CONSTRUCTION SPECIFICATIONS

NATURAL RESOURCES CONSERVATION SERVICE

EMBANKMENT PONDS

1. SCOPE

This work consists of the clearing, excavation, backfill, concrete, and other appurtenances required for the construction of the embankment and the disposal of all cleared and excavated materials for the water impoundment. Conduct construction operations in such a manner that erosion, air, water, and noise pollution will be minimized and held within legal limits as established by state regulations.

2. CLEARING AND GRUBBING

Clear the reservoir area up to the elevation of the crest of the principal spillway, as a minimum, unless less clearing is approved as provided in the National Engineering Manual Part 520.35. Clear the area extending the full length of the dam for a distance of 400 feet upstream from the dam and spillway, including the area where the dam and plunge pool will be located. Cut all trees and brush as flush with the ground as practicable, and remove all such trees, brush, logs, and other debris from the pond site before water is impounded. Dispose of all combustible material cleared and grubbed, from the site, by burning, burying at approved locations or removing from the site and stacking. Any material that will float will be removed or anchored.

3. FOUNDATION PREPARATION

Clear the foundation area of all trees, stumps, roots, brush, boulders, sod, and debris. Slope all channel banks and sharp breaks to no steeper than 1:1. Remove all topsoil containing excessive amounts of organic matter. Thoroughly scarify the surface of the foundation area before beginning placement of the embankment material.

4. CUTOFF TRENCH

Excavate the cutoff trench to the depths, bottom width and side slopes shown on the plans or as staked in the field. Remove all standing water from the trench before beginning placement of backfill. Place backfill in thin layers (maximum 6 in. thickness) of suitable material. Do not place backfill in the trench if the moisture content of the fill material will not permit satisfactory compaction of the fill, as determined by the NRCS Engineer on site (See Moisture Content under Embankment Construction). Operate the construction equipment over the surface of each layer in a manner that will result in the specified compaction of the fill material. Route the construction equipment to obtain a minimum of four (4) complete passes of a loaded rubber tired pan or a sheepsfoot roller over the entire surface of each layer. Adequate compaction is achieved when the “feet” of the sheepsfoot roller will walk on the top of the compacted fill material. Use special compaction equipment when the required compaction cannot be obtained by routing of the construction equipment.

5. SPILLWAY AND BORROW EXCAVATION

Excavate the auxiliary spillway in undisturbed earth to the lines, grades, bottom width, and side slopes shown on the plans. Grade and construct all borrow areas in such a manner that they are well drained and protected from erosion by the use of diversions or other conservation measures. Construct side slopes of borrow areas to facilitate the establishment of vegetation, mowing, and maintenance operations. NRCS staff will advise the contractor regarding the maximum depth of excavation in each borrow area. If the maximum depth is exceeded in the impoundment area, the contractor is responsible for covering the exposed area with a minimum of 2 feet of impervious material. Place stockpiled surface soils excavated from the foundation, spillway, and borrow areas on the dam, spillway and borrow areas to facilitate establishment of vegetation.

6. EMBANKMENT CONSTRUCTION

Selecting, Placing, and Spreading of Material

Obtain fill material from borrow areas designated by NRCS. Use material in the fill that is free of all sod, roots, frozen soil, stones over 6 inches in diameter, and other objectionable material. Start the placing and spreading of the fill material at the lowest point of the foundation and bring the fill up in approximately horizontal layers not exceeding 6 inches in thickness.

Place these layers at an approximately uniform elevation over the entire area of the fill, except where openings or sectionalized fills are required. In those cases where sectional fills are required, construct the bonding surfaces of the sectional fills no steeper than 3 horizontal to 1 vertical. Treat the bonding surface in the same manner specified for the foundation to insure a good bond with the new fill.

Operate the construction equipment over the surface of each layer in a manner that will result in the specified compaction of the fill material. Route the construction equipment to obtain a minimum of four (4) complete passes of a loaded rubber tired pan or a sheepsfoot roller over the entire surface of each layer. Adequate compaction is achieved when the “feet” of the sheepsfoot roller will walk on the top of the compacted fill material. Use special compaction equipment when the required compaction cannot be obtained by routing of the construction equipment.

Use a distribution and gradation of materials throughout the fill that will produce a homogenous fill without lenses, pockets, streaks, or layers of material differing substantially in texture or gradation from the surrounding material. Where it is necessary to use material of varying texture and gradation, place the more impervious material in the upstream and center portions of the fill.

Avoid contamination of the drainfill by adjacent soil materials during placement by placing the drainfill in a cleanly excavated trench or keeping the drain at least 1 ft. above the adjacent earthfill.

Place selected drainfill and backfill material around structures and pipe conduits at about the same rate on all sides to prevent damage from unequal loading.

Moisture Control

Use fill material with moisture content such that the specified compaction can be obtained with the equipment used. Maintain the moisture content of the fill within the limits to:

- prevent the bulking or dilatence of the material under the action of the hauling or compaction equipment,
- prevent adherence of the fill material to the equipment,
- ensure the crushing and blending of the soil clods and aggregation into a homogeneous mass, and
- contain adequate moisture so that a sample can be hand molded.

Dry material that is too wet to meet the requirements above by spreading to air dry or by disking. Uniformly add and thoroughly mix water with material that is too dry to meet the requirements above until the requirements are met.

Place the fill to the lines and grades, top width, and side slopes shown on the plans to the extent skillful operation of the construction equipment will permit.

6. PIPE CONDUIT INSTALLATION

Inspect the pipe upon delivery to the site to ensure that the materials meet the specifications and the pipe is not damaged. Install the pipe conduit barrel at the grade shown on the plans. Place selected backfill material to a minimum thickness of 3 feet beneath the pipe and a minimum width of 15 feet to form firm bedding for the pipe. Place select backfill around the barrel and its component parts in layers not exceeding 4 inches in thickness and thoroughly compact each layer with a manually directed hand tamper or equivalent until 2 ft. of hand compacted material has been placed over the pipe. Use cathodic protection on metal pipes, as recommended by the manufacturer. For conduits connected with bands, wrap the entire circumference of the joint with a 4-foot wide section of geotextile during installation

Materials

Use component parts of the conduit including barrel, riser, trashrack, or deep water release, support posts or brace and hardware for mounting that meet the requirements specified on the plans. Attach all components in a workmanlike manner.

Concrete

Use concrete meeting the following specifications:

1) Use the following concrete mixture:
    - Minimum of 6 bags (564 lbs) of Type I Portland cement per cubic yard of concrete to obtain 3000 psi minimum compressive strength in 28 days.
    - Entrained air at 6% $\pm$ 1%
    - Coarse aggregate from 3/8” to 1” diameter
2) Concrete slump will be 1 to 4”
3) Water to cement ratio will not exceed 0.5
4) Superplasticizers (ASTM C 494, Type F or G) ,may be used to increase the workability
5) Use polypropylene fibers ½” to 2” long at a rate of 1.5 lbs/cu. Yd. of concrete in the mix
6) Use rods or mechanical vibration to consolidate the concrete
7) Wet the compacted subgrade before beginning concrete placement
8) Use reinforcing steel that meets the requirements of ASTM A 615
9) Do not mix or place concrete when the daily minimum temperature is les than 40 degrees F, unless facilities are provided to prevent the concrete from freezing.

7. DRAINAGE DIAPHRAGM

Install the drainage diaphragm around the pipe to the lines and grades shown on the drawings using the materials specified.

8. EROSION AND SEDIMENT CONTROL

Minimize erosion and control sediment during construction using Best Management Practices (BMPs) in the Manual for Erosion and Sediment Control in Georgia.

9. VEGETATION

Establish adapted vegetation on all exposed surfaces of the embankment, auxiliary spillway, borrow areas, and other spoil areas as soon as possible after completion of construction.

Use Georgia NRCS Conservation Practice Standard, Critical Area Planting - Code 342, for plant selection, seedbed preparation, liming, fertilizing, seeding and mulching for permanent vegetation. Track the slopes of the dams to facilitate vegetation establishment. Fence treated areas when needed to protect the vegetation.