9. Landscaping Standards – Sub-Grade and Topsoil

PART I – DESIGN

9.1 Design Guidelines

9.1.1 Provide a minimum 2% gradient across all reserve parcels, medians, traffic islands, boulevards, public utility lots/ROW's and stormwater dry ponds.

9.1.2 Excessive fill that compromises the site design will not be acceptable

9.1.3 The Town may require that stripping material or excess fill be shaped within a park/playfield to create a toboggan hill(s). Where toboggan hills are required, the following provisions must be met:

a.) The toe of the slope must be set back a minimum of 18m from any roadways, trees, plants, benches, waste receptacles, fences, power boxes, lights, play equipment or other obstructions to allow for safe use of the hill for sledding.
b.) Maximum height shall be 6m with a minimum width at the top of 4m.
c.) Whenever possible, top soiling and seeding or sodding of hills and berms should be delayed until the spring following construction to allow for settlement of the soil

9.1.4 Geotechnical testing may be required where questionable sub-grades exist.

9.1.5 Joint Use Site Guidelines:

a.) School building envelope to have same grades as sports field envelope (i.e. 2%).
b.) School building envelopes and adjacent road grades must be at the same elevation.
c.) School building envelope is to have topsoil applied to a minimum depth of 250 mm.
d.) For every one metre in elevation in excess of 2% slope, a minimum increase of three metres will be required on site.
e.) If non-engineered fill is to be incorporated in an MSR site, the non-engineered fill drawing, documenting the limit and depth of the fill area and confirming the fill area is outside the building envelope, shall be provided at CCC.

9.2 Drainage Guidelines

9.2.1 Where possible drainage is to be directed to the reserve parcels, PUL/ROWs and stormwater dry ponds in grass swales.

9.2.2 Drainage shall not be directed into existing tree stands.

9.2.3 Grass swales are to drain at a minimum 2% gradient.

9.2.4 Grass swales exceeding sixty metre runs are to have a minimum gradient of 4.0%. If the swale is to drain less than 4.0%, it shall have weeping tile along the entire length of the swale tied into a catch basin or water drainage along a concrete swale of an approved equal

9.2.5 The Town reserves the right to limit the amount of off-site drainage onto a reserve parcel and PUL/ROW when, in their opinion, such drainage will compromise the integrity of the site.

9.2.6 All trapped lows must be approved by the Town prior to construction. Trap lows must not compromise the use of the site and must be integral part of the design.

9.2.7 All drainage swales that empty onto reserve parcels, boulevards, PULs, ROWs, and stormwater dry ponds should have concrete splash pads. Concrete splash pads should be installed at a 10% pitch or erosion fabric will be required at their end.

9.2.8 Residential and commercial lots shall not use MRs to convey drainage.

PART II – GENERAL

9.3 Examination

9.3.1 Report to the Town, in writing, any conditions or defects encountered in the site before or during any construction upon which the work of this section depends and which may adversely affect its performance.

9.3.2 Do not commence work until those conditions or defects have been investigated and corrected.

9.3.3 Commencement of work shall imply acceptance of existing surfaces and conditions and no claims for damages or extras resulting from such conditions or defects will be accepted later, except in cases where such conditions could not have been known prior to commencement of work.

9.3.4 Protect all existing trees and planting areas.

9.4 Samples

9.4.1 Samples of topsoil may be requested for approval by the Town.

a.) Sample and soil analysis report to be provided prior to construction.
b.) Submit required sample of topsoil to the testing laboratory and indicate intended use, type of mulches applied, type of sub-soil and quality of drainage.
c.) Obtain approval of the topsoil in writing from the Town. Topsoil testing shall be done on the source of topsoil. Four samples shall be taken (i.e. one within every 25% vertical increment of the stockpile) at a depth of one foot. The location of the samples within each vertical increment shall be determined by the Town.
d.) Submit for the Town's approval the name of the testing company who will conduct the soil analysis. The proposed testing laboratory is subject to approval by the Town.
e.) Submit two (2) copies of the soil analysis report, including the location of the topsoil stockpile or source and recommendation for correction to the Town. Test the topsoil for NPK, a particle size analysis (soil texture), soluble salt content, organic matter, pH, and micro/macro nutrient status. Recommendations should clearly state the type, quantity and application procedure for amendment.
f.) Should the source of topsoil be exhausted, test topsoil from new source, submit soil analysis report and recommendations for correction and obtain the approval of the Town.

9.4.2 Retain approved samples on site until work has been inspected and approved.

9.4.3 All work shall conform to approved samples.

9.5 Product Delivery, Storage and Handling

9.5.1 Stockpile topsoil in locations designated by the Town.

9.5.2 Stockpiling on future MR lands is not permitted, unless written permission is granted by Town Services.

9.5.3 Do not spread topsoil in a muddy condition.

9.6 Inspections

9.6.1 The Contractor shall have an approved set of drawings and specifications available prior to calling the Town for inspection.

9.6.2 The Town shall approve both rough grade prior to placing of topsoil and finished grade at appropriate times before contractor proceeds with next phase of work. For all joint use sites and community parks, as well as dry ponds containing sports field in MR and MSR sites, the Contractor shall:

a.) At Sub-Grade Inspection:
    i. Supply grade stakes at all corners of sports fields as well as along their centre line.

ii. Supply grade stakes at the toe and heel of all slopes and swales. Spacing of the stakes is to be determined by the Town prior to their installation.
iii. Be available for a joint site inspection with the Town and have on site a survey crew fully equipped to provide any additional elevations as may be requested.

b.) At Finished Grade Inspection:

i. Supply grade stakes at the corners, centre and quarter points of sports filed, break of slopes and along drainage channels.

PART III – PRODUCTS

9.7 Fill

9.7.1 Fill materials shall exclude all matter likely to breakdown and cause subsidence.

9.7.2 Fill materials shall be free of stones, clods, sticks, sod, roots, organic matter, frozen lumps, concrete, any toxic materials (e.g.: salt, oil, etc.), debris and other foreign material.

9.7.3 Fill shall not contain quack grass rhizomes.

9.8 Sand

9.8.1 Sand for horticultural use when tested by laboratory sieves shall be uniformly graded and meet the following grading requirements:

Passing	Cumulative % by Weight
2.5 mm	100
1.25 mm	90-100
0.8 mm	80-90
315 micro-m	30-60
160 micro-m	2-10
63 micro-m	1 maximum

9.8.2 Sand shall be natural and coarse (except for the removal of very fine particles and gravel). Sand shall be free from vegetation, clay balls and other foreign material. Care shall be taken in the selection of material from the pit to produce a uniform product.

9.9 Crushed Gravel

9.9.1 Crushed gravel shall be maximum size 25 mm complying with the following gradation.

Sieve Size	e
25 mm	100
19 mm	95-100
9.50 mm	60-80
4.75 mm	40-60
2.00 mm	25-45
425 micro-m	10-25
75 micro-m	2-10

9.9.2 Volume of rock in topsoil not to exceed 20%.

9.10 Topsoil

9.10.1 The following topsoil requirements are for boulevard and parks projects. For projects with specialized plant communities including, for example, species demanding unusually acid or alkaline soils (calcifuges or calcicoles), an appropriate soil specification shall be submitted to the Town for review and acceptance.

9.10.2 Topsoil shall be loose, loamy, friable soil, free from subsoil, refuse, roots, stones > 25mm, slag, clay, stones, lumps, quack grass and other perennial weeds and roots, rhizomes, noxious odors, chemical contaminants, live plant roots, or other foreign materials.

9.10.3 If the seed bank of an imported topsoil yields quack grass, noxious weeds, or restricted weeds as designated by the Weed Designation Regulation of the Weed Control Act of the Province of Alberta, or sufficient weeds of any type to choke the desired vegetation, up to three repetitions of cultivation, germination and appropriated translocated herbicide application will be required.

9.10.4 Topsoil pH to be between 6.0 and 7.5. Use lime or sulphur, as indicated by analysis of topsoil, to bring pH to the required range.

9.10.5 Stone content shall not exceed 10% by dry weight. The maximum stone size, in any direction, shall not exceed 25 mm.

9.10.6 Topsoil shall be free from weeds and weed seeds, and shall be in a reasonably moist condition.

9.10.7 Topsoil shall be capable of sustaining vigorous plant growth.

9.10.8 Soil mix for tree, shrub, and flower beds shall consist of black topsoil, a fertile friable natural loam containing not less than 4 – 6 % of organic matter for clay loams and not less than 2% for sandy loams.

PART IV - EXECUTION

9.11 Site Preparation

9.11.1 Locate and protect all existing trees and shrubs

a.) All existing trees and shrubs and the areas under their canopies to protect the root zone shall be fenced with timber posts of a height of 1,800 mm above ground level. Rails and either boards or snow fence at the discretion of the Town to protect against any damage, including leakage of toxic fluids or compaction of the soil through pedestrian, or vehicular traffic, or use as a storage or lay-down area.

b.) The Developer and/or Owner of the project will be responsible for any such damage including by third parties if enabled by lack of protection by Contractor.

9.11.2 Complete trench backfilling before beginning grading.

9.11.3 Maintain slopes and adequate drainage during grading.

9.11.4 Do not allow mixing of topsoil and subsoil material.

9.11.5 Locate, mark, and protect all utilities and appurtenances (i.e. manholes, catch basins, valves, and hydrants).

9.12 Clearing

9.12.1 Clearing shall only be permitted during periods which do not disturb nesting birds and other wildlife. Perform and document nesting check.

9.12.2 Cut, dig, remove, and dispose of all timber, brush, windfall, stumps, and rubbish except such trees and shrubs that are designated for preservation. Designated areas to be preserved shall be protected as per the ISA “Tree preservation During Construction” regulations. (www.treesaregood.com)

9.12.3 Preserve such designated trees and shrubs from scarring, barking, or other injury during construction operations. Maintenance charges for scarring, barking, or other injury to trees or shrubs will be assessed in accordance with the ISA “Tree Preservation during Construction” regulations.

9.12.4 Trim branches from timber and salvage usable timber. Salvaged timber shall be coordinated with the Town.

9.12.5 Where grubbing is not to be done, all trees, roots, and existing stumps shall be cut off flush with the original ground surface.

9.12.6 Cut, remove, and dispose of dangerous trees overhanging and off the right-of-way as per Contracted Arborist.

9.12.7 Pull down, remove, and relocate or dispose of any structures, fences, and /or any physical obstructions.

9.12.8 Dispose of branches and debris in accordance with Section 9.13.

9.12.9 Leave ground surface in a condition suitable for stripping of topsoil.

9.13 Disposal

9.13.1 Remove and dispose of surplus materials as directed by the Town.

9.13.2 The Contractor shall dispose of all waste materials at sites located by the Contractor and approved by the Town.

9.13.3 Waste materials at site shall be disposed of offsite at authorized public disposal sites at all times.

9.14 Salvage

9.14.1 Remove merchantable timber as in accordance with Provincial guidelines and regulations.

9.14.2 Merchantable timbers, in general, includes trees with a bottom diameter of 150 mm or greater and a top diameter of 100mm or greater.

9.14.3 All timber of materials salvaged shall be coordinated with the Town.

9.14.4 Trim branches from salvaged timber, cut into 3 m lengths and pile neatly in stockpiles.

9.14.5 Dispose of branches and debris in accordance with Section 9.13.

9.14.6 Salvageable items, as designated by the Town, are to be deposited in the Town's storage yard.

9.15 Grubbing

9.15.1 Excavate, remove and dispose of all roots, stumps, submerged logs, corduroy and similar objectionable matter to a depth as determined by the geotechnical report.

9.15.2 Fill holes and level areas disturbed by grubbing. Leave ground surface in a condition suitable for stripping of topsoil.

9.16 Topsoil Stripping and Stockpiling

9.16.1 Strip the site to the limits shown on the Drawings, or strip those areas specified or ordered in writing.

9.16.2 Strip all areas to be excavated for structures, pipes, or roadways to the limits shown on the Drawings or directed by the Town. Retain all subsoil in areas shown on the Drawings to be dedicated as municipal reserve and other lands to be retained as green space.

9.16.3 Strip the full depth of topsoil or organic material only for structures, pipes, or roadways. Sustain as much native topsoil for intended green infrastructure.

9.16.4 Topsoil shall only be stripped in dry weather and ground conditions to prevent damage to its crumb structure.

9.16.5 Frozen topsoil may be stripped by ripping provided a minimum of 2 passes are made, the first of which shall not exceed 50% of the topsoil depth.

9.16.6 Stockpile and windrow topsoil temporarily and dispose of stripped material that is unsuitable for replacement. Stockpile in a manner that will not endanger persons, existing vegetation, living nature, or adjacent property.

9.16.7 Ensure stockpiles of topsoil, common excavation, and borrow materials are sufficiently separated. Maintain a minimum of 1.0 m separation between topsoil and common excavation material when stockpiling.

9.16.8 If the topsoil and subsoil are mixed and the topsoil is adversely affected, the Contractor shall, at the Contractor's own expense, engage a soils specialist to determine the necessary remedial work, and shall perform the required work.

9.16.9 Disposal of unsuitable material shall be in accordance with Section 9.13.

9.16.10 Developer shall locate and protect all utilities; survey control monuments, plant material root systems that are designated to remain, including natural features, pavement, concrete and structures.

9.16.11 Plant material on Town or private land shall not be removed without the written approval of the Town.

9.16.12 All areas disturbed during the development process must be rehabilitated to its original state or better, as approved by the Town.

9.16.13 Plant material to be preserved on the site shall be of high quality worthy of preservation. All plant material to be approved by the Town representative.

9.16.14 All trees presently growing on the site, which are to remain, shall be protected to avoid any damage to them during construction operations. Refer to Appendix D. Trees approved for removal shall be cut and stumps removed to a minimum depth of 600 mm below proposed finished grades and disposed of offsite.

9.16.15 Burying of such material on the site shall be permitted only if approved by the Town. The Developer shall identify these burial locations on the plan of record.

9.16.16 "Close cut" clearing (hand clearing) shall be utilized adjacent to areas to be preserved to ensure no damage to existing plant material and root systems.

9.16.17 Existing grades around plant material are to be retained. If grades are raised or lowered around preserved plant material, the developer will be responsible for constructing proper soil retention to ensure the health of the plant material.

9.16.18 The Developer will replace all plant material that has died or suffered as a result of construction or grade changes in preserved areas.

9.17 Excavation, Fill and Grade

9.17.1 Excavate to the required sub-grade elevation.

9.17.2 Remove and dispose rocks and any other unsuitable materials.

9.17.3 Grades shall be within 25 mm of design grades.

9.17.4 Place and spread fill material in successive horizontal lifts.

9.17.5 Compact each lift to a minimum 98% Standard Proctor Density, unless otherwise specified or directed by the Town.

9.17.6 Each lift shall not exceed 150 mm in compacted thickness.

9.17.7 Trim side slopes from top down, and finish true to the required alignment, grade, and shape.

9.17.8 Trim high areas, scarify low areas, compact, and re-grade as required to achieve specified grades and compaction.

9.18 Sub-grade Preparation

9.18.1 Work the soil with cultivating and mixing equipment until the soil is pulverized into pieces no larger than 25 mm across, exclusive of stones.

9.18.2 Grade sub-grade to even running contours as shown on the approved drawings and given levels with a tolerance of ± 75 mm, scarify to 300 mm and roll to create a firm smooth surface.

9.18.3 Remove all debris from the Sub-grade and ensure it is not contaminated and free of all deleterious materials.

9.18.4 The final sub-grade surface shall be sloped so that there is no runoff onto adjacent property or ponding.

9.18.5 Fine grade to ensure positive drainage away from buildings and sidewalks.

9.18.6 Compact finished sub-grade and all fill material for areas under turf or planting.

9.18.7 Leave the surface of the compacted sub-grade slightly higher than the required elevation; then trim to the required elevation.

9.18.8 Leave the finished surface even and free of depressions, humps, loose debris, and foreign material.

9.18.9 Do not permit vehicular traffic over the prepared sub-grade.

9.18.10 Sub-grade may be inspected by the Town prior to topsoil placement.

9.19 Topsoil Placement

9.19.1 Do not place topsoil when sub-grade or topsoil is frozen, excessively wet or dry, or in a condition that inhibits proper grading, cultivation, or compaction.

9.19.2 Spread topsoil uniformly over prepared sub-grade to achieve a minimum compacted depth of 200 mm for sodded and seeded areas, unless otherwise specified or directed by the Town.

9.19.3 Cultivate topsoil to a minimum depth of 200 mm, breaking down lumps. Remove stones larger than 25 mm, weeds, roots, and other foreign material from the site.

9.19.4 Manually spread topsoil around trees and plants to prevent damage by grading and leveling equipment.

9.19.5 Float the area until the surface is smooth. Cut smooth and flush all areas adjacent to catch basins.

9.19.6 Fine grade to eliminate rough or low areas and to ensure positive drainage.

9.19.7 Boulevards – The finished topsoil level shall conform to the adjacent curb and sidewalk elevations and must provide for adequate drainage of sidewalk areas after turf establishment.

9.19.8 Buffer Strips – The finished topsoil level shall slope uniformly from the property line towards the back of the sidewalk at not less than 2%.

9.19.9 Utility Lots and Walkways –The grade must be sloped away from the sidewalk at a minimum grade of 2%.

9.19.10 Medians and Islands – The finished topsoil level shall be even from curb to curb with crowning to accommodate drainage.

9.19.11 Compact topsoil with rollers to the satisfaction of the Town.

9.19.12 Final topsoil grades for seeded areas shall be flush to finished grades at surface structures (i.e. manholes, sidewalks, driveways, and curbs).

9.19.13 Apply topsoil to the following minimum depths measured at right angles to the Sub-grade after leveling with a tolerance of 25 mm over a distance of 2.4 m:

a) Min 200 mm for seeded areas.
b) Min 200 mm for sodded areas.
c) Min 650 mm for planting beds.

9.19.14 When abutting an existing turf area, cut the existing turf to form a straight, non-jagged joint with the new seeded or sodded area.

9.19.15 Make good any damage caused by topsoil spreading activities.

9.19.16 Control dust so as to have no impact on surrounding land uses.

9.19.17 Clean all adjacent walks, streets and properties as a result of work done under this section at the end of each working day or as directed.

9.19.18 The Consultant shall inspect the topsoil preparation prior to the Contractor proceeding with seeding or sodding.

9.20 Spreading of Topsoil – Natural Areas, ERs

In addition to the requirements provided in Section 9.19, comply with the following:

9.20.1 In restoration the depth and finish grade of the topsoil should be tied to the depths and finish of the pre-existing native profile. This should be specified in the restoration plan and approved by the Town.

9.20.2 Rough grade topsoil to ensure positive drainage and to emulate the pre-development drainage patterns and rates.