

**HEAVY USE AREA PROTECTION DETAILS**  
NOT TO SCALE

**MATERIALS CALCULATIONS**

**4000 PSI CONCRETE PAD DIMENSIONS AND VOLUME:**

- \_\_\_\_\_ L1, LENGTH (ft)
- \_\_\_\_\_ W1, WIDTH (ft)
- \_\_\_\_\_ A1, AREA (ft<sup>2</sup>) = L1 x W1
- \_\_\_\_\_ D, DEPTH (in)
- \_\_\_\_\_ VOLUME (Cu. Yd.) = LENGTH (ft) x WIDTH (ft) x  $\frac{D}{12} \text{ ft} \times \frac{1 \text{ Cu. Yd.}}{27 \text{ Cu. Ft.}}$


**STONE APRON:**

- \_\_\_\_\_ wo, OFFSET WIDTH (ft)
- \_\_\_\_\_ L2, LENGTH (ft) = (L1 + 2wo)
- \_\_\_\_\_ W2, WIDTH (ft) = W1 + 2wo
- \_\_\_\_\_ A2, AREA (ft<sup>2</sup>) = (L2 x W2) - A1
- \_\_\_\_\_ TONS = A2 ft<sup>2</sup> x  $\frac{8}{12} \text{ ft} \times \frac{0.0725 \text{ ton}}{1 \text{ cu. ft.}}$

**FILTER FABRIC**

- \_\_\_\_\_ TOTAL Sq. Yd. FABRIC NEEDED ( $\frac{A2}{9}$ ) X 1.2, FOR OVERLAP

**ADDITIONAL NOTES:**



**CONCRETE 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:	REVISIONS	TITLE	DATE	APPROVED	
Address: 216 West Jones St. Raleigh, NC 27604 Phone: 919-707-3770					

**CONCRETE MIX DESIGN**

The contractor shall be responsible for the design of the concrete mix and for providing a letter certifying that the concrete materials and mix proportions (including admixtures if used) will provide the required compressive strength and include evidence satisfactory to the Technician that the materials and proportions (the "job mix") will produce concrete conforming to this specification. After a job mix has been approved, neither the source, character, or grading of the aggregates nor the type or brand of cement or admixture shall be changed without prior notice to the Technician. The letter certifying the materials and job mix shall be provided to the landowner with a copy to the Technician at the pre-construction meeting. All materials used in concrete construction shall meet the applicable ASTM standards and/or ACI specifications.

The proportions of the aggregates shall be such as to produce a concrete mixture that works readily into the corners and angles of the forms and around reinforcement when consolidated but will not segregate or exude free water during consolidation. The Maximum Size Aggregate (MSA) shall be 1.5 inches with a Nominal Maximum Size Aggregate (NMSA) of 1 inch. A #57 aggregate will meet these requirements.

The maximum water to cement ratio (w/c) shall be 0.50 unless otherwise specified. The concrete mix shall have a 28-day compressive strength of 4,000 psi or greater. The minimum cement content shall be 6 bags (564 lbs.) per cubic yard. Use Type I or Type I A portland cement meeting the requirements of ASTM C150. Water used in mixing and curing concrete shall be clean and free from injurious amounts of oil, salt, acid, alkali, organic matter, or other deleterious substances. Wash water shall not be used as part of the mixing water for succeeding batches.

The following mineral admixtures may be used as partial substitutions for Portland cement:

- Fly ash may be used in an amount not greater than 25 percent by weight of the total required cement in the concrete mix.
- Ground granulated blast furnace slag (GGBFS) may be used in amounts between 25 to 70 percent by weight of the total required cement in the concrete mix.
- Fly ash or GGBFS shall not be used in mixes designed or intended to obtain high early strength.
- The weight of the cement and the combined weight of the cement and fly ash or slag shall be within plus or minus 1 percent of the required weight of the cementitious material.
- Concrete mixes containing fly ash or GGBFS can only be used between April 1 and October 15.

Entrained air shall be used in all concrete that will be exposed to freezing and thawing. The air content by volume shall be 4% to 8% of the volume of the concrete. Air entraining admixtures shall conform to the requirements of ASTM C260.

Chemical admixtures shall conform to the requirements of ASTM C494 and be of the following types:

- Type A- Water-reducing admixture
- Type B- Retarding admixture
- Type C- Accelerating admixture
- Type D- Water-reducing and retarding admixture
- Type E- Water-reducing and accelerating admixture

Superplasticizers (ASTM C494 Types F and G) require PE approval.

Concrete shall have synthetic fibers added to the mix. The addition of synthetic fibers to concrete helps to reduce the bleeding process, reduce segregation of the concrete mix, and helps to control cracking due to plastic shrinkage and to drying shrinkage during the first few hours of curing. Micro-synthetic fibers or macro-synthetic fibers may be added to the concrete mix. The type of synthetic fibers shall be polypropylene. The dosage rates used should follow the manufacturer's recommendation for the product used.

**DESIGN OF CONCRETE SLABS**

The design of concrete slabs shall take into consideration the required performance and the critical applied loads. Concrete slabs may be used as floors as heavy use pads, scrape alleys, and feed pads. The in situ subgrade material must be evaluated as to the suitability and denseness. The HUAP slab may be used where the subgrade is uniform and dense. This slab is considered to be manure tight.

Vehicles of the following types may be used on this slab (maximum 12 ton Gross Vehicle Weight):

- Light (small) Farm Tractor
- Light (small) Tractor Loader/Backhoe
- Skid Steer
- Light (small) Dump Truck
- Standard pull-type rear-discharge Manure Spreader

Design Requirements:

- The concrete strength shall be 4,000 pounds per square inch (psi) or greater.
- The slab thickness shall be minimum 4 inches.
- Contraction (control) joints shall be used and be placed at a maximum spacing of 10 feet in both directions. The joints shall be continuous and not staggered or offset.
- Isolation joints for adjoining structures requires PE approval.
- Reinforcing steel requires PE approval.
- Slabs on fill require PE approval.
- Minimum cement content shall be 6 bags/cu.yd.
- Maximum water/cement ratio shall be 0.50 (0.40 for Agrichemical Handling Facility)
- 28-day compressive strength of 4,000 psi or greater (5,000 psi for Agrichemical Handling Facility)
- All concrete to be air entrained with an air content of 4%-8% of the concrete volume
- Slump shall be in the range of 3" to 5"

**Subgrade**

All subgrade surfaces shall be firm and damp prior to placement of concrete. The uniformity can be checked with the use of a tile probe. If the subgrade is found to have a soft spot, it should be excavated and backfilled with granular material. Placement of concrete on mud, dried earth, uncompacted fill, or frozen subgrade will not be permitted. Unless required or allowed to be used, do not use earth cuts as forms for vertical or sloping surfaces. When allowed, the original construction drawings shall clearly show the locations where earth cuts may be used as forms. The subgrade shall be inspected and approved by the Technician prior to the placement of concrete.

**Concrete mixers and mixing**

Concrete may be furnished by ready-mix methods, by volumetric batching and continuous mixing at the site, or by batch mixing at the site. Ready-mixed concrete shall be mixed, transported, and placed in a freshly mixed and unhardened state and meet the requirements as described in ASTM C94 "Standard Specification for Ready-Mixed Concrete". The contractor shall furnish a batch ticket upon the arrival of a load to the construction site.

No mixing water in excess of the amount called for by the job mix shall be added to the concrete during mixing or hauling or after arrival at the delivery point. Withholding some of the water until the concrete arrives on the job and then adding the remaining water and turning the mixer 30 revolutions at mixing speed is allowed to overcome transporting conditions. Water to compensate for up to a 1-inch loss in slump may be added one time prior to discharging any of the load, not to exceed the design maximum water cement (w/c) ratio.

**BATCH TICKET INFORMATION**

A delivery ticket for each batch of concrete shall be provided to the contractor by the concrete supplier prior to the concrete being unloaded at the work site. Upon completion of the placement of all concrete, copies of all batch tickets shall be provided to the landowner and district technician.

The following minimum information shall be included on each Batch Ticket:

- Name of purchaser and the work location (address)
- Name of the concrete supplier (ready-mix batch plant)
- Batch plant location
- Ticket serial number
- Design mix designation
- Delivery date
- Time the concrete was loaded onto the truck at the plant
- Time the concrete arrived at the site
- Amount of concrete delivered to the site (batch size)
- Time the concrete was unloaded at the site
- Actual weight of Cement (also Fly Ash and/or other mineral admixtures if used)
- Actual weight of Aggregates (Coarse and Fine)
- Actual weight of Water added at the plant
- Actual volume of Admixture(s) - Type(s) and Quantity(s) added at the plant (if used)
- Actual weight and type of fiber reinforcement (if used)
- Water/Cement ratio of batch leaving the plant
- Quantity of water added at the site by the receiver of the concrete
- Admixture(s) added at the site - type(s), quantity(s), and time admixture(s) added to the concrete

The contractor shall be responsible for any changes to the certified design mix.

**CONCRETE DELIVERY**

Concrete shall be delivered to the site and discharged into the subgrade within 90 minutes after the introduction of the cement to the aggregates. In hot weather or under conditions contributing to quick stiffening of the concrete or when the temperature of the concrete is 85° F or above, the time between the introduction of the cement to the aggregates and discharge shall not exceed 45 minutes. Concrete shall be conveyed from the mixer to the subgrade as rapidly as practicable by methods that will prevent segregation of the aggregates or the loss of mortar.

Reasonable notice shall be given to the technician for the required inspection and approval prior to the time of concrete placement. Such notice shall be far enough in advance to give adequate time to inspect the subgrade and other preparations for compliance with the specifications before the concrete is delivered to the site.

Prior to the placement of concrete, the subgrade shall be inspected and approved by the Technician. The concrete shall be deposited as closely as possible to its final position in the subgrade and shall be worked into the corners and angles of the subgrade in a manner to prevent segregation of aggregates or excessive laitance.

The depositing of concrete in slabs shall be regulated so that the concrete can be consolidated by the use of a vibrator with a minimum of lateral movement.

Slab concrete shall be placed to the design thickness in one continuous layer. Hoppers and chutes, concrete pumps, pipes, or "elephant trunks" shall be used when the vertical drop is in excess of 5 feet to prevent splashing of mortar and to prevent segregation.

**CONTRACTION JOINTS**

The slab panels created by the joints shall be as square as possible but with a maximum aspect ratio (length to width) of 1.5 to 1. Avoid L- or T-shaped panels. Add a joint at reentrant corners. Contraction (control) joints shall be made only at locations shown or noted on the drawings.

Contraction (control) joints are to be made to a depth of ¼ the thickness of the slab or wall but not less than 1 inch. Sawing is a commonly used method to make contraction (control) joints. Joints shall be 1/16" to 3/8" wide for unsealed joints.

Contraction (control) joints also can be formed in the fresh concrete with hand groovers or by using inserts (strips of plastic, e.g., "zip-strip", or other suitable material) at the joint location. The edges of these open joints shall be finished with an edging tool prior to removal of the joint filler strips. Inserts are not recommended for use on slabs that will be subjected to wheeled traffic.

Concrete that is honey combed, damaged, or otherwise defective shall be repaired or removed and replaced.

The Technician will determine the required extent of removal, replacement, or repair. The plan for implementing the repair must be approved by the Technician prior to the beginning of the repair work. The contractor shall perform all repair work in the presence of the Technician or his or her representative. The Technician will have the final approval of all repair work.

**CONCRETE CURING**

Concrete shall be prevented from drying for a curing period of at least 7 days after it is placed. Exposed surfaces shall be kept continuously moist for the entire period or until curing compound is applied as specified below. Moisture shall be maintained by sprinkling, flooding, fog spraying or by covering with continuously moistened canvas, cloth mats, straw, sand, or other approved materials. Water or covering shall be applied in such a way that the concrete surface is not eroded or otherwise damaged. Exposed and unformed concrete surfaces, especially flat work placed with large surface areas, shall be kept completely and continuously wet for the duration of the curing period or until curing compound is applied as specified below.

Concrete, except at construction joints, may be coated with a curing compound that meets ASTM C309 in lieu of continued application of moisture. The compound shall be sprayed on the moist concrete surface as soon as free water has disappeared but shall not be applied to any surface until patching, repairs, and finishing of that surface are completed. The compound shall be applied at a uniform rate of not less than one gallon per 150 square feet of surface (or at the manufacturer's recommended rate) and shall form a continuous adherent membrane over the entire surface. The use of white curing compound is strongly recommended if curing compound is used.

Do not drive on or load slabs before 14 days have elapsed after concrete placement unless specified differently on the drawings.

**WEATHER CONSIDERATIONS**

Cold weather concreting procedures may be required before when the atmospheric temperature is less than 40° at the time of placement or predicted to fall below 32° in the following 24 hours. The contractor shall submit a written plan detailing how the concrete is going to be protected from freezing and how the required temperatures of the concrete will be maintained. The written plan shall be approved by the Technician prior to any work on the project except for earthwork.

For the purpose of this specification, hot weather is defined as any site conditions that may potentially impair the quality of freshly mixed or hardened concrete by accelerating the rate of moisture loss and the rate of cement hydration or otherwise produce detrimental results. Finishing of slabs and other exposed surfaces shall be started as soon as the condition of the concrete allows and shall be completed without delay. The contractor shall maintain the temperature of the concrete below 90°F during mixing, conveying, and placing.

The contractor shall submit a written plan detailing procedures of mixing, using admixtures, placing, protection, curing, and temperature monitoring during hot weather. The Technician shall approve the written plan prior to the ordering of the concrete. The contractor shall maintain a record of the placement of the concrete.

**REFERENCES**

1. EFH- Ohio Supplement Issue 1 Revised 04/2016 Exhibit OH17-1

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



CONCRETE HUAP DESIGN SHEET

SPECIFICATIONS

----- COUNTY, NORTH CAROLINA

DIVISION OF SOIL AND WATER CONSERVATION  
NORTH CAROLINA DEPARTMENT OF AGRICULTURE  
AND CONSUMER SERVICES

**GEOTEXTILE CONSTRUCTION SPECIFICAITON**

**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.

**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) <sup>1</sup>	15 lb/ac	Jan. - March
	Hybrid Bermuda Sprigs <sup>1</sup>	40 bu/ac	March - April
	Pensacola Bahiagrass <sup>2</sup>	60 lb/ac	March – June
	Weeping Lovegrass	5 lb/ac	March – June
	Sericea Lespedeza (scarified) <sup>2</sup>	40 lb/ac	March – June
	Sericea Lespedeza (unscarified) <sup>1,2</sup>	50 lb/ac	Oct. – Feb.
Loamy/wet soils-	Switchgrass (Alamo, Blackwell) <sup>2</sup>	10 lb/ac	Feb. – May
	Switchgrass (Kanlow, Shelter) <sup>2</sup>	10 lb/ac	Feb. – May
	Tall Fescue <sup>3</sup>	50 lb/ac	Sept. – March
	Eastern Gammagrass (unscarified) <sup>2</sup>	25 lb/ac	Oct. – Dec.
	Eastern Gammagrass (scarified) <sup>2</sup>	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.

<sup>1</sup>If 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.

<sup>2</sup>Provides additional wildlife habitat, which may be required for some programs.

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

**REFERENCES**

1. NCDOT Standard Specifications Section 512 Aggregate Base Course
2. NRCS CPS Critical Area Planting Code 342
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

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