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- 1 General
- 1.1 **SECTION INCLUDES**
- .1 Labour, Products, equipment and services necessary for earthwork work in accordance with the Contract Documents.
- 1.2 **REFERENCES**
- .1 ASTM D698, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort.
- .2 OPSS, Ontario Provincial Standard Specification.
- .3 O.Reg. 406/19, Ontario Regulation 406/19: On-Site and Excess Soil Management
- .4 The Soil Rules, Rules for Soil Management and Excess Soil Quality Standards.
- 1.3 **SUBMITTALS**
- .1 Reports:
- .1.1 Submit written laboratory test reports.
- .1.2 Submit written field inspection and test report results after each inspection.
- .2 Submit dewatering methods 30 days in advance for review by Consultant. If well point system is required, Engineer shall design system and supervise installation.
- .3 Submit to Consultant details of locations where surplus soils and other materials are to be disposed of or reused. Include each disposal/reuse Site and type of surplus soil or other material, location of the disposal/reuse Site, operator's name and business address, type of license under which Site operates, and criteria used by Site to access suitability of surplus material for disposal.
- .4 Submit to the Consultant written acceptance from the reuse/receiving site of any surplus soils and other materials prior to removal from the Site.
- .5 Submit to Consultant, within 48 hours of a load of surplus soil or other material leaving the Site, a daily register recording the time and place of disposal/reuse of each load signed by a representative of the disposal site. Such documentation must be submitted before payment for excavation will be made.
- .6 If more than 2,000 m³ of surplus soil (excess soil) or other material leaves the Site, tracking in accordance with O.Reg. 406/19 will be required.
- .7 If more than 2,000 m³ of surplus soil (excess soil) or other material leaves the Site, file a notice on the Excess Soil Registry.

1.4 **SITE CONDITIONS**

- .1 Cultural heritage resources: If Cultural Heritage Resources (such as archaeological sites, artifacts, building and structural remains, and/or human burials) are encountered during performance of Work, contact Consultant immediately and suspend Work in immediate area until assessment has been completed by Ministry of Culture, Tourism and Recreation. Perform required measures to mitigate negative impacts on found resources to acceptance of Consultant.

1.5 **PROTECTION**

- .1 Existing buried utilities and structures:
 - .1 Size, depth and location of known existing utilities and structures are indicated for guidance only. Completeness and accuracy is not guaranteed.
 - .2 Prior to commencing any excavation Work, have authorities stake out utility locations to prevent disturbance during Work.
 - .3 Confirm locations of buried utilities by careful test excavations. Hand dig test excavations as necessary.
 - .4 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered. Obtain permission of Consultant before moving or otherwise disturbing utilities or structures.
- .2 Temporarily cover local existing catch basins and maintenance holes to prevent entry of earth or debris. Ensure adequate surface drainage in affected area is maintained.
- .3 Protect Work or work of other Contracts in progress or completed and protect existing properties, stored Products, services, utilities, trees, landscaping and natural features from damage.
- .4 Protect excavations against flooding and damage and install and maintain appropriate warning devices during construction and during time when Work is closed down for any cause.
- .5 Protect bottom of excavations that will support foundations, slabs, pavements etc. from frost or freezing.
- .6 Keep access roads clear of debris and dirt resulting from Work of this Section to acceptance of Authorities having jurisdiction.

2 Products

2.1 **MATERIALS**

- .1 Salt-impacted (elevated electrical conductivity and/or sodium adsorption ratio) reusable fill excavated from Site may only be placed greater than 30 m away from the on-Site watercourse. Salt-impacted soil may be placed to grade beneath parking areas, driveways, roadways, or sidewalks. Salt-impacted soil may be placed greater than 1.5 m below grade in other areas of the site greater than 30 m away from the watercourse. Imported soil must be demonstrated to meet the applicable Table 9.1 Full Depth Excess Soil Quality Standards for Use within 30 metres of a Water Body in a Non-Potable Ground Water Condition for placement within 30 m of the watercourse on the eastern portion of the Site, or must meet the applicable Table 3.1 Full Depth Excess Soil Quality Standards in a Non-Potable Ground Water Condition for placement greater than 30 m from the watercourse.
- .2 Granular A fill: Imported Granular A fill, free of organic matter and, in accordance with OPSS 1010.
- .3 Granular B Fill: Imported Granular B fill free of organic matter and in accordance with OPSS 1010.
- .4 Dewatering equipment: Equip submersible pumps with filters and/or screens to prevent ground loss. Maintain filters in good operating condition.

3 Execution

3.1 **EXAMINATION**

- .1 Verify condition and dimensions of previously installed work upon which this Section depends. Report defects to Consultant. Commencement of Work means acceptance of existing conditions.

3.2 **LINES AND ELEVATIONS**

- .1 Establish lines and elevations from Control Points shown on Contract Drawings.
- .2 Have lines and elevations established by Registered Ontario Land Surveyor or qualified Civil Engineer registered in Province of Ontario.
- .3 Protect and maintain Control Points and Bench Marks as long as they are required.

3.3 REMOVAL OF WATER

- .1 Obtain letter of conditional approval from Authorities having Jurisdiction to dispose of ground water into sewer drainage system. Apply for and pay for water disposal permit.
- .2 Keep excavations and trenches free of water throughout construction period.
- .3 Groundwater removal:
 - .1 Lower groundwater level and maintain at depth below lowest point of excavation to ensure a dry stable surface.
 - .2 Dewater to prevent loss of soil and maintain stability of sides and bottom of excavation and of adjacent structures.
 - .3 Dispose of water in conformance with applicable by-laws and in a manner not detrimental to public and private property, or portion of Work completed or under construction.
 - .4 Supply and install flocculation tanks, settling basins, or other treatment facilities to remove suspended solids or other materials before discharging to sewers, water courses or drainage areas in accordance with authorities having jurisdiction. Perform testing on settlement tank discharge to confirm that effluent meets sewer bylaw requirements. Locate tanks to acceptable area determined by Consultant.
 - .5 Should method of dewatering fail to achieve conditions specified above, Consultant reserves right to revise methods and procedures at no cost to Owner.
- .4 Surface water removal:
 - .1 Remove surface run-off in a manner that will prevent loss of soil and maintain stability of sides and bottom of excavation. Obtain Consultant's approval of dewatering method to be used.
 - .2 Discharge surface water into existing storm drainage system to acceptance of Consultant and local authorities.
- .5 Do not obstruct flow of surface drainage or natural water courses.

3.4 EXCAVATION

- .1 Remove concrete, masonry, paving, demolished foundations and rubble and other obstructions encountered during excavation work.
- .2 Do not disturb soil within drip line of trees or shrubs that are to remain. If excavating through roots, excavate by hand and cut roots with sharp axe or saw in a manner acceptable to authorities having jurisdiction.
- .3 Excavate to required lines and grades shown on Contract Drawings with allowance for subsequent Work including shoring, bracing and formwork. Make excavation clean and clear of loose material and true to size.
- .4 Protect stockpiles of fill against contamination and moisture absorption.

- .5 Do not undermine adjacent structures. Where it is necessary to have footings at different levels, found upper footing below imaginary 10-horizontal-to-7 vertical line, or as otherwise indicated, drawn up from base of lower footing. Protect adjacent foundations from frost.
- .6 Have excavations in excess of 1200 mm in depth conform to requirements of Occupational Health and Safety Act, and Regulations for Construction Projects.
- .7 Do not expose shale at subgrade elevation to drying cycles and in any case, following inspection, cover with minimum 50 mm of lean concrete within 4 hours after exposure.
- .8 Fill excavations for foundations which are, through error, carried below elevation shown or approved depth, with 15 MPa concrete, or as directed by Consultant.
- .9 Trim, and remove loose material, debris and organic material from excavations. Where material at bottom of excavation is disturbed, remove disturbed material and re-compact to density equal to or better than undisturbed soil or backfill with lean concrete as directed by Consultant.
- .10 When excavations are complete, prior to commencement of subsequent Work, request Consultant for inspection of excavation Work.

3.5 EXCAVATED MATERIAL DISPOSAL

- .1 Except for material to be used as select fill, immediately remove and dispose of excavated material from Site.

3.6 DISPOSAL OF EXCAVATED MATERIALS

- .1 All excavated sub-grade material generated by construction, may be used as fill on-site unless otherwise rejected by the Consultant, in which case it is to be disposed of legally off-site at a location determined and paid for by the Contractor in accordance with O.Reg. 406/19.
- .2 All surplus sub-grade material generated by construction and not required to attain indicated final grades is to be disposed of legally off-site, in accordance with O.Reg. 406/19, at a location determined and paid for by the Contractor.
- .3 Any required testing of excavated material to be disposed of off-site shall be arranged and paid for by the Contractor prior to removal from the Site.

3.7 BACKFILLING

- .1 Do not proceed with backfilling operations until walls, slabs, waterproofing and below grade Work has been inspected and accepted by Consultant.
- .2 Backfill areas which are 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 Do not backfill on or against any dampproofing, membrane, or protection board covered waterproofing with jagged rock or other sharp objects which might damage waterproofing.
- .5 Limit vertical drop of backfill material to 2000 mm.
- .6 Prior to backfilling or placing concrete on exposed soil subgrade, proof roll subgrade to identify soft or loose areas. Proceed with placing backfill or concrete only after inconsistencies identified by above procedure have been reworked and compacted or excavated, backfilled and compacted as required to eliminate such conditions to acceptance of Consultant.
- .7 Place backfill material, grade and compact to levels shown on Contract Drawings.
- .8 Place backfill materials in uniform layers 200 mm maximum loose thickness unless specified otherwise.
- .9 Ensure each layer is compacted, and accepted by Consultant, before placing succeeding layers.
- .10 During backfilling, take care to avoid displacing or damaging Utilities Work and Services.
- .11 Notify Consultant prior to commencement of backfilling and compacting operations.

3.8 **COMPACTION**

- .1 Compaction densities for select fill, granular fill, and sand fill materials will be determined by ASTM D698.
- .2 Add water if necessary to obtain required densities. Correct irregularities or depressions that may develop during compaction by removing or adding material to form a smooth and uniform surface.
- .3 Shape and roll alternately to obtain smooth, even and uniformly compacted base.
- .4 If material is excessively moist, aerate by scarifying with suitable equipment until moisture content is corrected.
- .5 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers acceptable to Consultant.
- .6 Compact backfill materials as follows:
 - .1 Imported fill: 98% standard Proctor maximum dry density (SPMDD).
 - .2 Under slabs, walks and pavements: 100% (SPMDD).
 - .3 All other areas: 95% (SPMDD).

3.9 GRADING

- .1 Prior to placing fill over existing ground, scarify surface to depth of 150 mm. Maintain fill and existing surface at approximately same moisture content to facilitate bonding.
- .2 Place material only on clean unfrozen surface, properly shaped and compacted and free from snow and ice. Ensure no frozen material is used in placing.
- .3 Grade as necessary to bring Work areas to required elevations. Supply additional material required to obtain new grade levels. Place and compact as specified.
- .4 Grade drainage ditches to elevations indicated on Contract Drawings.
- .5 Maintain positive drainage.
- .6 Grade materials using methods which do not lead to segregation or degradation of aggregate.
- .7 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
- .8 Remove and replace that portion of layer in which material becomes segregated during spreading.
- .9 Slope grade away from buildings 1:50 minimum.
- .10 Make graded areas smooth to profile, free of debris, with local excavations and depressions filled and compacted.
- .11 Do not disturb soil within branch spread of trees and shrubs remaining.
- .12 Cultivate entire area which is to receive topsoil to a depth of 100 mm. Repeat cultivation in those areas where equipment used for hauling and spreading has compacted soil.
- .13 Remove surface debris, roots, vegetation, branches and stones in excess of 50 mm in diameter.

END OF SECTION