

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE SPECIFICATIONS

POND

(No.)

CODE 378

Embankment Pond Specifications

Foundation Preparation

The foundation area shall be cleared of trees, logs, stumps, brush, boulders, sod, and rubbish. If needed to establish vegetation, the topsoil and sod shall be stockpiled and spread on the completed dam and spillways. Foundation surfaces shall be sloped no steeper than a ratio of one horizontal to one vertical. The foundation area shall be thoroughly scarified before placement of the fill material. The surface shall have moisture added, or it shall be compacted if necessary so that the first layer of fill material can be compacted and bonded to the foundation.

The cutoff trench and any other required excavations shall be dug to the lines and grades shown on the plans or as staked in the field. If they are suitable, excavated materials may be used in the permanent fill. Existing stream channels in the foundation area shall be sloped no steeper than a ratio of one horizontal to one vertical. They shall be deepened and widened as necessary to remove all stones, gravel, sand, stumps, roots, and other objectionable material and to accommodate compaction equipment.

Foundation areas shall be kept free of standing water when fill is placed on them.

Fill Placement

The material placed in the fill shall be free of detrimental amounts of sod, roots, frozen soil, stones more than 6 in. in diameter (except for rockfills), and other objectionable material.

Drainfill 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 1 ft. above the adjacent earthfill.

Selected drainfill and backfill material shall be placed around structures, pipe conduits, and antiseep collars at about the same rate on all sides to prevent damage from unequal loading.

Fill material shall be placed and spread beginning at the lowest point of the foundation and then bringing it up in horizontal layers thick enough that the required compaction can be obtained. The fill shall be constructed in continuous horizontal layers. If openings or sectionalized fills are required, the slope of the bonding surfaces between the embankment in place and the embankment to be placed shall not be steeper than a ratio of three horizontal to one vertical. The bonding surface shall be treated the same as that specified for the foundation to insure a good bond with the new fill.

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

Moisture Control

The moisture content of the fill material shall be adequate for obtaining the required compaction. Material that is too wet shall be dried to meet this requirement, and material that is too dry shall be wetted and mixed until the requirement is met.

Compaction

Construction equipment shall be operated over each layer of fill to insure that the required compaction is obtained. Special equipment shall be used if needed to obtain the required compaction.

If a minimum required density is specified, each layer of fill shall be compacted as necessary to obtain that density.

Fill adjacent to structures, pipe conduits, and drainfill or antiseep 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. Fill adjacent to concrete structures shall not be compacted until the concrete has had time to gain enough strength to support the load.

Protection

A protective cover of vegetation shall be established on all exposed surfaces of the embankment, spillway, and borrow area if soil and climatic conditions permit. If soil or climatic conditions preclude the use of vegetation and protection is needed, nonvegetative cover such as mulches or gravel may be used. In some places, temporary vegetation may be used until permanent vegetation can be established. The embankment and spillway shall be fenced if necessary to protect the vegetation.

Preparing the seedbed, seeding, fertilizing, and mulching shall comply with instructions in technical guides.

Principal Spillway

Corrugated metal pipe shall conform to the requirements of Federal Specifications WW-P-402 or WW-P-405, as appropriate. Other pipe materials shall conform to appropriate specifications. Antiseep collars shall be of materials compatible with that of the pipe and shall be installed so that they are water-tight. The pipe shall be installed according to manufacturer's instructions. It shall be firmly and uniformly bedded throughout its length and shall be installed to the line and grade on the drawings.

Concrete

The mix design and testing of concrete shall be consistent with the size and requirements of the job. Mix requirements or necessary strength shall be specified. The type of cement, air entrainment, slump, aggregate, or other properties shall be specified as necessary. All concrete is to consist of a workable mix that can be placed and finished in an acceptable manner.

Necessary curing shall be specified. Reinforcing steel shall be placed as indicated on the plans and shall be held securely in place during concrete placement. Subgrades and forms shall be installed to line and grade, and the forms shall be mortartight and unyielding as the concrete is placed.

Foundation and embankment drains

Foundation and embankment drains, if required, shall be placed to the line and grade shown on the drawings. Detailed requirements for drain material and any required pipe shall be shown in the drawings and specifications for the job.

Excavated ponds

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

Embankment and excavated ponds

Construction operations shall be carried out so that erosion and air and water pollution are minimized and held within legal limits. All work shall be conducted in a skillful and workmanlike manner. The completed job shall present a workmanlike appearance.

Measures and construction methods that enhance fish and wildlife values shall be incorporated as needed and practical. Fencing and cover to control erosion and pollution shall be established as needed. Appropriate safety measures, such as warning signs, rescue facilities, and fencing, shall be provided as needed.

Embankment Pond Specification

Foundation Preparation: No additional requirements.

Fill Placements: In addition to the requirements of the National Specification, a berm at least 8 feet in width shall be left between the toe of the fill and the edge of the borrow pit where the embankment is to be constructed with a dragline or scraper. Where the embankment is to be constructed by a bulldozer, no berm is required if the borrow pit slope adjacent to the embankment is sloped to conform with the upstream slope of the embankment. All borrow material shall be obtained within the pool area insofar as possible. Inside borrow pits should be cut with side slopes not steeper than 1:1 and should be constructed to drain. All borrow areas outside the pool area shall be graded and left in such a manner that they are well drained.

Embankments will be acceptable with the following tolerances:

1. The steepest sections of the upstream and downstream slopes do not exceed those planned by more than $\frac{1}{2}$ horizontal to 1 vertical.
2. Occasional lows on the centerline profile of the completed embankment of no more than 0.2 foot below the design height including settlement allowance.
3. The plotted cross section of the completed embankment verifies that the minimum (a) top and base widths and (b) cross-sectional area below the planned top elevation of the embankment, with allowance for settlement, have been met.

Moisture Control: In addition to the requirements of the National Specification the moisture content of the fill shall be maintained within the limits to:

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

Compaction: No additional requirements.

Protection: In addition to the National Specification, it is recommended that a 6-inch layer of topsoil be spread over the dam and spillway subgrade.

Principal Spillway – The following is in addition to the National Specification:

Smooth Steel or Wrought Iron Pipe – New, or good quality used, smooth welded steel or wrought iron pipe, suitably protected from rust and corrosion shall be used. Used pipe shall have a deformation of 2 percent or less of the diameter at any point, and must

have a remaining wall thickness at any pitted or rusted spot equal or greater than the wall thickness specified for new pipe.

Pipe joints shall be welded or flexible watertight coupling shall be used, except threaded joints may be used for elbow connections on the 4- 6- and 8- inch diameter pipe.

The minimum wall thickness for smooth steel pipe shall be determined by the use of Table 1.

Antiseep collars shall be watertight, and shall be constructed of 10-gage sheet metal suitably protected from rust and corrosion.

PVC – Follow Table 2 of the National Standard for acceptable PVC pipe for use in earth dams.

Corrugated Metal Pipe – The metal pipe shall be Class II (helical corrugation) with the ends reformed to annular corrugations. The reformed annular corrugations shall have the same pitch and depth as the helical corrugations. The minimum gage for corrugated metal pipe shall be determined by the use of Table 1.

Field coupling of pipe sections shall be accomplished by means of coupling bands unless otherwise specified. The band couplers shall be a minimum of 4 rod, ad minimum of 6 corrugations and watertight. Joint compound or closed cell expanded rubber gaskets shall be used with each connecting band. The joint compound shall be bitumastic “50” or equal. Closed cell rubber gaskets shall be twelve (12) inches wide, three-eighths (3/8) inch thick, unstretched diameter then (10) percent less than nominal pipe size and shall comply with ASTM Specification D-1056-85, Grade 2C2. The gate of the coupling band shall be one gage less than that of the pipe or a minimum of 16 gage.

Only new corrugated metal pipe and fittings shall be used. All corrugated metal pipe and fitting shall be polymer coated.

Corrugated aluminum pipe shall not be used in soils that have a PH value less than 4 or greater than 9. Where aluminum pipe is to be in contact with steel structure or components, contact area shall be given a heavy bituminous coating, inside and out, for a distance of one (1) foot beyond the contact or bituminous-coated coupling bands shall be used.

Installation – Follow procedures set forth in the Louisiana Specification 587 – Structure for Water Control (Installation – Pipe Structure).

Pollution Control – Construction operations shall be carried out in such a manner and sequence that erosion and air and water pollution will be minimized and held within legal limits. All work shall be conducted in a skillful and workmanlike manner.

Safety – Appropriate safety measures, such as warning signs, rescue facilities, fencing, etc., shall be planned for.

Pond and Reservoir Maintenance – All ponds must be adequately maintained if their purposes are to be realized through the expected life. Special considerations shall be given for maintenance needs during the planning, design and construction of the pond.

Rills on the slopes of the dam and washes in the earth spillway shall be filled with suitable material, compacted, reseeded and fertilized as needed. Should the upstream face of the dam wash, due to wave action, protection such as riprap shall be installed. If unacceptable seepage through or under the dam occurs, proper corrective measure shall be taken.

The vegetative cover of the dam and earth spillway shall be maintained by mowing and fertilizing when needed. The minimum side slope to facilitate mowing is 3 horizontal to 1 vertical. Trees on the embankment can cause leaks and safety hazards and should not be permitted.

Appurtenances such as trickle tubes, trashracks, outlet structures and valves shall be kept free of trash.

Excavated Ponds: Due to the inaccuracies of earthmoving equipment commonly used, excavated ponds will be acceptable when the steepest sections of the side slopes of the completed dugout do not exceed those planned by more than $\frac{1}{2}$ horizontal to 1 vertical, provided the required yardage has been removed, the required depth has been obtained and the bottom and top dimensions have been equaled or exceeded.

TABLE 1: MINIMUM WALL THICKNESS AND FILL HEIGHT FOR PIPE

Pipe Diameter (in)	CORRUGATED STEEL			CORRUGATED ALUMINUM			SMOOTH STEEL		
	Min Gage 1	Min Fill (in)	Max Fill (ft)	Min Gage 1	Min Fill (in)	Max Fill (ft)	Min. Wall Thickness (in)	Min Fill (in)	Max Fill (ft)
12	16	12	20	12	12	20	3/16	12	20
15	16	12	20	12	12	20	3/16	12	20
18	16	12	20	12	12	20	1/4	12	20
21	16	12	20	12	12	20	1/4	12	20
24	14	12	20	10	12	20	<u>3/</u>		
30	14	12	20	10	15	20			
36	12	12	20	8	15	20			
42	12	12	20	8	15	20			
48	10	12	20	8	15	19			
54	12	12	20	8	15	18			
60	10	12	20	<u>2/</u>					

1/ 2-2/3 x 1/2 in. corrugations (annular or helical)

2/ Do not use Aluminum material for diameters greater than 54"

3/ A special design is required

- Notes: 1. Max and Min fill heights are measured from top of pipe.
2. This Table to be used for applicable structures in Chapter 6 of the EFM.

CONSERVATION OF NOMINAL GAGE TO THICKNESS					
Gage No.	16	14	12	10	8
Corrugated Steel *	0.064	0.079	0.109	0.138	0.168
Corrugated Aluminum	xxxxx	xxxxx	0.105	0.135	0.164

* Galvanized thickness