359. WASTE TREATMENT LAGOON

CONSTRUCTION SPECIFICATION

1. SCOPE

The work shall consist of furnishing materials and installing all components of the Waste Treatment Lagoon as outlined in this specification and the drawings.

Construction work covered by this specification shall not be performed between December 1 through March 15 unless the site conditions and/or construction methods to be used have been reviewed and approved by the Engineer.

Construction operations shall be carried out in such a manner and sequence that erosion, air, and water pollution will be minimized and held within legal limits.

The completed job shall present a workmanlike appearance and shall conform to the line, grades, and elevations shown on the drawings or as staked in the field.

All operations shall be carried out in a safe and skillful manner. Safety and health regulations shall be observed and appropriate safety measures used.

2. MATERIALS

A. Earth fill and clay liner material shall be from the sources described in the drawings or Section 8 of this specification.

B. Flexible membrane liners shall meet the requirements of Specification 521A. (Flexible Membrane)

C. Soil dispersant shall meet the requirements of Specification 521B. (Soil Dispersant)

D. Bentonite shall meet the requirements of Specification 521C. (Bentonite Sealant)

E. Concrete shall meet the requirements of Specification 313P.

3. SITE PREPARATION

All trees, brush, fences, and rubbish shall be cleared within the area of the lagoon, including any embankment, ramp, or appurtenances, and any borrow areas. All stumps, roots and rubbish shall be removed from these areas to a depth of at least six inches below the existing ground surface. All material removed by the clearing and grubbing operation shall be disposed of as directed by the Owner or his/her Representative. Sufficient topsoil is to be stockpiled in a convenient location for use on the embankment and other disturbed areas to facilitate seeding.

4. CORE TRENCH

Where specified, a core trench shall be excavated along or parallel to the centerline of the embankment, as shown on the drawings. The width of the trench shall be governed by the equipment used for excavation and backfill, with the minimum bottom width being four feet or as specified in Section 8.

If a core trench is specified, the minimum depth shall be two feet or the depth shown on the drawings. If large boulders or bedrock is encountered in the excavation, the minimum depth will not be required if, in the opinion of the Engineer, the trench cannot be excavated to the required depth. The bedrock or boulders shall be cleared of all loose materials to insure adequate compaction of backfill material to the rock. The side slopes of the trench shall be one-on-one or flatter, or as otherwise shown on the drawings.

The backfill material for the core trench shall be the most impervious material available and shall be compacted as set forth in Section 6 for embankment fill. Where rock is encountered, the fill material shall be placed in three-inch layers and compacted by hand or mechanical tampers. Back-filling shall continue in three-inch layers until the depth of fill over the rock is such that acceptable density may be obtained by using construction equipment with a maximum of six-inch layers for the compaction operation.

5. PIPES

Excavation for pipes shall be made to the grades and lines shown on the drawings. Care should be taken not to excavate below the depths specified. Excavation below grade shall be corrected by placing firmly compacted layers of moist earth to provide a good foundation. If rock or boulders are exposed in the bottom of

the excavation, they shall be removed to a minimum depth of eight inches below the invert grade of the pipe and any appurtenances, and replaced with firmly compacted earth to the specified grade.

Pipes shall be back-filled in horizontal lifts of moist earth not to exceed four inches in thickness, or with other material as specified in Section 8 or in the drawings. Each lift shall be compacted by hand tampers or other compaction equipment, however at no time shall driven equipment tires or tracks be within two feet of pipes or appurtenances.

All pipe inlets and outlets within the treatment lagoon shall be installed with a watertight seal around the pipes to prevent migration of contaminated liquids along the pipe.

6. EMBANKMENT

The fill material for the embankment shall be obtained from within the required excavation or the designated borrow area(s) as specified in Section 8 or in the drawings. The material shall be free from stumps, wood, brush, roots, sod, rubbish, and other matter that may decay. 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.

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 minimum moisture content of the fill material and foundation shall be such that when kneaded in the hand, the fill material will form a ball that does not readily separate. If water can be squeezed out of the ball, it is too wet to compact properly.

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 lagoon 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. The most porous borrow material shall be placed on the downstream portions of the embankment.

Each layer of fill material shall be compacted by routing the construction equipment so that all parts of each layer are equally compacted. Each layer shall receive at least three passes of a sheeps-foot roller or five passes of a loaded carryall, unless otherwise specified in Section 8 or in the drawings.

Available topsoil should be placed on the top and on the finished exposed slopes of the lagoon embankment.

7. LININGS

A. FOUNDATION PREPARATION.

The completed excavation shall conform to the lines, grades, and elevation shown on the plans as nearly as can be achieved by skillful operation of the excavating equipment.
The bottom of the lagoon 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 8 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. If needed the water table level shall be controlled and collected to a free outlet and isolated from any leakage detection system. See additional requirements in Section 6. Fill shall be placed as described in Section 6.
The subgrade shall be free of debris, organic matter, free water, ice, snow, or other harmful substances. Placement of linings on mud, uncompacted or dry soil, 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 and cleared of rock and roots larger than 3 inches and all foreign material prior to placement of liner material or fill. If a liner other than soil is to be used, the scarified subgrade shall be compacted with a smooth wheeled roller as described in Section 6.

In addition to uniformity, the existing subgrade material must have sufficient strength to support the lining and its associated loads. In addition, geosynthetics may be used, if approved by the Engineer, to separate and/or stabilize the foundation. 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. Linings 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.

B. CLAY LINERS

The clay liner shall consist of the material designated in Section 8 or in the drawings, and shall be placed in accordance with Specification 521D and as described in Section 6, to the compactive effort and with the moisture content designated in Section 8.

C. OTHER LINERS

Other liners shall be installed in accordance with the applicable Specification 521A (Flexible membrane), 521B (Soil dispersant), 521C (Bentonite), or 521D (Compacted clay).

8. ADDITIONAL CONDITIONS WHICH APPLY TO THIS PROJECT ARE: