MICHIGAN

DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION

FOR

**WELL DRILLING**

UTL:CJD 1 of 3 APPR:NJM:DBP:02-24-21

**a. Description.** This work consists of constructing a new water supply well in accordance with the plans and as specified in the proposal. The work includes obtaining all permits, certificates, and licenses required by law and in compliance with all federal, state, and local laws, rules, and ordinances relating to the performance of the work.

Where the water bearing formation is anticipated to be an artesian aquifer, submit the proposed methods and procedures for protecting the aquifer and confining beds from erosion to the local county health department at least 30 days prior to commencement of drilling operations.

**b. Materials.** Provide an eight-inch internal diameter polyvinyl chloride (PVC) standard dimension ratio (SDR) 21 (or thicker) well casing meeting *ASTM F480* and *National Sanitation Foundation (NSF) 14*.

Provide a V-slot screen-type well screen constructed of silicon red brass, stainless steel, or other Engineer approved material.

**c. Construction.** Ensure that all work is in accordance with the Michigan Department of Environment, Great Lakes, and Energy (EGLE), Drinking Water and Radiological Protection Division, and as provided for in MCL 333.1101 et seq, MCL 325.1001 et seq, and the Michigan Water Well Construction and Pump Installation Code, 1994 AACS R 325.1601 et seq.

Keep disturbance to existing ground to a minimum and avoid damage to existing vegetation.

Conduct all excess water to a place where it will not cause damage by erosion or will not return to the groundwater, causing interference with the capacity test.

The proposed location of the well and the estimated depth is shown on the plans. If the Contractor determines that the proposed location will not produce a satisfactory water supply, the well location may be moved to a location determined by the Contractor and approved by the Engineer. The estimated depth of the well is not guaranteed to be accurate.

Ensure the well is rotary-bored.

Ensure the discharge is a minimum of 100 gallons per minute (gpm) determined in accordance with the requirements for the capacity test.

Notify the Engineer if water-bearing formations are encountered. If the Contractor determines that the formation may be capable of producing an acceptable yield, conduct pumping tests to ensure a satisfactory supply of water has been obtained, and to establish the depth of the well.

Keep a complete and accurate written log of all material encountered in drilling the well. File the written log with the Engineer, together with the static water level and other pertinent information relative to the well as required by the Michigan Water Well Construction and Pump Installation Code.

Inform the Engineer if the proposed well location is unsuitable to obtain water. Ensure all "dry" or otherwise unacceptable wells are abandoned in accordance with the Safe Drinking Water MCL 325.1001, specifically R 325.10832; and the Michigan Water Well Construction and Pump Installation Code.

Ensure the well screen is fitted with standard screwed fittings and plugged with a neoprene packer. Determine the size of the screen slots by information obtained from the samples of the aquifer and as approved by the Engineer.

Submit a selected sample of the water bearing formation to be delivered to the screen manufacturer for mechanical analysis and recommendation as to size of screen, slot openings, and length of screen necessary to permit the well to produce the required yield capacity. Ensure entrance velocity is 0.1 feet per second (fps) maximum. Furnish a copy of the manufacturer's report or recommendation to the Engineer. A well screen may not be required in bedrock. The method of placing the screen must ensure it against any damage.

Obtain approval of the Engineer before commencing well development. Ensure the well is thoroughly and completely surged to remove all fine sand, drilling mud, chips, silt, and to develop the well to its maximum yield. This surging may be done by means of an appropriate surge block, the use of air, jetting, or other appropriate method as approved by the Engineer. Ensure the surge block, if used, is equipped with a flap valve and use precaution when starting the surging operation to prevent extreme pressures.

After developing the well, run a capacity test by method as specified herein and approved by the Engineer. Ensure the pump test is continuous for 8 hours unless otherwise shortened or extended as approved by the Engineer. Provide a test pump of ample capacity to test the well up to 100 gpm.

Submit two samples of water to the local health department in standard samples bottles to obtain partial chemical analysis and the necessary bacteriological analysis to assure a safe water source. The determination must include the following information:

Fe (Iron) Mn (Manganese)

Cl (Chlorides) SO4 (Sulphate)

Hardness as CaC03 pH (acidity/alkalinity)

Obtain the first sample during the first part of the capacity test and the second sample near the end of the test to determine any change in the water quality. If the results are unsatisfactory flush and chlorinate until acceptable test results are obtained.

Report the laboratory results to the Engineer.

Obtain accurate measurements of the drawdown during the pump test period by means of air line and altitude gauge or other reliable means. Measure the quantity of water pumped utilizing any one of the following four methods: Weir box and hook gauge, calibrated orifice, calibrated tank and stopwatch, or reliable meter. Ensure the capacity test is witnessed and approved by the Engineer.

Control the output of the test pump by means of throttling valves or other acceptable means to permit accurate measurement of drawdown at various pumping rates.

Obtain and record the following information during the capacity test:

1. Static water level.

2. Pumping level recorded at intervals during the pumping test.

3. Residual drawdown and recovery rates.

4. Specific capacity.

Submit shop drawings in portable document format (PDF) for all equipment associated with the well drilling. Ensure shop drawings are reviewed and approved prior to beginning well drilling.

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

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

Well in Drift, 8 inch Foot

Well in Rock, 8 inch Foot

Well Screen Each

Well Development Lump Sum

Capacity Test Hour

1. **Well in Drift** includes installing the casing, grouting, and perform all other related work required to install the portion of the well in drift complete, subject to the approval of the Engineer, and as specified in the well permit.

2. **Well in Rock** includes the construction of the portion of the well in rock.

3. **Well Screen** includes installing the screen in accordance with this special provision to the satisfaction of the Engineer.

4. **Well Development** includes surging the well and developing it to maximum capacity.

5. **Capacity Test** includes performing the test complete as specified.

Payment for **Well in Drift, 8 inch**; **Well in Rock, 8 inch**; **Well Screen; Well Development**; and **Capacity Test** will only be made towards a completed well of the size and capacity specified or otherwise accepted by the Engineer. "Dry Wells" or otherwise unacceptable wells will not be paid for.

The Engineer retains the right to add or delete quantities, as appropriate for the proper construction of the well, at no additional cost to the contract.