

**NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATION**

IA-605 DENITRIFYING BIOREACTOR

1. SCOPE

The work consists of constructing a denitrifying bioreactor as required by the construction plans.

2. UTILITIES

The contractor is responsible for calling Iowa One Call at least 48 hours prior to beginning any excavation work. The landowner is responsible for locating other infrastructure such as tile lines and structures. The landowner will obtain all necessary permissions from regulatory agencies, or document that no permits are required.

3. GENERAL

Carry out construction operations in a manner and sequence that erosion and air and water pollution are minimized and held within legal limits.

The completed job must present a workmanlike appearance and conform to the line, grades, and elevations shown on the drawings or as staked in the field.

Carry out all operations in a safe and skillful manner. Observe safety and health regulations and use appropriate safety measures.

Save documentation of materials used (geotextile tags, seed tags, photographs of pipe labeling, etc.) and provide to NRCS.

All trees, stumps, brush, and debris shall be removed from the site and disposed of so they will not interfere with construction or proper functioning of the structure.

4. EXCAVATION

Unless otherwise specified, excavation for and subsequent installation of the pipe and structures shall begin at the outlet end and progress upstream.

Excess spoil material must be placed, spread, leveled, shaped, or hauled away as shown on the construction plans or as staked in the field. Finish the completed job to a degree so the surface can be traveled with farm-type equipment unless otherwise specified in the construction plans.

All excavations must conform to the lines, grades, elevations, bottom width, and side slopes shown on the construction plans or as staked in the field.

Trench shields, shoring, bracing, or other methods necessary to safeguard the workers and prevent damage to the existing improvements shall be furnished, placed, and subsequently removed by the contractor. Occupational Safety and Health Administration (OSHA) requirements relating to trench safety shall be followed.

5. MEDIA CHAMBER

Line the bottom and sides of the media chamber with plastic as shown on the construction drawings. If the bioreactor is located in glacial till soil and has a Unified Soil Classification System designation of CL or CH, the drawings may show that the chamber sides and bottom do not need to be lined. However, if sand is encountered when excavating the chamber, a plastic liner is required. Plastic must have a minimum thickness of 4 mil.

If a soil cap is to be constructed over the top of the chamber, use geotextile to separate the media from the soil. Geotextile must be non-woven, class II, and meet the requirements of Iowa Construction Specification IA-95, Geotextile.

Carbon source media must meet the following requirements:

1. Wood material shall be chipped, not shredded. The chips shall be well-graded with at least 80% in the 1-2" range by weight.
2. Wood chips shall be less than 120 days old. Decomposed or partially decomposed wood chips shall not be used.
3. Wood chips shall be free from objectionable material such as dirt, fines, stones, leaves, long stringy material, etc.
4. Wood must not be treated for ground contact.
5. Wood made from high tannin content species such as oak, cedar, or redwood is to be avoided. NRCS will reject any proposed wood chips with more than trace amounts of the high tannin content materials. The contractor is advised to check with NRCS in advance for acceptance of the media to be used in the bioreactor.

Spread the media evenly around the chamber. There must be no air pockets, bridging, or uneven surface of the media. Media must be placed in a manner that avoids damage to the distribution and collection pipes in the chamber.

Mound the top surface of the media chamber with the material specified in the plans to allow for settlement of the media and to shed water. The center of the trench should be mounded as shown on the plans but no less than 10% of the total depth of the media material.

6. WATER CONTROL STRUCTURE AND PIPE

The materials and manufacture of the water control structure, pipe, anti-seep collars, coupling bands, coatings, and other appurtenances must be as shown on the construction drawings and conform to materials and applicable reference specifications as shown in Iowa Construction Specification IA-620, Underground Outlet.

Place the water control structure and pipe couplers on a stable base. The stable base may be compacted earth, compacted sand, or a concrete pad. Extend the stable base no less than 1 foot around the structure.

Install the structure with all stop boards in their tracks. Place impervious backfill material around the structure and appurtenances by hand and in layers not more than 6 inches thick before compaction. Thoroughly compact each layer, by means of hand tamping, to the same density as the surrounding materials. Increase the height of fill at approximately the same rate on all sides of the structure.

Lay the pipe to the lines, grades, and elevations shown on the drawings. Bed the pipe firmly and uniformly throughout its entire length. Use hand tamping methods around pipes that are within 20 feet of the water control structure. Beyond that distance, the pipe may be laid with a tile plow or trencher designed for proper bedding of the pipe, and the disturbed soil allowed to naturally subside back into place.

7. OUTLET

Where the construction plans call for a free outlet, use a continuous section of non-perforated conduit at the outlet, unless a headwall is used. All outlets must have an animal guard, installed to allow passage of debris.

The continuous section of non-perforated conduit must be long enough to satisfy all requirements of Conservation Practice Standard 606 – Subsurface Drain:

- At least two-thirds of the pipe must be buried in the ditch bank.
- The cantilever section must extend to the toe of the ditch side slope or to the side slope protected from erosion.
- The continuous section must be at least 20 feet long.

Acceptable materials for use at the outlet include the following:

- Corrugated metal pipe, galvanized or aluminum, 16-gauge, minimum thickness,
- Smooth steel pipe with 3/16 of an inch minimum thickness,
- Smooth plastic pipe, polyvinyl chloride (PVC), with a SDR of 35 or less or schedule 40 or heavier, and
- Dual wall corrugated polyethylene pipe.

All plastic and polyethylene pipe outlets must include an ultra-violet stabilizer.

8. VEGETATION

A protective cover of vegetation shall be established on all surfaces of the areas disturbed by construction. Seeding and mulching shall be performed in accordance with the Seeding Plan, IA-CPA-4, and Construction Specification IA-6, Seeding and Mulching for Protective Cover.

Vegetation should be established as soon after construction as possible.

9. SPECIAL SPECIFICATIONS:

