MICHIGAN

DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION

FOR

**STEEL SHEET PILING, TEMPORARY, LEFT IN PLACE, SPECIAL**

RAL:JLD 1 of 2 APPR:SCK:RWS:11-18-22

**a. Description.** This work consists of designing, furnishing, installing, maintaining, and cutting off the sheet piling and bracing, anchors, deadman, walers, related materials, and equipment required to maintain support of the sheeting and adjacent embankment and coordinated with the staged construction requirements at this site. Perform the work in accordance with the AREMA Manual for Railway Engineering (“AREMA” hereafter), the plans, and this special provision.

**b. Materials.** Furnish materials in accordance with AREMA requirements and subsections 704.02 and 707.02 of the Standard Specifications for Construction.

**c. Construction.** Design, prepare working drawings, install, and maintain the temporary steel sheet piling. Design cantilever or braced steel sheet piling walls interaction with the soil using the following software: SPW 911 by PileBuck International Inc.; SupportIT by GTSoft Ltd.; or CivilTech Software Shoring Suite. The use of other software will be reviewed by the Department and requires approval by the Engineer prior to use. Hand calculations and/or spreadsheet calculations will not be accepted for steel sheet piling design unless special conditions are present, which will require approval by the Engineer prior to use. Hand calculations and/or spreadsheet calculations (with example hand calculations) for design of anchors, deadman, bracing sections, weld details and connections is acceptable.

Ensure design of steel sheet piling, ground anchors, deadman, bracing sections, and adjacent excavations to support railroad traffic are in accordance with AREMA. Use interlocking steel sheet piles for temporary shoring systems. Assume a vertical railroad live load surcharge equivalent to Cooper E-80 loading of 1882 psf for design of sheet piling adjacent to the railroad. Use the Boussinesq strip load formula shown in AREMA Chapter 8, Part 20 to determine the lateral pressure caused by the railroad surcharge loading. Ensure surcharge from other sources (e.g., impact loads, construction equipment, vehicular traffic, material stockpiles, existing structures, etc.) is considered in the design of the temporary sheeting for excavation support as appropriate. Add surcharge from other sources to the above railroad surcharge if the surcharge loads act concurrently. The calculated and measured maximum deflection of the temporary steel sheet piling installed adjacent to the railroad right-of-way must not exceed 1/2 inch for walls within 12 feet of track centerline (Measured from centerline of the nearest track to the nearest point of the supporting structure) and 1 inch for walls located greater than 12 feet from track centerline. Include supporting assumptions and calculations for the steel sheet piling including: sheeting, anchors, deadman, bracing sections, welded or bolted connection details, sheeting tip elevations, calculated deflection of sheeting sections, all connections and embedment depth. The design must consider and provide supporting calculations for all stages of construction.

If ground anchors are used, submit a load testing program for review by the Department with the design submittal. The Contractor’s designer must reference AREMA and FHWA Publication No. FHWA-IF-99-015 (Geotechnical Engineering Circular No. 4, Ground Anchors and Anchored System) in the design and load testing program. Ensure all ground anchors, regardless of anchor type, are load tested. Ensure all ground anchors and deadman are prestressed and locked off. Ground anchors and deadman that cannot be prestressed to the required load and locked off cannot be used. Install ground anchors a minimum of 6 feet below the bottom of existing rail ties.

Ensure that the design is prepared by the Contractor’s designer; and the designer is a Professional Engineer, licensed in the State of Michigan. Submit the design and supporting calculations to the Engineer for review and approval prior to beginning of work. Ensure design calculations and working drawings are sealed by a Professional Engineer, licensed in the State of Michigan. Obtain the Engineer’s approval of the steel sheet piling design prior to beginning installation. The Department will require 10 calendar days for each review cycle and revisions may be required following each review. No extension of time or additional compensation will be granted due to delays in preparing the final working drawings, calculations and material specifications or securing approval from the Engineer. An exception may be granted for an extension of time only in the case that the Engineer’s review of a submittal exceeded 10 calendar days and if it can be shown that such a delay impacts the final project completion date.

Alternate temporary retaining wall design options may be considered for this project by the Engineer provided that alternate designs are prepared and submitted in accordance with this special provision. All alternate temporary retaining wall design options must be in accordance with AREMA, the standard specifications, and this special provision.

To minimize the risk for disturbance of the existing railroad bridge and adjacent facilities, only low impact methods that produce the least amount of vibrations approved by the Engineer are allowed for the installation of the sheet piling. The use of vibratory hammers is prohibited for the installation of the sheet piling.

Install the sheet piling for this project in stages that match the staged construction of the project. The limits and sequence of steel sheet piling construction are shown conceptually on the plans however, the Contractor’s design and installation plan will take precedence.

When no longer needed, cut off the sheet piling to the elevation shown on the plans or as approved by the Engineer.

Begin work only after the Engineer’s approval of the steel sheet piling design is received.

**d. 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**

Steel Sheet Piling, Temp, Left in Place, Spec Square Foot

**Steel Sheet Piling, Temp, Left in Place, Spec** quantities will be computed based on the area of required earth retention. The vertical dimension for computing areas will be the difference in ground elevation at the sheeting line or the planned foundation excavation limit at the sheeting line, whichever is less. Unless shown on the plans, the lateral limits will be determined by the design. When earth is retained on both sides of the same steel sheet piling during different construction stages, the quantity will be computed from the stage requiring the largest area of earth retention and not the sum of the area of required earth retention for each stage.

All horizontal measurements will be made along the sheet piling alignment without allowance for the structural shapes of the separate sections.