NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATION

GRADE STABILIZATION STRUCTURE

(No.)
CODE 410

SCOPE

This item shall consist of all work necessary for the installation of the grade stabilization structure to the lines and grades shown on the drawings. Construction operations shall be carried out in such a manner that erosion, air, water and noise pollution will be minimized and held within legal limits as established by state or local regulations.

Specified materials shall provide stability, durability, and safety characteristics required to achieve the planned objective.

SITE PREPARATION

All brush, trees, stumps, roots, boulders, sod, debris, fence rows, and other objectionable material shall be cleared and grubbed from the areas on which earthfill will be placed and borrow material will be obtained. All stumps and roots 1 inch and larger shall be grubbed to a minimum depth of 12 inches.

Disposal shall be by burning, on-site burial or off-site disposal. Burning shall comply with Tennessee law. Non-combustible materials and burn residue shall be lawfully disposed of off-site or buried on-site with a minimum of two feet of cover at locations which will not interfere with constructing, shaping, or proper functioning of the grade stabilization structure.

Topsoil shall be salvaged, stockpiled and spread where needed to facilitate establishment of vegetative cover on all disturbed areas.

FOUNDATION PREPARATION

Site preparation shall be accomplished as described above. Existing channels or gullies crossing the foundation area shall be over-excavated to remove all rocks, gravel, sands, sediments, and other objectionable materials as well as to provide room for placement and compaction equipment. All sharp breaks shall be sloped to no steeper than 1H:1V. Soils containing excessive amounts of organic matter shall be removed.

EARTHFILL

Material. The earthfill material shall be taken from approved designated borrow areas. It shall be free of roots, stumps, wood, sod, rubbish, stones greater than 6", frozen soil and other objectionable materials.

Placement. Areas on which fill is to be placed shall be scarified to a depth of at least 6 inches prior to placement of the earthfill. The placing and spreading of the earthfill material shall begin at the lowest point of the foundation and shall be brought up in approximately horizontal layers not exceeding 9 inches in thickness (before compaction). The layers shall be of approximately the same elevation and shall extend over the entire area of the earthfill.

The distribution and gradation of the materials throughout the fill shall be such that no lenses, pockets, streaks, or layers of material differing substantially in texture and gradation from the surround material exist. The most impervious earthfill material shall be placed in the upstream and center portions of the embankment.

Compaction. The construction equipment shall be operated over the area of each layer in a manner that will result in the specified compaction of the earthfill material. A minimum of two complete passes of the construction equipment over each layer must be obtained after the layer has been spread to the layer thickness. Special compaction equipment shall be used when the required compaction cannot be obtained by the routing of the on-site equipment.

The moisture content of the fill material shall be such that the specified compaction can be obtained with the equipment used. The fill

material shall contain sufficient moisture so that if formed into a ball it will not crumble yet not be so wet that water can be squeezed out. The moisture content of the fill shall be maintained within the limits to (1) prevent the bulking or dilatence of the material under the action of the hauling or compaction equipment, (2) prevent adherence of the fill material to the equipment and (3) ensure the crushing and blending of the soil clods and aggregation into a homogeneous mass.

Earthfill material moisture is considered satisfactory when a sample molded in the hand will retain its' shape. The material is too wet for placement if water escapes from the sample when hand rolled and too dry when the sample falls apart.

When dispersive soils or other special conditions exist, construction requirements shall comply with the Engineer's site specific design requirements.

Cutoff Trench. Where required, the cutoff trench shall be excavated into impervious material along or parallel to the centerline of the embankment as shown on the drawings. The bottom width of the trench shall be governed by the equipment used for excavation, with the minimum width being four feet. The depth shall be as shown on the drawings. The side slopes of the trench shall be 1 horizontal to 1 vertical (1:1) or flatter. The earth backfill shall be compacted with construction equipment, rollers, or hand tampers to assure maximum density and minimum permeability.

All excess water shall be removed from the foundation and cutoff trench prior to placement of earthfill.

Structure Backfill. Backfill adjacent to pipes or structures shall be of the type and quality conforming to that specified for the adjoining earthfill material. The earthfill shall be placed in horizontal layers not to exceed 4 inches in thickness and compacted by at least 2 passes of hand tampers or other manually directed compaction equipment. The material shall completely fill all spaces under and adjacent to the pipe. At no time during the backfilling operation shall driven equipment be allowed to operate closer than the greatest of 4 feet or 2 times the interior diameter of the pipe, measured horizontally, to any part of a structure or pipe. Under no circumstances shall equipment be driven over any part of a concrete structure or pipe, unless the minimum compacted earthfill cover depth has been obtained which is the greatest of 3 feet or 1 times the interior diameter of the pipe per ASTM D2321-11 Paragraph 7.6.

The pipe conduit barrel shall be placed on a firm, excavated foundation (to the extent possible) to the lines and grades shown on the drawings. The pipe shall be firmly and uniformly bedded and haunched throughout its entire length. The bedding and haunch material shall be shaped to conform to the bottom of the pipe below the springline. Where rock or soft, spongy or other unstable soil is encountered, all such material shall be removed and replaced with suitable earthfill material compacted as specified to provide adequate support.

During compaction operations around the pipe, the pipe shall be properly anchored to maintain constant contact between the pipe, bedding and the haunch material.

The minimum pipe trench width shall be that necessary to allow compaction equipment to be operated between the trench wall and the pipe. The minimum width shall be not less than the greater of either the outside diameter of the pipe plus 16 inches or the outside diameter of the pipe times 1.25, plus an additional 12 inches per ASTM D2321-11 Paragraph 6.3.

All earth removed and not needed during construction shall be spread or disposed of in such a way that it will not interfere with the functioning of the grade stabilization structure. All portions of the grade stabilization structure shall be finished and smoothed in such a manner that the applied vegetative cover can be properly maintained, the structure blends into the surrounding topography and the site has positive drainage.

MATERIALS

Pipe. All pipes shall be circular in cross section and shall meet the requirements as shown on the drawings.

Coupling bands, fittings, anti-seep collars, end sections, etc., shall be composed of the same material as the pipe. Metals must be isolated from dissimilar materials with the use of rubber or plastic materials of at least 24 mils in thickness.

All constructed pipe joints shall be completely watertight. The pipe barrel connection to the riser shall be solidly constructed using watertight methods such as welding. . Anti-seep collars shall be flexible and connected to the pipe in such a manner as to be completely watertight. Dimple bands are not considered to be watertight.

Helical corrugated pipe shall have either continuously welded seams or have lock seams with internal caulking or a neoprene bead.

Other details (anti-seep collars, valves, etc.) shall be as shown on the drawings.

Concrete. Concrete shall meet the requirements of NRCS Construction Specification 32, Structure Concrete.

Rock Riprap. Rock riprap shall meet the requirements of NRCS Construction Specification 61, Rock Riprap.

Geotextile. Geotextile shall be placed under all riprap and shall meet the requirements of NRCS Construction Specification 95, Geotextile.

Any special protection materials shall be installed per manufacturer's instructions.

POLLUTION CONTROL

Construction operations shall be performed so that erosion and sediment control are provided, and air and water pollution are minimized and held within legal limits as established by state or local regulations. Applicable pollution control methods shall be used such as silt fence, hay bale barrier, temporary vegetation, mulching, water or chemical dust abatement, etc. As required by law, the appropriate storm water pollution prevention plan shall be developed and followed.

VEGETATION

Vegetation will be established as specified in the vegetative plan shown on the drawings or as specified in NRCS Construction Specification 6, Seeding, Sprigging, and mulching.