



HEAVY USE AREA PROTECTION DETAILS

NOT TO SCALE

MATERIALS CALCULATIONS

ABC STONE (CRUSHER RUN):

- _____ LENGTH (FT)
- _____ WIDTH (FT)
- _____ DEPTH (IN) - See Table 1 for minimum compacted thickness, multiply by 1.33 for uncompacted thickness.
- _____ TOTAL (CU FT)
- _____ TOTAL (TONS)

$$\text{TONS STONE} = \text{LENGTH (FT)} \times \text{WIDTH (FT)} \times \frac{\text{DEPTH (INCH)}}{12} \times \frac{0.0725 \text{ TON}}{1 \text{ CU. FT.}}$$

FILTER FABRIC:

- _____ LENGTH (FT)
- _____ WIDTH (FT)
- _____ TOTAL AREA (SQ FT)
- _____ TOTAL SQ YD FABRIC NEEDED (TOTAL AREA X 1.2, FOR OVERLAP)

NOTES:

Table 1 - Compacted Aggregate Base Thickness (Inches) w/ Geotextile

Consistency	Identification Procedure	Undrained Shear Strength (PSF)	Permissible Shear Stress (Ultimate Bearing Capacity) (PSF)	Sheep/Goats/Swine (14.5 - 25 psi)	Horses/Dairy Cattle/Beef Cattle (1,200 - 1,400 lbs.)(37.5 - 50 psi)	Light Trucks/Farm Equipment (GVW<10,000 lbs.)
Soft to Very Soft	Thumb penetrates ≥ 1", Extruded between fingers or molded by light finger pressure	< 500	750 - 1,250	6	10	12
medium	Thumb penetrates 1/4", molded by strong finger pressure	500 - 1,000	2,500 - 5,000	6		
Stiff	Indented by thumb but not penetrated	1000 - 2,000	5,000 - 10,000			
Very Stiff	Not indented by thumb, but indented by thumbnail	2000 - 4,000	10,000 - 20,000			
Hard	Not indented by thumbnail, indented w/ knife	> 4,000	> 20,000			



STONE HUAP DESIGN SHEET
 DESIGN SHEET AND MATERIAL QUANTITIES
 COUNTY, NORTH CAROLINA
 DIVISION OF SOIL AND WATER CONSERVATION
 NORTH CAROLINA DEPARTMENT OF AGRICULTURE
 AND CONSUMER SERVICES

Designed	Date
Drawing File Name:	
DATE	APPROVED
TITLE	
REVISIONS	
Address: 216 West Jones St. Raleigh, NC 27604	Phone: 919-707-3770

GENERAL SPECIFICATIONS FOR VEGETATING CRITICAL AREAS

General

Once grading, excavating, and/or filling is complete, smooth area to be vegetated and cover fill material or excavated areas with 2 to 4 inches of top soil as practical.

Broadcast apply dolomitic limestone at a rate of 2 tons per acre and 1000 pounds of 10-10-10 fertilizer per acre, unless a soil test has been taken, giving site-specific rates. Incorporate 2 to 4 inches deep with disk or other suitable means. Re-smooth area and seed or sprig as specified below:

Seeding Rates/Dates by General Soil Type

	Seed	Rate	Seeding Dates
Sandy/droughty soils-	Common Bermuda (hulled)	10 lb/ac	April - August
	Common Bermuda (unhulled) ¹	15 lb/ac	Jan. - March
	Hybrid Bermuda Sprigs ¹	40 bu/ac	March - April
	Pensacola Bahiagrass ²	60 lb/ac	March – June
	Weeping Lovegrass	5 lb/ac	March – June
	Sericea Lespedeza (scarified) ²	40 lb/ac	March – June
	Sericea Lespedeza (unscarified) ^{1,2}	50 lb/ac	Oct. – Feb.
Loamy/wet soils-	Switchgrass (Alamo, Blackwell) ²	10 lb/ac	Feb. – May
	Switchgrass (Kanlow, Shelter) ²	10 lb/ac	Feb. – May
	Tall Fescue ³	50 lb/ac	Sept. – March
	Eastern Gammagrass (unscarified) ²	25 lb/ac	Oct. – Dec.
	Eastern Gammagrass (scarified) ²	15 lb/ac	March – June

Immediately Following Seeding/Sprigging

Rake in seed, but do not disk as seed does not need to be deeper than 5 to 10 times the seed's diameter (thickness). Cultipack, if available to firm seedbed. Apply mulch to cover approximately 75% of the ground surface as uniformly as practical. Small grain straw is best, but Coastal Bermuda hay may be used as well. Crimp straw to prevent blowing and clumping by using a crimper or disk set straight (no soil turning). Additional mulch anchoring methods, such as netting will be needed where concentrated water flows across seeded area. Maintain area with occasional mowing and fertilization for the life of the practice.

¹If temporary cover is needed for quick erosion control, add 25 lb/ac of small grain to seed mixture. Be sure to mow small grain by April 1st to prevent shading of warm season grasses.

²Provides additional wildlife habitat, which may be required for some programs.

³Do not plant during extended cold periods where soils are subject to "hard freeze".

GEOTEXTILE CONSTRUCTION SPECIFICATION

Material

Geotextile shall be class II nonwoven needle-punched geotextile fabric with a minimum tensile strength of 157 lbs.

Placement

Before the geotextile is placed, the soil surface will be reviewed for quality assurance of the design and construction. The geotextile shall be placed on the approved prepared surface at the locations and in accordance with the details shown on the drawings. It shall be unrolled along the placement area and loosely laid, without stretching, in such a manner that it conforms to the surface irregularities when material or gabions are placed on or against it. The geotextile may be folded and overlapped to permit proper placement in designated area(s).

The geotextile shall be joined by overlapping a minimum of 18 inches (unless otherwise specified) and secured against the underlying foundation material. Securing pins, approved and provided by the geotextile manufacturer, shall be placed along the edge of the panel or roll material to adequately hold it in place during installation. Pins shall be steel or fiberglass formed as a **U**, **L**, or **T** shape or contain "ears" to prevent total penetration through the geotextile. Steel washers shall be provided on all but the U-shaped pins. The upstream or upslope geotextile shall overlap the abutting downslope geotextile. At vertical laps, securing pins shall be inserted through the bottom layers along a line through approximately the mid-point of the overlap. At horizontal laps and across slope labs, securing shall be inserted through the bottom layer only. Securing pins shall be placed along a line about 2 inches in from the edge of the placed geotextile at intervals not to exceed 12 feet unless otherwise specified. Additional pins shall be installed as necessary and where appropriate to prevent any undue slippage or movement of the geotextile. The use of securing pins will be held to the minimum necessary. Pins are to remain in place unless otherwise specified.

Should the geotextile be torn or punctured, or the overlaps disturbed, as evidenced by visible geotextile damage, subgrade pumping, intrusion, or grade distortion, the backfill around the damaged or displaced area shall be removed and restored to the original approved condition. The repair shall consist of a patch of the same type of geotextile being used and overlaying the existing geotextile. Geotextile panels joined by overlap shall have the patch extend a minimum of 2 feet from the edge of any damaged area.

ROCKFILL CONSTRUCTION SPECIFICATION

Material

Material for rockfill shall meet the NCDOT gradation for size ABC stone, shall comply to the requirements set forth in section 520 and meet NCDOT Aggregate QC/QA program requirements.

Placement

Place the aggregate material on the subgrade with a mechanical spreader capable of placing the material to a uniform loose depth and without segregation; except, for areas inaccessible to a mechanical spreader, the aggregate material may be placed by other methods approved by the technician.

Where the required compacted thickness of the base is 10" or less, the base material may be spread and compacted in one layer. Where the required compacted thickness is more than 10" spread the base material and compact in 2 or more approximately equal layers. Shape the base material in accordance with the lines, grades, and typical section as shown on the plans. Construct the base course so that it is smooth, hard, dense, unyielding,, and well bonded upon completion. Construct the base so that the compacted thickness of the base is within a tolerance of +/- 1/2" of the base thickness required by the plans.

CLEARING AND GRUBBING SPECIFICATION

Marking and Existing Vegetation Protection

Trees and other vegetation 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. The limits of the area(s) to be cleared and grubbed 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.

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 1 foot below the ground surface at embankment sites and other designated areas.

Disposal

All materials cleared and grubbed from the project site shall be disposed of at locations shown on the plans and/or agreed upon during the pre-construction meeting. The contractor and/or cooperater is responsible for complying with all local rules and regulations and the payment of any and all fees that may result from disposal at locations away from the project site.

EXCAVATION SPECIFICATIONS

Excavation

Excavation shall be approximately to the lines and grades shown on the drawings or as staked in the field. Suitable material from the specified excavations may be used in the construction of required earthfill. The suitability of material for specific purposes is determined by a district technician.

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. Structure and trench excavations shall be completed to the specified elevations and to the length and width required to safely install, adjust, and remove any forms, bracing, or supports necessary for the installation of the work. Excavations outside the lines and limits shown on the drawings or specified herein are required to meet safety requirements and shall be the responsibility of the contractor in constructing and maintaining a safe and stable excavation.

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 shall be approved by a district technician.

Overexcavation

Excavation beyond the specified lines and grades shall be corrected by filling the resulting voids with approved, compacted earthfill with exception of any subgrade for riprap, rockfill, sand/gravel bedding, or drainfill. Overexcavation shall be reviewed with the technician for planned corrective action.

Disposal of Waste Materials

All surplus and unsuitable material is designated as waste and shall be disposed of at locations shown on the drawings or at locations approved by the technician.

EARTHFILL SPECIFICATION

General

The work consists of the construction of earth embankments, other earthfills, and earth backfills required by the drawings and specifications. Earthfill is composed of natural earth materials that can be placed and compacted by construction equipment operated in a conventional manner. Earth backfill is composed of natural earth material placed and compacted in confined spaces or adjacent to structures (including pipes) by hand tamping, manually directed power tampers or vibrating plates, or their equivalent.

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 technician. 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.

Foundation Preparation

Foundations for earthfill shall be stripped to remove vegetation and other unsuitable material or shall be excavated as specified. Except as otherwise specified, 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 needed for the earthfill, and the surface material of the foundation shall be compacted and bonded with the first layer 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 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.

Placement & Compaction

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 technician. 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 8 inches.

Compaction of earthfill surface may be achieved by one of the following methods:

1. 6 passes of a sheepsfoot roller or equivalent for cohesive soils
2. 6 passes of a vibratory roller or equivalent for granular soils

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.

Control of Moisture Content

During placement and compaction of earthfill and earth backfill, the moisture content of the material being placed shall be maintained to achieve adequate compaction. Material that is too wet when deposited on the earthfill shall either be removed or dried to a moisture content adequate for compaction.

REFERENCES

1. NRCS CPS Critical Area Planting Code 342
2. NCDOT Standard Specifications Section 512 Aggregate Base Course
3. NRCS National Engineering Handbook, Part 642 - Specifications for Construction Contracting
 - 3.1. Construction Specification 95 - Geotextile
 - 3.2. Construction Specification 2 - Clearing and Grubbing
 - 3.3. Construction Specification 21 - Excavation
 - 3.4. Construction Specification 23 - Earthfill



STONE HUAP DESIGN SHEET
SPECIFICATIONS
 ----- COUNTY, NORTH CAROLINA
 DIVISION OF SOIL AND WATER CONSERVATION
 NORTH CAROLINA DEPARTMENT OF AGRICULTURE
 AND CONSUMER SERVICES

Designed	Date
Drawing File Name:	
DATE	APPROVED
REVISIONS	TITLE
Address:	Phone:
216 West Jones St.	919-707-3770
Raleigh, NC 27604	