

**PART 1**      **GENERAL**

**1.1**            **RELATED SECTIONS**

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 01 35 43 - Environmental Procedures.
- .3 Section 01 56 00 - Temporary Barriers and Enclosures.
- .4 Section 02 41 16.01 – Structure Demolition
- .5 Section 31 05 16 – Aggregate Materials.
- .6 Section 31 22 13 – Rough Grading.
- .7 Section 31 23 16.26 – Rock Removal.

**1.2**            **REFERENCES**

- .1 American Society for Testing and Materials (ASTM).
  - .1 ASTM C117, Standard Test Method for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
  - .2 ASTM C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
  - .3 ASTM D422, Standard Test Method for Particle-Size Analysis of Soils.
  - .4 ASTM D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup>) (600 kN-m/m<sup>3</sup>).
  - .5 ASTM D1557, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup>) (2,700 kN-m/m<sup>3</sup>).
  - .6 ASTM D4318, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- .2 Canadian General Standards Board (CGSB).
  - .1 CAN/CGSB-8.1, Sieves, Testing, Woven Wire, Inch Series.
  - .2 CA/CGSB-8.2, Sieves, Testing, Woven Wire, Metric
- .3 Canadian Standards Association (CSA)
  - .1 CAN/CSA-A3000, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
    - .1 CSA-A3001, Cementitious Materials for Use in Concrete.
  - .2 CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/ Methods of Test and Standard Practices for Concrete.

**1.3**            **DEFINITIONS**

- .1 Excavation classes: two classes of excavation will be recognized; common excavation and rock excavation.

- .1 Rock excavation: excavation of material from solid masses of igneous, sedimentary or metamorphic rock which, prior to its removal, was integral with its parent mass, and boulders or rock fragments having individual volume in excess of 1 m<sup>3</sup>. Frozen material not classified as rock.
- .2 Common excavation: excavation of materials of whatever nature, which are not included under definitions of rock excavation.
- .2 Unclassified excavation: excavation of deposits of whatever character encountered in work.
- .3 Topsoil: material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.
- .4 Waste material: excavated material unsuitable for use in work or surplus to requirements.
- .5 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of work.
- .6 Unsuitable materials:
  - .1 Weak and compressible materials under excavated areas.
  - .2 Frost susceptible materials under excavated areas.
  - .3 Frost susceptible materials:
    - .1 Fine grained soils with plasticity index less than 10 when tested to ASTM D4318, and gradation within limits specified when tested to ASTM D422 and ASTM C136: Sieve sizes to CAN/CGSB-8.1.

<u>Sieve Designation</u>	<u>%Passing</u>
2.00 mm	100
0.10 mm	45-100
0.02 mm	10-80
<u>0.005 mm</u>	<u>0-45</u>

- .2 Coarse grained soils containing more than 20% by mass passing 0.075 mm sieve.

**1.4 SUBMITTALS**

- .1 Inform Departmental Representative at least 4 weeks prior to commencing work, of proposed source of fill materials and provide access for sampling.
- .2 Submit 70 kg samples of type of fill specified including representative samples of excavated material.
- .3 Ship samples as directed by Departmental Representative in tightly closed containers to prevent contamination.

**1.5 QUALITY ASSURANCE**

- .1 Submit design and supporting data at least 2 weeks prior to commencing work.

- .2 Design and supporting data submitted to bear stamp and signature of qualified professional engineer registered or licensed in the province of Newfoundland and Labrador.
- .3 Keep design and supporting data on site.
- .4 Engage services of qualified professional engineer who is registered or licensed in Province of Newfoundland and Labrador to design and inspect cofferdams, shoring, bracing and underpinning required for work.
- .5 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 verify location of buried services on and adjacent to site.
  - .2 Arrange with appropriate authority for relocation of buried services that interfere with execution of work: pay costs of relocating services.
  - .3 Remove obsolete buried services within 2 m of foundations: cap cut-offs.
  - .4 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.
  - .5 Prior to commencing excavation work, notify applicable Owner or authorities having jurisdiction, establish location and state of use of buried utilities and structures. Owners or authorities having jurisdiction to clearly mark such locations to prevent disturbance during work.
  - .6 Confirm locations of buried utilities by careful test excavations.
  - .7 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered as indicated.
  - .8 Where utility lines or structures exist in area of excavation, obtain direction of Departmental Representative before removing or re-routing.
  - .9 Record location of maintained, re-routed and abandoned underground lines.
  - .10 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 to approval of Departmental Representative.
  - .3 Where required for excavation, cut roots or branches as approved by Departmental Representative.

**PART 2      PRODUCTS**

**2.1      MATERIALS**

- .1      .1      Backfill Type 1 and Type 2 fill: properties to Section 31 05 16 - Aggregate Materials and the following requirements:
  - .1      Crushed, pit run or screened stone, gravel or sand.
  - .2      Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.1.

Sieve Designation	%Passing	
	<u>Type1</u>	<u>Type2</u>
75 mm	-	100
50 mm	-	-
37.5 mm	-	-
25 mm	100	-
19 mm	75-100	-
12.5 mm	-	-
9.5 mm		50-100
4.75 mm	30-70	22-85
2.00 mm	20-45	-
0.425 mm	10-25	5-30
0.180 mm	-	-
<u>0.075 mm</u>	<u>3-8</u>	<u>0-10</u>

- .2      Type 3 fill: selected material from excavation or other sources, approved by Departmental Representative for use intended, unfrozen and free from rocks larger than 75 mm, cinders, ashes, sods, refuse or other deleterious materials.

**PART 3      EXECUTION**

**3.1      SITE PREPARATION**

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

**3.2      PREPARATION/PROTECTION**

- .1      Protect existing features in accordance with Section 01 56 00 - Temporary Barriers and Enclosures and applicable local regulations.
- .2      Keep excavations clean, free of standing water, and loose soil.
- .3      Where soil is subject to significant volume change due to change in moisture content, cover and protect to Departmental Representative's approval.
- .4      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. Protect buried services that are required to remain undisturbed.

**3.3 STRIPPING OF TOPSOIL (N/A)**

**3.4 STOCKPILING**

- .1 Stockpile fill materials in areas designated by Departmental Representative. Stockpile granular materials in manner to prevent segregation.
- .2 Protect fill materials from contamination.

**3.5 COFFERDAMS, SHORING, BRACING AND UNDERPINNING (N/A)**

**3.6 DEWATERING AND HEAVE PREVENTION**

- .1 Keep excavations free of water while work is in progress.
- .2 Submit for Departmental Representative's review details of proposed dewatering or heave prevention methods, such as dikes, well points, and sheet pile cut-offs.
- .3 Avoid excavation below groundwater table if quick condition or heave is likely to occur. Prevent piping or bottom heave of excavations by groundwater lowering, sheet pile cut-offs, or other means.
- .4 Protect open excavations against flooding and damage due to surface run-off.
- .5 Dispose of water in accordance with Section 01 35 43 - Environmental Procedures and in manner not detrimental to public and private property, or any portion of work completed or under construction.
- .6 Provide flocculation tanks, settling basins, or other treatment facilities to remove suspended solids or other materials before discharging to storm sewers, water courses or drainage areas.

**3.7 EXCAVATION**

- .1 Excavate to lines, grades, elevations and dimensions as indicated by Departmental Representative.
- .2 Remove concrete, masonry, paving, walks, demolished foundations and rubble and other obstructions encountered during excavation in accordance with Section 02 41 16.01 Structure Demolition.
- .3 Excavation must not interfere with bearing capacity of adjacent foundations.
- .4 Do not disturb soil within branch spread of trees or shrubs that are to remain. If excavating through roots, excavate by hand and cut roots with sharp axe or saw.
- .5 Keep excavated and stockpiled materials a safe distance away from edge of trench as directed by Departmental Representative.
- .6 Restrict vehicle operations directly adjacent to open trenches.
- .7 Dispose of surplus and unsuitable excavated material off site.
- .8 Do not obstruct flow of surface drainage or natural watercourses.

- .9 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.
- .10 Notify Departmental Representative when bottom of excavation is reached.
- .11 Obtain Departmental Representative approval of completed excavation.
- .12 Correct unauthorized over-excavation as follows:
  - .1 Fill under bearing surfaces and footings with concrete specified for footings.
  - .2 Fill under other areas with Type 2 fill compacted to not less than 95% of corrected maximum dry density.

### 3.8 **FILL TYPES AND COMPACTION**

- .1 Use fill of types as indicated or specified below. Compaction densities are percentages of maximum densities obtained from ASTM D698 corrected maximum dry density.
  - .1 Exterior side of perimeter walls: use Type 3 fill to subgrade level. Compact to 95%.
  - .2 Within building area: use Type 2 to underside of base course for floor slabs. Compact to 98%.
  - .3 Under concrete slabs: provide 150 mm compacted thickness base course of Type 1 fill to underside of slab. Compact base course to 100%.
  - .4 Retaining walls: use Type 2 fill to subgrade level on high side for minimum 500 mm from wall and compact to 95%. For remaining portion, use Type 3 fill compacted to 95%.
  - .5 To correct over excavation in trenches: use Type 2 fill to underside of sand bedding compacted to 95%.

### 3.9 **BACKFILLING**

- .1 Vibratory compaction equipment: approved by Departmental Representative.
- .2 Do not proceed with backfilling operations until Departmental Representative has inspected and approved installations.
- .3 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.
- .4 Do not use backfill material which is frozen or contains ice, snow or debris.
- .5 Place backfill material in uniform layers not exceeding 150 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.
- .6 Backfill around installations.
  - .1 Do not backfill around or over cast-in-place concrete within 24 hours after placing of concrete.
  - .2 Place layers simultaneously on both sides of installed work to equalize loading. Difference not to exceed 600 mm.
  - .3 Where temporary unbalanced earth pressures are liable to develop on walls or other structures.

- .1 Permit concrete to cure for minimum 14 days or until it has sufficient strength to withstand earth and compaction pressure, and approval obtained from Departmental Representative, or

**3.10 RESTORATION**

- .1 Upon completion of work, remove waste materials and debris, trim slopes, and correct defects as directed by Departmental Representative.
- .2 Clean and reinstate areas affected by work as directed by Departmental Representative.
- .3 Use temporary plating to support traffic loads over unshrinkable fill for initial 24 h.

**END OF SECTION**