PART 1 - GENERAL

1.1 Related Sections

.1 Section 32 92 23 – Sodding

.2 Section 32 92 19.13 - Seeding

.3 Section 32 93 10 – Trees, Shrubs and Ground Covers

1.2 Definitions

.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 30 and contain no toxic or growth inhibiting contaminates. Composed bio-solids must meet the requirements of the Guidelines for Compost Quality, Category (A) produced by the Canadian Council of the Ministers of the Environment (CCME), January 1996.

1.3 Source Quality Control / Testing

.1 Contractor is responsible to obtain soil analysis and requirements for amendments to supply topsoil as specified.

.2 As part of the approval process, the Contractor shall provide written documentation demonstrating that the Contractor has fulfilled the following requirements:

.1 Representative soil samples of the proposed source of imported topsoil shall be collected by or under the supervision of a Qualified Person.

.2 Those representative soil samples to be tested by an accredited analytical laboratory to determine the concentrations of any contaminants that may reasonably be expected to be present in the soil.

.3 Typical contaminant parameters shall include, as a minimum, metals, polycyclic aromatic hydrocarbons (PAHs), petroleum hydrocarbons (PHCs), and organochloride pesticides. Any additional contaminant parameters to be tested shall be identified by the Qualified Person based on the historic or present use of the property from which the topsoil is sourced, any potentially contaminating activities that may have taken place thereon, or known environmental conditions that may impact the quality of the topsoil.

.4 The results of the testing shall be compared to the appropriate Site Condition Standards established by the Ontario Ministry of

the Environment and Climate Change as provided in the Ontario Soil, Ground Water and Sediment Standards for Use under Part XV.1 of the Environmental Protection Act dated April 15, 2011 and as may be amended from time to time and in effect at the time the topsoil is imported. The Site Condition Standards shall be those applicable to the receiving property as determined based on ground water use, soil texture and land use.

.5 Topsoil failing to meet the applicable Site Condition Standards for the receiving site shall not be imported under any circumstances.

.3 If defects are revealed during inspection and/or testing, the appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by the City Project Manager at no cost to the City. Pay costs for retesting and reinspection.

.4 All samples and test results shall be clearly marked to indicate the Contractor's name, the date tested, type of topsoil specified and the contract for which it is to be used. Provide samples of all types indicated in materials.

.5 All testing and criteria shall meet references set out below. The test shall indicate the parameters set out in 2.1.1 and N, P, K, Mg soluble salt content, organic matter content, soil texture, pH value, trace minerals and recommendations for fertilizing (recommendation for application prior to seeding or planting and recommendation for maintenance application). For topsoil for playing field - Provide soil analysis indicating texture, infiltration rate, bulk density, pH , organic content (by weight), and nutrient requirements.

.1 Recommended agencies for nutrient, pH analysis::

.1 A&L Canada Laboratories Inc., London Ontario (519) 457-2575, 1-855-837-8347. (S1B plus Particle Size Anaysis).

.2 SGS Agrifood Laboratories, Guelph, Ontario, 1-800-265-7175. (Topsoil Package).

.6 Employment of inspection/testing agencies does not relax the responsibility to perform Work in accordance with the Contract Documents.

.7 Notify the appropriate agency and Owner's Representative in advance of the requirement for tests, in order that attendance arrangements can be made.

1.4 References

Latest references for:

.1 ASTM D698, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN-m/m3).

.2 ASTM F1815, Test Method for Bulk Density.

.3 84-001, 84-002, 84-003 Analytical Methods Manual Agricultural Canada, testing of soil pH conductivity.

.4 84-004 Analytical Methods Manual Agricultural Canada, testing of mineral content in soil (K, Mg).

.5 84-017 Analytical Methods Manual Agricultural Canada, testing of phosphorous content in soil.

.6 S-9.20 Western States laboratory proficiency testing program soil and plant analytical methods, for organic matter content in soil.

1.5 Quality Assurance

.1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements.

1.6 Waste Management and Disposal

.1 Separate and recycle waste materials according to project Waste Management Plan.

.2 Divert unused soil amendments from landfill to official hazardous material collections site approved by Departmental Representative.

.3 Do not dispose of unused soil amendments into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

PART 2 - PRODUCTS

2.1 Imported Topsoil (Grassed Areas)

.1 Imported topsoil: mixture of mineral particulates, micro-organisms and organic matter, which provides suitable medium for supporting intended plant growth.
  .1 Soil texture based on The Canadian System of Soil Classification
    .1 Friable loam / sandy loam with the following parameters: 40 to 60% sand, 25 to 45% silt, 5 to 25% clay.
    .2 Containing minimum 4% organic matter **by weight**.
  .2 Fertility: macro and micro soil nutrients adequate to support

germination and establishment of intended vegetation. Adjust topsoil nutrients to meet analysis recommendations.

.3 pH value: 6.0 to 7.5.

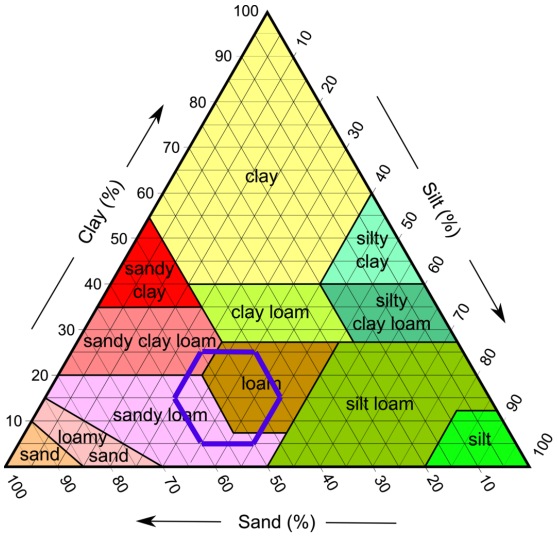
.4 Contain no toxic elements or growth-inhibiting materials.

.5 Free from:

.1 Debris and stones over 50mm diameter.

.2 Course vegetative material, 10mm diameter and 100mm length, occupying more than 2% of soil volume.

.6 Consistency: friable when moist.



2.2 Amended Topsoil (Planting Medium)

.1 Imported Topsoil amended for use as Planting Medium.

.1 Planting Medium: planting medium to be composed of imported Topsoil incorporated with 20% organic matter by volume or 4% - 6% by weight. Ready mixed topsoil can be used after obtaining approval by Consultant prior to shipment to site. Supply all topsoil analysis of mix for approval.

2.3 Soil Amendments

.1 Organic matter: compost Category A, unprocessed organic matter, such as rotted manure, hay, straw, bark residue or sawdust, meeting the organic matter, stability and contaminant requirements.

.1 Aged (minimum 2 years) mushroom compost, leaf mold, humus peat, or similar approved material. Soluble salt content must not exceed 1.0 ms/cm.

.2 Free of wood and deleterious material which could prohibit growth.

.2 Limestone:
- .1 Ground agricultural limestone containing minimum calcium carbonate equivalent of 85%.
- .2 Gradation requirements: percentage passing by weight, 90% passing 1.0mm sieve, 50% passing 0.125mm sieve.

.3 Fertilizer: industry accepted standard medium containing nitrogen, phosphorous, potassium and other micro-nutrients suitable to specific plant species or application or defined by soil test.
- .1 Fertility: major soil nutrients present in following amounts:
- .2 Nitrogen (N): 20 to 40 micrograms of available N per gram of topsoil.
- .3 Phosphorus (P): 40 to 50 micrograms of phosphate per gram of topsoil.
- .4 Potassium (K): 75 to 110 micrograms of potassium per gram of topsoil.
- .5 Calcium, magnesium, sulfur and micro-nutrients present in balanced ratios to support germination and/or establishment of intended vegetation.
- .6 Ph value: 6.5 to 8.0.

PART 3 - EXECUTION

3.1 Preparation of Existing Grade

.1 Verify that grades are correct. If discrepancies occur, notify Consultant and do not commence work until instructed by Consultant.
- .1 Remove existing grass layer as indicated on drawings.
- .2 Verify fill layer prior to proceeding.

.2 Grade soil, eliminating uneven areas and low spots, ensuring positive drainage.

.3 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 75 mm above surface. Dispose of removed material off site.

.4 Cultivate entire area which is to receive organic topsoil to depth indicated on drawings. Cross cultivate those areas where equipment used for hauling and spreading has compacted soil.

.5 Refer to details for preparation of planting beds.

3.2 Soil Amendments

.1 Soil amendments to be thoroughly mixed through organic topsoil / planting medium prior to spreading. Fertilizer amendments may be mixed into planting medium after spreading.

.2 Apply and thoroughly mix fertilizer into full specified depth of topsoil at rate recommended by testing laboratory. Obtain approval of City's Consultant before application of materials.

3.3 Placing and Spreading of Topsoil (sod / seed)

.1 Place topsoil after Consultant has accepted subgrade. Place / cultivate as indicated on drawings.

.2 Spread topsoil in uniform layers not exceeding 150 mm.

.3 For sodded areas keep topsoil 15 mm below finished grade.

.4 Spread topsoil to following minimum depths after settlement.
- .1 125 mm for sodded areas.
- .2 125mm for seeded areas.

3.4 Placing and Spreading of Planting Medium

.1 Place planting medium after Consultant has accepted subgrade. Place / cultivate as indicated on drawings.

.2 Spread topsoil in uniform layers not exceeding 150 mm.

.3 Spread amended topsoil to following minimum depths after settlement.
- .1 400 mm for shrub beds.
- .2 refer to details for tree planting.

.4 Manually spread planting medium around trees, shrubs and obstacles.

3.5 Finish 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 or Consultant. Leave surfaces smooth, uniform and firm against deep footprinting.

3.6 Acceptance

.1 Consultant will inspect topsoil in place and determine acceptance of material, depth of topsoil and finish grading.

3.7 Surplus Material

.1 Dispose of materials except topsoil not required where directed by Departmental Representative or Consultant off site.

3.8 Cleaning

.1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION