

**PART 1        GENERAL**

**1.1            General**

- .1        This specification shall be read in conjunction with the Drawings and all other Sections of the Contract Documents.

**1.2            Related Sections**

- .1        Section 01 29 83 – Testing and Laboratory Services.
- .2        Section 01 33 00 – Shop Drawings and Submittals.
- .3        Section 01 35 30 – Health and Safety Requirements.
- .4        Section 01 45 00 – Quality Control.
- .5        Section 31 05 16 – Aggregates.
- .6        Section 31 23 33.01 –Trenching and Backfilling.

**1.3            Work Included**

- .1        The Work under this Section shall include the supply and placement of all equipment, labour, and materials necessary to reinstate existing roadways including excavation to subgrade, subgrade preparation, supply, placement, and compaction of granular A, B, or C base course.

**1.4            Reference Standards**

- .1        ASTM International (ASTM)
  - .1        ASTM D698, 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>)).
  - .2        ASTM D6938, Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

**1.5            Definitions**

- .1        Surface Course
  - .1        The surface course shall be the top layer of material which will be exposed to vehicle traffic.
- .2        Base Course
  - .1        The base course shall be the layer of material directly below the surface course.
- .3        Subbase
  - .1        The subbase shall be the layer of material below the base course.
- .4        Subgrade

- .1 The subgrade shall be the material which the road structure is founded upon. This may be the existing ground, the prepared base of an excavation, or the top of an embankment of engineered fill.
- .5 Embankment
  - .1 Fill material outside the road subgrade.
- .6 Rock
  - .1 As defined in Section 31 23 33.01 – Trenching and Backfilling.
- .7 Unsuitable Material
  - .1 As defined in Section 31 23 33.01 – Trenching and Backfilling.
- .8 Surplus Material
  - .1 Excess material for which there is no need for on Site.
- .9 Borrow
  - .1 Embankment or subgrade material imported from an off-Site source.

## **PART 2 PRODUCTS**

### **2.1 Materials**

- .1 Granular A
  - .1 Granular A shall conform to the requirements listed in Section 31 05 16 - Aggregates.
- .2 Granular B
  - .1 Granular B shall conform to the requirements listed in Section 31 05 16 - Aggregates.
- .3 Granular C
  - .1 Granular C shall conform to the requirements listed in Section 31 05 16 - Aggregates.
- .4 Sand
  - .1 Sand shall conform to the requirements listed in Section 31 05 16 - Aggregates.

## **PART 3 EXECUTION**

### **3.1 Stripping Organic Material**

- .1 Unless specifically directed, there shall be no stripping of the organic layer of material for road construction.
- .2 Stripping of the organic material shall only occur in areas requiring excavation to prepare the subgrade at the design elevation.

### **3.2 Excavation and Subgrade Preparation**

- .1 This Work shall include all excavation necessary to prepare the subgrade in areas requiring new construction or reconstruction and shall include all hauling, spreading, and levelling of excavated material.
- .2 The excavated material shall be hauled to the location as directed of the Owner's Representative. It shall be spread, graded, and compacted as directed by the Owner's Representative.
- .3 The Contractor shall not excavate below the subgrade level unless directed by the Owner's Representative.
- .4 The bottom of the excavation shall provide a flat, uniform, dry surface for the construction of the subbase.
- .5 Upon completion of the excavation to the subgrade elevation, the bottom of the excavation shall be inspected and approved by the Owner's Representative prior to the placement of any material for the construction of the subbase.
- .6 If the bottom of the excavation is unsuitable for the placement of granular material, the Contractor shall notify the Owner's Representative.
- .7 Remove and dispose of unsuitable or surplus material as directed. The Contractor shall source an appropriate disposal site. It is the Contractor's responsibility to acquire permits as required by the Municipality or Territory.

### **3.3 Subgrade or Embankment Filling**

- .1 In all areas requiring subgrade or embankment fill, the Contractor shall be responsible to supply, haul, place, and compact suitable material to the elevations as indicated on the Drawings. No organic or other unsuitable materials shall be acceptable. The material shall be placed to provide a width sufficient to allow for the driving surface specified, shoulders, side slope specified, base course, and subbase. Material used to fill to subbase shall have a 3 horizontal to 1 vertical (3H:1V) side slope unless otherwise specified.
- .2 Filling to subgrade shall be accomplished with Granular C unless an alternative has been otherwise specified and/or approved by the Owner's Representative.

### **3.4 Construction of Roadway Granular Courses**

- .1 The granular courses and surface materials shall be kept free from clay and other types of deleterious materials. The Contractors shall ensure that their operations do not disturb underlying Work.
- .2 The granular courses shall be placed without segregation in uniform layers.
- .3 Each layer shall be bladed to a smooth surface conforming to the required cross-section.
- .4 Prior to closing down operations for each working day, the granular material shall be bladed and compacted and, if necessary, covered with sufficient base material to carry traffic.
- .5 In no case shall a layer of granular material be laid and compacted on frozen layer of granular. The Contractor shall be responsible for making good any section of the road which the Owner's Representative considers to be below standard because granular material was laid on a frozen granular surface. All costs associated with this Work will be borne by the Contractor.

- .6 The granular courses shall be maintained to the tolerances in grade and cross-section and to the specified density until the Project is accepted.
- .7 The Owner's Representative may direct that soft or otherwise defective areas be cut out and backfilled with granular material. This Work is to include the excavation, removal, and disposal offsite of contaminated material, and the supply, placement, and compaction of Granular A material.
- .8 Should, in the Owner's Representative's opinion, the failure of the granular course has been caused by the Contractor's negligence, the full reinstatement shall be carried out and the Owner's Representative's word shall be final and binding upon this matter.

### **3.5 Surface Tolerance**

- .1 The surface of the uppermost layer of granular material shall be bladed, shaped, and compacted to produce the required surface contour.
- .2 The finished granular courses shall not deviate more than 30 mm from the specified grade and cross-section and the surface shall not deviate more than 15 mm at any place on a 3-metre template.
- .3 The finished granular courses shall not deviate more than the amount specified below from the specified grade and cross-section, shall not be consistently high or low, and the surface shall not deviate more than 15 mm at any place on a 3-metre template.
  - .1 Surface Course +15 mm to -15 mm
  - .2 Base Course +15 mm to -25 mm
  - .3 Subgrade +25 mm to -50 mm

### **3.6 Compaction**

- .1 The maximum rate of placing material shall be as specified or as instructed by the Owner's Representative. The maximum rate will be determined by the adequacy of the compaction obtained.
- .2 Each layer of material shall be compacted to 95% Standard Proctor Dry Density (per ASTM D698) unless otherwise specified before the next layer is placed.
- .3 Nuclear methods (ASTM D6938) shall be used for field density testing. It is the only method accepted by the city.

## **PART 4 BASIS FOR PAYMENT**

### **4.1 Granular Material**

- .1 Unit of Measurement: Square metres, cubic metres, or tonnes, as indicated in the Unit Price Schedule.
- .2 The Contractor shall measure the quantity of materials as per methods listed
- .3 Method of Measurement:
  - .1 For Square Metres: Square metres of granular material installed, for the thickness and material types specified in the Unit Price Schedule, as measured at the finished grade edges.

- .2 For Cubic Metres: Cubic metres of granular material, for the material types specified in the Unit Price Schedule, as confirmed by survey. Acceptable survey methods are via total station equipment or survey grade GNSS equipment only. Drone surveys will not be acceptable. Survey data shall be provided to the Owner's Representative for quantity verification.
- .3 For Tonnage: Tonnage of granular material delivered and installed, for the material types specified in the Unit Price Schedule, as confirmed by scale tickets. Scale tickets shall be provided to the Owner's Representative daily.
- .4 Item Includes: Supply, installation, compaction, removal, fine grading, material testing, compaction testing, and all labour, equipment, material, tools, and incidentals necessary to complete the Work.

#### **4.2 Stripping**

- .1 Unit of Measurement: Cubic metres
- .2 Method of Measurement: Cubic metres of material removed, as confirmed by survey. Acceptable survey methods are via total station equipment or survey grade GNSS equipment only. Drone surveys will not be acceptable. Survey data shall be provided to the Owner's Representative for quantity verification.
- .3 Item Includes: Excavating, stockpiling, loading, hauling, disposal including any tipping fees, and all material, equipment, tools, labour, and incidentals necessary to complete the Work.

#### **4.3 Roadway Excavation (Subgrade or Embankment Construction)**

- .1 Unit of Measurement: Cubic metres
- .2 Method of Measurement: Cubic metres of material removed, as confirmed by survey. Acceptable survey methods are via total station equipment or survey grade GNSS equipment only. Drone surveys will not be acceptable. Survey data shall be provided to the Owner's Representative for quantity verification.
- .3 Item Includes: Excavating, stockpiling, loading, hauling, dumping, spreading, fine grading, compaction, and all labour, equipment, material, tools, and incidentals necessary to complete the Work.

#### **4.4 Roadway Excavation (Unsuitable or Surplus)**

- .1 Unit of Measurement: Cubic metres
- .2 Method of Measurement: Cubic metres of material removed and disposed, as confirmed by survey. Acceptable survey methods are via total station equipment or survey grade GNSS equipment only. Drone surveys will not be acceptable. Survey data shall be provided to the Owner's Representative for quantity verification.
- .3 Item Includes: Excavating, stockpiling, loading, hauling, disposal off Site including any tipping fees, and all labour, equipment, material, tools, and incidentals necessary to complete the Work.

#### **4.5 Borrow**

- .1 Unit of Measurement: Cubic metres

- .2 Method of Measurement: Cubic metres of material delivered to Site and compacted in place, as confirmed by survey. Acceptable survey methods are via total station equipment or survey grade GNSS equipment only. Drone surveys will not be acceptable. Survey data shall be provided to the Owner's Representative for quantity verification.
- .3 Item Includes: Permits, sourcing, processing, excavating, stockpiling, loading, hauling, placement, fine grading, compaction, and all labour, equipment, material, tools, and incidentals necessary to complete the Work.

#### **4.6 Ditching**

- .1 Unit of Measurement: Lineal Metres
- .2 Method of Measurement: Lineal metres of drainage ditches re-graded and restored, for the depths and dimensions indicated on the Unit Price Schedule.
- .3 Item Includes: Excavation, shaping, compaction, surface restoration, waste disposal including all labour, material, equipment, tools, and incidentals necessary to complete the Work.

**END OF SECTION**