

PART 1 - GENERAL

- | | | |
|-------------------------|----|---|
| 1.1 RELATED
SECTIONS | .1 | Section 01 33 00 - Submittal Procedures. |
| | .2 | Section 01 56 00 - Temporary Barriers and Enclosures. |
-
- | | | |
|----------------|----|--|
| 1.2 REFERENCES | .1 | American Society for Testing and Materials International (ASTM) |
| | .1 | ASTM C 117, Standard Test Method for Material Finer than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing. |
| | .2 | ASTM C 136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates. |
| | .3 | ASTM D 422-63, Standard Test Method for Particle-Size Analysis of Soils. |
| | .4 | ASTM D 698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN-m/m ³). |
| | .5 | ASTM D 1557-02e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (2,700 kN-m/m ³). |
| | .6 | ASTM D 4318, 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 | CAN/CGSB-8.28, Sieves, Testing, Woven Wire, Metric. |
| | .3 | Canadian Green Building Council (CaGBC) |
| | .1 | LEED Canada-NC Version 1.0, LEED (Leadership in Energy and Environmental Design): Green Building Rating System For New Construction and Major Renovations. |
| | .4 | Canadian Standards Association (CSA International) |
| | .1 | CAN/CSA-A3000, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005). |
| | .1 | CSA-A300, 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. |

1.2 REFERENCES
(Cont'd)

- .5 U.S. Environmental Protection Agency
(EPA)/Office of Water
.1 EPA 832R92005, Storm Water Management
for Construction Activities: Developing
Pollution Prevention Plans and Best Management
Practices.

1.3 DEFINITIONS

- .1 Excavation classes: two classes of excavation
will be recognized; common excavation and rock
excavation.
.1 Rock : solid material in excess of 1.00
m³ and which cannot be removed by means of
heavy duty mechanical excavating equipment
with 0.95 to 1.15 m³ bucket. 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:
.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 25 millimeters in any dimension.
- .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 Recycled fill material: material, considered
inert, obtained from alternate sources and
engineered to meet requirements of fill areas.
- .7 Unsuitable materials:
.1 Weak, chemically unstable, and
compressible materials.
.2 Frost susceptible materials:
.1 Fine grained soils with plasticity
index less than 10 when tested to ASTM D
4318, and gradation within limits
specified when tested to ASTM D 422 and
ASTM C 136: Sieve sizes to CAN/CGSB-8.1.
.2 Table:
-

1.3 DEFINITIONS
(Cont'd)

- .7 Unsuitable materials: (Cont'd)
.2 Frost susceptible materials: (Cont'd)

Sieve Designation	% Passing
2.00 mm	100
0.10 mm	45 - 100
0.02 mm	10 - 80
0.005 mm	0 - 45

- .3 Coarse grained soils containing more than 20 % by mass passing 0.075 mm sieve.
- .8 Unshrinkable fill: very weak mixture of cement, concrete aggregates and water that resists settlement when placed in utility trenches, and capable of being readily excavated.

1.4 SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Quality Control: in accordance with Section 01 45 00 - Quality Control:
- .1 Submit condition survey of existing conditions as described in EXISTING CONDITIONS article of this Section.
- .2 Submit for review by Departmental Representative proposed dewatering and heave prevention methods as described in PART 3 of this Section.
- .3 Submit to Departmental Representative written notice at least 7 days prior to excavation work, to ensure cross sections are taken.
- .4 Submit to Departmental Representative written notice when bottom of excavation is reached.
- .5 Submit to Departmental Representative testing inspection results and report as described in PART 3 of this Section.
- .3 Preconstruction Submittals:
- .1 Submit construction equipment list for major equipment to be used in this section prior to start of Work.
- .2 Submit records of underground utility locates, indicating: location plan of existing utilities as found in field clearance record from utility authority location plan of relocated and abandoned services, as required.
- .4 Samples:
- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
-

1.4 SUBMITTALS
(Cont'd)

- .4 Samples: (Cont'd)
 - .2 Inform Departmental Representative at least 4 weeks prior to beginning Work, of proposed source of fill materials and provide access for sampling.
 - .3 Submit 70 kg samples of type of fill specified including r.prepresentative samples of excavated material
 - .4 Ship samples as directed by Departmental Representative, in tightly closed containers to prevent contamination and exposure to elements.

1.5 QUALITY
ASSURANCE

- .1 Qualification Statement: submit proof of insurance coverage for professional liability.
- .2 Submit design and supporting data at least 2 weeks prior to beginning Work.
- .3 Design and supporting data submitted to bear stamp and signature of qualified professional engineer registered or licensed in Province of Newfoundland and Labrador, Canada.
- .4 Keep design and supporting data on site.
- .5 Engage services of qualified Professional Engineer who is registered or licensed in the Province of Newfoundland and Labrador, Canada in which Work is to be carried out to design and inspect cofferdams, shoring, bracing and underpinning required for Work.
- .6 Do not use soil material until written report of soil test results are reviewed and approved by Departmental Representative.
- .7 Health and Safety Requirements:
 - .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

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
-

1.6 EXISTING
CONDITIONS

(Cont'd)

- .1 (Cont'd)
 - .4 (Cont'd)

guidance only. Completeness and accuracy are not guaranteed.
 - .5 Prior to beginning excavation Work, notify applicable Departmental Representative or authorities having jurisdiction establish location and state of use of buried utilities and structures. Departmental Representative 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 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 as directed by Departmental Representative.
 - .3 Where required for excavation, cut roots or branches as directed by Departmental Representative.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Backfill Type 1 and Type 2 fill: properties to the following requirements:
- .1 Crushed, pit run or screened stone, gravel or sand.
 - .2 Gradations to be within limits specified when tested to ASTM C 136 and ASTM C 117. Sieve sizes to CAN/CGSB-8.1.

Sieve Designation	% Passing	
Type 1	Type 2	
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	-	-
0.075 mm	3-8	0-10

- .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 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 approval.

3.2 PREPARATION/
PROTECTION
(Cont'd)

- .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.
- .5 Protect buried services that are required to remain undisturbed.

3.3 STRIPPING OF
TOPSOIL

- .1 Begin topsoil stripping of areas as indicated by Departmental Representative after area has been cleared of brush weeds and grasses and removed from site.
- .2 Strip topsoil to depths as indicated by Departmental Representative. Do not mix topsoil with subsoil.
- .3 Stockpile in locations as indicated by Departmental Representative. Stockpile height not to exceed 2 m and should be protected from erosion.
- .4 Dispose of unused topsoil as directed by Departmental Representative off site.

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

- .1 Maintain sides and slopes of excavations in safe condition by appropriate methods and in accordance with Occupational Health and Safety Act for Province of Newfoundland and Labrador
 - .2 Obtain permit from authority having jurisdiction for temporary diversion of water course.
 - .3 Construct temporary Works to depths, heights and locations as indicated or approved by Departmental Representative.
 - .4 During backfill operation:
-

3.5 COFFERDAMS,
SHORING, BRACING
AND UNDERPINNING
(Cont'd)

- .4 During backfill operation: (Cont'd)
 - .1 Unless otherwise indicated or directed by Departmental Representative, remove sheeting and shoring from excavations.
 - .2 Do not remove bracing until backfilling has reached respective levels of such bracing.
 - .3 Pull sheeting in increments that will ensure compacted backfill is maintained at elevation at least 500 mm above toe of sheeting.
- .5 When sheeting is required to remain in place, cut off tops at elevations as indicated.
- .6 Upon completion of substructure construction:
 - .1 Remove cofferdams, shoring and bracing.
 - .2 Remove excess materials from site and restore watercourses as indicated and as directed by Departmental Representative.

3.6 DEWATERING AND
HEAVE PREVENTION

- .1 Keep excavations free of water while Work is in progress.
- .2 Provide for Departmental Representative's review approval details of proposed dewatering or heave prevention methods, including 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 a manner not detrimental to public and private property, or 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, watercourses or drainage areas.

3.7 EXCAVATION

- .1 Advise Departmental Representative at least 7 days in advance of excavation operations for initial cross sections to be taken.
-

3.7 EXCAVATION
(Cont'd)

- .2 Excavate to lines, grades, elevations and dimensions as indicated by Departmental Representative.
 - .3 Remove concrete masonry paving walks demolished foundations and rubble and other obstructions encountered during excavation in accordance with Departmental Representative.
 - .4 Excavation must not interfere with bearing capacity of adjacent foundations.
 - .5 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.
 - .6 For trench excavation, unless otherwise authorized by Departmental Representative in writing, do not excavate more than 30 m of trench in advance of installation operations and do not leave open more than 15 m at end of day's operation.
 - .7 Keep excavated and stockpiled materials safe distance away from edge of trench as directed by Departmental Representative.
 - .8 Restrict vehicle operations directly adjacent to open trenches.
 - .9 Dispose of surplus and unsuitable excavated material off site.
 - .10 Do not obstruct flow of surface drainage or natural watercourses.
 - .11 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.
 - .12 Notify Departmental Representative when bottom of excavation is reached.
 - .13 Obtain Departmental Representative approval of completed excavation.
 - .14 Remove unsuitable material from trench bottom including those that extend below required elevations to extent and depth as directed by Departmental Representative.
 - .15 Correct unauthorized over-excavation as follows:
 - .1 Fill under bearing surfaces and footings with concrete specified for footings.
-

- 3.7 EXCAVATION (Cont'd) .15 (Cont'd)
- .2 Fill under other areas with Type 2 fill compacted to not less than 95 % of corrected maximum dry density.
- .16 Hand trim, make firm and remove loose material and debris from excavations.
- .1 Where material at bottom of excavation is disturbed, compact foundation soil to density at least that of undisturbed soil.
- .2 Clean out rock seams and fill with concrete mortar or grout to approval of Departmental Representative.
- 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 D 698 corrected maximum dry density.
- .1 Exterior side of perimeter walls: use Type 3 fill to subgrade level. Compact to 95 of corrected maximum dry density.
- .2 Within building area: use Type 2 to underside of base course for floor slabs. Compact to 100% of corrected maximum dry density.
- .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 BEDDING AND SURROUND OF UNDERGROUND SERVICES .1 Place and compact granular material for bedding and surround of underground services as indicated.
- .2 Place bedding and surround material in unfrozen condition.
- 3.10 BACKFILLING .1 Vibratory compaction equipment: approved by Departmental Representative.
-

3.10 BACKFILLING
(Cont'd)

- .2 Do not proceed with backfilling operations until completion of following:
 - .1 Departmental Representative has inspected and approved installations.
 - .2 Inspection, testing, approval, and recording location of underground utilities.
 - .3 Removal of concrete formwork.
 - .4 Removal of shoring and bracing; backfilling of voids with satisfactory soil material.
- .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 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. Difference not to exceed 600 mm.
 - .4 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:
 - .2 If approved by Departmental Representative, erect bracing or shoring to counteract unbalance, and leave in place until removal is approved by Departmental Representative.

3.11 RESTORATION

- .1 Upon completion of Work, remove waste materials and debris, trim slopes, and correct defects as directed by Departmental Representative.
 - .2 Replace topsoil as indicated as directed by Departmental Representative.
 - .3 Reinstall lawns to elevation which existed before excavation.
-

- 3.11 RESTORATION
(Cont'd)
- .4 Reinstall pavements and sidewalks disturbed by excavation to thickness, structure and elevation which existed before excavation.
 - .5 Clean and reinstall areas affected by Work as directed by Departmental Representative.
 - .6 Use temporary plating to support traffic loads over unshrinkable fill for initial 24 hours.