrostatic testing, disinfection, and water analyses of all water mains installed are required. Ensure hydrostatic testing, disinfection, and water analyses are coordinated with other water main work and performed in accordance with the standard specifications and the city of Grand Rapids specifications.

Furnish the Engineer a complete set of as-built plans, showing all bores (successful and failed), within 30 calendar days of completing the work. Ensure as-built plans include the locating equipment used; horizontal and vertical alignment with degree of accuracy, entry, and exit points; bore diameter; drilling fluid composition; and important subsurface features. Ensure the as-built plans are legibly drawn on project plan sheets or sheets developed by the boring Contractor. The Engineer will have 15 calendar days to review and approve the as-built plans.

**e. Measurement and Payment.** The completed work, as described, will be measured and paid for at the contract unit price using the following pay item:

**Pay Item** **Pay Unit**

Water Main, DI, \_\_ inch, Directional Bore Foot

**Water Main, DI, \_\_ inch, Directional Bore** will be measured horizontally from bore entrance to exit with no allowance for curvature of the pipe. This item includes all utility location, excavation, backfill, boring, sheeting and bracing, dewatering, testing, disinfection and flushing, cleanup, as-built plans, and all other miscellaneous items of work necessary to complete the bore and install the DI pipe.