Section 02930 - SEEDING AND MULCHING

1. SCOPE. This section covers the operations necessary to produce established grass covered areas, including preparations of the soil surface, application of lime, seeding, compacting, mulching, watering, and maintenance.

Areas to be seeded include all areas disturbed by construction operations including grading, parking of equipment, trenching, or any other operation that has destroyed the existing vegetative cover.

2. PERSONNEL AND EQUIPMENT. All work shall be performed by personnel who are experienced and qualified in the work required, utilizing equipment such as a fertilizer spreader; tilling equipment; cyclone seeder, drill, or cultipacker type seeder; cultipacker or roller; mulch blower or hydromulcher; and mulch puncher.

3. SUBMITTALS. The Contractor shall furnish to the Engineer in duplicate a typed and signed statement which certifies that each container of seed for use on this Project is fully labeled in accordance with the Federal Seed Act and is at least equal to the requirements for seed listed herein. This certification shall appear on or with all copies of invoices for the seed. Each lot of seed shall be subject to sampling and testing at the discretion of the Engineer. Sampling and testing will be in accordance with the latest Rules and Regulations under the Federal Seed Act and North Carolina seed laws.

4. MATERIALS.

4.01. Soil for Repairs. The soil used in repair work shall be of a quality at least equal to that which exists in areas adjacent to the area to be repaired. Soil shall be used that is free from tree roots, clay balls, stones, and other materials that hinder grading, planting, and maintenance operations and that is free from noxious and other objectionable weed seeds and toxic substances.

4.02. Seed. Seed shall be certified seed labeled in accordance with the U.S. Department of Agriculture Rules and Regulations under the Federal Seed Act and shall comply with the State Seed Laws of North Carolina. Seed shall be furnished in sealed, standard containers unless written exception is granted.

Seed that is wet or moldy or that has been otherwise damaged in transit or storage will not be acceptable. The seed shall be free of field bindweed, hedgeweed, and nutgrass seed. The seed shall not contain other noxious weed seed in excess of the limits allowable under the Federal Seed Act.

Samples of all seed used shall have been tested within 9 months prior to seeding by a legally authorized seed testing laboratory.

4.03. Lime. Lime shall be ground dolomitic limestone passing a 10 mesh sieve with at least 50 percent passing a 100 mesh sieve.

4.04. Fertilizer. Fertilizer shall be delivered in standard size bags of the manufacturer, showing weight, analysis, and the name of the manufacturer. If the fertilizer is not used immediately after delivery, it shall be stored in a dry place in such a manner that its effectiveness will not be impaired.

4.05. Mulch. Mulch for application to seedbed areas shall include threshed straw of oats, wheat, barley, rye, or wood cellulose fiber.

Straw mulch shall be baled, dry, unweathered, and show no signs of discoloration and mold damage.

A minimum of 50 percent of weight of the herbage making up the material shall be 10 inches in length or longer. Mulch material containing an excessive amount of weed and crop seeds will not be acceptable.

Wood cellulose fiber mulch shall be "Hydro Mulch 2000" as manufactured by Conwed Corporation or similar wood fiber mulch containing an organic mulch binder.

A weight certificate for each load of mulch delivered to the site shall be furnished to the Engineer at the time of delivery.

5. CONSTRUCTION.

5.01. Time and Conditions for Seeding. The work shall not be started until substantially all earthwork has been completed in the area to be seeded. Backfills and fills shall be allowed to settle and the topsoil spread and finish grading completed immediately before the work is started. Seeding shall be performed within 15 days after the completion of clearing and grubbing unless otherwise noted on the drawings or if permission is given otherwise.

Seeding and fertilizing shall not be done during periods of severe drought, high winds, excessive moisture, or frozen ground as determined by the Engineer, so that unsatisfactory results are not likely to be obtained.

Seeding shall be performed according to Table 1 in this section.

5.02. Clearing. Prior to grading and tilling, vegetation that may interfere with operations shall be mowed, grubbed, and raked. The collected material shall be removed from the site. The surface shall be cleared of stumps, stones larger than 6 inches, roots, cable, wire, and other materials that might hinder the work or subsequent maintenance.

5.03. Application of Fertilizer and Lime. Fertilizer and lime as specified shall be applied within 24 hours prior to the tilling operation. The fertilizer and lime shall be distributed uniformly over the entire area to be seeded at the rates indicated in Table 1 of this section.

The Contractor shall submit to the Engineer a laboratory soil analysis of a representative topsoil sample and use the recommended rates for fertilizer and lime. For the purpose of bidding, the Contractor will assume an application rate as indicated in Table 1 of this section. Adjustments for recommended rate will be made in accordance with the provisions of the Contract Documents for changes in the work and contract price.

5.04. Grading. Established grades, as indicated on the drawings, shall be maintained in a true and even condition. Eroded areas and areas having inadequate drainage, as indicated by the ponding of water, shall be filled. Ruts, deep tracks, dead furrows, and ridges shall be eliminated.

5.05. Tillage. After the areas have been backfilled, compacted, and fine graded with topsoil and fertilizer and lime spread, tillage shall be accomplished in such a manner as to destroy existing vegetation and to prepare an acceptable seedbed. All areas shall be tilled to a depth of 4 inches with a heavy-duty disc or chisel type breaking plow followed by discing with a disc harrow and smoothing with a weighted spike tooth harrow, railroad irons, or bridge timber float drag. When a chisel plow is used, the chisels shall be set not more than 10 inches apart, and the areas shall be cross or double tilled. All areas shall be left smooth for ease of mowing. All operations shall be done in a direction parallel to the contour lines on the slope and not uphill and downhill.

5.06. Application of Seed. Seeding equipment calibration tests shall be made in the presence of the Engineer to determine the equipment setting required to broadcast the seed at the specified rates.

The seed box shall be kept at least half full during seeding operations to insure even distribution of seed over all the areas seeded.

The seeder shall uniformly distribute the seed mixture over the area. Markers shall be used to assure that no significant gaps will exist between successive passes after there is a show of green. If unplanted skips and areas are noted after germination and growth of the grass, the unplanted areas shall be seeded at no additional cost to the Owner.

When hydraulic seeding equipment is used, no tillage to mix soil and fertilizer is required. However, some compacted areas may require scarification.

Seeding shall be applied at the following rates:

Table 1

1-CED
STEEP SLOPES OR POOR SOILS AND LOW MAINTENANCE

Seeding periods:	Fall	August 20 - October 25
	Spring	February 1 - April 15

Species	Bulk Pounds/Acre
Tall Fescue	100
Sericea Lespedeza	30
Rye Grain (Aug to May only)	40
Kobe Lespedeza	10
10-10-10 Fertilizer	1,000
Limestone	4,000

2-CED
GENTLE SLOPES, AVERAGE/GOOD MOISTURE RETENTION AND LOW MAINTENANCE

Seeding periods:	Fall	August 20 - October 25
	Spring	February 1 - April 15

Species	Bulk Pounds/Acre
Tall Fescue	80
Sericea Lespedeza	20
German Millet (May to Aug only)	10
Rye Grain (Aug to May only)	40
Kobe Lespedeza	10
10-10-10 Fertilizer	1,000
Limestone	4,000

3-CED
GRASS PULLOVERS, SIDE DITCHES AND HIGH MAINTENANCE

Seeding periods:	Fall	August 25 - October 25
	Late Winter	February 1 - April 15

Species	Bulk Pounds/Acre
Tall Fescue	200
Rye Grain (Winter)	40

10-10-10 Fertilizer	1,000
Limestone	4,000

5.07. Covering and Firming. Unless hydroseeding or a cultipacker type seeder is used, the seed shall be covered with a shallow-set spike tooth harrow or a chain, plank, or brush drag immediately after sowing. The depth of cover shall not exceed 1/4 inch. In small areas, covering may need to be performed by light hand raking. After covering, the areas shall be firmed by rolling or with the use of a cultipacker.

5.08. Application of Mulch. Mulch shall be applied immediately after sowing, covering, and firming. Straw shall be spread uniformly in a continuous blanket at the rate of 2 tons per acre. Mulch shall be spread by hand or by a blower type mulch spreader. Blower type mulch spreaders shall be adjusted and operated in such a manner as to prevent excessive breakage of the mulch material. If this cannot be accomplished, the mulch shall be spread by hand. Care shall be exercised to insure that all wire or twine from baled straw is collected as it is removed from the bale. Mulching shall be started at the windward side of relatively flat areas, or at the upper part of a steep slope and continued uniformly until the area is covered. The mulch shall not be bunched.

Wood cellulose fiber mulch shall be applied at the rate indicated on the bag when applied by hydroseeding.

The Contractor shall take sufficient precautions to prevent mulch from entering drainage structures through displacement by wind, water, or other causes and shall promptly remove any blockage to drainage facilities which may occur.

5.09. Anchoring Mulch. Immediately following application, straw mulch shall be anchored by applying a sufficient amount of emulsified asphalt or other approved binding material to assure that the mulch is properly held in place. Where the binding material is not applied directly with the mulch it shall be applied immediately following the mulch application.

The method of application of binding material shall meet the approval of the Engineer. The rate of application of emulsified asphalt shall be not less than 4.5 gallons per 400 square feet of mulch.

During application of asphalt binding material, or other binding materials which may cause damage, adequate precautions shall be taken to prevent damage to surrounding structures, manholes, frames and covers, vents, or any other appurtenances. The Contractor shall either provide adequate covering or change method of application as required to avoid such damage.

Wood celluose fiber applied as part of the hydroseeding should not require anchoring.

5.10. Cleanup. After completion of the construction operations, the entire area shall be cleared of excess soil and waste material, including but not limited to stones, stumps, roots, brush, wire, grade stakes, and all objects that might be a hindrance to maintenance operations and affect the visual appearance of the site. All roads over which hauling operations have been conducted, despite the type of surfacings, shall be kept clean, and soil clods and debris left on the surface shall be removed. The wheels of vehicles shall be cleaned to avoid leaving soil upon the surface of roads, and other paved areas.

5.11. Protection. Immediately after completion of construction operations, the entire area shall be protected as necessary against traffic by erecting barricades or placing warning signs in appropriate areas. Such protective devices shall be maintained until final acceptance of the project.

6. GRASS ESTABLISHMENT. All seeded areas shall be maintained until final acceptance of the Project. Maintenance shall include mowing, reseeding, repair of erosion damage, maintenance of mulch, refertilize at end of warranty period, and all other operations necessary to obtain an acceptable grass cover.

6.01. Watering. Watering to expedite germination and establishment of the grass will not be required. However, the Contractor shall guarantee a uniform stand of grass in all areas. The Project will not receive final acceptance until all areas have a stand of turf. The Contractor may elect to water areas to expedite germination and establishment, but in such cases he shall supply all water and the equipment necessary for its application.

6.02. Maintenance of Grades and Repair of Erosion Damage. Original grades of the grass areas shall be maintained after commencement of planting operations and during the maintenance period. Any damage to the finished surface from construction operations shall be promptly repaired. In the event erosion occurs from either watering operations or rainfall, such damage shall be promptly repaired. Ruts, ridges, tracks, and other surface irregularities shall be corrected and areas replanted where required.

6.03. Maintenance of Mulch. Mulch shall be maintained until covered with growing grass seedlings. Material that has been removed from the site by wind, water, or other causes shall be replaced and secured. Repair work that is required because of faulty operations or negligence on the part of the Contractor shall be performed at no additional cost to the Owner.

7. COMPLETION. In the event that all of the Work required by the Contract Documents, with the exception of the establishment of a satisfactory grass growth by seeding, is completed before a satisfactory grass growth is established, partial acceptance of the work will be made with final acceptance delayed until a satisfactory grass growth has been established.

End of Section