

1.0 DESCRIPTION:

1.1 SCOPE

The work shall consist of furnishing and constructing a new vegetated surface composed of an organic growing medium injected with seed and placed pneumatically. This surface must be constructed with a pneumatic blower unit complete with a supplemental granular injection system capable of installing at least 15 cubic meters per hour.

2.0 MATERIALS

2.1 GROWING MEDIUM: The growing medium shall consist of composted materials or a blend of materials including organics that meet particle size and nutritional specifications for the particular application. The organic soil component shall abide by the minimum standards required for seed establishment.

2.1.1 All organic components within the growing medium must be derived from well composted greenwaste organic matter and meet the Canadian Council of Ministers of the Environment's (CCME) definition for Type "A" Compost.

2.1.2 Quality Assurance – A sample of the specified growing medium and current analysis from an approved laboratory shall be submitted to the engineer/landscape architect for approval prior to installation.

2.2 SEED:

2.2.1 Grade Standards

All seed, supplied either as single seed species, or as a seed mix shall comply with the provisions of the Canada Seeds Act and Regulations and the grade standards for that particular seed type.

2.2.2 Seed Analysis Certificate

A legible, valid Seed Analysis Certificate from a Seed Testing Laboratory approved by the Canadian Food Inspection Agency (CFIA) for all single seed species and all seed mixtures shall be provided to the Contract Administrator prior to any seeding operations. The Seed Analysis Report shall stipulate the seed supplier's lot designation numbers. Test results from the Seed Analysis Certificate shall specify germination and purity for each seed species of the mix as well as the seed mix composition expressed as a percentage of each seed species by mass for each seed mix specified in the contract. Test results shall meet or exceed the value for the various seed mixes as specified by the consultant.

2.2.3 Seed Packaging, Labeling and Storage

All seed and seed mixes shall be in the original sealed package with the original legible label securely attached. Labeling shall conform to the requirements of the Canada Seeds Act and Regulations. Each package shall be labeled to show:

2.2.3.1 The name and address of the seed supplier.

2.2.3.2 The seed species, or the name of the seed mix and the various individual seed species that comprise the seed mix and the percentage by mass.

2.2.3.3 The grade of the seed or seed mix.

2.2.3.4 The supplier's lot designation number, corresponding to the Seed Analysis Certificate.

2.2.3.5 Mass in kilograms.

2.2.3.6 All seed shall be stored in cool, dry location until use.

2.2.4 Permanent Seed Mixes

Permanent seed mixes as per consultant.

2.2.5 Annual Nurse Crop Seed

Nurse crop seed shall be a cereal grain such as Annual Ryegrass, Fall Rye Grain or Winter Wheat Grain unless otherwise approved by the Contract Administrator.

2.3 Fertilizer

Fertilizer shall comply with the provisions of the Canada Fertilizers Act and Fertilizer Regulations. Fertilizer shall be supplied in original bags bearing the manufacturer's original label indicating mass and analysis. All fertilizer shall be in granular form, dry, free flowing and free from lumps, and applied at rates specified by the Consultant.

3.0 SURFACE PREPARATION

Areas must be set to grade and all large clods, rocks, stumps, roots larger than 50mm in diameter must be removed from the site to be seeded. This soil preparation step may be eliminated where approved by the Project Engineer or Landscape Architect/Designer. Where practical, the soil surface should be tracked or roughed before Terraseeding™.

4.0 APPLICATION

4.1 Operational Requirements:

4.1.1 The composted topsoil and seeding application and/or re-application shall not be carried out under adverse field conditions such as high wind, frozen soil or soil covered with snow, ice or in areas of standing water or a concentrated flow of water unless directed by the Engineer / Project Manager.

4.1.2 The Contractor shall maintain the site and control erosion until conditions permit application or reapplication of seed and composted topsoil.

4.1.3 The surface to be seeded shall be prepared not more than 7 calendar days before the seeding operation.

4.1.4 No seed or composted topsoil application shall come in contact with the foliage of any trees, shrubs, or other vegetation.

4.1.5 No seed or composted topsoil application shall come in contact with water bodies.

4.2 Pneumatic Blower

The pneumatic blower shall be a custom manufactured, fully integrated, blower truck unit. The blower shall be equipped with a computer-calibrated seed injection system and shall be capable of uniformly and simultaneously applying growing medium and seed at a rate greater than 0.25 cubic meters of material per minute. The blower truck shall also be equipped with an application hose capable of extending 90 meters from the blower truck unit.

4.3 Blower Calibration

4.3.1 Prior to the application of the growing medium and seed, the Contractor shall ensure that the pneumatic blower has been properly calibrated to provide the specified amounts of seed and that the blower can adequately uniformly apply growing medium and seed at a rate greater than 0.25 cubic meters of material per minute.

4.3.2 Once the blower has been calibrated, the Contractor shall apply composted topsoil and seeding uniformly at specified depths to all areas identified for cover in the contract drawings or as directed by the Contract Administrator.

4.3.3 Growing medium and seed shall overlap the adjoining ground cover by 300 mm unless specified.

4.4. The material shall be placed as shown on the plans or as directed by the site Engineer/ Project Manager.

4.5. The Engineer/Landscape Architect shall specify seed.

4.6. Unless otherwise allowed by Engineer, seeding shall be performed within the local region's seeding deadlines.

5.0 APPLICATION RATES

5.1 Growing Medium

5.1.1 Growing Medium application depth may be modified based on specific site (e.g., soil characteristics, existing vegetation) and climatic conditions, as well as particular project related requirements.

5.1.2 Application depth of Growing Medium shall vary as per site Engineer's / Architects instructions between 12.5mm and 900mm.

5.2. Seed

5.2.1 Growing Medium and seed shall be uniformly and simultaneously applied directly to the soil surface with a pneumatic blower.

5.2.2 At a minimum, growing medium and soil shall be applied to a depth of 12.5mm.

5.2.3 In cases where application of growing medium exceeds 50mm, only the upper 50mm shall be TerraSeeded™ unless directed by the site Engineer or Project Manager.

6.0 CLEAN-UP

6.1 At the completion of the seeding and cover operation, materials applied to areas or objects other than those designated to grow grass shall be removed.

6.2 Clean water shall be used to immediately wash seed or cover materials that have been applied to the foliage of trees, shrubs or other susceptible plant growth.

7.0 MAINTENANCE:

7.1. The client shall maintain the surface in a functional condition for a period of one year. The client shall make periodic inspections of the composted surface for effectiveness and shall immediately correct all deficiencies. Where deficiencies exist, additional material shall be installed immediately as required.

7.2 Irrigation

Water shall be free of any contaminants or impurities that would adversely affect the germination and growth of vegetation.

8.0. WARRANTY

8.1 Performance Measure:

8.1.1 All treated areas will be inspected by the Contract Administrator to ensure compliance with this specification at thirty, sixty and ninety day periods following the Terraseeding™ operation.

8.1.2 At the thirty day inspection within the seeded earth area;

8.1.2.1 The composted topsoil shall be visually intact and shall form a uniform cohesive mat;

8.1.2.2 Germination of the nurse crop shall be visually evident.

8.1.3 At the sixty day inspection within the seeded earth area;

8.1.3.1 The nurse crop shall be evident at mature height in an evenly dispersed, uniform cover;

8.1.3.2 Germination of the specified, permanent seed species shall be visually evident in an evenly dispersed uniform cover;

8.1.3.3 There shall not be any significant bare areas, both in terms of quantity and size;

8.1.3.4 Non-seeded, non-specified vegetation shall not exceed 20% of the seeded earth area.

8.1.4 At the ninety day inspection within the seeded earth area;

8.1.4.1 The permanent seed species shall be at an average height of 50mm in an evenly dispersed, uniform cover; representative of the specified, permanent seed mixes;

8.1.4.2 There shall not be any significant bare areas, both in terms of quantity and size;

8.1.4.3 Non-seeded, non-specified vegetation shall not exceed 20% of the seeded earth area.

8.1.5 No inspections will be held during the winter dormant period or when site conditions prohibit a visual field inspection. Timing intervals between inspections will be suspended during the winter dormant period or adverse weather conditions.

8.2. Failure to Meet Performance Measure

8.2.1 If the completed work does not meet the Performance Measure outlined in section 8.1. at the time of the thirty-day inspection, the Contract Administrator shall;

8.2.1.1 Document the failure areas

8.2.1.2 Notify the Contractor of those areas

8.2.1.3 Re-inspect at the sixty day inspection

8.2.2 If the completed work does not meet the Performance Measure after the sixty or ninety day inspection, the Contract Administrator shall;

8.2.2.1 Notify the Contractor in writing

8.2.2.2 Request that the contractor re-apply the specified materials in accordance with this specification within 14 calendar days of receiving the notification.

8.2.3 All replaced composted topsoil and seed shall be subject to the Quality Assurance section of this specification.

8.3. Dispute Resolution

Dispute resolution only applies to the germination and growth of the permanent seed mix species.

8.3.1 Disputes arising from the Performance Measure evaluation shall be settled through referee testing using an actual live seedling count of the specified permanent seed mix species within the seeded earth area.

8.3.2 An independent consultant with experience in herbaceous plant identification shall perform the referee testing.

8.3.3 Both parties shall agree on the selection of the independent consultant and both parties shall be bound by the consultant's evaluation

8.3.4 The actual count shall be based on minimum germination requirements and minimum levels of acceptability to meet industry standards and federal legislation governing the testing, inspection, quality and sale of seed.

8.3.5 The various seed mixes specified by the Owner are comprised of different individual commercial seed species expressed as a percentage of the overall seed mix by weight.

8.3.6 Industry standards list the number of seeds per unit of weight. For this specification, the mid-range number for each seed species shall be used based on these industry standards. Where there is a difference in estimated number of seeds by weight, the lower figure shall be used.

8.3.7 The Canada Seeds Act requires a minimum germination rate of 70% for each seed species to be registered and labeled.

8.3.7.1 While several seed species require higher levels of germination, this specification has adopted 70% as the acceptable minimum and has allowed a further 25% reduction to account for variation in seeding application, seedbed quality, seedbed preparation and area cover.

8.3.7.2 The Contractor and the Contract Administrator may agree to use a simplified analysis, where instead of counting each seedling of each individual seeded perennial species of the mix, only the total number of seedlings of the mix is counted.

8.3.7.3 If the parties cannot agree to the simplified analysis, the default method is a seedling count of each seeded perennial species.

8.3.8 The final field inspection to determine the number of live plant seedlings should only be performed after the ninety-day inspection. Many of the perennial plants in the various seed mixes take several months to grow to an identifiable and measurable size.

8.3.9 The sampling procedure should be randomized over an area that both parties agree is representative of the seeded contract.

8.3.10 The selection and evaluation process is as follows:

8.3.10.1 Select a representative area from the average seeded areas, eliminating the thinnest and thickest growth areas from the analysis.

8.3.10.2 Measure its length and depth. Use a random numbers table to generate five sets of X and Y axis coordinates from the area.

8.3.10.3 Each axis coordinate is a sampling point. A sampling plot, or quadrat, is set out in a 200 mm by 1000 mm plot with the axis coordinate becoming the lower right-hand corner of each quadrat.

8.3.10.4 Each quadrat is divided into 20 sub-sampling units, each being 100 mm by 100 mm.

8.3.10.5 The sub-sampling units are numbered from 1 to 20.

8.3.10.6 Using a random numbers table, two of the twenty sub-sampling units are randomly selected.

8.3.10.7 Live seedlings of each individual seeded perennial species of the mix are counted in the selected sub-sampling units to determine actual plant densities.

8.3.10.8 An average seedling density per seeded perennial species, expressed as the number of seedlings per square meter is generated for each sampling plot, or quadrat, based on the data from the two selected sub-sampling units.

8.3.10.9 The procedure is repeated for the four other sampling points.

8.3.10.10 The average number of seedlings per square meter for each of the seeded perennial species generated from the five sampling points is evaluated against the minimum industry standard benchmark for the seeded mix.

8.3.10.11 The results of the referee testing analysis will be binding on both parties, subject to further dispute mechanisms as described in the General Conditions of the contract.

8.3.10.12 If the results of the referee testing prove that the seed and cover is unacceptable in meeting the minimum industry standard for germination, then the Contractor shall pay all costs associated with the dispute resolution process.

8.3.10.13 If the results of the referee testing proves that the seed and cover is acceptable in meeting the minimum industry standard for germination, then the Owner shall pay all costs associated with the dispute resolution process.

9.0 MEASUREMENT FOR PAYMENT

The method for payment for Terraseeding™ shall be agreed on prior to the commencement of the work. The method of measurement will be by;

9.1 Area:

Seeding and cover measurement shall be in square meters (m²) or square feet (ft²) at a pre-defined average depth (inches or mm) following the contours of the ground including required overlap into existing vegetation where applicable.

9.2 Volume:

Seeding and cover measurement shall be in cubic yards (yd³) or cubic meters (m³) at a pre-defined average depth (inches or mm) following the contours of the ground including required overlap into existing vegetation where applicable. As an alternate, square meters (m²) may be used at a specified average depth.

Terraseeding Services provided by:



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