

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 01 35 43 – Environmental Procedures.
- .2 Section 26 05 01 – Common Work Results Electrical

**1.2 MEASUREMENT OF PAYMENT**

- .1 Excavated materials will be by lump sum and shall include all labour, equipment and materials required to excavate to the limits indicated and dispose excavated materials off site, including trenches for underground services.
- .2 Payment for sandfill for bedding material and surround at underground services shall be deemed incidental and shall be included in the electrical item, as per Section 26 05 01 - Common Work Results Electrical

**1.3 REFERENCES**

- .1 American Society for Testing and Materials International (ASTM)
  - .1 ASTM C117-04, Standard Test Method for Material Finer than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
  - .2 ASTM C136-05 Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
  - .3 ASTM D422-63 2002, Standard Test Method for Particle-Size Analysis of Soils.
  - .4 ASTM D698-00ae1, Standard Test Methods 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 D1557-02e1, Standard Test Methods 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 D4318-05, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- .2 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
  - .2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.
  - .3 LEED Canada-CI Version 1.0-2007, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Guide For Commercial Interiors.

**1.4 DEFINITIONS**

- .1 Excavation classes: one class of excavation will be recognized; common excavation.
  - .1 Common excavation: excavation of materials of whatever nature, which are not included under definitions of rock excavation.
- .2 Waste material: excavated material unsuitable for use in Work or surplus to requirements.
- .3 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of Work.

- .4 Recycled fill material: material, considered inert, obtained from alternate sources and engineered to meet requirements of fill areas.
- .5 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 D4318, and gradation within limits specified when tested to ASTM D422 ASTM C136: Sieve sizes to CAN/CGSB-8.1 CAN/CGSB-8.2.

## **1.5 SUBMITTALS**

- .1 Quality Control:
  - .1 Submit for review by Engineer proposed dewatering methods as described in PART 3 of this Section.
  - .2 Submit to Engineer written notice at least 7 days prior to excavation work, to ensure cross sections are taken.
  - .3 Submit to Engineer written notice when bottom of excavation is reached.
  - .4 Submit to Engineer testing results as described in PART 3 of this Section.
- .2 Preconstruction Submittals:
  - .1 Submit records of underground utility locates, indicating: location plan of existing utilities as found in field, clearance record from utility authority, and location plan of relocated and abandoned services, as required.

## **1.6 QUALITY ASSURANCE**

- .1 Qualification Statement: submit proof of insurance coverage for professional liability.
- .2 Keep design and supporting data on site.
- .3 Engage services of qualified professional Engineer who is registered or licensed in Province of Manitoba, Canada in which Work is to be carried out to design and inspect cofferdams, shoring, bracing and underpinning required for Work.
- .4 Health and Safety Requirements:
  - .1 Do construction occupational health and safety in accordance with Provincial standards.

## **1.7 EXISTING CONDITIONS**

- .1 Buried services:
  - .1 Before commencing work verify location of buried services on and adjacent to site.
  - .2 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered.
  - .3 Where utility lines or structures exist in area of excavation, obtain direction of Engineer before removing or re-routing.
  - .4 Record location of maintained, re-routed and abandoned underground lines.

- .2 Existing buildings and surface features:
  - .1 Conduct, with Engineer, condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, 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 Engineer.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Geotextiles: Non-woven geotextiles shall be Class II and consist of a manufactured sheet, web, or batt of directionally or randomly oriented fibres, filaments, or other elements produced by bonding or interlocking the elements by mechanical, thermal, or chemical means.
  - .1 Tensile strength, Marv, minimum 660 N to CAN/CGSB 148.1, Method No. 7.3.
  - .2 Elongation at break, typical, >50% to CAN/CGSB 148.1, Method No. 7.3.
  - .3 Tear strength, MARV, minimum, 250 N to CAN/CGSB 4.2, Method No. 12.2.
  - .4 Puncture strength, MARV minimum, 1375 N to ASTM D 6241.
  - .5 Permittivity, minimum, to 0.05 CAN/CGSB 148.1, Method No. 4 s<sup>-1</sup>.
  - .6 Ultraviolet stability, minimum, 50% retained tensile strength at 500 hours to ASTM D 4355.
- .2 Backfill: Type 'B' limestone. Gradations to be within limits specified when tested to ASTM C136 ASTM C117. Sieve sizes to CAN/CGSB-8.1 CAN/CGSB-8.2.
- .3 Sandfill: Uniformly graded clean sand with maximum aggregate size of 2.0 mm and maximum 8% passing the number 200 sieve.

## **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, walkways and waterways.
- .2 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

### **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, and loose soil.
- .2 Protect buried services that are required to remain undisturbed.

### **3.4 DEWATERING**

- .1 Keep excavations free of water while Work is in progress.
- .2 Provide for Engineer approval details of proposed dewatering methods, including dikes, well points, and sheet pile cut-offs.
- .3 Protect open excavations against flooding and damage due to surface run-off.
- .4 Dispose of water in accordance with Section 01 35 43 - Environmental Procedures and in manner not detrimental to public and private property, or portion of Work completed or under construction.

### **3.5 EXCAVATION**

- .1 Advise Engineer at least 7 days in advance of excavation operations for initial cross sections to be taken.
- .2 Excavate to lines, grades, elevations and dimensions as indicated.
  - .1 In addition, remove all topsoil, organic matter, debris, and other loose and harmful matter encountered at subgrade level.
- .3 Excavation must not interfere with bearing capacity of adjacent foundations.
- .4 Excavate trenches to provide uniform continuous bearing and support for 250 mm thickness of bedding material.
- .5 Dispose of surplus and unsuitable excavated material off site.
- .6 Base of excavations to be free from loose, soft or organic matter.
- .7 Notify Engineer when bottom of excavation is reached.
- .8 Obtain Engineer approval of completed excavation.
- .9 Correct unauthorized over-excavation, and fill all exposed voids, as follows:
  - .1 Fill with Granular B Limestone material compacted to not less than 95 % of corrected Standard Proctor maximum dry density.
- .10 Level and compact base of excavation to 95% SPD to ensure a smooth profile free of sharp edges.
- .11 Install geotextile at limits of excavation, as indicated on the Drawings and in accordance with Section 31 32 19.01 - Geotextiles.

### **3.6 FILL TYPES AND COMPACTION**

- .1 Use types of fill as indicated and specified below.
  - .1 In Trenches
    - .1 Provide 250 mm thick sandfill for bedding material and surround at underground services, as indicated.
    - .2 Provide new limestone 'B' granular material as indicated. Compact in 150 mm lifts to 98% SPD.

### **3.7 BACKFILLING**

- .1 Do not proceed with backfilling operations until completion of following:

- .1 Engineer has inspected and approved installations.
- .2 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.
- .3 Do not use backfill material which is frozen or contains ice, snow or debris.
- .4 Place granular backfill material in uniform layers not exceeding 150 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.

**3.8 RESTORATION**

- .1 Upon completion of Work, remove waste materials and debris off site.

**END OF SECTION**