

6.06

Practice Standards and Specifications

TEMPORARY GRAVEL CONSTRUCTION ENTRANCE/EXIT

Definition A gravel area or pad located at points where vehicles enter and leave a construction site.

Purpose To provide a buffer area where vehicles can drop their mud and sediment to avoid transporting it onto public roads, to control erosion from surface runoff, and to help control dust.

Conditions Where Practice Applies Whenever traffic will be leaving a construction site and moving directly onto a public road or other paved off-site area. Construction plans should limit traffic to properly constructed entrances.

Design Criteria Aggregate Size—Use 2-3 inch washed stone.

Dimensions of gravel pad—
Thickness: 6 inches minimum
Width: 12-foot minimum or full width at all points of the vehicular entrance and exit area, whichever is greater
Length: 50-foot minimum

Locations—Locate construction entrances and exits to limit sediment from leaving the site and to provide for minimum utility by all construction vehicles (Figure 6.06a). Avoid steep grades, and entrances or exits to public roads.

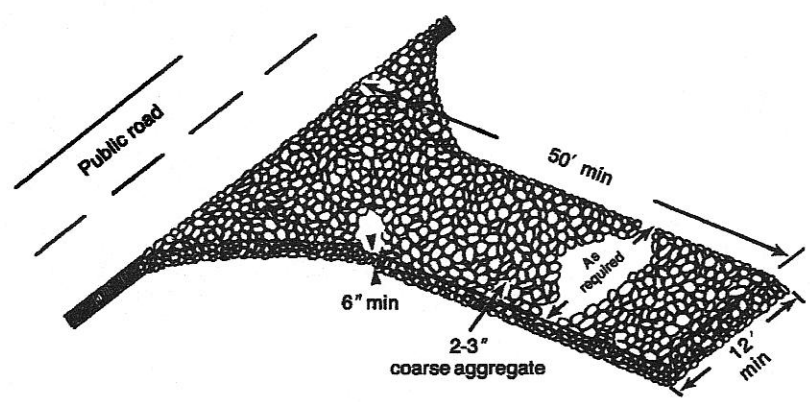


Figure 6.06a Gravel entrance/exit heape sediment from leaving the construction site (modified from NCESB/CES).

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Table 6.10b Temporary Seeding Recommendations for Summer

Seeding mixture Species	Rate (lb/acre)
German millet	40
In the Piedmont and Mountains, a small-stemmed Sudangrass may be substituted at a rate of 50 lb/acre.	
Seeding dates	
Mountains—May 15–Aug. 15	
Piedmont—May 1–Aug. 15	
Coastal Plain—May 1–Aug. 15	
Soil amendments	
Follow recommendations of soil tests or apply 2,000 lb/acre ground agricultural limestone and 750 lb/acre 10-10-10 fertilizer.	
Mulch	
Apply 4,000 lb/acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.	
Maintenance	
Referitize if growth is not fully adequate. Reseed, referitize and mulch immediately following erosion or other damage.	

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Table 6.10c Temporary Seeding Recommendations for Fall

Seeding mixture Species	Rate (lb/acre)
Rye (grain)	120
Seeding dates	
Mountains—Aug. 15–Dec. 15	
Coastal Plain and Piedmont—Aug. 15–Dec. 30	
Soil amendments	
Follow soil tests or apply 2,000 lb/acre ground agricultural limestone and 1,000 lb/acre 10-10-10 fertilizer.	
Mulch	
Apply 4,000 lb/acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.	
Maintenance	
Repair and referitize damaged areas immediately. Topdress with 50 lb/acre of nitrogen in March. If it is necessary to extend temporary cover beyond June 15, overseed with 50 lb/acre Kobe (Piedmont and Coastal Plain) or Koran (Mountains) lespedeza in late February or early March.	

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Vermiculite—horticultural grade and free of toxic substances.

Rotated manure—stable or cattle manure not containing undue amounts of straw or other bedding materials.

Thoroughly washed sawdust—free of stones and debris. Add 6 lb of nitrogen to each cubic yard.

Sludge—Treated sewage and industrial sludges are available in various forms; these should be used only in accordance with local, State, and Federal regulations.

SPECIES SELECTION

Use the *Key to Permanent Seeding Mixtures* (Table 6.11b) to select the most appropriate seeding mixture based on the general site and maintenance features. A listing of species, including scientific names and characteristics, is given in Appendix 8.02.

SEEDBED PREPARATION

Install necessary mechanical erosion and sedimentation control practices before seeding, and complete grading according to the approved plan.

Lime and fertilizer needs should be determined by soil tests. Soil testing is performed free of charge by the North Carolina Department of Agriculture soil testing laboratory. Directions, sample returns, and information sheets are available through county Agricultural Extension offices or from NCDAS. Because the NCDAS soil testing lab requires 1-2 weeks for sample turn-around, sampling must be planned well in advance of final grading. Testing is also done by commercial laboratories.

When soil tests are not available, follow rates suggested on the individual specification sheet for the seed mix chosen (Tables 6.11c through 6.11v). Application rates usually fall into the following ranges:

- Ground agricultural limestone:
 - Light-textured, sandy soils: 1-1 1/2 tons/acre
 - Heavy-textured, clayey soils: 2-3 tons/acre
- Fertilizer:
 - Grasses: 800-1200 lb/acre of 10-10-10 (or the equivalent)
 - Grass-legume mixtures: 800-1200 lb/acre of 5-15-10 (or the equivalent)

Apply lime and fertilizer evenly and incorporate into the top 4-6 inches of soil by disk or other suitable means. Operate machinery on the contour. When using a hydroseeder, apply lime and fertilizer to a rough, loose surface. Roughen surface according to Practice 6.03, *Surface Roughening*.

Complete seedbed preparation by breaking up large clods and asking into a smooth, uniform surface (slopes less than 3:1). Fill in low level depressions that can collect water. Broadcast seed into a freshly loosened seedbed that has not been sealed by mulch.

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Washing—If conditions at the site are such that most of the mud and sediment are not removed by vehicles traveling over the gravel, the tires should be washed. Washing should be done on an area stabilized with crushed stone that drains into a sediment trap or other suitable disposal area. A wash rack may also be used to make washing more convenient and effective.

Construction Specifications

1. Clear the entrance and exit area of all vegetation, roots, and other objectionable material and properly grade it.
2. Place the gravel to the specific grade and dimensions shown on the plans, and smooth it.
3. Provide drainage to carry water to a sediment trap or other suitable outlet.
4. Use geotextile fabric because they improve stability of the foundation in locations subject to scourage or high water table.

Maintenance Maintain the gravel pad in a condition to prevent mud or sediment from leaving the construction site. This may require periodic topdressing with 2-inch stone. After each rainfall, inspect any structures used to trap sediment and clean if not as necessary. Immediately remove all objectionable materials spilled, washed, or tracked onto public roads.

References *Handbook of Construction Materials* 6.30, Green Steel Channels

Sediment Traps and Barriers 6.60, Temporary Sediment Trap



FOR CONSTRUCTION

FOR BID

FOR REVIEW

CONCEPTUAL

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PERMANENT SEEDING

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Definition Controlling runoff and erosion on disturbed areas by establishing permanent vegetative cover with seeds.

Purpose To reduce erosion and decrease sediment yield from disturbed areas, to permanently stabilize such areas in a manner that is economical, adapts to site conditions, and allows selection of the most appropriate plant materials.

Conditions Where Practice Applies Fine-grained areas on which permanent, long-lived vegetative cover is the most practical or most effective method of stabilizing the soil. Permanent seeding may also be used on rough-grained areas that will not be brought to final grade for a year or more.

Practice Applies Areas to be stabilized with permanent vegetation must be seeded or planted within 15 working days of weathering days after final grade is reached, unless temporary stabilization is applied.

Planning Considerations Vegetation controls erosion by protecting bare soil surfaces from raindrop impact and by reducing the velocity and volume of overland flow.

The most common and economical means of stabilizing disturbed soils is by seeding grasses and legumes. The advantages of seeding over other means of establishing plants include the smaller initial cost, lower labor input, and greater flexibility of method. The disadvantages of seeding include:

- potential for erosion during the establishment stage,
- the need to reseed areas that fail to establish,
- seasonal limitations on suitable seeding dates, and
- a need for water and appropriate temperatures during germination and early growth.

The probability of successful plant establishment can be maximized through good planning. Knowledge of the soil characteristics (Table 6.11a), selection of suitable plant materials for the site, good seedbed preparation, adequate liming and fertilization, and timely planting and maintenance.

SELECTING PLANT MATERIALS

Climate, soils, and topography are the major factors affecting the suitability of plants for a particular site. All three of these factors vary widely across North Carolina, with the most significant contrasts occurring among the three major physiographic regions of the state—Mountains, Piedmont, and Coastal Plain (Figure 6.11a).

To simplify plant selection, a *Key to Permanent Seeding Mixtures* is presented in Table 6.11b. To find seeding specifications for a specific site, follow this key through the different steps—region, slope, soil, and maintenance level—to the appropriate seeding number. Seeding mixtures recommended here are designed for general use and are well proven in practical field situations.

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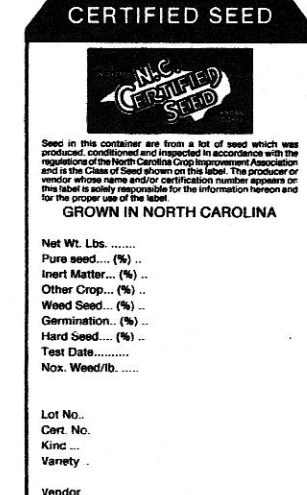
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SEEDING

Seeding dates given in the seeding mixture specifications (Table 6.11c through 6.11v) are designated as "best" or "possible." Seedlings properly carried out within the "best" dates have a high probability of success. It is also possible to have satisfactory establishment when seeding occurs these dates. However, as you deviate from them, the probability of failure increases rapidly. Seeding on the last date shown under "possible" may reduce chances of success by 70-90%. Always take this into account in scheduling land-disturbing activities.

Use certified seed for permanent seeding whenever possible. Certified seed is inspected by the North Carolina Crop Improvement Association. It meets published North Carolina Standards and should have an official "Certified Seed" label (Figure 6.11b).

Figure 6.11b Label displayed on all North Carolina certified seed.



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TEMPORARY SEEDING

Definition Planting rapid-growing annual grasses, small grains, or legumes to provide initial, temporary cover for erosion control on disturbed areas.

Purpose To temporarily stabilize disturbed areas that will not be brought to final grade for a period of more than 21 calendar days.

Temporary seeding controls runoff and erosion until permanent vegetation or other erosion control measures can be established. In addition, it provides erosion for soil protection and seedbed preparation, and reduces problems of mud and dust production from bare soil surfaces during construction.

Conditions Where Practice Applies On any cleared, unvegetated, or sparsely vegetated soil surface where vegetative cover is needed for less than 1 year. Applications of this practice include divisions, dams, temporary sediment basins, temporary road banks, and typical roadways.

Planning Considerations Annual plants, which sprout and grow rapidly and survive for only one season, are suitable for establishing initial or temporary vegetative cover. Temporary seeding preserves the integrity of surface sediment control structures such as dikes, diversions, and the banks of dams and sediment basins. It can also reduce the amount of maintenance associated with these devices. For example, the frequency of sediment basin cleanouts will be reduced if watershed areas, outside the active construction zone, are stabilizing.

Proper seedbed preparation, selection of appropriate species, and use of quality seed are as important in this Practice as in Practice 6.11, *Permanent Seeding*. Failure to follow established guidelines and recommendations carefully may result in an inadequate or short-lived stand of vegetation that will not control erosion.

Temporary seeding provides protection for no more than 1 year, during which time permanent stabilization should be initiated.

Specifications Complete grading before preparing seedbeds, and install all necessary erosion control practices such as, dikes, waterways, and basins. Minimize steep slopes because they make seedbed preparation difficult and increase for erosion hazard. If soils become compacted during grading, loosen them to a depth of 6-8 inches using a ripper, harrow, or chisel plow.

SEEDBED PREPARATION Good seedbed preparation is essential to successful plant establishment. A good seedbed is well-jetted, loose, and uniform. When hydroseeding methods are used, the surface may be left with a more irregular surface of large clods and stones.

Liming—Apply lime according to soil test recommendations. If the pH (acidity) of the soil is not known, an application of ground agricultural limestone at the

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Table 6.11a Suitability of Soil for Establishment of Low-maintenance Vegetation

Criteria	Good	Fair	Poor	Limiting Factors
pH	5.6-7.8	4.5-6.5	<4.5	Too acid, possible Al, Mn, Fe toxicity
Available water capacity ¹	>10	05-10	<5	Too dry
Texture ²	1, sil, sil, sil	scl, silcl, d	sc, sil, c	Too high in clay
		ls	s	Too high in sand
Coarse fragments ³ (>10 in)	<15%	15-35	>35	Lg. stones restrict tillage; droughty
Depth to bedrock (in.)	<36	3-10	>10	Insufficient rooting depth
Depth to bedrock (in.)	40	20-40	>40	Insufficient rooting depth
Salinity (mmhos/cm)		8-16	>16	Excess salt

¹in./in.
²Sandy clay loam (sc), silty clay loam (scl), clay loam (cl), sandy loam (sl), silty loam (sil), loamy sand (ls), sandy clay (sc), silty clay (scl), clay (cl), silty loam (sl), sandy loam (sl), loamy sand (ls), and loam (l).
³Percent by weight.

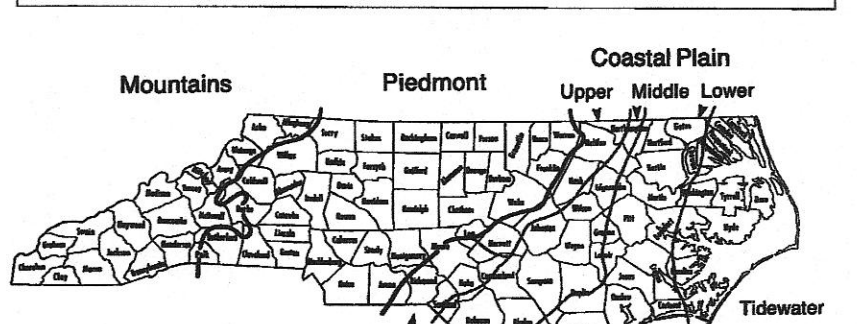
Source: *National Soils Handbook*, USDA-SCS, 1983.

Figure 6.11a Major physiographic regions of North Carolina differing in climate, soils and topography.

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(Tables 6.11c through 6.11v). They are designed to produce maximum stabilization and minimize the amount of maintenance and repair required.

Land use is a primary consideration in planning permanent seedings. For this purpose land use, whether residential, industrial, commercial, or recreational, can be divided into two general categories:

- **High-maintenance areas** are mowed frequently, limed and fertilized regularly, and either (1) receive intensive use (e.g., athletic fields) or (2) require maintenance to an aesthetic standard (e.g., house lawns). Grasses used for these situations are long-lived perennials that form a tight sod and are fine-leaved and attractive in appearance. They must be well-adapted to the geographic area where they are planted and able to endure the stress of frequent mowing. Sites where high-maintenance vegetative cover is desirable include homes, industrial parks, schools, churches, and recreational areas.
- **Low-maintenance areas** are mowed infrequently or not at all, and do not receive lime and fertilizer on a regular basis. Plants must persist with little maintenance over long periods of time. Grass and legume mixtures are favored for these sites because legumes are a source of soil nitrogen. Mixed stands are also more resistant to adverse conditions. Sites suitable for low-maintenance vegetation include steep slopes, streams or channel banks, some commercial properties, and "utility" turf areas such as roadbanks.

SEEDBED PREPARATION The soil on a disturbed site must be amended to provide an optimum environment for seed germination and seedling growth. The surface soil must be loose enough for water infiltration and root penetration. The pH (acidity) or alkalinity of the soil must be such that it is not toxic and nutrients are available—preferably between 6.0 and 6.5. Surface nutrients—added as fertilizer—must be present.

It is as important to add lime as to add fertilizer. Lime is used primarily as a pH or acidity modifier, but it also supplies calcium and magnesium, which are important plant nutrients. By increasing soil pH, it also makes other nutrients more available to plants. At the same time, it prevents aluminum toxicity by decreasing the solubility of soil aluminum. Many soils in North Carolina are high in aluminum, which stunts plant growth.

After seed is in place, it must be protected with a mulch to hold moisture and modify temperature extremes, while preventing erosion during seedling establishment.

STEEP SLOPES The operation of equipment on steep slopes can be made during final grading. In construction of fill slopes, for example, the last 4-6 inches may be left uncompacted. A loose, rough seedbed is essential. Large clods must be left uncompacted. A loose, rough seedbed is essential. Large clods must be left uncompacted.

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Maintenance Reseed and mulch areas where seedling emergence is poor, or where erosion occurs, as soon as possible. Do not mow. Protect from traffic as much as possible.

References *Site Preparation* 6.03, Surface Roughening 6.04, Topsoiling 6.05, Subsoiling 6.06, Permanent Seeding 6.14, Mulching 6.15, Vegetation Tables

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Table 6.10a Temporary Seeding Recommendations for Late Winter and Early Spring

Seeding mixture Species	Rate (lb/acre)
Rye (grain)	120
Annual lespedeza (Kobe in Piedmont and Coastal Plain; Koran in Mountains)	50
Omit annual lespedeza when duration of temporary cover is not to extend beyond June.	
Seeding dates	
Mountains—Above 2500 feet: Feb. 15–May 15	
Piedmont—Jan. 1–May 1	
Coastal Plain—Dec. 1–Apr. 15	
Soil amendments	
Follow recommendations of soil tests or apply 2,000 lb/acre ground agricultural limestone and 750 lb/acre 10-10-10 fertilizer.	
Mulch	
Apply 4,000 lb/acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.	
Maintenance	
Referitize if growth is not fully adequate. Reseed, referitize and mulch immediately following erosion or other damage.	

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and stones provide long-term stabilization and erosion control. On slopes should be roughened (Practice 6.03, *Surface Roughening*).

Where steepness prohibits the use of farm machinery, seeding methods are limited to broadcast or hydroseeding, with hydroseeding giving the most dependable results. Vegetation chosen for these slopes must not require mowing or other intensive maintenance. Using a hydraulic seeder, seed, fertilizer, wood fiber mulch, and a tacking agent can be applied in one operation.

Good mulching practices are critical to protect against erosion on steep slopes. When using straw, anchor with netting or asphalt. On slopes steeper than 2:1, a rolled erosion control product may be required to protect the slope.

SEEDING REQUIREMENTS Establishment of vegetation should not be attempted on sites that are unsuitable due to inappropriate soil texture (Table 6.11a), poor drainage, concentrated overland flow, or steepness of slope and soil moisture have been taken to correct these problems.