Natural Resources Conservation Service
PRACTICE SPECIFICATION
POND
(Code 378)

1. SCOPE

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

Construction work covered by this specification shall not be performed between December 1st and the following March 15th, unless the site condition and/or construction methods to be used have been reviewed and approved by the Engineer or his/her Representative.

2. MATERIALS

Unless otherwise set forth in Section 10, the following materials are to be used for construction of a pond:

PORTLAND CEMENT shall conform to the requirements of ASTM C150 for the specific types of cement such as Type I, IA, II, IIA, II(MH), II(MH)A, III, IIIA, IV, and V Portland cement. Type IS Portland blast-furnace slag cement, Type IP Portland-pozzolan cement, or Type IL Portland-limestone cement shall conform to the requirements of ASTM C595 and may be used unless prohibited by the specifications.

CONCRETE AGGREGATE shall meet the requirements and gradation specified in ASTM-C33. Coarse aggregate shall meet the gradation for size numbers 57 or 67.

WATER used in mixing or curing concrete shall be clean and free from injurious amounts of oil, acid, salt, organic matter or other deleterious substances.

REINFORCEMENT bars shall be grade 60 or higher, and shall conform to ASTM-A615, A616, or A617. Welded wire fabric reinforcement shall conform to ASTM-A185 or A497. Reinforcement shall be free from loose rust, oil, grease, curing compound, paint or other deleterious coatings.

CONCRETE ADMIXTURES shall conform to ASTM-C260 for air entrainment, and ASTM-C494, Types A, D, F, or G, for water- reduction and set-retardation.

POZZOLAN shall conform to ASTM-C618, Class F, except loss of ignition shall not exceed 3.0 percent.

CURING COMPOUND shall meet the requirements of ASTM-C309, Type 2, Class A or B.

MASONRY COMPONENTS shall meet the requirements of ASTM-C90 and C270, and shall be installed in accordance with ACI-530.

PRECAST CONCRETE UNITS shall comply with ACI-525 and 533.

PREFORMED EXPANSION JOINT FILLER shall conform to the requirements of ASTM-D1752, Type I, II or III, unless bituminous type is specified, in which case it shall conform to ASTM-D994 or D1751.

JOINT SEALERS shall conform to the requirements for ASTM-DI850, with “penetration” not greater than 120, or Federal Specification SS-S-210A; except that sealers for vertical or overhead application must meet the requirements of Federal Specification TT-S-227, Type II.

WATERSTOPS. Vinyl-chloride polymer types shall be tested in accordance with Federal Test Method Standard No. 601, and shall show no sign of web failure due to brittleness at a temperature of -35 degrees Fahrenheit. Colloidal waterstops shall be at least 75 percent bentonite in accordance with Federal Specification SS-S-210A.

DRAINFILL AGGREGATE AND BEDDING shall meet the requirements of PennDOT Specifications, Section 703.

ROCKFILL AND RIPRAP shall meet the material requirements: of PennDOT Specifications, Section 850.

PIPE AND APPURTENANCES shall meet the requirements listed in the NRCS National Engineering Handbook (NEH) (Title 210), Part 636, Chapter 52, “Structural Design of Flexible Conduits”.

WOOD shall be graded and stamped by an agency accredited by the American Lumber Standards Committee as meeting the required species, grade, and moisture content. In the absence of such a stamp, the Contractor or material supplier shall provide written certification that the wood products meet the designated quality criteria.

PRESSURE TREATED WOOD PRODUCTS shall be Douglas Fir, Southern Yellow Pine, or as otherwise specified on the drawings or in Section 10. They shall be treated with preservatives in accordance with the American Wood Preservers Association (AWPA) Standard C16, “Wood Used on Farms, Pressure Treatment.” Each piece shall bear the AWPA stamp of quality. In the absence of such a stamp, the Contractor or material supplier shall provide written certification that the pressure treated wood meets the designated quality criteria.

FASTENERS for wood structures shall be stainless steel, galvanized, or otherwise protected from corrosion due to contact with moisture and associated gasses.

GEOTEXTILE shall meet the requirements as outlined in NRCS Design Note 24 and NRCS Material Specification 592.

3. SITE PREPARATION

All trees, brush, fences, and rubbish shall be cleared within the areas of the embankment, spillways, appurtenances, and 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. Unless otherwise set forth in Section 10, all trees, brush, fences, and rubbish shall

be cleared from the pool area. All material removed by the clearing and grubbing operation shall be disposed of as directed by the Owner or Representative.
Sufficient topsoil should be stockpiled in a convenient location for use on the embankment and other disturbed areas to facilitate seeding. Final grading of the embankment foundation prior to any fill placement shall remove all unsuitable rock and soil, and any slopes steeper than 1: 1.

For excavated ponds, the pool area shall be excavated to the lines, grades and elevations shown on the drawings. Unless specified in Section 10, the materials excavated from the pond shall be placed in one of the following ways so that its weight will not endanger the stability of the pond side slopes, and where it will not be washed back into the pond by rainfall:

1. Uniformly spread to a height not exceeding three feet with the top graded to a continuous slope away from the pond.
2. Uniformly placed or shaped, with side slopes assuming the natural angle of repose for the excavated material, and set a distance from the pond edge equal to the depth of the pond, but not less than 12 feet.
3. Hauled away as directed by the Landowner.

4. CUTOFF TRENCH

Where specified, a cutoff trench shall be excavated along or parallel to the centerline of the earthfill, as shown on the plans. Unless otherwise shown on the drawings, the bottom width of the trench shall be governed by the equipment used for excavation, but not less than four feet.

The minimum depth of the cutoff trench shall be three feet or as otherwise 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 ensure adequate compaction of backfill material to the rock.

The side slopes of the trench shall be one-to-one or flatter, or as otherwise shown on the drawings.

The backfill material for the cutoff 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. Backfilling 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 plans or as indicated by construction stakes. Care should be taken not to excavate below the depths specified. Excavation below the design grade shall be corrected by firmly compacting 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 bottom of the pipe and, where applicable, below the bottom of anti- seep collars, and replaced with firmly compacted earth to the specified grade. Pipes shall be firmly and uniformly bedded.

Pipes shall be of the materials set forth in Sections 2 and 10, or as otherwise shown on the drawings.
All pipe connections shall be watertight. Anti-seep collars, where used, shall also be connected to pipes in such a manner as to be watertight. Helically corrugated pipe shall have, as a minimum, either continuously molded seams or lock seams which are caulked, during fabrication, with a neoprene bead. Bell and spigot pipe shall be placed with the bell end upstream.

Any bituminous coating which is damaged shall be repaired with cold applied bituminous coating compound. Aluminum surfaces that are to be in contact with concrete shall be painted with one coat of zinc chromate primer. Hot dipped galvanized bolts may be used for connections.

6. EMBANKMENT

The fill material for the embankment shall be obtained from the designated borrow areas and/or required excavations. The material shall be free from stumps, wood, brush, roots, sod, rubbish, and other matter that may decay. Fill shall also be free of stones over two inches in diameter if compacted by hand or mechanical tampers, or over six inches in diameter if 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 exposed by this operation, i.e., other than the mineral soil that has been identified for use as fill, shall be disposed of as directed by the Owner.

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 thickness of each layer of fill prior to compaction shall be no greater than eight inches for sheepsfoot rollers, six inches for rubber-tired compaction equipment, or four inches for track-type compaction equipment (must be 10 ton or greater), unless otherwise specified.

Materials placed on the fill by dumping in piles or windrows shall be spread uniformly to not more than the specified thickness prior to compaction.

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.
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 sheepsfoot roller or track-type equipment or five passes of rubber-tired compaction equipment, unless otherwise specified on the drawings or in Section 10. 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.

Fill adjacent to structures, pipe conduits, and drain fill 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.

Final grading of the embankment shall be smooth and free of ruts and debris. Apply topsoil 6” thick unless otherwise specified in Section 10.

Drain fill, where required, shall be placed to the line and grade shown on the drawings. Detailed requirements for drain material and any required drainpipe shall be as shown in the drawings.

7. FOUNDATION PREPARATION

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 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 6, unless otherwise specified in Section 10 or on the drawings.

The subgrade shall be free of debris, organic matter, free water, ice, snow, 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. If a liner other than soil is to be used, the surface of the scarified subgrade shall be compacted with at least 3 passes of a smooth wheeled roller.

In addition to uniformity, the existing subgrade material must have sufficient strength to

support the lining and its associated loads. Geosynthetics may be used, if approved by the Engineer, to further separate and/or stabilize the foundation.

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

SOIL LINERS

A soil liner shall consist of the material designated in Section 10 or in the drawings, and shall be placed as described in Section 6, to the compactive effort and with the moisture content designated in Section 10. The use of soil dispersants or bentonite shall conform to Specification 520.

OTHER LINERS

Other liners, e.g., flexible membrane, shall be installed in accordance with Specification 521.

8. EROSION CONTROL AND WATER REMOVAL

All work on permanent structures shall be carried out in areas free from water. The Contractor shall construct and maintain all temporary dikes, levees, cofferdams, drainage channels, and stream diversions necessary to protect the areas to be occupied by the permanent works. The Contractor shall also furnish, install, operate, and maintain all necessary pumping and other equipment required for removal of water from the various parts of the work and for maintaining the excavations, foundation, and other parts of the work free from water as required or directed by the Engineer for constructing each part of the work. After having served their purpose, all temporary protective works shall be removed or leveled and graded to the extent required to prevent obstruction in any degree whatsoever of the flow of water to the spillway or outlet works and so as not to interfere in any way with the operation or maintenance of the structure. Stream diversions shall be maintained until the full flow can be passed through the permanent works.

The removal of water from the required excavation and the foundation shall be accomplished in a manner and to the extent that will maintain stability of the excavated slopes and bottom of required excavations and will allow satisfactory performance of all construction operations. During the placing and compacting of material in required excavations, the water level at locations being refilled shall be maintained below the bottom of the excavation. Such locations may require draining the water to sumps from which the water shall be pumped to settling basins. Construction operations will be carried out in such a manner that erosion will be controlled and water and air pollution minimized. State and Local laws concerning pollution abatement will be followed.

9. VEGETATION ESTABLISHMENT

A protective cover of vegetation shall be established on all exposed earth surfaces of the embankment, spillway, and borrow areas to the extent practicable under prevailing soil and climatic conditions. The embankment and spillway shall be fenced where shown on the drawings to protect the vegetation.

Sodding, liming, seeding, fertilizing and mulching shall conform to the standards for

permanent seeding in the Pennsylvania Technical Guide available, and as otherwise set forth in Section 10.

10. ADDITIONAL CONDITIONS WHICH APPLY TO THIS PROJECT ARE: