

## SECTION 751

### TOPSOIL AND LANDSCAPE GRADING

#### DESCRIPTION

**751.01 Scope** – This Section refers to those portions of work that are unique to the supply and placement of topsoil and subsequent finish grading. In this Section, the term "topsoil" is used to identify either:

- a) On-Site topsoil: material stockpiled for use, or
- b) Imported topsoil, or
- c) Manufactured topsoil (Growing Medium).

**751.02 Related Work** – SS 754, Planting of Trees, Shrubs and Ground Covers; SS 757, Revegetation Seeding.

**751.03 References** – Canadian System of Soil Classification, Canada Fertilizer Act, Canadian National Master Specification.

**751.04 Topsoil Supplied by the Contractor** – The Contractor shall advise the Ministry Representative of the sources of topsoil not less than seven days before any is used in the work.

The Contractor shall, at the Contractor's expense, acquire a soil analysis from an accredited soil testing laboratory, to verify that supplied material is within the requirements indicated. Results of the soil test are to be submitted to the Ministry Representative prior to installation.

The Ministry Representative will approve all topsoil once it has met the standard required at the source.

#### MATERIALS

**751.11 General** – In this Section, a range of measurable physical and chemical properties are set out as being acceptable in a topsoil. Compliance with this Section shall be determined by testing for those properties. When imported or on-Site topsoil is used, it shall be tested and modified as necessary by a mixture of other components to bring its properties to within the range set in SS 751.16, or as stated in the Special Provisions. Topsoil shall not be prepared or handled in an excessively wet or frozen condition, or in any manner in which structure is adversely affected.

**751.12 Topsoil Types** – Three topsoil types are described in SS 751.13 through SS 751.15. Regardless of origin, all types shall conform to SS 751.16.

**751.13 On-Site Topsoil** – On-Site topsoil may be used, as specified in the Special Provisions, provided that it meets the standard set for imported topsoil and can be modified to meet the requirements set out for the specified topsoil. On-Site topsoil shall be defined as the existing "A" horizon containing accumulated organic matter. On-Site topsoil shall be tested prior to stockpiling. Upon approval

by the Ministry Representative of the suitability of the on-Site topsoil for topsoil, a sufficient quantity of stripped on-Site topsoil shall be stockpiled where shown on the Drawings or in areas designated for stockpiling.

**751.14 Imported Topsoil** – Imported topsoil shall be of a sandy loam or loamy sand texture (no less than 50% sand by weight) containing between 4% and 15% organic matter (dry weight basis).

Imported topsoil shall be free of propagules of plant species designated as noxious weeds under the BC Weed Control Act and Regulation and other perennial, weedy plants such as couch-grass, horsetail, broom, Japanese Knotweed and blackberry species.

At least 80% of imported topsoil shall pass a Tyler #10 sieve after appropriate crushing of structural units using accepted laboratory test methods.

**751.15 Manufactured Topsoil** – Manufactured topsoil is any soil or growing medium mixture whose chemical and physical properties fall within ranges required by this Section for a particular application.

Manufactured topsoil shall conform to SS 751.16 or as specified in the Special Provisions.

**751.16 Requirements For Topsoil** – Commercial processing and mixing of topsoil components shall be done thoroughly by a mechanized screening process. No hand mixing shall occur. The resulting product shall be a homogenous mixture having the required properties throughout.

The general amendment of both natural topsoils and manufactured topsoils by mixing in situ with rototill cultivation equipment after placement, will be acceptable if carried out to the satisfaction of the Ministry Representative. Fertilizers typically used at time of seeding or planting will be surface applied and incorporated as described in SS 751.33, Applying Fertilizers.

The Contractor shall also require the laboratory to include recommendations for incorporating fertilizers and other amendments into the topsoil as needed for plant establishment and maintenance, and as they specifically relate to:

- grassed areas
- ground covers, shrubs and trees
- container or planter box installations, and to site conditions and season of planting.

Refer to Table 751-A for required properties of growing medium for different applications.

**TABLE 751-A PROPERTIES OF TOPSOIL FOR DIFFERENT APPLICATIONS**

PROPERTIES	Low Traffic Lawn Areas Trees and Large Shrubs	Planting Areas, Planters, Shrub and Groundcover Areas
TEXTURE: Particle size classes by the Canadian system of soil Classification	Percent of Dry Weight Mineral Fraction (%)	
Gravel greater than 2 mm, less than 30 mm	0 – 10	0
Sand greater than 0.05 mm, less than 2 mm	50 – 70	50 – 70
Silt & Clay combined	Maximum 25%	Maximum 25%
ACIDITY (pH)	6.0 – 7.0	4.5 – 6.5
DRAINAGE: Minimum saturated hydraulic conductivity (cm/hr) in place	2.0	2.0
ORGANIC CONTENT: Percent of Dry Weight (%)	5 – 10	14 – 20

Other specific requirements are as follows:

Fertility :

- Nitrogen – total nitrogen shall be 0.2% to 0.6% by weight.
- Phosphorus – available phosphorus shall be 20 to 100 ppm.
- Potassium – available potassium shall be 50 to 250 ppm.
- Boron – concentration in saturation extract shall not exceed 1 ppm

General:

- Acidity – in accordance with Table 751-A. Maximum of 0.5 kg/m<sup>2</sup> of dolomite lime to achieve the required pH level.

- Salinity – saturation extract conductivity shall not exceed 3.0 mmho/cm at 25°C. Sodium absorption ration (SAR) as calculated from analysis of saturated extract shall not exceed 8.0.

- C/N ratio – carbon to nitrogen ration shall not exceed 40:1.

- Texture – in accordance with Table 751-A.

- Organic content – in accordance with Table 751-A

- Cedar or redwood sawdust shall not be present in the topsoil.

- Soil shall be virtually free from subsoil, wood including woody plant parts, weeds, toxic materials, stones over 30 mm, and foreign objects.

- Drainage – in accordance with Table 751-A. Drainage of growing medium can be measured only after growing medium is in place. Mixing and handling of growing medium shall be done in such a manner that the minimum saturated hydraulic conductivity indicated is achieved.

**751.17 Soil Amendments** – The following amendments shall be added to the topsoil as required.

**751.17.01 Peat Moss** – Peat moss shall be Horticultural grade, partially decomposed fibrous or cellular stems and leaves of sphagnum mosses with a texture varying from porous to spongy fibrous, fairly elastic and substantially homogeneous with pH value not less than 3.5 and not greater than 6.5, medium to coarse shredded, suitable for horticultural purposes.

**751.17.02 Sand** – Sand shall be clean river pump sand or alternative source approved by the Ministry Representative, free of impurities, chemical or organic matter.

Particle size in sand shall be as follows:

- 95 – 100% passing a 4.75 mm sieve;
- 0 – 40% passing a 0.600 mm sieve;
- 0 – 5% passing a 0.075 mm sieve.

**751.17.03 Manure and Compost** – Manure shall be well-rotted farm animal manure or mushroom manure, rotted to the extent that the material is crumbly. Manure shall be free from weed seeds, rocks, sticks, rubble and shall contain not more than 40% composted sawdust, straw or shavings. Manure shall be free of propagules of plant species designated as noxious weeds under the BC Weed Control Act & Regulation and other perennial, weedy plants such as couch-grass and horsetail.

Commercial compost shall be free from all weed seeds, coliform, pathogens and chemical or toxic contaminants. Physical contaminants such as rocks, plastic, metal or glass shall be less than 0.5%. Compost shall not be derived from or contain processed municipal sewage sludge, unless such product is authorized for use by the

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Ministry of Water, Land and Air Protection, and meets all local regulations and approvals.

**751.17.04 Wood Residuals** – Raw sawdust and woodwaste are not acceptable components of topsoil. Wood residuals used as a component of topsoil, compost, farm animal manure or mushroom manure are acceptable provided they are rotted and the total Carbon to total Nitrogen ratio for the topsoil is a maximum of 40:1.

**751.18 Fertilizers** – Fertilizers shall be standard commercial brands, meeting the requirements of the Canada Fertilizer Act.

All fertilizers shall be in granular, pelleted or prill form, and shall be dry, free-flowing and free from lumps.

Fertilizers shall be packed in standard waterproof containers, clearly marked with the name of the manufacturer, weight and guaranteed analysis.

All fertilizer shall be stored in a weatherproof storage place and in such a manner that it will stay dry and its effectiveness will not be impaired.

The types, formulations, and rates of application for fertilizers and liming agents to topsoil supplied by the Contractor shall be as recommended by a laboratory soil specialist on the basis of tests of the topsoil, and as approved by the Ministry Representative.

Substitutions or variations in fertilizers and methods shall be made only upon pre-approval by the Ministry Representative.

**751.19 Fill Material** – Fill Material shall not be toxic to plant and animal life in part or in concentration.

### CONSTRUCTION

#### 751.31 Area Preparation

**751.31.01 Stripping of Topsoil** – Existing top soil material, where specified or required by the Ministry Representative shall be stripped and removed to stockpile(s) within the project area, kept properly drained, and maintained in a neat and presentable condition free of spoil and subsoil material for subsequent spreading on prepared rough graded areas.

The storage of topsoil shall not interfere with the effective utilization of a granular source or borrow pits.

**751.31.02 Preparation of Landscape Area Subgrade** – This Section applies only to grading of landscaped areas outside the roadway prism.

Rough grading shall be carried out by necessary cutting and filling work to produce the lines and grades shown on the Drawings and as directed by the Ministry Representative, allowing for the stipulated new topsoil thickness.

Surplus excavated material shall be removed from the Site and disposed of at the Contractor's expense unless the

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Ministry Representative authorizes its use as fill elsewhere on the project.

The landscape area subgrade shall be prepared to a consistent 80 – 85% Proctor density.

Soft and unstable areas below the landscape area subgrade that cannot be compacted to this standard shall be excavated and filled with suitable fill material, except in locations where special environmental conditions have been identified. In such cases, appropriate alternative solutions shall be approved by the Ministry Representative and environmental agencies as required, and carried out.

Debris, roots, branches, stones, building material, contaminated subsoil, visible weeds and anything else that may interfere with the proper growth and development of the planned finished landscaping shall be removed.

Fill materials shall be placed so as to achieve stability. This may necessitate placing in lifts of 225 mm and compacting each layer to 80 – 85% standard proctor density.

Grade transitions of landscape area subgrade should be smooth and even and shall be such that ponding cannot occur on the landscape area subgrade surface.

Existing land forms shall be warped and blended into the landscaped areas with a minimum of visual disharmony.

**751.31.03 Fine Grading** – Areas requiring topsoil shall be fine graded by raking out spoil material and debris such as rocks, asphalt and concrete over 50 mm in diameter.

Naturalized areas not requiring topsoil shall be similarly cleaned, raked and manicured.

**751.31.04 Scarifying** – All landscape area subgrade shall be scarified to a minimum depth of 150 mm immediately before placing topsoil.

**751.31.05 Cleanup** – All unsuitable material and inorganic debris shall be removed from the project area by the Contractor unless the Ministry Representative authorizes its use in fill areas on the project.

All surplus or unsuitable organic waste and debris shall be removed from the Site unless its complete burning is approved by the Ministry Representative in compliance with the B.C. open burning regulation.

**751.32 Placing Topsoil** – The landscape area subgrade shall be inspected and approved by the Ministry Representative, before topsoil is placed.

The topsoil shall be:

- placed over the prepared landscape area subgrade and shall be allowed to settle or be compacted by light rolling such that it is firm against deep footprints and shall not be compacted more than necessary to meet this requirement;
- moist (25% to 75% of field capacity) but not wet when placed, and shall not be handled if frozen or wet such that

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its structure will be altered;

- manually spread around trees, shrubs and obstacles;
- evenly spread to a depth which after settlement or light compaction will be that shown in the Drawings or as directed by the Ministry Representative.

During hauling and spreading, the paved roadway and other finished surfaces including subgrade under future base courses shall be kept clean and free of all topsoil.

**751.33 Applying Fertilizers** – Fertilizers shall be added to bring topsoil fertility within the ranges set out in this Section or as specified in the Special Provisions.

Manufactured topsoils and processed imported topsoils will typically have fertilizers and amendments incorporated at the time of mixing and screening, while other topsoils will receive in situ amendment.

Fertilizers normally applied at the time of seeding and planting are specified under the appropriate sections. These fertilizers are generally supplemental to the base fertility requirements outlined for topsoil and are applied after topsoil is in place.

Surface applied fertilizers shall be evenly spread over the topsoil with a suitable mechanical spreader and fully incorporated to a minimum depth of 50 mm.

Lime used for top dressing shall be thoroughly cultivated into the top 100 mm of topsoil.

**751.34 Finish Grading** – After placing the topsoil to the finish elevations and contours required, the grade shall be finished to a high standard, to the grades shown on the Drawings with a smooth and even surface. Rough spots and low areas shall be eliminated to ensure positive surface drainage, and the surface shall be left smooth, uniform, free of debris and firm enough to resist deep footprinting.

Topsoil placed in traffic islands and medians shall be crowned for drainage, as shown on Drawing SP751-01.

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### MEASUREMENT

**751.81 General** – Measurement for the supply of topsoil by the Contractor will be by the CUBIC METRE in the truck at the point of delivery. Topsoil removed from stockpiles will be measured in place in the stockpile.

The placing of topsoil will be measured by the SQUARE METRE for the stipulated topsoil thickness, unless stated otherwise in the Special Provisions.

### PAYMENT

**751.91 General** – Payment for TOPSOIL supplied by the Contractor will be at the Contract Unit Price bid per cubic metre. The Unit Price bid for topsoil supplied by the Contractor shall be accepted as full compensation for all handling, any necessary screening and testing of topsoil, and for delivery and off-loading on the area to be topsoiled.

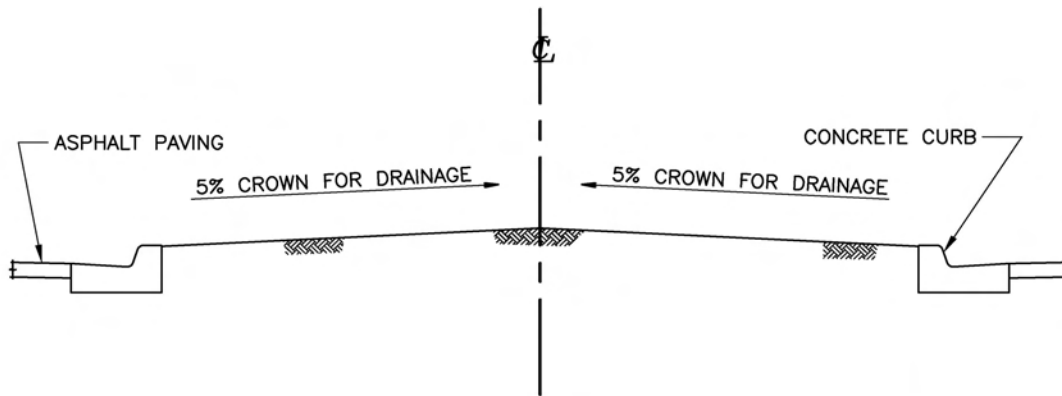
Payment for TOPSOIL SPREADING will be at the Contract Unit Price bid per square metre. The Unit Price bid for topsoil spreading shall be full compensation for all labour and equipment required for the specified preparation, spreading, and finish grading of the topsoil, and for all incidental work not required to be separately paid for.

Separate prices may be included in the Contract to cover the area preparation work such as:

- clearing and grubbing,
- stripping existing topsoil and removal to stockpile,
- rough grading and fill,
- naturalizing with fine grading,
- rotovating and soil conditioning, and
- trenching for irrigation and sub-soil drainage systems.

CROWNING DETAIL FOR ISLANDS & MEDIANS

SP751-01



NOT TO SCALE

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE NOTED