Section 704. STEEL SHEET PILING AND COFFERDAMS

704.01. Description. This work consists of the following:

A. Providing and driving permanent steel sheet piling,
B. Designing, providing, installing, maintaining, and removing temporary steel sheet piling, or cutting off temporary steel sheet piling left in place, including bracing, tie backs, walers, and related material, and
C. Designing, installing, maintaining, and removing cofferdams or cutting off cofferdams left in place, including sheet piling, bracing, tie backs, walers, and related material.

704.02. Materials. Provide material in accordance with the following:

- Geosynthetics ............................................................. 910
- Steel sheet piling ......................................................... 906

Provide new or used continuous interlock-type steel sheet piling including connections and corner pieces. Used steel sheet piling must be in good condition and its use must be approved by the Engineer. Provide steel sheet piling with a nominal section modulus of at least 18.1 cubic inches per foot of wall, for both temporary steel sheet piling and cofferdams, when installed adjacent to traffic or when supporting traffic loads. Provide the permanent steel sheet piling section modulus shown on the plans.

The Contractor may provide cold-rolled sheeting for applications specified in this section.

704.03. Construction.


Include the following information, as applicable, on the design documents:

1. Sheet piling section modulus and, embedment depth;
2. Design criteria for bracing and bracing sections, connection and tie-back details, and deadman sections;
3. Assumptions and references for the design calculations;
4. Any temporary loads for construction equipment, construction materials, traffic loading and any unbalanced hydrostatic pressure loading; and
5. Profile views and plan views with cross sections.
Document each stage of the construction on the working drawings. Submit an electronic file copy and one paper copy of the proposed design, supporting calculations and working drawings for steel sheet piling and/or cofferdams to the Engineer for review not less than 10 working days before beginning work, in accordance with subsection 104.02. If required by subsection 104.02, have working drawings sealed by Contractor's designer.

Begin work only after the Engineer approves the sheet pile design. The Engineer will not make allowance for increases in cost or lost time associated with resubmittals of the design due to comments or questions from the Department.

Construct steel sheet piling and cofferdams to the cutoff elevations and coordinate with the construction staging required by the contract. Provide a copy of any steel sheet piling or cofferdam design and working drawings at the job site as required by MIOSHA Construction Safety Standard.

B. Driving Steel Sheet Piling. Drive, brace, and cut off steel sheet piling in accordance with the Contractor's design for temporary steel sheet piling and cofferdams and the contract.

The Contractor may use drop hammers. Unless otherwise shown on the plans, the Contractor may use vibratory hammers.

Cut off temporary steel sheet piling, left in place, to the elevation shown on the plans. Do not pull up or redrive temporary steel sheet piling, left in place, to match the cut off elevation required, unless otherwise shown on the plans or approved by the Engineer.

After casting adjoining concrete, do not drive steel sheet pilings to a greater depth. To lower the top of permanent sheet piling after placing adjoining concrete, remove by cutting.

C. Cofferdams. Construct partial or total enclosure cofferdams to allow construction of substructures, above the seal or subfooting, in the dry without damaging the work. The Engineer may approve alternate methods, in lieu of cofferdams. The Engineer will consider approval after receiving applicable MDNRE permits for the alternate method.

Construct cofferdams with interior clearance for constructing forms, and inspecting form exteriors, and to allow pumping outside the forms. Construct cofferdams to protect the work from damage from high water and prevent damage to the foundation by erosion. Align or enlarge cofferdams or cribs that tilt or move laterally during the process of sinking, to provide required clearance.
Do not brace cofferdams to substructure forms. Bracing which extends into or remains in the finished concrete is not permitted.

If dewatering, pump from a sump located outside the forms. Do not dewater until the tremie seal obtains the minimum strength in accordance with subsection 706.03.H.3.

If the plans do not call for a tremie seal, discharge water pumped from a cofferdam into a geotextile filter bag. If the plans call for a tremie seal, maintain the water level inside the cofferdam equal to the water level outside the cofferdam, until the tremie seal is placed, unless otherwise approved by the Engineer. After placing tremie seal and initially dewatering into a geotextile filter bag, the Contractor may pump silt-free and sediment-free water directly into the watercourse, if approved by the Engineer.

Remove cofferdams without disturbing or marring finished concrete.

Cut off the cofferdams, left in place, at the elevation shown on the plans. Do not pull up or redrive cofferdam sheeting to match the cut off elevation, unless otherwise shown on the plans or approved by the Engineer.

**704.04. Measurement and Payment.**

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
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<tbody>
<tr>
<td>Steel Sheet Piling, Permanent</td>
<td>Square Foot</td>
</tr>
<tr>
<td>Steel Sheet Piling, Temp</td>
<td>Square Foot</td>
</tr>
<tr>
<td>Steel Sheet Piling, Temp, Left in Place</td>
<td>Square Foot</td>
</tr>
<tr>
<td>Cofferdams (Structure No.)</td>
<td>Lump Sum</td>
</tr>
<tr>
<td>Cofferdams, Left in Place (Structure No.)</td>
<td>Lump Sum</td>
</tr>
</tbody>
</table>

**A. Steel Sheet Piling.**

1. **Steel Sheet Piling Permanent.** The Engineer will calculate quantities of **Steel Sheet Piling, Permanent** based on the lines and lengths below cutoff, shown on the plans or authorized by the Engineer.

2. **Steel Sheet Piling, Temp and Steel Sheet Piling, Temp, Left in Place.** The Engineer will calculate quantities of **Steel Sheet Piling, Temp** and **Steel Sheet Piling, Temp, Left in Place** based on the area of earth retention. The Engineer will calculate the vertical dimension of the area, based on the difference in ground elevations at the sheeting line, or the planned foundation excavation limits at the sheeting line, whichever is less. Unless otherwise shown on the plans, the Engineer will calculate the lateral limits based on the design specified in subsection 704.03.A.
If retaining earth on both sides of the same steel sheet piling during different construction stages, the Engineer will calculate the quantity based on the stage requiring the largest area of earth retention; not the sum of the areas of earth retention for each stage.

The Engineer will take horizontal measurements along the sheet piling alignment without allowance for the structural shapes of the separate sections.

a. **Steel Sheet Piling, Temp.** The unit price for Steel Sheet Piling, Temp includes designing, providing, installing, maintaining, and removing the sheet piling, bracing, tie backs, walers, deadman, related material, and equipment required to maintain support of the sheeting and adjacent embankment.

b. **Steel Sheet Piling, Temp, Left in Place.** The unit price for Steel Sheet Piling, Temp, Left in Place includes designing, providing, installing, maintaining, and cutting off the sheet piling, bracing, tie backs, deadman, walers, related material, and equipment required to maintain support of the sheeting and adjacent embankment.

B. **Cofferdams.** The Engineer will measure, and the Department will pay for filter bags as specified in subsection 208.04.

1. **Cofferdams.** If the contract includes a separate pay item for Cofferdams, the Engineer will group and measure cofferdams for the structure as a unit. The unit price for Cofferdams, of the type required, includes designing, providing, installing, maintaining, and removing sheet piling, bracing, tie backs, walers, deadman and related material.

2. **Cofferdams, Left in Place.** If the contract includes a separate pay item for Cofferdams, Left in Place, the Engineer will group and measure cofferdams specified as left in place for the structure as a unit. The unit price for Cofferdams, Left in Place includes designing, providing, installing, maintaining, and cutting off of sheet piling, bracing, tie backs, walers, deadman, and related material.

If the contract does not include a pay item for Cofferdams or Cofferdams, Left in Place, the cost of constructing a cofferdam for structures not crossing streams is included in the unit prices for other items of work; for structures crossing streams or encroaching on water courses, the cost of constructing a cofferdam will be paid for as extra work.
If the Engineer authorizes an alternate method to a sheet pile cofferdam, the Department will pay for the alternate method at the unit price for **Cofferdams** or **Cofferdams, Left in Place**.