

CONSTRUCTION SPECIFICATION

ND-9 POND (EMBANKMENT)

1. SCOPE

The work shall consist of all construction operations and furnishing all materials as required by the drawings and specifications for the complete installation of the pond. All work shall be completed in a skillful manner.

2. LOCATION

The location of the embankment, borrow area, emergency spillway, and appurtenant structures shall be as specified on the drawings or as staked in the field.

3. SITE PREPARATION

Foundation Area: The foundation area shall be cleared of all trees, logs, stumps, roots, brush, boulders, sod, and rubbish. Channel banks and other steep foundation surfaces shall be sloped no steeper than 1 horizontal to 1 vertical. Topsoil and sod shall be stripped to a minimum depth of 6 inches. Topsoil shall be stockpiled for later placement on the dam, spillway, and borrow areas.

Stream channels in the foundation area shall be deepened and widened as necessary to remove stones, gravel, sand, stumps, roots, mud, or other objectionable material and to accommodate compaction equipment.

The foundation area will be thoroughly scarified to a minimum depth of 2 inches and compacted in accordance with the method specified for the earth fill. Water will be added, if necessary, to meet the compaction requirements and to permit bond with the first layer of fill. The foundation area shall be kept free of standing water when fill is being placed.

Waste Material: Waste material from the construction operation such as rocks, frozen soil, mud, stumps, trees, logs, roots, or rubbish shall be disposed of by piling, burying, or burning at locations outside the dam and reservoir area or as directed by the cooperater. Burning or other disposal shall comply with State Health Department and environmental regulations.

4. EXCAVATION

To the extent they are suitable and approved by the SCS representative, excavated materials are to be used as fill materials.

Cutoff and Principal Pipe Spillway Trenches: These trenches shall be excavated to the lines, grades, and widths shown on the drawings or as revised by the inspector for depth adjustment during excavation.

Emergency Spillway and Principal Spillway Outlet Channel: These excavations shall conform to the lines and grades shown on the drawings or as staked in the field.

The emergency spillway shall be over-excavated to a minimum depth of 4 inches for topsoil placement.

Borrow: The location, extent, and depth of the borrow area shall be as shown on the drawings or as staked in the field. The borrow pits shall be stripped of all vegetation and topsoil. The topsoil will be used on the embankment, cut slopes, and other disturbed areas.

Borrow areas will be excavated and dressed in a manner to eliminate steep or unstable side slopes or other hazardous conditions. Side slopes shall be no steeper than 4:1. Surfaces of the borrow areas not covered by permanent water shall be graded and shaped to prevent the ponding of water and to permit seeding.

5. PLACEMENT OF EARTH FILL

The material placed in the fill shall be free of sod, roots, frozen soil, stones over 6 inches in diameter, and other objectional material.

The foundation and excavated trenches shall be kept free of standing water during earth fill placement.

Plastic, fine grained materials from the borrow area and other required excavations shall be used for all earth fill unless shown otherwise on the drawings or specifications. Material selection shall be approved by the SCS representative. Except for surface top dressing, no organic materials (strippings) shall be used within the embankment.

The placing and spreading of fill material shall be started at the lowest point of the foundation and the fill brought up in horizontal layers of such thickness that the required compaction can be obtained. Lifts are not to exceed 9 inches in thickness before compaction. If the surface of any layer becomes too hard or dry for proper bonding with succeeding layers, it shall be scarified parallel to the axis of the fill to a depth of 2 inches and moistened before the next layer of fill is placed. The fill shall be constructed in continuous horizontal layers from abutment to abutment, except where openings or sectionalized fills are called for. In those cases, the slope of the bonding surfaces between embankment in place and embankment to be placed will not be steeper than 3 horizontal to 1 vertical. The bonding surface is to be treated the same as that specified for the foundation to insure a good bond with the new fill.

The distribution of materials shall be such that no lenses, pockets, streaks, or layers of material differing substantially in texture or gradation from the surrounding material. Where it is necessary to use materials of varying texture and gradation, the more impervious material shall be placed in the center and upstream portions of the fill. Where zoned fills of substantially differing materials are specified, the zones shall be placed according to lines and grades shown on the drawings.

The completed work shall conform to the lines, grades, and elevations shown on the drawings or as staked in the field.

The surface 4 inches of the embankment shall be topsoil. The topsoil shall be placed concurrently with the fill and shall be bonded to the compacted fill with the compaction equipment.

MOISTURE CONTROL

The moisture content of the fill material shall be such that the required compaction can be obtained. Material that is too wet shall be dried to meet this requirement, and material that is too dry shall have water added and mixed until the requirement is met. The minimum moisture content of the fill material shall be such that when kneaded in the hand, the fill material will form a ball that does not readily separate, unless other moisture requirements are shown on the drawings or in this specification.

COMPACTION

Construction equipment shall be operated over each layer of fill to insure that the required compaction is obtained.

Compaction shall be accomplished by one of the following methods. If no method is specified, compaction will be by Method 1.

Method 1 - Each layer of fill shall be compacted by the wheels or tracks of the loaded hauling equipment make at least 2 passes over the entire surface of the layer.

Method 2 - Each layer of fill shall be compacted by a tamping-type roller making two passes over the entire surface of the layer. Minimum weight of the roller shall be specified on the drawings or construction detail section of the specification.

Method 3 - Each layer of fill shall be compacted to a minimum of 95 percent of the maximum dry density obtained under ASTM D698, Method A. The allowable moisture range from optimum shall be 0 to 3 percent above.

Fill adjacent to structures and appurtenances shall be placed in 4-inch layers (before compaction) and compacted to a density equal to that of the surrounding fill by means of hand tamping or manually directed power tampers or plate vibrators. Selected backfill material shall be placed around structures at the same rate on all sides to prevent damage from unequal loading. Fill adjacent to concrete structures shall not be compacted until the concrete is strong enough to support the load. Care should be taken that compaction around the principal spillway does not lift the pipe, resulting in a void beneath the pipe. Hand tamping shall be done to a depth of fill two feet over the top of the pipe. Earth foundations shall be prevented from drying and cracking before concrete and backfill are placed.

Power driven equipment shall not pass over any pipe conduit until the compacted fill has reached height of two feet over the conduit.

Other compaction requirements will be as shown on the drawings or in the construction detail section of this specification.

6. PRINCIPAL SPILLWAY

Details of the pipe, anti-seep collars, and other appurtenances shall be as shown on the drawings or in construction details.

Corrugated steel pipe shall conform to the requirements of ASTM A760 (zinc coated) or ASTM A762 (polymer coated). Polymer coated pipe shall be coated to a minimum thickness of 0.01 inches (10 mils) on each side. The pipe shall have annular corrugations with close riveted and caulked seams or shall have helical corrugations with continuously welded seams. The ends of helical pipe shall have rerolled annular corrugations. The wall thickness of the pipe and details of coatings shall be as shown on the drawings or in the construction details of this specification. Water-tight connecting bands shall be 24 inches wide, held in place with four 1/2" diameter rods with silo lugs, and sealed with asphalt mastic. Requirements for other pipe materials shall be as shown on the drawings or in the construction details of this specification.

Anti-seep collars shall be of materials compatible with that of the pipe and shall be installed so that they are watertight. The pipe shall be installed according to the manufacturer's instructions.

The pipe shall be laid to the line and grade shown on the drawings or as staked in the field. The pipe shall be placed in original earth or properly compacted earth fill, and be uniformly bedded to the depth and in the manner specified.

Excavation required for the principal spillway shall extend at least two feet from the sides of the conduit or structural components. Excavations below grade shall be backfilled and compacted to the density specified for the earth fill. Side slopes of the excavation shall not be steeper than 2:1.

After the principal spillway has been completely installed and while still exposed, any damaged areas shall be repaired according to manufacturer's recommendations.

7. FOUNDATION AND EMBANKMENT DRAINS

Foundation and embankment drains, when required, will be placed to the line and grade as shown on the drawings or as staked in the field. Drain fill shall be kept from being contaminated by adjacent soil materials during placement by either placing it in a cleanly excavated trench or by keeping the drain at least one foot above the adjacent earth fill. Detailed requirements for drain fill and any required pipe will be as shown on the drawings or as specified in the construction details section of this specification.

8. CONCRETE

Unless specified otherwise on the drawings or in the specifications, the following shall apply to the construction of all concrete appurtenances.

Concrete shall have a maximum net water content of 6 1/2 gallons/bag and a minimum cement content of 6 bags/cu.yd.

Portland cement shall be Type I or II conforming to ASTM C150. Air entraining admixtures or air entraining cement shall be used to provide an air content of 5 to 8 percent of the volume of concrete. Air entraining admixtures shall conform to ASTM C260.

Fine and coarse aggregates shall conform to the requirements of ASTM C33. Coarse aggregate shall be size no. 57 or 67.

Mixing water shall be clean and free from oil, alkali, or acid.

Steel reinforcement shall conform to the requirements of ASTM A615. The reinforcement shall be free of oil, grease, loose rust, or other deleterious matter.

The proportions of the aggregates shall be such to produce a concrete mixture that will work readily into the corners and angles of the forms and around steel reinforcement when consolidated. The slump at the time of placing shall be 2 to 4 inches.

Forms shall be wood, plywood, steel, or other approved materials and shall be mortar tight. The forms shall be unyielding and shall be constructed so the finished concrete conforms to the specified dimensions and contours. Reinforcing steel shall be placed as indicated on the plans and shall be held securely in place during concrete placement.

Prior to placement of concrete, the forms and subgrade shall be free of chips, sawdust, debris, water, ice, snow, extraneous oil, mortar, or other harmful substances or coatings. Subgrade surfaces shall be moist and shall not be frozen.

Subgrade and forms shall be installed to line and grade shown on the drawings or staked in the field.

Concrete shall be conveyed from the mixer to the forms as rapidly as practical by methods that will prevent segregation of the aggregates and loss of mortar. Concrete shall not be dropped more than 5 feet vertically except where suitable equipment is used to prevent segregation.

Immediately after the concrete is placed in the forms, it shall be consolidated by spading, hand tamping, or vibration as necessary, to insure smooth surfaces and dense concrete.

All exposed surfaces of the concrete shall be accurately screeded to grade and then wood floated. All exposed edges shall be chamfered or tooled to a uniform radius.

Forms shall be removed in such a way to prevent damage to the concrete. Forms shall not be removed for at least 24 hours after concrete placement unless a longer period is specified.

Concrete shall be prevented from drying for a curing period of at least 7 days after it is placed. Exposed surfaces shall be kept continuously moist for the entire period or until curing compound is applied.

Concrete shall not be mixed nor placed when the atmospheric temperature is less than 40 degrees F., or more than 90 degrees F., unless facilities are provided to prevent freezing or for cooling as required.

9. TOPSOIL PLACEMENT

Topsoil will be considered as the friable surface soils available at the site.

The bottom and side slopes of the emergency spillway shall be over excavated to a minimum depth of 4 inches and backfilled to grade with topsoil. The surface of the excavation shall be lightly scarified just prior to spreading the topsoil.

The surface 4 inches of the embankment shall be topsoil as required in Section 5 of this specifications.

Placement of topsoil on other disturbed areas shall be as shown on the drawings or in the construction detail of this specification.

10. VEGETATION

A protective cover of vegetation shall be established on all exposed surfaces of the embankment, emergency spillway, and borrow area. Seedbed preparation, seeding, fertilizing, mulching, or other vegetation shall be completed in accordance with Critical Area Planting (342).

All areas will be vegetated as soon as possible after construction is completed.

Other vegetation requirements shall be specified in the construction details.

11. FENCING

The embankment and spillway shall be fenced to protect the vegetation, when specified on the plans or the construction details.

12. MEASUREMENT

Excavation: The volume of excavation will be measured and computed to the nearest cubic yard by the method of average cross sectional end areas.

The upper measurement limit shall be the ground surface before the start of construction. Where previous excavations or fills have been performed, the resulting modified ground surface shall be the upper limit.

The lower measurement limit shall be the specified, measured, or staked surface of the excavation.

Earth Fill: The volume of earth fill will be measured and computed to the nearest cubic yard by the method of average cross sectional end areas.

The lower measurement limit shall be the specified, measured, or staked surface of the foundation including stripping, cutoff trench, and other required excavations.

The upper measurement limit will be the specified neat lines of the embankment surface including the allowance for settlement.

Topsoil: Topsoil placed on the surface of the embankment will not be measured. It will be considered as part of the earth fill volume.

Topsoil on the emergency spillway and other specified areas will be measured to the nearest square yard.

Other Specified Components: Measurement will be to the units shown on the drawings or in the construction details of this specification.

12. PAYMENT

Payment for the items of work will be made in accordance with the agreement between the contractor and cooperator.

Payment will constitute full compensation for furnishing, transporting, and installing the item of work. This includes the necessary fittings and appurtenances to complete that item of work.

13. CONSTRUCTION DETAILS

