## Part 1 General

### 1.1 RELATED REQUIREMENTS

.1 Section 013543 – Environmental Procedures.

.2 Section 024199 – Demolition for minor works.

.3 Section 313219.01 – Geotextiles.

.4 Section 313700 – Rip-Rap.

### 1.2 MEASUREMENT PROCEDURES

.1 Excavation and backfill works are not subject to any paying post. They are included in the prices of the corresponding structures.

### 1.3 REFERENCES

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

.1 ASTM C 117-latest edition, Standard Test Method for Material Finer than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.

.2 ASTM C 136-latest edition, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

.3 ASTM D 422-latest edition, Standard Test Method for Particle-Size Analysis of Soils.

.4 ASTM D 1557-[02e1], Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft $^3$) (2,700 kN-m/m$^3$)

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-8.1-latest edition, Sieves, Testing, Woven Wire, Inch Series.

.2 CAN/CGSB-8.2-latest edition, Sieves, Testing, Woven Wire, Metric.

.3 Canadian Standards Association (CSA International)

.1 CAN/CSA-A3000-latest edition, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

.1 CSA-A3001-[03], Cementitious Materials for Use in Concrete.

.2 CSA-A23.1/A23.2-latest edition, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

.4 Ministry of Transportation of Quebec : standards 2101 and 14501.

### 1.4 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 m $^3$ and which cannot be removed by means of heavy duty mechanical excavating equipment with 0.95 to 1.15 m$^3$ 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 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 are not authorized by this contract.

## 1.5 ACTION AND INFORMATIONAL 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 the Departmental representative proposed dewatering methods as described in PART 3 of this Section.

.3 Submit to the Departmental representative written notice at least 7 days prior to excavation work, to ensure cross sections are taken.

.4 Submit to the Departmental representative written notice when bottom of excavation is reached.

.5 Submit to the Departmental representative testing, inspection results and report as described in PART 2 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 location plan of relocated and abandoned services, as required.

.4 Samples

.1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

.2 Inform the Departmental representative at least 4 weeks prior to beginning Work, of proposed source of fill materials and provide access for sampling.

## 1.6 QUALITY ASSURANCE

.1 Engage services of qualified professional Engineer who is registered or licensed in Province of Quebec, Canada in which Work is to be carried out to design and inspect cofferdams, shoring, bracing and underpinning required for Work. All costs must pay by the Contractor.

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

.3 Health and Safety Requirements

.1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

## 1.7 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling.

.2 Divert excess aggregate materials from landfill to local quarry or recycling for reuse as directed by the Departmental representative.

## 1.8 EXISTING CONDITIONS

.1 Examine soil report.

.2 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 beginning excavation Work, notify the Job Site Supervisor, Departmental Representative and authorities having jurisdiction established location and state of use of buried utilities and structures. The Job Site Supervisor, the Departmental Representative and authorities having jurisdiction have 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.

.8 Where utility lines or structures exist in area of excavation, obtain direction of the Departmental representative before removing.

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

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

.3 Existing buildings and surface features

.1 Conduct, with the 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 the Departmental representative.

.3 Where required for excavation, cut roots or branches in accordance with standards and regulations in effect.

## Part 2 Products

### 2.1 MATERIALS

.1 Backfill of crushed stone or natural gravel, MG 112.

.2 Stone fill: granite, limestone or other hard stone of calibre 100 to 300 kg (supplied by Parks Canada).

.3 Stone fill: granite, limestone or other hard stone of calibre 20 to 150 mm.

.4 Geotextiles: according to section 313219.01 – Geotextiles.

## Part 3 Execution

### 3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

.1 Not used.

### 3.2 SITE PREPARATION

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

.2 Cut pavement or sidewalk neatly along limits of proposed excavation in order that surface may break evenly and cleanly.

### 3.3 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 the Departmental representative 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.

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

### 3.4 STRIPPING OF TOPSOIL

.1 Not used.

### 3.5 STOCKPILING

.1 Stockpile fill materials in areas designated by the Departmental representative.

.1 Stockpile granular materials in manner to prevent segregation.

.2 Protect fill materials from contamination.

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

## 3.6 COFFERDAMS, SHORING, BRACING AND UNDERPINNING

.1 If necessary, during the excavation and for setting up of work, construction of temporary retaining structure (cofferdams, shoring, bracing and underpinning work).

.2 Cofferdam in impermeable soils are not allowed.

.3 During backfill operation.

.1 Unless otherwise indicated or directed by the 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.

.4 When sheeting is required to remain in place, cut off tops at elevations as indicated.

.5 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 the Departmental representative.

## 3.7 DEWATERING AND HEAVE PREVENTION

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

.2 Provide for information the Departmental representative 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.

.1 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 to approved collection and in 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.

## 3.8 EXCAVATION

.1 Advise the Departmental representative 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.

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

.4 Keep excavated and stockpiled materials safe distance away from edge of trench as directed by the Departmental representative.

.5 Restrict vehicle operations directly adjacent to open trenches.

.6 Dispose of surplus and unsuitable excavated material off site.

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

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

.9 Notify the Departmental representative when bottom of excavation is reached.

.10 Obtain the Departmental representative approval of completed excavation.

.11 Remove unsuitable material from trench bottom including those that extend below required elevations to extent and depth as directed by the Departmental representative.

.12 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 equal to undisturbed soil.

.2 Clean out rock seams and fill with concrete mortar or grout to approval of the Departmental representative.

.13 Install geotextiles in accordance with Section 31 32 19.01 - Geotextiles.

## 3.9 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 1557.

.1 Exterior side of perimeter walls: use Type [3] fill to subgrade level. Compact to [95]% of corrected maximum dry density.

## 3.10 BEDDING AND SURROUND OF UNDERGROUND SERVICES

.1 Not used.

## 3.11 BACKFILLING

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

.1 The Departmental representative 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 backfill material in uniform layers not exceeding 300 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.

.5 Backfilling around installations

.1 Place bedding and surround material as specified elsewhere.

.2 Do not backfill around or over cast-in-place concrete within 48 hours after placing of concrete.

.3 Place layers simultaneously on both sides of installed Work to equalize loading. Difference not to exceed 0,3 m.

.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 the Departmental representative.

.6 Install drainage system in backfill as indicated.

.7 For backfill stone reshape embankment to obtain the slopes shown on the plans. Place the largest stone at the bottom in a stable manner. Spread the rock carefully to fill in the gaps with smaller pieces and get a compact mass.

## 3.12 RESTORATION

.1 Upon completion of Work, remove waste materials and debris, trim slopes, and correct defects as directed by the Departmental representative.

.2 Replace topsoil as directed by the Departmental representative.

.3 Reinstate lawns to elevation which existed before excavation.

.4 Reinstate pavements and sidewalks disturbed by excavation to thickness, structure and elevation which existed before excavation.

.5 Clean and reinstate areas affected by Work as directed by the Departmental representative.

**END OF SECTION**