

CONSTRUCTION SPECIFICATION

PA 521D - POND SEALING OR LINING – COMPACTED CLAY TREATMENT

1. SCOPE

The work shall consist of furnishing clay, placing, and compacting clay in a pond to the elevations, grades, and cross sections as shown on the drawings or as staked in the field.

2. MATERIALS

Soil material shall be obtained from the designated area(s). The selection of the soil shall be as described in the drawings or in Section 10 of this specification. Soil material shall contain no sod, brush, roots, or other objectionable materials. It shall also be free of stones over two inches in diameter where compacted by hand or mechanical tampers, or over six inches in diameter where compacted by rollers or other driven equipment. Frozen material shall not be placed in the fill nor shall the fill material be placed on a frozen foundation.

Water shall be clean and free from oil, acid, alkali, organic matter, or other deleterious substances in amounts that will negatively affect the dispersant.

3. EQUIPMENT

All equipment necessary for the proper construction of the work shall be on the work site prior to the start of compacted clay treatment operations.

All equipment used to convey or transport clay to work-site shall be covered or enclosed, if necessary, so as to avoid dust related pollution or exposure problems.

4. SUBGRADE PREPARATION

Prior to placing the fill material on any portion of the foundation, that portion shall be scarified,

plowed, or disked to a depth of three inches. All objectionable material, i.e., other than the mineral soil that has been identified for use as fill, exposed by this operation shall be disposed of as directed by the Owner.

The bottom of the pond shall be excavated to the designated subgrade and be inspected by the Engineer before work proceeds. All exposed rock surfaces will be cleaned for inspection. Open joints, fractures, solution channels, pockets of coarse material, and groundwater seeps will be brought to the attention of the Engineer.

Open bedrock conditions shall be treated as specified in Section 10 and/or in the drawings. Coarse material and wet foundation conditions shall be over excavated and replaced with at least one foot of compacted soil as directed by the Engineer. Fill shall be placed as described in Section 5.

The subgrade shall be free of debris, organic matter, free water, ice, snow, mortar, or other harmful substances. Placement of linings on mud, uncompacted fill or frozen material will not be permitted. The subgrade shall be moist and dampened with water, if necessary. The surface of the subgrade shall be scarified to a depth of three inches prior to placement of liner material or fill. In addition to uniformity, the existing subgrade material must have sufficient strength to support the lining and its associated loads. Subsurface drainage may also be used to stabilize localized soft areas, however it will then be necessary to treat the drainage if it contains effluent from the stored wastes.

Clay lining shall not be placed until the subgrade or base course has been inspected and approved by the designated inspector. Notification shall be given far enough in advance to provide time to schedule the inspection.

5. PLACEMENT

The placing and spreading of fill material shall be started at the lowest part of the section under construction and carried up in layers of six inches. The layers shall slope slightly towards the pond to prevent puddles and provide for faster runoff in case of rain. Where possible, the layers should extend over the entire area of the fill. The distribution and gradation of the materials throughout the fill shall be such that there are no lenses, pockets, streaks or layers of material differing substantially in texture or gradation from the surrounding material.

6. COMPACTION

The clay liner shall be compacted while it is still moist in accordance with the specified class set forth in Section 10:

Class A compaction: Each layer of earthfill shall be compacted as necessary to provide the density of the earthfill matrix not less than the minimum density specified in Section 10 or identified on the drawings. The earthfill matrix is defined as the portion of the earthfill material finer than the maximum particle size used in the compaction test method specified.

Class B compaction: Each layer of earthfill shall be compacted to a mass density not less than the minimum density specified.

Class C compaction: Each layer of earthfill shall be compacted by the specified number of passes of the type and weight of roller or other equipment specified or by an approved equivalent method. Each pass shall consist of at least one passage of the roller wheel or drum over the entire surface of the layer.

7. LEAK DETECTION AND FOUNDATION DRAINAGE

Sites that are required to have leak detection systems shall be as shown in the plans and as set forth herein. Collection lines will be installed at the lowest elevation of the pond. A layer of geotextile shall be placed over any aggregate to provide added protection. A four-inch corrugated polyethylene drain tubing,

complying with the requirements of ASTM F405, shall be embedded in size 57 stone, ASTM C33. Solid PVC SDR 26 pipe ASTM D2241, or Schedule 40 ASTM D1785, shall be installed through the embankment. The outlet shall consist of at least ten feet of Schedule 40 pipe with an animal guard.

A leak detection system shall have a pipe outlet that discharges into an accessible sump or at the ground surface at least 50 feet from a stream or other water body. The leak detection system shall be separate and isolated from any groundwater drainage system that is installed around or under the facility.

8. SEALING AROUND PENETRATIONS

Sealing appurtenances and/or special compaction requirements may be required around any penetration (pipe openings) and shall be as set forth in the drawings and/or Section 10. Unless otherwise required therein, the following shall apply:

- a) Adjacent to structures, fill shall be placed in a manner adequate to prevent damage to the structure and to allow the structure to gradually and uniformly assume the backfill loads. Backfill adjacent to structures shall be placed in layers not thicker than four inches prior to compaction. The height of the backfill shall be increased at approximately the same rate on all sides of the structure during placement.
- b) Fill adjacent to structures, pipe conduits, and drainfill or anti-seep collars shall be compacted to a density equivalent to that of the surrounding fill by hand tamping or by using manually directed power tampers or plate vibrators. Heavy equipment shall not be operated within two feet of any structure. Compaction by means of drop weights operating from a crane or hoist of any type will not be permitted. Fill adjacent to concrete structures shall not be compacted until the concrete has had time to gain enough strength to support the load.

9. FIELD QUALITY CONTROL

The moisture content of the clay and compactive effort shall be as set forth in Section 10. Unless otherwise required therein, the following shall be performed:

- a) Each layer shall receive at least three passes of a sheepsfoot roller, or five passes of rubber-tired or track-type equipment compaction equipment. Each layer of fill material shall be compacted by routing the construction equipment so that all parts of each layer are equally compacted. Fill material should contain sufficient moisture so that it can be formed into a ball without crumbling. If water can be squeezed out of the ball, it is too wet to compact properly and shall be dried prior to compaction. Dry soil shall be wetted and mixed prior to compaction.
- b) Construction operations shall be performed in such a manner that erosion, and air and water pollution are minimized and held within legal limits. The owner, Contractor, or other persons will conduct all work and operations in accordance with proper safety codes for the type of construction being performed with due regards to the safety of all persons and property.

10. ADDITIONAL CONDITIONS WHICH APPLY TO THIS PROJECT ARE: