

PART 1 – GENERAL

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| 1.1 | <u>RELATED SECTIONS</u> | .1 | Section 310099 - Earthworks for Minor Works |
| | | .2 | Section 313119.14 - Erosion Control |
| | | .3 | Section 329223 - Sodding |
| | | .4 | Section 329310 - Trees, Shrubs and Ground cover Planting |
| 1.2 | <u>BASIS FOR PAYMENT</u> | .1 | The Contractor shall provide all materials, tooling, labour and monitoring necessary to complete the works shown in the drawings and described below, including the placement of existing recovered topsoil and of new topsoil if required for, seeding, trees and shrub planting and grading at the locations indicated in the drawings. Include costs related to topsoil placement and grading in items where required. |
| 1.3 | <u>DEFINITIONS</u> | .1 | COMPOST: A mixture of soil and decomposing organic matter used as a fertilizer, mulch, or soil conditioner. Compost is processed organic matter containing 40% or more organic matter as determined by the Walkley-Black or LOI test. Product must be sufficiently decomposed (i.e. stable) so that any further decomposition does not adversely affect plant growth (C:N ratio below (25) (50)), and contain no toxic or growth inhibiting contaminants. Composed bio-solids must meet the requirements of the Guidelines for Compost Quality, Category (A) (B) produced by the Canadian Council of the Ministers of the Environment (CCME), January 1996. |
| 1.4 | <u>SOURCE QUALITY CONTROL</u> | .1 | Departmental Representative will provide to Contractor the required list of soil amendments necessary to improve the quality of native soil. |
| | | .2 | If the Contractor uses soil other than the existing soil, soil testing is to be supplied by the contractor, and provided to the Departmental Representative for review and approval. Contractor is responsible for amendments to supply topsoil as specified. |
| | | .2 | Notify Departmental Representative of proposed supply sources for different soil mixtures 7 days prior to undertaking the work. It is forbidden to provide a topsoil from a cultivated field nearby, to avoid any introductions of undesirable plant species. |
| | | .3 | Soil testing by recognized testing facility for PH, P and K, and organic matter. |
| 1.5 | <u>SUBMITALS</u> | .1 | For soil other than existing soil, submit technical data sheets and test reports in compliance with General Requirements of current book of specifications: |
| | | .1 | The data sheet for each type of soil mixture describing: |
| | | .1 | The composition of the mixture; |
| | | .2 | Organic matter content; |
| | | .3 | Chloride |
| | | .4 | Sand content; |

- .5 Clay content;
- .6 Lime content;
- .7 Ph, nitrogen, phosphorus, potassium magnesium, calcium content;
- .8 Recommendations for improvement from a forestry engineer.

PART 2 – PRODUCTS

2.1 TOPSOIL

- .1 For trees, shrubs and seeding, topsoil recovered from site. Thickness in accordance with the drawings and specifications. The use of existing topsoil is prioritized.
- .2 If required the Contractor requires additional topsoil it should match the following criteria for trees and shrubs : Homogeneous mixture of topsoil, sand, and 2 years old manure or compost with following content:
 - .1 PH : 6 to 7 (PH control method- Determination of water PH)
 - .2 Dry organic matter based on: 8 to 12 %
(control method MA-1, Determination of organic carbon (modified Walkley-Black) or MA-2, Determination of the organic matter through incineration);
 - .3 Cation exchange capacity (CEC) : minimum 10 meq/100g (control method CA-1, Exchangeable cations– Ammonium acetate (calcium, magnesium, potassium and sodium) ;
 - .4 Salinity or electrical conductivity: less than 3,5 mS/cm (control method SS-1, Greenhouse soil analysis – Method SSE);
 - .5 Mineral elements including analysis ME-3 / (control method Mehlich-3) corresponds to :
 - Phosphorus avail. : 150-200kg/ha;
 - Potassium exch. : 300-800 kg/ha;
 - Calcium exch. : 4 000-9 000 kg/ha;
 - Magnesium exch. : 250-700 kg/ha.
 - .6 Soil tests should include recommendations for amendment products.

- .7 Soil mixture must be sifted, exempt of any contaminants (pesticide, hydrocarbons or other) debris and stones greater than 25 mm diameter, course vegetative material seeds, roots, or rhizomes of weed species.
- .3 If required the Contractor requires additional topsoil it should match the following criteria for sodding : use a homogeneous mixture of topsoil and sand with following content:
 - .1 PH : 6 to 7 (PH control method- Determination of water PH)
 - .2 Dry organic matter based on: more than 3% (control method MA-1, Determination of organic carbon (modified Walkley-Black) or MA-2, Determination of the organic mater through incineration);
 - .3 Cation exchange capacity (CEC) : minimum 7 meq/100g (méthode de contrôle CA-1, 100g (control method CA-1, Exchangeable cations– Amonium acetate (calcium, magnesium, potassium and sodium) ;
 - .4 Salinity or electrical conductivity: less than 3,5 mS/cm (control method SS-1, Greehouse soil analysis – Method SSE);
 - .5 Mineral elements including analysis ME-3 / (control method Mehlich-3) corresponds to :
 - Phosphorus avail. : 50-150 kg/ha;
 - Potassium exch. : 250-350 kg/ha;
 - Calcium exch. : 6 000-9 000 kg/ha;
 - Magnesium exch. : 250-350 kg/ha.
 - .6 Soil tests should include recommendations for amendment products.
 - .7 Soil mixture must be sifted, exempt of any contaminants (pesticide, hydrocarbons or other) debris and stones greater than 25 mm diameter, course vegetative material seeds, roots, or rhizomes of weed species.

2.2 SOIL AMENDMENTS

- .1 Sand: washed coarse silica sand, medium to course textured.
- .2 Organic matter: compost Category B, unprocessed organic matter, such as rotted manure, hay, straw, bark residue or sawdust, meeting the organic matter, stability and contaminant requirements
- .3 Limestone: apply according to analyses and recommendations of soil tests.
 - .1 Ground agricultural limestone
 - .2 Gradation requirements: percentage passing by weight, 90% passing 1.0 mm sieve, 50% passing 0.125 mm sieve.
- .4 Non-animal derived fertilizer, type 1-2,5-1 and mycorrhizal inoculants applied on plant roots and soil. Departmental Representative must approve mixture. Contractor will pay for cost of tests.

- .5 Mycorrhizal inoculum: ratios as prescribed by the manufacturer

ENDOMYCORRHIZAL FUNGUS	(spores/g)	(spores/lb)
<i>Glomus intraradices</i>	15	6810
ECTOMYCORRHIZAL FUNGUS	(spores/g)	(spores/lb)
<i>Pisolithus tinctorius</i>	100 000	45 400 000
<i>Scleroderma cepa</i>	7 500	3 405 000
<i>Scleroderma citrinii</i>	7 500	3 405 000
<i>Rhizopogon roseolus</i>	3 750	1 702 500
<i>Rhizopogon subscaerelescens</i>	3 750	1 702 500
<i>Rhizopogon villosulus</i>	3 750	1 702 500
<i>Rhizopogon vulgaris</i>	3 750	1 702 500
<i>Laccaria laccata</i>	2 250	1 021 500

PART 3 – EXECUTION

3.1 PREPARATION OF EXISTING .1
GRADE

- Preserve existing levels. Grade soil, eliminating uneven areas and low spots in order to ensure positive drainage.
- .2 Remove debris, roots, branches, stones in excess of 50 mm diameter and other deleterious materials. Remove soil contaminated with calcium chloride, toxic materials and petroleum products. Remove debris which protrudes more than 75mm above surface. Dispose of removed material off site. Comply with the current standards for the removal of contaminated if any is found.
- .3 Cultivate entire area which is to receive topsoil to minimum depth of 100 mm. Cross cultivate those areas where equipment used for hauling and spreading has compacted soil.
- .4 Dig tree pits as to be well coordinated with the delivery of plants so that both operations take place at the same time.
- .5 Indicate the location of planting beds using flags. Flaging must be approved by Departmental Representative before proceeding with work.
- .6 Protect roots and trunks of existing trees.
- .7 Excavate soil following depths indicated in drawings. Plant in individual pits.
- .8 The diameter of planting pit must be 2 to 3 times larger than the diameter of the root ball or large enough to allow for roots to spread 300 mm or more in all directions.
- .9 Dig planting pits to allow for the necessary space to insuring enough soil to reach beneath and around the roots.

- .10 For bare ground where no trees or shrubs are planted, follow specifications in Section 313119.14 – Erosion Control.
- 3.2 PLACING AND SPREADING TOPSOIL/ PLANTING SOIL
- .1 Place topsoil after Departmental Representative has accepted subgrade. Spread topsoil in uniform layers not exceeding 150 mm. Make sure that the bottom is not frozen and free of any stagnant water.
- .2 For areas where erosion control mat / mulch are installed, follow specifications in Section 313119.14 – Erosion Control.
- .3 Apply agricultural lime at recommended rate as well as fertilizer and mycorrhizal inoculum.
- .4 Form a groove around planting bed to facilitate water retention and mulch laying.
- 3.3 SOIL AMENDEMENTS
- .1 For planting and seeding, apply soil amendments and mix thoroughly within topmost 50 mm layer of soil, in the proportions specified soil tests.
- 3.4 FINAL GRADING
- .1 Grade to eliminate rough spots and low areas and ensure positive drainage. Prepare loose friable bed by means of cultivation and subsequent raking.
- .2 Consolidate topsoil to required bulk density using equipment approved by Departmental Representative. Leave surfaces smooth, uniform and firm.
- 3.5 SURPLUS MATERIAL
- .1 Dispose of non required materials off site.
- 3.6 UNDESIRABLE PLANTS
- .1 Until the acceptance of seeding work, manually remove undesirable plants growing in sown areas.
- 3.7 STORAGE AREAS
- .1 Rehabilitate storage sites used during the work to the satisfaction of Departmental Representative.
- 3.8 APPROVAL
- .1 Departmental Representative will review and determine if products, amendments, soil types, soil thickness, finish grades correspond to the requirements of the current book of specifications.
- 3.9 CLEANING
- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

***** END OF SECTION *****