

DESCRIPTION

This work shall consist of furnishing and installing SPECIAL WOODLAND SEEDING and SPECIAL ROADSIDE SEEDING in accordance with the contract documents and as directed by the Engineer.

MATERIALS

General: The Contractor shall furnish all materials necessary for seed placement/ broadcasting, drill seeding, hydro-seeding, liming, fertilizing, and maintaining in accordance with the contract documents and as directed by the Engineer.

Seed: All seed species (except annual rye and perennial rye grasses) shall be native to the New York City Metropolitan region. Substitutions must be approved by the Engineer.

Seed Quality Assurance: All seed shall be delivered in standard size bags of the seed vendor, properly labeled to comply with the seed law of New York State, clearly showing the name, and address of the Seedman, the mixture of the seed contained therein, the purity and germination percentages of each seed type, the date of seed test, and the full bag's net weight in metric units.

The seed shall meet the minimum requirements as specified by the Engineer regardless of any other guarantees of quality or date of testing. Seeds, packaging, and labeling not meeting the requirements as set forth in the specifications will be rejected. Seed which has become wet, moldy, or otherwise damaged in transit and/or storage will not be accepted.

Provisional acceptance of the seed must be obtained before the seed is sown. However, the Engineer and the Regional Landscape Architect reserve the right to reject on, or after delivery, any materials that do not meet the requirements as set forth in the specifications.

Seed Mixtures: All seed shall be fresh, re-cleaned seed of the latest crop and shall consist of the following seed mixtures in proportions by weight:

Woodland Seed Mix

<u>Genus/Species</u>	<u>% by Weight</u>
<u>Andropogon virginicus</u>	<u>15.0%</u>
<u>Aquilegia canadensis</u>	<u>1.0%</u>
<u>Aronia arbutifolia</u>	<u>1.0%</u>
<u>Aronia melanocarpa</u>	<u>2.0%</u>
<u>Aster cordifolius</u>	<u>2.0%</u>
<u>Aster divaricatus</u>	<u>2.0%</u>
<u>Carpinus caroliniana</u>	<u>3.0%</u>
<u>Carya ovata</u>	<u>5.0%</u>
<u>Cinna arundinacea</u>	<u>5.0%</u>
<u>Clematis virginiana</u>	<u>2.0%</u>

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<u>Cornus amomum</u>	<u>1.0%</u>
<u>Dennstaedtia punctilobula</u>	<u>1.0%</u>
<u>Elymus canadensis</u>	<u>15.0%</u>
<u>Eupatorium rugosum</u>	<u>2.0%</u>
<u>Hamamelis virginiana</u>	<u>1.0%</u>
<u>Ilex verticillata</u>	<u>2.0%</u>
<u>Ostrya virginiana</u>	<u>5.0%</u>
<u>Parthenocissus quinifolia</u>	<u>5.0%</u>
<u>Quercus palustris</u>	<u>5.0%</u>
<u>Quercus rubra</u>	<u>10.0%</u>
<u>Rhus glabra</u>	<u>3.0%</u>
<u>Rosa carolina</u>	<u>1.0%</u>
<u>Rubus allegheniensis</u>	<u>1.0%</u>
<u>Salix discolor</u>	<u>1.0%</u>
<u>Thelypteris novaboracensis</u>	<u>1.0%</u>
<u>Tilia americana</u>	<u>5.0%</u>
<u>Viburnum dentatum</u>	<u>3.0%</u>

Roadside Seed Mix

<u>Genus/Species</u>	<u>% by Weight</u>
<u>Asclepias syriaca</u>	<u>10.00%</u>
<u>Aster cordifolius</u>	<u>1.00%</u>
<u>Aster macrophyllus</u>	<u>3.00%</u>
<u>Carex vulpinoidae</u>	<u>5.00%</u>
<u>Danthonia spicata</u>	<u>1.00%</u>
<u>Dennstaedtia punctilobula</u>	<u>1.00%</u>
<u>Eupatorium purpureum</u>	<u>8.00%</u>
<u>eupatorium rugosum</u>	<u>3.00%</u>
<u>Solidago caesia</u>	<u>2.00%</u>
<u>Solidago canadensis</u>	<u>10.00%</u>
<u>Solidago juncea</u>	<u>5.00%</u>
<u>Solidago speciosa</u>	<u>3.00%</u>
<u>Sorghastrum nutans</u>	<u>25.00%</u>
<u>Thelypteris novaboracensis</u>	<u>1.00%</u>
<u>Tridens flavus</u>	<u>10.00%</u>
<u>Matteucia sturhiopteris</u>	<u>6.00%</u>
<u>Andropogon virginicus</u>	<u>10.00%</u>

Seed for each respective seed zone (Wetland Zone, Woodland Zone, Roadside Zone) shall be incorporated into the bonded fiber matrix for application in accordance with product manufacturer's specifications and in accordance with the contract documents and as directed by the Engineer.

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Accessory Materials:

Hydro-mulch Material: The bonded fiber matrix shall be manufactured to be hydraulically applied, and upon drying to adhere to the soil in the form of a continuous, biodegradable, erosion control "blanket. Bonded fiber matrix shall be comprised of long strand, thermally produced wood fibers passing a freeness test at a 760 cc (MLS) level or below (>88% of total volume by weight) held together by organic tackifiers (10%) and mineral bonding agents (2%) which upon drying become insoluble and non-dispersible.

The formed matrix shall meet the following requirements:

- A. The material, when mixed in a liquid slurry, shall pass a free liquid quality control test (liquids separate from fibrous solids no greater than 25 mm in one minute's time as measured on a standard test board).
- B. The binder shall not dissolve or disperse upon re-wetting.
- C. The matrix shall have no holes > 1mm in size.
- D. The matrix shall have no gaps between product and the soil.
- E. The matrix shall have minimum water holding capacity of **1000 g/100 g**.
- F. The matrix shall have no germination or growth inhibiting factors and shall not form a water insensitive crust.
- G. The matrix shall be comprised of materials which are 100% biodegradable and 100% beneficial to plant growth.
- H. The final slurry matrix shall include bonded fiber, limestone, fertilizer, and seed, in accordance with the contract documents and as directed by the Engineer.

Bonded fiber matrix material shall be Soil Guard as manufactured by:

Mat, Inc.
12402 Highway 2
Floodwood, MN 55736
Tel: (888)-477-3028
Fax: (218) 476-2039

Or equal as approved by the Engineer.

Lime: Shall be ground limestone (calcium carbonate) having the following analysis:

<u>Sieve Test</u>	<u>Minimum Percentage Passing Sieve</u>
No. 200 mesh	50%
No. 100 mesh	90%
No. 10 mesh	100%

Total carbonates shall not be less than eighty (80%) percent or 44.8% calcium oxide equivalent. The Contractor shall, at the discretion of the Engineer, furnish a certified report of an approved analytic chemist, showing the analysis of representative samples of the limestone proposed for use. All samples will be taken by the Engineer and delivered to the laboratory: The price bid

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shall include inspection and laboratory charges. No limestone shall be delivered to job-site until the approval of samples by the Engineer, but such approval does not necessarily constitute final acceptance of the material. The Engineer reserves the right to reject on or after delivery, any material which does not, in his opinion, meet these specifications.

Limestone shall be incorporated into the bonded fiber matrix for application in accordance with product manufacturer's specifications and in accordance with the contract documents and as directed by the Engineer.

Fertilizer: Shall be recommended for grass/legume mixtures with the following proportions:

- Nitrogen - 5%
- Phosphoric Acid - 10%
- Soluble Potash - 10%

Fertilizer shall be applied at a rate of 1,000 kg per hectare.

The Contractor shall, at the discretion of the Engineer, furnish a certified report of an approved analytic chemist, showing the analysis of representative samples of the fertilizer proposed for use. All samples will be taken by the Engineer and delivered to the laboratory: The price bid shall include inspection and laboratory charges. No fertilizer shall be delivered to the job-site until the approval of samples by the Engineer, but such approval does not necessarily constitute final acceptance of the material. The Engineer reserves the right to reject on or after delivery, any material which does not, in his opinion, meet these specifications.

Fertilizer shall be incorporated into the bonded fiber matrix for application in accordance with product manufacturer's specifications and in accordance with the contract documents and as directed by the Engineer.

Water: Shall be clean, fresh, free of pollutants, and other substances or matter which could inhibit the vigorous germination and growth of seed.

CONSTRUCTION DETAILS

Delivery, Storage, and Handling:

- A. Contractor shall deliver products to site, and store and protect them until they are sown.
- B. Contractor shall deliver all seed in original sealed bags. Seed in damaged packaging will not be accepted. If temporary storage of seed is necessary, seed shall be kept indoors in a cool (between 5° to 20°C), dry, dark, well ventilated area that is off the surface of the ground. Seed shall be mixed on-site immediately prior to hydro-seeding, drill seeding, or broadcast seeding.
- C. Contractor shall deliver all fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

Inspection: Contractor shall verify that the protective cover soil installed as per Section 203 of the Standard Specifications is ready to receive the work of this section. The cover soil must be

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free of rills, low spots, and uneven areas to the satisfaction of the Engineer and the Regional Landscape Architect. Upon acceptance of cover soil conditions, the work described in this section may begin.

Placing Topsoil:

- A. Before applying topsoil, Contractor shall uniformly grade the protective cover soil in accordance with Section 613 of the Standard Specifications and the Supplemental Landscape Development Specifications.
- B. Contractor shall place topsoil during dry weather and on dry, unfrozen subgrade.
- C. Contractor shall spread, and rake smooth topsoil to a minimum depth of 150 mm over all areas to be seeded in accordance with the contract documents and as directed by the Engineer.
- D. Contractor shall grade topsoil to eliminate rough, low, or soft areas and to insure positive drainage.

Liming:

- A. Contractor shall apply lime at an adequate rate (rate shall not exceed three 2500 kg per 4000 sq. meters) based on pH test results to achieve a pH of between 5.5 to 6.5.
- B. Contractor shall broadcast lime prior to seeding. Lime shall be applied under low wind conditions to minimize the loss of lime.

Seeding:

Temporary seeding shall be applied to all immediate cover materials that will be exposed in excess of four (4) months; and to final cover materials only outside of the planting dates for the permanent seeding and pending prior approval of the Engineer. Contractor shall avoid application during periods of rain or within twenty four (24) hours preceding expected rainfall.

Temporary plant materials must be cut and removed, or otherwise killed back prior to the placement of final cover materials and permanent seeding. Temporarily seeded areas shall be covered with straw mulch applied uniformly at 0.41 kg per square meter. Straw mulch shall be held in place by applying a chemical spray tackifier such as Terra Tack II at a rate of 45 kgs/hectare or Aerospray 70 at 55.6 milliliters per square meter according to manufacturer's instructions. Contractor shall avoid applications during periods of rain or within twenty four (24) hours preceding expected rainfall such that the bonded fiber matrix will have the opportunity to dry for up to 24 hours after installation.

A companion crop of annual ryegrass shall be broadcast seeded on all unconsolidated soil areas between wetland plants. Contractor shall apply a uniform straw mulch cover at a rate of 0.41 kg per square meter over such seeded areas.

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- A. Contractor shall apply companion rye seed mixtures, as required at the manufacturer's specified rates.
- B. Contractor shall apply fertilizer for companion rye seed mixture, as required, at a rate of 500 kg per hectare.
- C. Contractor shall not apply seed to ground during periods of saturation, during windy periods (wind force that is sufficient to carry seed "away" from its intended area of placement according to the contract documents and as directed by the Engineer), or during periods of time when the ground surface is too dry for the seed to germinate and gain root-hold in the area of its intended placement according to the contract documents and as directed by the Engineer.

The Bonded Fiber Matrix (BFM) shall be biodegradable and non-toxic, and shall be applied by a contractor certified by the product manufacturer to have been trained in the proper procedures for the mixing and application of the product. The BFM shall be mixed according to the manufacturer's specifications and the Contractor shall be able to demonstrate a "free-liquid test", as described in the manufacturer's specifications, to the Engineer, and or the Regional Landscape Architect upon request. Bonded Fiber Matrix shall be spray applied at a rate of 2,250-3,000 kg /hectare, utilizing standard, hydraulic seeding equipment in successive layers so as to achieve 100% coverage of all exposed soil intended for coverage in accordance with the contract documents and as directed by the Engineer in coordination with the Regional Landscape Architect.

- A. Contractor shall hydroseed the Woodland Seeding Zone in the Spring between March 15 through May 15.
- B. Contractor shall hydroseed the Roadside Seeding Zone in the Spring between March 15 through May 15.
- C. Contractor shall drill seed the Woodland Seeding Zone in the Spring between March 15 through May 15, or in the Fall between September 15 and November 15.
- D. Contractor shall drill seed the Roadside Seeding Zone in the Spring between March 15 through May 15, or in the Fall between September 15 and November 15.

Contractor shall apply Soil Guard containing Zone Z seed mixture in the Spring between March 15 through May 15.

If adequate vegetative establishment is not attained within the first growing season following application to the satisfaction of the Engineer, the Engineer reserves the right to instruct the Contractor to hydroseed the face and top of the soil slopes with the same seed mixture during the next consecutive planting season.

MAINTENANCE

- A. Contractor shall maintain all seeded areas immediately after sowing/placement until vegetation is sufficiently established and exhibits a vigorous growing condition.
- B. Contractor shall supply, and apply supplemental irrigation for the maintenance period immediately following the installation of permanent seed mixtures.
- C. Contractor shall irrigate a minimum of 40 mm and a maximum of 50 mm per week.
- D. Contractor shall not irrigate between November 1 and March 15. Irrigation shall be applied until a uniform and vigorous growth that is 100 mm minimum in height is established.
- E. Contractor shall immediately repair any seeded areas damaged by erosion. The Contractor, in repairing any seeded areas damaged by erosion, shall reseed areas which failed to germinate and within the next consecutive specified planting date-range. All such work shall be completed a minimum of one month prior to the project close-out.

SUBMITTALS

- A. Contractor shall submit name, address and telephone number of manufacturer/suppliers of all seed, fertilizer and other agricultural chemicals.
- B. Contractor shall submit Seedman's Certificate.
- C. Contractor shall furnish a certified report of an approved seed testing laboratory, not engaged in the selling of seed, showing a test for purity, viability and weed seed content of representative samples of the seed mixes which he/she proposes to use.
- D. Contractor shall submit maintenance data for continuing Owner maintenance including fertilizer top-dressing where applicable.
- E. Contractor shall prepare a one pound dry sample of the seed mixture as specified by the Engineer in the Seed Schedule of this Section. Sample shall be submitted to the Engineer in a sealed, waterproof bag and clearly marked with the proportions of each seed type in sample, date of sample, and names of seed suppliers.
- F. Contractor shall provide evidence of Soil Guard manufacturer's application certification and material samples to Engineer within seven days prior to Soil Guard application.
- G. Contractor shall prepare a .5 kg dry sample of Bonded Fiber Matrix to the Engineer in a sealed, waterproof, and clearly marked bag.

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METHOD OF MEASUREMENT

This work will be measured for payment as the number of square meters of SPECIAL WOODLAND SEEDING or SPECIAL ROADSIDE SEEDING satisfactorily furnished and installed.

BASIS OF PAYMENT

The unit price bid for SPECIAL WOODLAND SEEDING or SPECIAL ROADSIDE SEEDING shall include the cost of furnishing all labor, materials, and equipment necessary to satisfactorily complete the work.

DISAPPROVED BY EI 12-001