

BEST MANAGEMENT PRACTICES IMPORTING FILL MATERIAL



Photo Source: City of Vancouver

PART 1: PURPOSE AND DEFINITION

The Park Board accepts free topsoil and fill material from a variety of sources as a cost saving measure. These guidelines are intended to ensure that inappropriate soils are not introduced onto Park Board properties. The focus is on selecting topsoil and fill material that meets horticultural and engineering specifications for organic and physical/mineral properties while minimizing the chance of introducing materials that may result in poor drainage or nutrients, or present a potential risk to human health or the environment.

Soil and fill materials usually become available on short notice. If the supplier does not have adequate documentation verifying the properties of the material that allows the Park Board to assess its ability to meet specifications, the soil should be rejected. If the supplier will allow time to have the material tested, the appropriate analyses to be conducted will have to be determined and carried out by a qualified agency. Appropriate analyses can be based on the history of the site use and what the material is to be used for.

All imported topsoil and fill material must meet applicable specification quality requirements and be capable of being placed and compacted at or close to its maximum achievable density. A soil relocation permit is also required. All testing must be reported in writing and a record kept for verification. Unless material to be imported can be demonstrated to be free of contamination and/or appropriate for the proposed use, the use of that material shall be rejected.

PART 2: APPLICATIONS AND LIMITATIONS

Topsoil for horticultural use may be obtained from acceptable residential or commercial/industrial sites and existing parks. On site or imported soil shall be friable "A Horizon" topsoil to the requirements of the B.C. Landscape Standard, stripped and stockpiled on site in an approved location. Stripping and stockpiling work shall be such that the soil structure is not damaged and contamination is avoided.

Topsoil properties are controlled to meet specifications for nutrients and particle size. Mineral particle sizes shall be within the following ranges by weight:

- 100% shall pass a 10 mm (3/8") sieve
- Maximum of 10% shall pass a #200 sieve (silt and clay)

Soil shall be of a sandy loam or loamy sand texture containing between 3% and 15% organic matter (dry weight basis). Soil shall be virtually free from subsoil, wood including woody plant parts, weeds, stones over 30 mm, pests, undesirable grasses or weeds, and seeds or parts thereof and foreign objects. Soil shall be free from crabgrass, couch grass, Equisetum sp., Convolvulus sp. or other weeds or seeds or parts thereof.

Soil shall be suitable for modification by screening and additives to meet the requirements for Screened Growing Medium except where specified and approved for use as Unscreened Imported Soil (Refer to Section 32 91 13 Growing Medium).

Fill materials in Vancouver are most often obtainable from construction sites and from demolition debris including concrete and asphalt. Materials from these types of sites may or may not be appropriate depending on the proposed use of the fill and the quality of assessment and /or mitigation measures, if necessary. Unless construction projects can be demonstrated to be free of contamination and/or appropriate for the proposed use, the material should not be accepted.

In general, fill source site should be located in non-industrial areas and not from sites undergoing environmental clean up. Non-industrial sites include those that have never been developed or have been used solely for residential or agricultural uses. If the source is an agricultural site, care should be taken to ensure that the fill does not include agricultural waste process by-products such as manure or decomposed organic matter. Material should also not be accepted from lands within the Agricultural Land Reserve.

The following types of sites are unacceptable sources of fill material:

- Industrial sites where hazardous materials were used, handled or stored
- Unpaved parking areas where petroleum hydrocarbons may have been spilled or leaked into the soil
- Residential sites with underground fuel/oil tanks
- Former gasoline stations
- Retail sites that contain dry cleaners
- Photographic processing facilities
- Paint stores
- Auto repair shops
- Auto painting facilities
- Metal processing shops
- Manufacturing facilities
- Oil refineries
- Waste treatment plants, etc.
- Current or former landfills

Fill obtained from a commercial supplier of manufactured top soil (growing medium) or fill material or from soil pits in rural and suburban areas must be documented as uncontaminated.

The type of soil suitable for fill material depends on the proposed facility to be built. Fills range from granular soils (sand and gravel), which are most desirable, to more finely sized soils (silt and clay), which are usually less desirable. Certain types of soils such as saturated clays and highly organic soils are unsuitable for use as materials for most fill construction. Fill materials should be well graded, capable of being well compacted, be within a proper range of moisture to optimize compaction and be free of unsuitable or deleterious materials such as tree roots, branches, stumps, sludge, metal, trash, or contamination.

Some materials over 100 mm (4 in) in size, such as rocks, large stones, or reclaimed paving materials (recycled concrete aggregate) can be used as fills if deemed suitable by a Geo-technical Engineer. Oversize materials should have strong particles that do not readily break down under the action of construction machinery and which have a range of sizes so that voids are partially filled.

Contractors must submit documentation showing proof of insurance to the City prior to delivery and/or placement of fill material on a construction site. The required types of insurance include but are not limited to the following:

- Comprehensive Liability Insurance
- Automobile Liability Insurance
- Worker’s Compensation Insurance

PART 3: DOCUMENTATION

To minimize the introduction of contaminated fill onto a site it must be verified through documentation that the source is acceptable and/or have the material analyzed for potential contaminants based on the location and history of the source area.

Documentation required for use of imported fill material shall include:

- A review of available historic records including street directories, the British Columbia Ministry of Water, Land and Air Protection (MWLAP) on-line site registry, aerial photographs, fire insurance maps, land use maps and current title searches, City of Vancouver business licenses issued to municipal address of property (reviewed and approved by District Director);
- A site reconnaissance to observe conditions which may indicate the potential presence of contamination, and to prepare a photographic record;
- A review of available documents and reports relating to waste management and site contamination;
- Interviews with individuals knowledgeable about the site;
- If a building exists, a preliminary survey for special attention substances such as polychlorinated biphenyls (PCB’s), asbestos, lead paint, urea formaldehyde foam insulation (UFFI), and mercury which may be present in construction materials at the site.
- Any such documentation shall be signed by an experienced Environmental Consultant.

If signed documentation is not available or is determined to be inadequate, samples of the fill material shall be submitted for chemical analysis.

PART 4: SAMPLING AND TESTING

If there are detectable amounts of compounds of concern, the material should be evaluated by the Consultant for risk in accordance with City and/or Provincial environmental assessment guidelines. Metal analysis needs only to be performed for those metals to which risk levels have been assigned. The same applies to chemical and petroleum hydrocarbon contaminated soil.

Representative samples should be collected from material still in place at source. The appropriate number of samples should be taken based on the approximate area or volume of soil to be used as recommended in the following table.

Recommended Fill Material Sampling Schedule

Area of Source Site	Sampling Requirements
2 acres (.81 h) or less	Minimum 4 samples taken from quadrants
2 to 4 acres (.81 to 1.62 h)	Minimum 1 sample every 2 acre
4 to 10 acres (1.62 to 4.05 h)	Minimum 8 samples
Greater than 10 acres (4.05 h)	Minimum of 8 locations with 4 sub-samples per location
Volume of Stockpile	Sample per Volume
Up to 1000 yd; (764.6 m)	1 sample per 250 yd; (191 m;)
1000 to 5000 yd; (764.6 to 3823.8 m;)	4 samples for first 1000 yd; + 1 sample per each additional 500 yd; (382.3 m;)
Greater than 5000 yd; (3823.8 m;)	12 samples for first 5000 yd; + 1 sample per each additional 1000 yd;

Note: Samples requiring chemical analysis shall not be combined.

Sampling Alternatives

- An Environmental Stage I Preliminary Site Investigation (history of site uses) may be conducted prior to sampling to determine whether the site has been impacted by previous activities. After being evaluated, any sampling that may be required can be determined.
- If it is not possible to analyze fill material at the source or determine that it is appropriate for use from the Stage 1 investigation, one sample per truckload shall be collected and analyzed for all compounds of concern.

Material Properties and Testing Methods

- Submit a copy of an analysis by an approved independent soil-testing laboratory, (current contracted vendor is Pacific Soil Analysis; #5 11720 Voyageur Way, Richmond B.C. Ph. 273-8226). The analysis shall be of tests done on the proposed top soils or structural soils and additives

proposed for the work from samples taken at the supply source, within three weeks immediately prior to placement. Costs of the initial analysis, and subsequent tests to ensure compliance with the specification shall be borne by the Contractor. Failure to submit soils analysis is cause for immediate rejection of any placed soils.

- The analysis for planting soils shall include a breakdown of the following components: total nitrogen by weight, available levels of phosphorous, potassium, calcium, magnesium, soluble salt content, organic matter by weight, % sand, % fines (silt and clay) and pH value. In addition, the analysis shall clearly indicate the Project Name, Date Tested and Contractor's Name. Submit with the above analysis, the testing laboratory's recommendations for amendments, fertilizers and other modifications to make the proposed growing medium meet the requirements of this specification.
- A particle size analysis shall be undertaken by a qualified and approved soils testing laboratory.
- Fill material shall be natural mineral material of a consistent quality throughout, free from foreign matter such as construction debris, plant and grass seeds, organic matter and pests, and meeting the requirements set out, depending on the application.
- Obtain the approval of fill material before delivering to the site if imported, or before moving on site if native. If imported material is approved for use, supply a written notification a minimum of thirty (30) days prior to beginning fill operations a complete statement of origin, compensation, suitability, environmental clearance and proposed location of all deposits that is intended for imported fill.
- Fill shall be classified depending on its application and shall meet the following requirements:
 - Topsoil – under planted and grass areas. Maximum aggregate size 200mm evenly graded, containing not more than 20% fines (clay and silt) and not more than 5% organic matter.
 - Structural Soil - under sub-base for pathways, paved areas, structures. Maximum aggregate size 200mm evenly graded, containing not more than 15% fines passing a No. 200 (0.075mm) sieve when tested according to ASTM designation C-136. Refer to Structural Growing Medium specification.

PART 5: CHECKLIST

The following provides basic checks that will assist staff in determining if a material is suitable for use:

- Has an Environmental Stage 1 Preliminary Site Investigation been performed for the site?
 - A history of site use and adjacent site use(s) is generally a good indication as to whether further analysis is required. Refer to the list of land uses that are considered undesirable.
- Has a geotechnical investigation been carried out on the site or a location adjacent to the site?
- What are the results of any analyses that have been carried out?
 - If the site use is questionable and no analyses have been carried out, the type of analysis required is determined by whether the soil is for horticultural use or for structural fill.
- Is sampling of the fill material being conducted per the 'Recommended Fill Material Sampling Schedule'?
 - Sampling requirements are based on the size of the site area from which material is being imported.
- Is placement of the fill material being monitored at the source and/or at the delivery site by an experienced soils engineer?
 - Subsequent testing requirements will be based on information regarding the source of the fill and from ongoing visual examination of the imported material.

END OF BMP