

ITEM 17203.40 M - SOIL-BENTONITE CUT-OFF WALL

DESCRIPTION

General

Furnish a Soil-Bentonite Cut-Off Wall in accordance with these specifications and in conformity with the lines, grades, thicknesses and cross sections shown on the plans or established by the Engineer.

The intent of the work is to provide a Cut-Off wall with a permeability of 5×10^{-6} cm/sec or less. Construct the wall by excavating a trench using the slurry trench method. Mix the excavated material with bentonite, to create a backfill capable of producing the desired product, unless otherwise directed.

Definitions

Bentonite - A clay mineral material.

Slurry Trench Method - Excavating a trench while replacing the volume of excavated material with an equal volume of bentonite slurry.

Cut-Off Wall Backfill - A mixture of excavated material and bentonite, either slurry or dry, which will meet the gradation requirements shown on the plans.

Type A Wall - The most common type of wall composed of backfill which is close to the finer side of the acceptance envelope, in order to exhibit more impermeability and less strength.

Type B Wall - A wall constructed under any roadway, which will have backfill which is closer to the coarser side of the acceptance envelope, and have a quantity of Portland Cement in order to exhibit strength and stiffness characteristics similar to the subbase material.

Type C Wall - A cast-in-place concrete wall at utility crossings that is created by the tremie method of concrete placement. This wall will have a void for accepting the proposed utility.

End Stop - A pipe, with or without sheathing, of sufficient width to span the excavation to form a joint between two wall types.

MATERIALS

Bentonite - Provide bentonite which is high swelling, pure, premium grade type sodium cation based bentonite, consisting mainly of montmorillonite and meeting the requirements of the API Standard 13A specification for oil drilling fluid material, section 3, Bentonite. Provide certification of the bentonite by a supplier authorized to use the API monogram on drilling fluid materials. Do not chemically treat the bentonite without the approval of the Engineer.

Concrete - Provide concrete meeting the requirements of Class GG.

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Reinforcement - Provide Grade 420 bar reinforcement meeting requirements of 709-01.

Portland Cement - Provide cement meeting the requirements of Section 701-1, Type 2.

Water - Provide water conforming to the requirements of subsection 712-01 WATER, except with a pH conforming to the slurry requirements listed below.

CONSTRUCTION DETAILS

A. Previous Experience

Submit proof and details of: 1.) two projects in the past 5 years where the Contractor performing the work has successfully installed soil-bentonite cut-off wall similar to the size and type on this project and 2.) the foreman for this work having supervised the successful installation of soil-bentonite cut-off wall on at least two projects in the last 5 years. Include details describing the equipment and methods used, any difficulties encountered and how they were overcome, and the results of any testing performed. Include the name and telephone number of someone for each project cited who can be contacted as a reference. Submit this information to the Deputy Chief Engineer Technical Services (DCETS) for review, evaluation, and approval. The DCETS will render a decision within 15 working days. A Contractor or subcontractor will not be permitted to install soil-bentonite cut-off wall without this approval.

All approvals are subject to satisfactory field performance. Departmental approval does not relieve the Contractor of his responsibility to satisfactorily complete the work detailed in the contract documents. Excavate the trench for the wall using the slurry trench method.

B. Trench Construction

Excavate the trench to the lines and elevations outlined on the plans or as ordered by the Engineer, using slurry trench methods. Maintain the properties of the bentonite slurry used to stabilize the sides of the excavation must be within the following limits:

Range of Values (20° C)

Property (Units)	Value	Test Method
Density (kg/m ³)	1030 to 1106	Density Balance
Viscosity (sec. per liter)	29 to 48	Marsh Cone
pH	8 to 11	pH paper or meter

Desand the slurry as necessary to meet the above requirements and to produce a maximum sand content of 10%.

Once the trench has an excavated length of 10 to 12 times its average excavated depth then commence backfilling. If there is to be a change in wall type within the above distance then

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a introduce suitable end stop to create a key between the Type A wall and the type being interposed.

C. Backfilling

Create the backfill by mixing the excavated soil with the bentonite so that the gradation of the resulting mixture falls within the limits shown on the plans. The bentonite used in the mixing can be extracted as slurry from the trench or introduced dry from bagged material. Once the excavated material and the bentonite are thoroughly mixed and the trench has a length as described above, place the mixture back into the trench. Starting where the trench began, build up the backfill vertically from the bottom of the trench and horizontally at its natural angle of repose.

Place Type B and Type C walls between completed sections of Type A walls, once the backfill has begun to cure and the end stops are removed.

METHOD OF MEASUREMENT

The number of cubic meters of material computed in its final position within the payment lines shown on the plans or otherwise ordered, in writing, by the Engineer. No deduction will be made for the volume occupied by pipes or conduits 150 mm or less in nominal inside diameter.

BASIS OF PAYMENT

Include in the unit price bid the cost of furnishing all labor, materials and equipment necessary to complete the work, including the disposal of unused slurry.