Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 02 65 00 – Underground Storage Tank Removal

1.2 REFERENCES

.1 American Society for Testing and Materials International (ASTM)

- .1 ASTM C117, Standard Test Method for Material Finer Than 0.080 mm Sieve in Mineral Aggregates by Washing.
- .2 ASTM C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
- .3 ASTM D1557, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft3 (2,700 kN-m/m3))
- .4 ASTM D4318, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

.2 Latest edition of Canadian General Standards Board (CGSB)

- .1 CAN/CGSB 8.1, Sieves, Testing, Woven Wire, Inch Series.
- .2 CAN/CGSB 8.2, Sieves, Testing, Woven Wire, Metric.

.3 Latest edition of Newfoundland and Labrador Department of Transportation and Works Specifications.

1.3 DEFINITIONS

.1 Excavation class: one class of excavation will be recognized: common excavation.

.2 Common excavation: excavation of materials of whatever nature

.3 Waste material: excavated material unsuitable for use in Work or surplus to requirements.

.4 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of Work.

.5 Recycled fill material: material, considered inert, obtained from alternate sources and engineered to meet requirements of fill areas.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Preconstruction Submittals:

- .1 Submit records of underground utility locates, indicating: location plan of relocated and abandoned services to Departmental Representative, as required.

.3 Samples:

- .1 Inform Departmental Representative at least 4 weeks prior to beginning Work, of proposed source of fill materials and provide access for sampling.

.2 Departmental Representative will provide all contact information relating to testing laboratory.

.3 Ship samples to laboratory as per laboratory's direction.

.4 Pay cost for shipping samples.

.5 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.

1.5 QUALITY ASSURANCE

.1 Qualification Statement: submit proof of insurance coverage for professional liability.

.2 Do not use soil material until written report of soil test results are reviewed and approved by Departmental Representative.

1.6 EXISTING CONDITIONS

.1 Buried services:

.1 Before commencing work establish location of buried services on and adjacent to site. Clearly mark such locations to prevent disturbance during Work.

.2 Arrange with appropriate authority for relocation of buried services that interfere with execution of work.

.3 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.

.4 Confirm locations of buried utilities by careful test excavations or soil hydrovac methods where appropriate.

.5 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered.

.6 Where utility lines or structures exist in area of excavation, obtain direction of Departmental Representative before removing or re-routing. Costs for such Work to be paid by Departmental Representative.

.7 Record location of maintained, re-routed and abandoned underground lines.

.8 Confirm locations of recent excavations adjacent to area of excavation.

.2 Existing buildings and surface features:

.1 Conduct, with Departmental Representative, condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, rail tracks, pavement, survey bench marks and monuments which may be affected by Work.

.2 Protect existing buildings and surface features from damage while Work is in progress. In event of damage, immediately make repair as directed by Departmental Representative.

Part 2 Products

2.1 MATERIALS

.1 All materials shall be supplied by the Contractor.

.2 Unsuitable construction materials/debris:

.1 Unsuitable construction material/debris (non-contaminated) must be completely removed from the excavation until a suitable material is encountered. Soil review will be conducted with Departmental Representative.

.2 Unsuitable construction materials/debris (non-contaminated) must be stockpiled on-site as directed by Department Representative.

.3 Following removal of unsuitable material from the excavation, the unsuitable material must be removed from site. Unsuitable material may be left on site if Department Representative reviews the material and deems it useful. Permission must be granted by Department Representative.

.4 Following completion of unsuitable material removal, exposed sub-grade shall be proof rolled.

.5 Soft spots or loose areas defined by the proof rolling process will be excavated and refilled with 100mm Granular Backfill and compacted to 95% of the material's maximum dry density as determined in accordance with ASTM D1557 (Modified Proctor).

.3 Approved Backfill

.1 Granular Bedding

.1 Surface finish at walking paths

.2 Below all concrete tank pads

.3 Shall meet the requirements of ASTM C117, ASTM C136 grain size analysis, which locations as follows:

Gradation requirements for Granular Bedding aggregate:

Sieve Size	% Passing
19.0 mm	100
12.5 mm	-
9.5 mm	50-80
4.75 mm	35-60
1.18 µm	15-35
600 µm	-
300 µm	5-20
75 µm	2-8

.2 Approved Backfill

.1 Excavation backfill (excluding immediately surrounding new underground storage tank – see FRP Tank Backfill)

.2 100mm Crushed Gravel

.3 Type 5 Material – Approved Backfill Material

.1 The Contractor shall supply all materials.

.2 Aggregate shall be composed of clean, hard, sound, durable, uncoated particles that do not contain friable, soluble or reactive minerals or other deleterious materials or conditions that would make the aggregate prone to decomposition or disintegration, or

present any environmental hazard, from the presence of the parent material or its by-products, when exposed to the natural elements after placement in the Work.

.3 Gradations to be within limits specified in Table 02223-5 below when tested in accordance with ASTM C136.

Grading Limits for Approved Backfill

Sieve Size	% By Weight Passing
125 mm	100
100 mm	95-100
75 mm	82-100
50 mm	62-100
37.5 mm	52-100
19 mm	30-90
9.5 mm	22-79
4.75 mm	16-66
2.36 mm	12-55
1.18 mm	9-44
300 μm	4-25
75 μm	0-7

.4 The aggregate shall not have greater than a 30% loss by weight when tested by MTO LS-608 (Micro-Deval).

.3 FRP Tank Backfill

.1 Immediately surrounding FRP tank as per tank manufacturer's recommendations/installation instruction

.2 Clean pea gravel 3mm to 19mm or clean crush stone 3mm to 15mm

.3 Washed, free flow and free of snow and ice

.4 Refer to ATSM C-33

.5 Wrapped with geotexture

.4 Top Soil

.1 Material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.

.2 Material reasonably free from subsoil, clay lumps, brush, objectionable weeds, and other litter, and free from cobbles, stumps, roots, and other objectionable material larger than 25mm in any dimension.

.5 Clean Sand

.1 The Contractor shall supply all materials.

.2 Type 3 Material shall consist of uncoated natural sand, manufactured sand or an approved combination.

.3 Type 3 Material shall be graded within the limits as shown in Table 02223-3, when tested in accordance with ASTM C136.

Grading Limits for Clean Sand

Sieve Size	% By Weight Passing
14.0 mm	100
10.0 mm	95-100
5.0 mm	70-100
2.5 mm	50-100
1.25 mm	35-90
630 µm	15-65
315 µm	5-35
160 µm	0-10
75 µm	0-5

.4 Sod

.1 Shall be free of all weed or seeds

.5 Fertilizer

.1 Fertilizer shall be a 6-12-12 grade, uniform in composition, free flowing and suitable for application with approved equipment delivered to the site in bags or other convenience containers, each fully labelled, conforming to the applicable local government laws, and bearing the name, trademark or trade name and warranty of the producer

.6 Lime

.1 Lime shall be ground limestone containing not less than 85% of total carbonates and shall be ground to such fineness that at least 50% will pass through a 100 mesh sieve and at least 90% will pass through a 20 mesh sieve. Coarser materials will be acceptable provided the specified rates of application are increased proportionally on the basis of quantities passing the 100 mesh sieve, but no additional payment will be made for increased quantity.

Part 3 Execution

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.2 SITE PREPARATION

.1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.

3.3 PREPARATION / PROTECTION

.1 Keep excavations clean, free of standing water, snow, and loose soil.

.2 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage.

.3 Protect buried services that are required to remain undisturbed.

3.4 STOCKPILING

.1 Stockpile fill materials in areas designated by Departmental Representative.

.1 Stockpile granular materials in manner to prevent segregation.

.2 Ensure area is segregated from surrounding area to prevent fill from dispersing.

.3 Implement sufficient erosion and sediment control measures to prevent sediment release off construction boundaries and into water bodies.

.2 Protect fill materials from contamination.

3.5 EXCAVATION

.1 Excavation must not interfere with bearing capacity of adjacent foundations.

.2 Do not disturb soil within branch spread of trees or shrubs that are to remain.

.1 If excavating through roots, excavate by hand and cut roots with sharp axe or saw.

.3 Keep excavated and stockpiled materials a safe distance away from the edge of excavation.

.4 Dispose of surplus and unsuitable excavated material as directed by Departmental Representative.

.5 Do not obstruct flow of surface drainage or natural watercourses.

.6 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.

3.6 SHORING

.1 Maintain sides and slopes of excavations in safe condition by appropriate methods.

3.7 DEWATERING

.1 Keep excavations free of water while work is in progress.

.2 Provide for review and approval Departmental Representative details of proposed dewatering methods, and well points.

.3 Avoid excavation below groundwater table if quick condition is likely to occur

.4 Protect open excavations against flooding and damage due to surface run-off

.5 Dispose of water in a manner not detrimental to public and private property, or portion of Work completed or under construction.

.1 Provide and maintain temporary drainage ditches and other diversions outside of excavation limits.

.6 Provide flocculation tanks, settling basins, or other treatment facilities to remove suspended solids or other materials before discharging to storm sewers, watercourses or drainage areas, and ensure plan is approved by authorities having jurisdiction.

3.8 FILL TYPES AND COMPACTION

.1 Use types of fill as indicated or specified below. Compaction densities are percentages of maximum densities obtained from ASTM D1557.

.1 Compact to 95% of corrected maximum dry density.

.2 Under concrete slabs: provide 300 mm compacted thickness base course material to underside of slab. Compact base course to 95 %.

3.9 BACKFILLING

.1 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.

.2 Do not use backfill material which is frozen or contains ice, snow or debris.

.3 Place backfill material in uniform layers not exceeding 150 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.

.4 Backfilling around installations:

.1 Place bedding and surround material as specified elsewhere.

.2 Do not backfill around or over cast-in-place concrete within 24 hours after placing of concrete.

.3 Place layers simultaneously on both sides of installed Work to equalize loading.

.4 Where temporary unbalanced earth pressures are liable to develop on walls or other structures:

.5 Permit concrete to cure for minimum 7 days or until it has sufficient strength to withstand earth and compaction pressure and approval obtained from Departmental Representative.

.6 Excavation to be backfilled with 100mm Approved Backfill. The top 300mm below finished surface grade is to be Granular ‘A’ material (see herein);

.7 Fill shall be placed in lifts not exceeding 300mm in loose thickness, and be compacted throughout the lift thickness to a maximum of 95% the material’s maximum dry density as determined in accordance with ASTM D1557 (Modified Proctor). Depending on the compaction equipment, thinner lifts may be necessary in order to achieve the specified compaction criteria.

.8 In the event of winter construction, fill shall be placed and compacted in an unfrozen condition.

3.10 TOPSOIL

.1 The topsoil shall be uniformly distributed on the designated areas and evenly spread to an average thickness of 100 mm with a minimum thickness of 75 mm. Spreading shall be performed in such a manner that planting can proceed requiring little additional soil preparation or tillage. Irregularities in the surface resulting from top soiling or other operations shall be corrected so as to prevent the formation of depressions where water will stand. Topsoil shall not be placed where the subgrade is frozen, excessively wet,

extremely dry or in a condition otherwise detrimental to the proposed planting or to proper grading.

.2 After the topsoil has been spread and graded as required, the surface shall be cleared of stone, stumps or other objects larger than 50 mm in thickness or diameter, and or root, brush, wire or other objects that might be a hindrance to planting or maintenance operations.

3.11 SODDING

.1 Before sodding, the surface is to be raked smooth to provide uniform slopes. Topsoil with a uniform organic content will be raked smooth to conform with the preparation slopes. Lime will be added to the topsoil at the rate of 1.125 kg/ha. The lime may be placed up to three weeks ahead of placing of sod. Fertilizer will be spread evenly over the top 50 mm of the soil.

.2 Fertilizer cannot be added at the same time as the lime. The fertilizer shall be applied at the rate of 1.125 kg/ha, and will have a plant food ratio of 10 nitrogen to 20 phosphorous to 20 potash plus 2% FTE. The fertilizer must be placed not more than one week ahead of sodding. After adding fertilizer, the surface shall be fine graded.

.3 Sod shall be laid on the prepared sod bed as soon after cutting as practical. Sod may be stored in stacks or piles, grass to grass and roots to roots for not more than five (5) days. Sod shall be protected against drying from sun or wind and from freezing as necessary. The moving and laying of sod shall, as far as possible, be done when weather conditions and soil moisture are favourable. On slopes, stakes shall be driven flush with the top of the sod, spacing stakes shall not exceed 600 mm across the face of slopes.

.4 If rainfall is insufficient during the period of sodding and initial grass growth, then water shall be applied immediately before and after sodding and subsequently thereafter until the grass is established, as directed by the Engineer.

.5 Sods placed in the Fall will not be accepted until the following Spring.

3.12 MAINTENANCE

.1 Ensure maintenance equipment suitable to Engineer.

.2 Keep soil moist during germination period and adequately water grassed areas until accepted by Engineer.

.3 Apply water to ensure moisture penetration of 75 to 100 mm. Control watering to prevent wash-outs.

END OF SECTION