**UNITED STATES DEPARTMENT OF AGRICULTURE**
**NATURAL RESOURCES CONSERVATION SERVICE**
**VERMONT**

## DRAWINGS AND CONSTRUCTION SPECIFICATIONS

**Practice:** Debris Removal

**Program:** 5042 EWP

**Cooperator:** Town of Middlesex

**Address:** 77 Brook Road, Middlesex , Vermont

## CONTENTS

**Drawings:** 6 # Sheets

**Specifications:** 6 # No.

I have received the drawing(s) and construction specification(s), for this practice and reviewed them with NRCS. I have read the "General Requirements" and understand my roles and responsibilities as the "Owner/Operator" of this project. It is my responsibility to hire a contractor who will install the practice(s) according to the attached drawings and specifications.

Landowner / Operator

8/14/2026
Date

Prepared by: Stacey Bryant

Date: 7/28/2026

USDA – Natural Resources Conservation Service Phone:

FAX:

**UNITED STATES DEPARTMENT OF AGRICULTURE**
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Note: ⋆ Include in all design packages.

# Construction Specification
# 000 General Requirements

## 1. General

These construction specifications set forth the minimum requirements for installation of the practice(s) which is shown on the drawings. The items checked on the Table of Contents (Misc.-B) pertain to your practice and are submitted with the drawings as the construction specifications for this practice. The practice shall be constructed to the lines and grades as shown on the drawings using the construction specifications that were specially developed for this practice.

## 2. Responsibilities

### Owner/Operator:

The Owner/Operator is the person who is the official spokesman for the project. He/she enters into all contractual agreements, ensures construction is in accordance to the requirements as set forth in the plans, obtains all permits necessary for construction and is financially responsible for the project. The Owner/Operator also agrees to properly maintain this practice for the expected lifespan.

### Technician:

The technician is the NRCS representative who has the authority to review the project during construction and take necessary measurements to ensure that all work is in compliance with the construction plans.

### Contractor:

The contractor is the individual who is in agreement with the owner/operator for installation of the practice(s) as set forth in the technical requirements for the project. The designated contractor is ultimately responsible for the work of any subcontractors. The contractor will be responsible for contacting “Dig Safe” prior to any excavation activities. The contractor shall also be responsible for contacting both the Owner/Operator and NRCS immediately when unforeseen conditions arise. Any required earthfill or other testing requiring an outside lab or contractor shall be arranged by the contractor at the specified time intervals. Upon completion of work the contractor may be asked to sign a “Certification of Installation” to certify that all practices have been installed in accordance to NRCS plans and specifications.

## 3. Constructions Plans

### Specifications:

The construction specifications describe quality of work which is to be done. The specifications may also reference a commercial standard such as the American Society for Testing and Materials, ASTM, which is identifiable for all products or procedures where referenced. These commercial specifications are commonly recognized within the industry. If a conflict arises between the drawings and specifications, the specification governs the work or product.

### Drawings:

The drawings are a visual representation of the project which show the location and describe the work to be done. The drawings include plan views, sections, profile details and notes which are necessary to supplement the construction specifications for a site-specific installation.

### Cost Estimates:

Cost estimates for this practice(s) are based on national averages throughout the construction industry provided by RS Means, Kingston, MA; prices provided by local vendors or suppliers; or costs based on practices installed in previous years. These average costs are for estimating purposes only and should not be shown or given to the contractor. The estimated cost is based on quantities calculated for this specific design. Actual construction quantities may vary if the practice is changed during construction or differing site conditions are encountered (i.e., bedrock, excessive moisture, etc.).

It is the landowner’s responsibility to contact one or more contractors and obtain a contractor's cost estimate or bid. Prices may vary from place to place and contractor to contractor. It is best to obtain estimates from several qualified contractors before selecting someone to construct the practice(s). The Natural Resources Conservation Service does not guarantee cost estimates.

## 4. Permits

All permits and/or easements that are applicable for the construction and/or operation of this practice(s) are the responsibility of the landowner and shall be available for review by the NRCS prior to the start of construction. **CHECK ALL PERMITS THAT APPLY:**

Agency of Agriculture, Food and Markets (AAFAM)

- ☐ SFO, CSFO, MFO or LFO Permit
- ☐ Amendment to LFO Permit – Constructing animal housing, WSF or modifying a WSF

Local Municipal Zoning

- ☐ Zoning Administrator – Notification required for construction of a farm structure
- ☐ Zoning Variance – Issued by VT Commissioner of Agriculture

Vermont Watershed Management Division (VT DEC)

- ☐ Construction Stormwater Permit 3-9020
- ☐ Vermont Wetlands Permit
- ☐ Stream Alteration Permit
- ☐ Flood Hazard Permit (NFIP)

Vermont Solid Waste Division (VT DEC)

- ☐ Insignificant Waste Disposal Event (IWMEA) – disposal of concrete, asphalt, construction debris, etc.

Vermont Natural Resources Board

- ☐ Act 250 Permit – generally only applies to farmsteads with a previous ACT 250 permit

Vermont Agency of Transportation (VT AOT)

- ☐ Work in a State Highway Right of Way

Vermont Waste Management and Prevention Division (VT DEC)

- ☐ Bulk Above Ground Storage Tanks (AST's) - > 1320 gals Petroleum Products

U.S. Environmental Protection Agency (U.S. EPA)

- ☐ SPCC Plan 40 CFR § 112 - On Farm Petroleum Storage > 2500 gals

U.S. Army Corp of Engineers (U.S. ARMY)

- ☐ Wetlands Permit - Section 404 Clean Water Act
- ☐ Rivers and Streams Permit - Section 10 Rivers and Harbors Act
- ☐ Lakes and Ponds Permit - Section 10 Rivers and Harbors Act

Vermont Land Trust

- ☐ Approval for structures outside the designated farmstead area

## 5. Public and Private Utilities

The Natural Resources Conservation Service (NRCS) makes no representation as to the location or existence of public or private utilities in the vicinity of investigations or construction operations conducted through its programs.
The NRCS will not be held responsible for damage to utilities or accidents involving utilities that occur during the investigation or construction operations. To prevent damage to telephone, gas, water or other underground facilities, contact the Dig Safe Center. Call toll free 1-888-344-7233 or 811.

If the landowner/operator knows of the existence of underground utilities in the vicinity of the proposed work area it is their responsibility to notify the NRCS so that appropriate action can be implemented. It shall be the excavating contractor's responsibility to contact "Dig Safe" prior to start of construction.

## 6. Pre-Construction Meeting

Construction of the practice or practices shall **NOT** start before a thorough "sit down" pre-construction meeting is held between the Owner/Operator, Contractor and the NRCS representative to go over the plans, specifications and other details of the project.

## 7. Basis of Acceptance

The acceptance of the installation will be by inspection and review for conformance with the site-specific drawings and construction specifications for this practice. Upon completion of work the contractor may be asked to sign a "Certification of Installation" to certify that all work has been done to NRCS plans and specifications.
Failure to install a practice in accordance to the plans and specifications or contacting NRCS before or during construction of a practice could warrant forfeiture of cost share money.

# Construction Specification
# 001 Site Preparation

## 1. Scope

The work shall consist of the clearing, clearing and grubbing, and the removal, salvage and disposal of trees, snags, logs, brush, shrubs, stumps, rubbish and structures (including fences) from the designated areas.

## 2. Protection of existing vegetation and structures

Trees, woody vegetation, structures, and other areas designated to remain undisturbed shall be protected from damage throughout the duration of the construction period. Any damages resulting from the contractor's operations or neglect shall be repaired by the contractor.

Earthfill, stockpiling of materials, vehicular parking, and excessive foot or vehicular traffic shall not be allowed within the drip line of vegetation designated to remain in place. Vegetation damaged by any of these or similar actions shall be replaced with viable vegetation of the same species, similar condition, and like size. Any structures damaged shall be repair at the contactor's expense.

Any cuts, skins, scrapes, or bruises to the bark of the vegetation shall be carefully trimmed and local nursery accepted procedures used to seal damaged bark.

Any limbs or branches 0.5 inch or larger in diameter that are broken, severed, or otherwise seriously damaged during construction shall be cut off at the base of the damaged limb or branch flush with the adjacent limb or tree trunk. All roots 1-inch or larger in diameter that are cut, broken, or otherwise severed during construction operations shall have the end smoothly cut perpendicular to the root. Roots exposed during excavation or other operations shall be covered with moist earth or backfilled as soon as possible to prevent the roots from drying out.

## 3. Marketing

The limits of the area(s) to be cleared, cleared and grubbed, and structures to be removed will be marked by stakes, flags, tree markings, or other suitable methods. Trees to be left standing and uninjured will be designated by special markings placed on the trunk about 6 feet above the ground surface.

## 4. Clearing

All trees not marked for preservation and all snags, logs, brush, shrubs, stumps, rubbish, and similar materials shall be cleared from within the limits of the marked areas. Unless specified otherwise trees and woody vegetation to be clear shall be cut of 12 inches above the ground.

## 5. Clearing and grubbing

All trees not marked for preservation and all snags, logs, brush, stumps, shrubs, rubbish, and similar materials shall be cleared from within the limits of the designated areas. Unless otherwise specified, all stumps, roots, and root clusters that have a diameter of 1 inch or larger shall be grubbed out to a depth of at least 2 feet below subgrade for concrete structures and 1 foot below the ground surface at embankment sites and other designated areas.

## 6. Structure Removal

All visible and buried structures designated for removal or within the marked area shall be removed to the specified extent and depth.

## 7. Salvage

To fullest extent possible timber shall be salvaged for lumber and firewood. Salvageable timber shall be moved to a separate on or off site staging area where further grading and cutting can be done.

Structures or structure parts that are designated to be salvaged shall be carefully removed and neatly placed in the specified or approved storage location.

Material from fences designated to be salvaged shall be placed outside the work area on the property on which the fence was originally located.

## 8. Disposal

Refuse material and all materials from the designated clearing and clearing and grubbing areas shall be disposed of at locations shown on the drawings or removed off site to an approved landfill or disposal area. Disposal by burning shall be in accordance with local rules and regulations. The contractor is responsible for complying with all local rules and regulations, acquiring all permits, and the payment of any and all fees that may result from this disposal.

**Specific Site Requirements**

# Construction Specification
# 005 Pollution Control

## 1. Scope

The work consists of installing measures or performing work to control erosion and minimize the production of sediment and other pollutants to water and air from construction activities.

## 2. Materials

All material furnished shall meet the requirements shown on the drawings.

## 3. Erosion and sediment control measures and works

The most effective means of erosions and sedimentation control is to minimize exposure of the soil, complete work in a timely manner and re-establish vegetation as soon as possible.

The measures and works may include, but are not limited to, the following:

**Staging of earthwork activities -** The excavation and moving of soil materials shall be scheduled to minimize the size of areas disturbed and unprotected from erosion for the shortest reasonable time. Land cleared for construction shall be kept to a minimum. When feasible, larger projects shall phase construction activities to reduce the exposure of soil to wind and rain.

**Seeding -** Seeding to protect disturbed areas shall occur as soon as reasonably possible following completion of that earthwork activity. Areas which are exposed for longer than seven days, including topsoil stock piles, shall be temporarily seeded.

**Mulching -** Mulching to provide temporary protection of the soil surface from erosion. Areas which are exposed longer than seven days, including topsoil stock piles, shall be temporarily mulched.

**Erosion control mats, blankets, and netting –** Erosion control mats, blankets, and netting may be required on steep slopes or swales.

**Diversions -** Diversions to divert water from work areas and to collect water from work areas for treatment and safe disposition. They are temporary and shall be removed and the area restored to its near original condition when the diversions are no longer required or when permanent measures are installed.

**Stream crossings -** Culverts or bridges where equipment must cross streams. They are temporary and shall be removed and the area restored to its near original condition when the crossings are no longer required or when permanent measures are installed.

**Sediment basins -** Sediment basins collect, settle, and reduce the impact of sediment from eroding areas on properties and streams below the construction site(s). These basins are temporary and shall be removed and the area restored to its original condition when they are no longer required or when permanent measures are installed.

**Silt fence –** Silt fence trap sediment from areas of limited runoff. Silt fence shall be properly anchored to prevent erosion under or around them. These measures are temporary and shall be removed and the area restored to its original condition when they are no longer required or when permanent measures are installed.

**Waterways -** Waterways for the safe disposal of runoff from fields, diversions, and other structures or measures. These works are temporary and shall be removed and the area restored to its original condition when they are no longer required or when permanent measures are installed.

**Other -** Additional protection measures as specified on the drawings or required by Federal, State, or local government.

## 4. Chemical pollution

The contractor shall provide watertight tanks or barrels to dispose of chemical pollutants, such as drained lubricating or transmission fluids, grease, soaps, concrete mixer wash water, or asphalt, produced as a

by-product of the construction activities. At the completion of the construction work, sumps shall be removed and the area restored to its original condition. Sump removal shall be conducted without causing pollution.

Sanitary facilities, such as chemical toilets, or septic tanks shall not be located next to live streams, wells, or springs. They shall be located at a distance sufficient to prevent contamination of any water source. At the completion of construction activities, facilities shall be disposed of without causing pollution.

### 5. Air pollution

The burning of brush or slash and the disposal of other materials shall adhere to state and local regulations.

Fire prevention measures shall be taken to prevent the start or spreading of wildfires that may result from project activities. Firebreaks or guards shall be constructed and maintained at locations shown on the drawings.

All public access or haul roads used by the contractor during construction of the project shall be sprinkled or otherwise treated to fully suppress dust.

### 6. Maintenance, removal, and restoration

All pollution control measures and temporary works shall be adequately maintained in a functional condition for the duration of the construction period. All measures shall be inspected after every rain event and shall be cleaned out, repaired and other maintenance performed to insure their effectiveness. All temporary measures shall be removed and the site restored to near original condition.

**Specific Site Requirements**

# Construction Specification
# 011 Earthwork

## 1. Scope

The work shall consist of the excavation, earthfill, drainfill, or topsoil as required by the drawings and specifications

## 2. Excavation

**A. Classification** Excavation will be classified in accordance with the following definitions for common, rock or trench excavation. The classification of excavation will be determined by the NRCS Representative.

***Common excavation*** shall be defined as the excavation of all materials not classified as rock excavation.

***Rock excavation*** shall be defined as the excavation of all hard, compacted or cemented materials the accomplishment of which requires blasting or the use of heavy ripping equipment. The excavation and removal of isolated boulders or rock fragments larger than one cubic yard in volume encountered in materials otherwise conforming to the definition of common excavation shall be classified as rock excavation.

***Trench excavation*** shall be defined to include all excavation necessary for the installation of any underground conduits.

**B. Blasting**

The transportation, handling, storage, and use of dynamite and other explosives shall be directed and supervised by a person(s) of proven experience and ability who is authorized and qualified to conduct blasting operations.

Blasting shall be done in a manner as to prevent damage to the work or unnecessary fracturing of the underlying rock materials and shall conform to any special requirements on the drawings.

**C. Use of excavated material**

To the extent they are needed, all suitable material from the specified excavations shall be used in the construction of required permanent earthfill. The suitability of material for specific purposes is determined by the NRCS representative. The contractor shall not waste or otherwise dispose of suitable excavated material.

**D. Disposal of waste materials**

All surplus or unsuitable excavated materials are designated as waste and shall be disposed of at the locations shown on the drawings.

**E. Structure and Trench Excavation** Excavations shall comply with OSHA Construction Industry Standards (29CFR Part 1926) Subpart P, Excavations, Trenching, and Shoring. All excavations shall be completed and maintained in a safe and stable condition throughout the total construction phase. Excavated surfaces too steep to be safe and stable shall be supported as necessary to safeguard the workmen, prevent sliding or settling of the adjacent ground and to avoid damaging existing improvements. Trenches over 5 feet in depth in which workmen will enter shall be shored, sloped or otherwise stabilized to prevent sliding or cave-ins.

Structure or trench excavations shall be completed to specified elevations and dimensions as shown on the drawings. The width of the excavation shall be increased if necessary to provide space for forms, sheeting, bracing, shoring, and other supporting installations. The contractor shall furnish, place and subsequently remove such supporting installations.

**F. Borrow excavation**

When the quantities of suitable material obtained from specified excavations are insufficient to construct the specified earthfills and earth backfills, additional material shall be obtained from the designated

borrow areas. The extent and depth of borrow pits within the limits of the designated borrow areas shall be as specified on the drawings.

Borrow pits shall be excavated and finally dressed to blend with the existing topography and sloped to prevent ponding and to provide drainage.

**G. Overexcavation**

Excavation in rock beyond the specified lines and grades shall be corrected by filling the resulting voids with portland cement concrete, earthfill or drainfill as specified on the drawings. If specified, concrete shall meet the requirements of Construction Specification 31, Concrete and Steel Reinforcement, as appropriate.

Excavation in earth beyond the specified lines and grades shall be corrected by filling the resulting voids with compacted earthfill or drainfill (bedding) as specified on the drawings.

## 3. Earthfill

**A. Material** All fill material shall be obtained from required excavations and designated borrow areas. The selection, blending, routing, and disposition of material in the various fills shall be subject to approval by the NRCS representative. Fill materials shall contain no frozen soil, sod, brush, roots, or other perishable material. Rock particles larger than the maximum size specified for each type of fill shall be removed prior to compaction of the fill.

The types of material used in the various fills shall be as listed and described on the drawings.

**B. Foundation preparation**

Foundations for earthfill shall be stripped to remove vegetation and other unsuitable material or shall be excavated to the elevations and depths as specified on the drawings.

Except as otherwise shown on the drawings, earth foundation surfaces shall be graded to remove surface irregularities and shall be scarified parallel to the axis of the fill or otherwise acceptably scored and loosened to a minimum depth of 2 inches. The moisture content of the loosened material shall be controlled as specified for the earthfill, and the surface material of the foundation shall be compacted and bonded with the first layer of earthfill as specified for subsequent layers of earthfill.

Earth abutment surfaces shall be free of loose, uncompacted earth in excess of 2 inches in depth normal to the slope and shall be at such a moisture content that the earthfill can be compacted against them to produce a good bond between the fill and the abutments.

Rock foundation and abutment surfaces shall be cleared of all loose material by hand or other effective means and shall be free of standing water when fill is placed upon them. Occasional rock outcrops in earth foundations for earthfill, except in dams and other structures designed to restrain the movement of water, shall not require special treatment if they do not interfere with compaction of the foundation and initial layers of the fill or the bond between the foundation and the fill.

Foundation and abutment surfaces shall be no steeper than one horizontal to one vertical unless otherwise specified. Test pits or other cavities shall be filled with compacted earthfill conforming to the specifications for the earthfill to be placed upon the foundation.

**C. Placement**

Earthfill shall not be placed until the required excavation and foundation preparation have been completed and the foundation has been inspected and approved by the NRCS representative. Earthfill shall not be placed upon a frozen surface nor shall snow, ice, or frozen material be incorporated in the earthfill matrix.

Earthfill shall be placed in approximately horizontal layers. The thickness of each layer before compaction shall not exceed the maximum thickness specified on the drawings. Materials placed by dumping in piles or windrows shall be spread uniformly to not more than the specified thickness before being compacted.

Hand compacted earth backfill shall be placed in layers whose thickness before compaction does not exceed the maximum thickness specified for layers of earth backfill compacted by manually directed power tampers.

Earth backfill shall be placed in a manner that prevents damage to the structures and allows the structures to assume the loads from the earth backfill gradually and uniformly. The height of the earth backfill adjacent to a structure shall be increased at approximately the same rate on all sides of the structure.

Earthfill and earth backfill in dams, levees, and other structures designed to restrain the movement of water shall be placed to meet the following additional requirements:

(a) The distribution of materials throughout each zone shall be essentially uniform, and the earthfill shall be free from lenses, pockets, streaks, or layers of material differing substantially in texture, moisture content, or gradation from the surrounding material. Zone earthfills shall be constructed concurrently unless otherwise specified.

(b) If the surface of any layer becomes too hard and smooth for proper bond with the succeeding layer, it shall be scarified parallel to the axis of the fill to a depth of not less than 2 inches before the next layer is placed.

(c) The top surface of embankments shall be maintained approximately level during construction with two exceptions: A crown or cross-slope of about 2 percent shall be maintained to ensure effective drainage, or as otherwise specified for drainfill or sectional zones.

(d) Dam embankments shall be constructed in continuous layers from abutment to abutment except where openings to facilitate construction or to allow the passage of streamflow during construction are specifically authorized in the contract.

(e) Embankments built at different levels as described under (c) or (d) above shall be constructed so that the slope of the bonding surfaces between embankment in place and embankment to be placed is not steeper than 3 feet horizontal to 1 foot vertical. The bonding surface of the embankment in place shall be stripped of all material not meeting the requirements of this specification and shall be scarified, moistened, and recompacted when the new earthfill is placed against it. This ensures a good bond with the new earthfill and obtains the specified moisture content and density at the contact of the inplace and new earthfills.

**D. Control of moisture content** During placement and compaction of earthfill and earth backfill, the moisture content of the material being placed shall be maintained within the range specified on the drawings.

The application of water to the earthfill material shall be accomplished at the borrow areas insofar as practicable. Water may be applied by sprinkling the material after placement on the earthfill, if necessary. Uniform moisture distribution shall be obtained by disking.

Material that is too wet when deposited on the earthfill shall either be removed or be dried to the specified moisture content prior to compaction.

If the top surface of the preceding layer of compacted earthfill or a foundation or abutment surface in the zone of contact with the earthfill becomes too dry to permit suitable bond, it shall either be removed or scarified and moistened by sprinkling to an acceptable moisture content before placement of the next layer of earthfill.

**E. Compaction**

**Earthfill -** Earthfill shall be compacted according to the following requirements for the class of compaction specified:

***Class A compaction -*** Each layer of earthfill shall be compacted as necessary to provide the density of the earthfill matrix not less than the minimum density specified on the drawings. The earthfill matrix is

defined as the portion of the earthfill material finer than the maximum particle size used in the compaction test method specified.

***Class B compaction -*** Each layer of earthfill shall be compacted to a mass density not less than the minimum density specified on the drawings.

***Class C compaction -*** Each layer of earthfill shall be compacted by the specified number of passes of the type and weight of roller or other equipment specified or by an approved equivalent method. Each pass shall consist of at least one passage of the roller wheel or drum over the entire surface of the layer.

**Earth backfill -** Earth backfill adjacent to structures shall be compacted to a density equivalent to that of the surrounding inplace earth material or adjacent required earthfill or earth backfill. Compaction shall be accomplished by hand tamping or manually directed power tampers, plate vibrators, walk-behind, miniature, or self-propelled rollers. Unless otherwise specified heavy equipment including backhoe mounted power tampers or vibrating compactors and manually directed vibrating rollers shall not be operated within 2 feet of any structure. Towed or self-propelled vibrating rollers shall not be operated within 5 feet of any structure. Compaction by means of drop weights operating from a crane or hoist is not permitted.

The passage of heavy equipment will not be allowed:

- Over cast-in-place conduits within 14-days after placement of the concrete.
- Over cradled or bedded precast conduits within 7 days after placement of the concrete cradle or bedding.
- Over any type of conduit until the backfill has been placed above the top surface of the structure to a height equal to one-half the clear span width of the structure or pipe or 2 feet, whichever is greater.

Placement and compaction of earth backfill adjacent to structures shall not be started until the following time intervals have elapsed after placement of the concrete.

| **Structure** | **Time Interval (Days)** |
|---|---|
| Vertical or near-vertical walls with earth loading on one side only | 14 |
| Walls backfilled on both sides simultaneously | 7 |
| Conduits and spillway risers, cast-in-place (with inside forms in place) | 7 |
| Conduits and spillway risers, cast-in-place (inside forms removed) | 14 |
| Conduits, pre-cast, cradled | 2 |
| Conduits, pre-cast, bedded | 1 |
| Cantilever outlet bents (backfilled both sides simultaneously) | 3 |

**F. Reworking or removal and replacement of defective earthfill** Earthfill placed at densities lower than the specified minimum density or at moisture contents outside the specified acceptable range of moisture content or otherwise not conforming to the requirements of the specifications shall be reworked to meet the requirements or removed and replaced by acceptable earthfill. The replacement earthfill and the foundation, abutment, and earthfill surfaces upon which it is placed shall conform to all requirements of this specification for foundation preparation, approval, placement, moisture control, and compaction.

**G. Testing** If specified, the density and moisture content of the compacted fill shall be tested by a certified laboratory. Testing requirements, including the type and frequency of tests, shall be as specified on the drawings. Test procedures and records shall be maintained throughout the project. If the fill does not meet the specified requirements, the fill shall be removed and reworked. Weekly reports, including copies of the test results, shall be provided to the landowner and the NRCS representative during the course of the work.

During the course of the work, the NRCS representative or an independent laboratory may perform quality assurance tests required to identify material; determine compaction characteristics; determine moisture content; and determine density of earthfill in place. Tests performed by NRCS will be used to verify that the earthfills conform to contract requirements of the specifications and not as a replacement for the contractor's quality control program.

Densities of earthfill requiring Class A compaction will be determined in accordance with ASTM D1556, D2167, D2922, or D2937 except that the volume and moist weight of included rock particles larger than those used in the compaction test method specified for the type of fill will be determined and deducted from the volume and moist weight of the total sample before computation of density or, if using the nuclear gauge, added to the specified density to bring it to the measure of equivalent composition for comparison (See ASTM D4718). The density so computed is used to determine the percent compaction of the earthfill matrix. Unless otherwise specified, moisture content is determined by one of the following methods: ASTM D2216, D3017, D4643, D4944, or D4959.

## 4. Drainfill

**A. Material** Drainfill material shall be sand, gravel, or crushed stone, or mixtures thereof, obtained from the specified sources. The material shall be selected as necessary to avoid the inclusion of organic matter, clay balls, excessive fine particles, or other substances that would interfere with their free-draining properties.

**B. Base preparation**

Foundation surface and trenches shall be clean and free of organic matter, loose soil, foreign substance, and standing water when the drainfill is placed. Earth surfaces upon or against which drainfill will be placed shall not be scarified.

**C. Placement**

Drainfill shall be placed uniformly in layers not to exceed 12 inches thick before compaction. When compaction is accomplished by manually controlled equipment, the layers shall not exceed 8 inches thick. The material shall be placed to avoid segregation of particle sizes and to ensure the continuity and integrity of all zones. No foreign material shall be allowed to become intermixed with or otherwise contaminate the drainfill.

Traffic shall not be permitted to cross over drains at random. Equipment cross-overs shall be maintained, and the number and location of such crossovers shall be established and approved before the beginning of drainfill placement. Each crossover shall be cleaned of all contaminating material and shall be inspected and approved by the NRCS representative before the placement of additional drainfill material.

Any damage to the foundation surface or the trench sides or bottom occurring during placement of drainfill shall be repaired before drainfill placement is continued.

The upper surface of drainfill constructed concurrently with adjacent zones of earthfill shall be maintained at a minimum elevation of 1 foot above the upper surface of adjacent earthfill.

Drainfill over and/or around pipe or drain tile shall be placed to avoid any displacement in line or grade of the pipe or tile.

Placement of drainfill adjacent to concrete structures shall not be commenced until the following item intervals have elapsed following placement of the concrete:

| Structure | Time Interval (Days) |
|---|---|
| Vertical or near-vertical walls with earth loading on one side only | 14 |
| Walls backfilled on both sides simultaneously | 7 |
| Conduits and spillway risers, cast-in-place (with inside forms in place) | 7 |
| Conduits and spillway risers, cast-in-place (inside forms removed) | 14 |
| Conduits, pre-cast, cradled | 2 |

| Structure | Time Interval (Days) |
|---|---|
| Conduits, pre-cast, bedded | 1 |
| Cantilever outlet bents (backfilled both sides simultaneously) | 3 |

**D. Control of moisture** The moisture content of drainfill material shall be controlled as specified on the drawings. When additional water is required, it shall be applied in a manner to avoid excessive wetting to adjacent earthfill.

**E. Compaction** Drainfill shall be compacted according to the following requirements for the class of compaction specified:

**Class A compaction -** For drainfill materials with more than 70 percent passing the 3/4 inch sieve, each layer of drainfill shall be compacted to a minimum dry density of not less than the density specified on the drawings as determined by ASTM D 698. For drainfill materials with 70 percent or less passing the 3/4 inch sieve, each layer of drainfill shall be compacted to a relative density of not less than 70 percent as determined by ASTM D 4254.

**Class I compaction -** Each layer of drainfill shall be compacted by a minimum of two passes over the entire surface with a steel-drum vibrating roller weighing at least 5 tons and exerting a vertical vibrating force of not less than 20,000 pounds at a minimum frequency of 1,200 times per minute, or by an approved equivalent method.

**Class II compaction -** Each layer of drainfill shall be compacted by one of the following methods or by an approved equivalent method. (A pass is defined as, at least one complete coverage of the roller wheel, tire, or drum over the entire surface for each layer.)

(a) A minimum of two passes over the entire surface with a pneumatic-tired roller exerting a minimum pressure of 75 pounds per square inch.

(b) A minimum of four passes over the entire surface with the track of a crawler-type tractor weighing at least 20 tons.

(c) Controlled movement of the hauling equipment so that the entire surface is traversed by not less than one tread track of the loaded hauling equipment.

**Class III compaction -** No compaction will be required beyond that resulting from the placing and spreading operations.

When compaction other than Class III compaction is specified, material placed in trenches or other locations inaccessible to heavy equipment shall be compacted by manually controlled pneumatic or vibrating tampers.

Heavy equipment shall not be operated within 2 feet of any structure. Vibrating rollers shall not be operated within 5 feet of any structure. Compaction by means of drop weights operating from cranes, hoists, or similar equipment will not be permitted.

**F. Testing** If specified, the contractor shall conduct such tests as necessary to verify that the drainfill material and the inplace drainfill meets the specification requirements.

The NRCS representative shall be granted access to perform such tests as are required to verify that the drainfill materials and the drainfill in place meets the requirements of the specifications. These tests are not intended to provide the contractor with information needed to assure that the materials and workmanship meet the specification requirements. These verification tests will not relieve the contractor of the responsibility of performing required tests for that purpose.

## 5. Topsoil

**A. Quality of topsoil** Topsoil shall consist of friable surface soil reasonably free of grass, roots, weeds, sticks, rocks, or other unsuitable material.

**B. Furnishing**

Topsoil shall be salvaged from designated earth surfaces that will be disturbed by construction activities. After designated sites have been cleared and grubbed, the topsoil shall be removed from the designated areas and stockpiled at locations shown on the drawings. Unsuitable material encountered during removal of topsoil shall be spoiled at locations shown on the drawings or off site locations determined by the contractor. The contractor is responsible for complying with all local rules and regulations and the payment of any and all fees that may result from the disposal at locations outside the construction work limits. If adequate quantities of topsoil are not available from the site, topsoil shall be furnished from an offsite source designated by the contractor.

**C. Stockpiling**

Stockpiles of topsoil shall not conflict with the requirements of Construction Specification 5, Pollution Control.

**D. Spreading**

Spreading shall not be conducted when the ground or topsoil is frozen, excessively wet, or otherwise in a condition detrimental to uniform spreading operations. Surfaces designated to receive a topsoil application shall be lightly scarified just before the spreading operation.

Following the spreading operation, the topsoil surface shall be left reasonably smooth and without ruts or surface irregularities that could contribute to concentrated waterflow downslope.

## Specific Site Requirements

# Construction Specification
# 052 Seeding

## 1. Scope

The work consists of seed bed preparation; furnishing and placing seed, mulch, fertilizer, inoculant, lime, and other soil amendments; and anchoring mulch in designated areas as specified on the drawings.

## 2. Material

***Seed -*** All seed shall conform to the current rules and regulations of the state of Vermont and shall be from the latest crop available. It shall meet or exceed the standard for purity and germination specified on the drawings.

Seed shall be labeled in accordance with the state laws and the U.S. Department of Agriculture rules and regulations under the Federal Seed Act. Bag tag figures are evidence of purity and germination. No seed will be accepted with a test date of more than 9 months before the delivery date to the site.

Seed that has become wet, moldy, or otherwise damaged in transit or storage will not be accepted. The percent of noxious weed seed allowable shall be as defined in the current State laws relating to agricultural seeds. Each type of seed shall be delivered in separate sealed containers and fully tagged.

***Fertilizer -*** Fertilizer shall be commercial grade and shall meet the standard for grade and quality specified by State law. Unless otherwise specified on the drawings, the rate of application shall be 500 pounds of fertilizer per acre having an analysis of 10-10-20.

***Inoculants -*** The inoculant for treating legume seeds shall be a pure culture of nitrogen-fixing bacteria prepared specifically for the species and shall not be used later than the date indicated on the container. A mixing medium, as recommended by the manufacturer, shall be used to bond the inoculant to the seed. Two times the amount of the inoculant recommended by the manufacturer shall be used except four times the amount shall be used when seed is applied using a hydraulic seeder. Seed shall be sown within 24 hours of treatment and shall not remain in the hydraulic seeder longer than 4 hours.

***Lime and other soil amendments -*** Lime shall consist of standard ground agriculture limestone, or approved equivalent. Standard ground agriculture limestone is defined as ground limestone meeting current requirements of the State Department of Agriculture. Unless otherwise specified on the drawings, the rate of application shall be two tons of lime per acre. Other soil amendments shall meet quality criteria and application requirements specified on the drawings.

***Straw or hay mulch material -*** Straw mulch shall consist of wheat, barley, oat or rye straw, hay, grass cut from native grasses, or other plants. The mulch material shall be air-dry, reasonably light in color, and shall not be musty, moldy, caked, or otherwise of low quality. The rate of application shall be no less than two tons per acre. The use of mulch that contains noxious weeds is not permitted.

***Other mulch materials -*** Mulching materials, such as wood cellulose fiber mulch, mulch tackifiers, synthetic fiber mulch, netting, and mesh, are other mulching materials that may be required for specialized locations and conditions. These materials, when specified, shall be applied and secured in accordance to the manufacturer’s recommendations.

### 3. Seeding mixtures and dates of planting

Time of seed application shall be from early spring until June 1 or from August 15 to September 15. The application rate for seed mixtures shall be:

A. Embankments (Un-mowed Conditions)[1/]

| Seed | lbs./Acre | lbs./1000 sq. ft. | Soil Drainage |
|---|---|---|---|
| Smooth bromegrass | 15 | .33 | Well to moderately well |
| Ryegrass | 5 | .10 | |
| Birdsfoot trefoil | 5 | .10 | |
| Creeping red fescue | 10 | .25 | Excessively to moderately well |
| Tall fescue | 15 | .33 | |
| Clover (Ladino type) | 3 | .10 | |
| Reed canarygrass 2/ | 15 | .33 | Moderately well to poorly |
| Creeping foxtail | 5 | .10 | |
| Redtop | 5 | .10 | |
| Birdsfoot trefoil | 10 | .25 | |
| Creeping red fescue | 20 | .45 | Excessively to moderately well |
| Redtop | 2 | .10 | |
| Field Peas 3/ | 15 | .33 | |
| White Clover | 2.5 | .10 | |
| Birdsfoot trefoil | 8 | .20 | Excessively to moderately well |
| Hairy Vetch | 15 | .33 | |
| Creeping red fescue | 20 | .50 | |

1/ Use this table for seeding banks with loamy or clayey soils only. For details on vegetating sandy or gravely areas, see VT NRCS publication “Vegetating Vermont Sand and Gravel Pits”.

2/ Use only Reed canarygrass with a germination rate of 70% or better that has been tested within the past 4 or 5 months. Reed canarygrass can be invasive in wetland areas. Do not use it if planning objective is plant diversity.

3/ Field peas will not over winter but give a quick spreading cover.

**B. Embankments (Mowed Conditions)**

| Seed | lbs./Acre | lbs./1000 sq. ft. | Soil Drainage |
|---|---|---|---|
| Kentucky bluegrass | 20 | .50 | Well to moderately well |
| Creeping red fescue | 20 | .50 | |
| Ryegrass | 5 | .10 | |
| Creeping red fescue | 20 | .50 | Well to moderately well |
| Tall fescue | 20 | .50 | |
| Birdsfoot trefoil | 8 | .20 | |
| Creeping red fescue | 20 | .50 | Moderately well to poorly |
| Redtop | 2 | .10 | |
| Tall fescue | 20 | .50 | |

| Seed | lbs./Acre | lbs./1000 sq. ft. | Soil Drainage |
|---|---|---|---|
| Creeping red fescue | 20 | .50 | Well to moderately well |
| Redtop | 2 | .10 | |
| Birdsfoot trefoil | 8 | .20 | |
| Tall fescue | 20 | .50 | Well to poorly |
| Reed canarygrass | 10 | .25 | |
| Redtop | 3 | .10 | |

**C. Streambanks**

| Seed | lbs./Acre | lbs./1000 sq. ft. | Soil Drainage |
|---|---|---|---|
| Creeping red fescue | 20 | .50 | Well to moderately well |
| Tall fescue | 20 | .50 | |
| Birdsfoot trefoil | 8 | .20 | |
| Creeping red fescue | 20 | .50 | Well to moderately well |
| Redtop | 2 | .10 | |
| Birdsfoot trefoil | 8 | .20 | |
| Tall fescue | 20 | .50 | Moderately well to poorly |
| Reed canarygrass 1/ | 10 | .25 | |
| Redtop | 3 | .10 | |
| Creeping red fescue | 20 | .50 | Excessive to moderately well |
| Redtop | 2 | .10 | |
| Hairy Vetch | 15 | .33 | |
| 1/ In place of Reed canarygrass use brome (15lb/a) with an oats (50#/a) companion crop in wetland sensitive habitats. Reed canary grass can be invasive. | | | |

**D. Vegetative Spillways and Waterways**

| Seed | Lbs./Ac. | Lbs./1000 Sq. Ft. | Soil Drainage |
|---|---|---|---|
| Kentucky Bluegrass | 20 | .50 | Well to moderately well |
| Creeping red fescue | 20 | .50 | |
| Ryegrass | 5 | .10 | |
| Creeping red fescue | 20 | .50 | Well to moderately well |
| Tall fescue | 20 | .50 | |
| Birdsfoot trefoil | 8 | .20 | |
| Creeping red fescue | 20 | .50 | Moderately well to poorly |
| Redtop | 2 | .10 | |
| Tall fescue | 20 | .50 | |
| Creeping red fescue | 20 | .50 | Well to moderately well |
| Redtop | 2 | .10 | |
| Birdsfoot trefoil | 8 | .20 | |
| Smooth Bromegrass | 15 | .33 | Well to moderately well |
| Ryegrass | 5 | .10 | |
| Birdsfoot trefoil | 15 | .10 | |

**E. Recommended Varieties**

| | |
|---|---|
| Annual ryegrass ……... | Common |
| Birdsfoot trefoil ……. | Empire |
| Creeping foxtail …… | Garrison |
| Creeping red fescue …… | Ensylva |
| Kentucky bluegrass ……. | Adelphi/Barron |
| Redtop …….. | Common |
| Reed canarygrass ……... | Palaton/Venture |
| Ryegrass ……... | Pennfine |
| Smooth bromegrass …… | Saratoga/Baylor |
| Tall Fescue 1/……... | KY-31 |
| White Clover ……. | Dutch/New Zealand |
| 1/ Do not use in or near grazing areas. | |

Cover grass and/or legume seed with 1/4 inch of soil unless a hydroseeder is used. Many failures result from poor seed-soil contact. Cultipacking or tracking the site with a dozer will improve the speed and uniformity of germination

## 4. Seedbed preparation and treatment

Areas to be seeded shall be dressed to a smooth, firm surface. On sites where equipment can operate on slopes safely, the seedbed shall be adequately loosened (4 to 6 inches deep) and smoothed. Depending on soil and moisture conditions, disking or cultipacking, or both, may be necessary to properly prepare a seedbed.

Where equipment cannot operate safely, the seedbed shall be prepared by hand methods by scarifying to provide a roughened soil surface so that broadcast seed will remain in place. Seedbed preparation shall be discontinued when soil moisture conditions are not suitable for the preparation of a satisfactory seedbed.

Rocks larger than 6 inches in diameter, trash, weeds, and other debris that will interfere with seeding or maintenance operations shall be removed.

## 5. Seeding, fertilizing, mulching, and stabilizing

All seeding operations shall be performed in such a manner that the seed is applied in the specified quantities uniformly in the designated areas. Unless otherwise specified on the drawings, seeding shall be accomplished within 2 days after final grading is completed.

Fertilizer, lime, and other soil amendments shall be applied as in section 2. When specified on the drawings, the fertilizer and soil amendments shall be thoroughly incorporated into the soil immediately following surface application.

Mulches shall be applied uniformly to the designated areas at the rates shown in section 2. They shall be applied to areas seeded not later than 2 working days after seeding has been performed. Straw mulch material shall be stabilized within 24 hours of application using a mulch crimper or equivalent anchoring tool or by a suitable tackifier. When the mulch crimper or equivalent anchoring tool is used, it shall have straight blades and be the type manufactured expressly for and capable of firmly punching the mulch into the soil. Where the equipment can be safely operated, it shall be operated on the contour. Hand methods shall be used where equipment cannot safely operate to perform the work required.

The tackifier shall be applied uniformly over the mulch material at the manufacturer's specified rate, or it shall be injected into the mulch material as it is being applied.

Mesh or netting stabilizing materials shall be applied smoothly, but loosely on the designated areas. The edges of these materials shall be buried or securely anchored using spikes or staples.

## Specific Site Requirements