MICHIGAN

DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION

FOR

**EMBANKMENT COMPACTED IN PLACE, CLAY, SPECIAL**

GND:DLK 1 of 2 APPR:DMG:DBP:03-19-21

**a. Description.** This work consists of the placement of a compacted cohesive (clay) embankment within berms that are intended to impound ponded or flowing storm water as shown on the plans. Ensure all work is in accordance with Division 2 of the Standard Specifications for Construction, except as modified herein.

**b. Materials.** The cohesive (clay) soil for the embankment must be clay till as defined by the U.S. Department of Agriculture and *ASTM D2487* with a Unified Soil Classification group symbol of CL, CH, ML or CL/ML and a maximum hydraulic conductivity of 1.0 x 10-7 centimeters (cm)/second (sec) at the specified compaction and moisture content range. Identify the source of the material and provide geotechnical data that confirms the material classification, optimum moisture content, maximum dry density, and hydraulic conductivity at specified compaction and moisture content range.

**c. Construction.** Prior to placement of the embankment, ensure the existing ground surface is cleared and grubbed or excavated to remove undesirable materials. Ensure existing topsoil is stripped and salvaged in accordance with subsection 205.03.A of the Standard Specifications for Construction. Place the cohesive (clay) soil for the embankment within the specific zones of berms to the top width shown on the plans and bottom width as required for a 1:1 slope to the depth of placement to the cleared ground surface.

1. Subgrade. Place the impervious fill for the embankment berms only on an approved subgrade of existing soil. Remove any embankment placed prior to subgrade approval at no cost to the contract.

Excavate to the proposed subgrade line shown on the plans. Thoroughly loosen the top 8 inches of subgrade by scarifying or plowing. Remove all organic matter, topsoil, roots, and other debris turned up by such loosening. Compact the loosened subgrade to the required density specified in subsection c.3 of this special provision.

Remove material found unsuitable for compaction to a depth as determined by the Engineer and replace with suitable material.

2. Placement. Place embankment in uniform lifts not more than 8 inches thick.

Begin embankment construction in low areas, building the full width of berm before beginning the next lift. As the height of the embankment increases, it must be extended until the entire footprint is being constructed to the full width of the fill area at one time for each lift.

Ensure the embankment extends above grade a minimum of 1 foot above the wetland overflow elevation or 1.5 feet above the 100-year water surface elevation of the detention or retention basin whichever is higher.

3. Compaction. The maximum variation in moisture content in compacted impervious fill from the optimum moisture content is ±3 percent.

If moisture is required to be added to the surface of the subgrade or layer of impervious fill material, apply water uniformly so that free water does not appear on the surface during or after compaction operations.

Ensure material that is too wet to enable compaction to the specified density is permitted to dry, assisted by disking, harrowing, or pulverizing, if necessary, until the moisture content is reduced to within the maximum variation from optimum.

Ensure the compacted density within the optimum moisture content range is 95 percent of maximum unit weight.

Repair or replace any portion of the embankment that is damaged or displaced at no cost to the contract. Ensure after the embankment has been constructed, the sides are trimmed to the required grade and maintained to the elevation and cross section shown on the plans.

**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**

Embankment CIP, Spec Cubic Yard

**Embankment CIP, Spec** will be measured for payment in place and the volume in cubic yards computed by the method of average end areas. Embankment placed in excess of that required for the execution of the contract will not be measured for payment. The volume of embankment will be computed on the basis of using the subgrade line as reestablished by the Engineer after the clearing, grubbing, and excavation to remove undesirable material has been performed and the top 8 inches of the existing ground has been disked and compacted as specified herein.

**Embankment CIP, Spec** includes furnishing, placing, and compacting all materials required for embankment construction including any water applied, disking and drying.