

## **1 GENERAL**

### **1.01 PRODUCTS INSTALLED BUT NOT SUPPLIED UNDER THIS SECTION**

- .1 Not used.

### **1.02 RELATED REQUIREMENTS**

- .1 Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .2 Section 32 11 23 - Aggregate Base Courses.

### **1.03 MEASUREMENT AND PAYMENT**

- .1 Granular sub-base to be included in square metre cost of base asphalt placement unit price.
- .2 Transport of granular sub-base to be included in unit price.
- .3 Compaction of granular sub-base to be included in unit price.

### **1.04 REFERENCE STANDARDS**

- .1 ASTM International
  - .1 ASTM C 117-04, Standard Test Methods for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.
  - .2 ASTM C 131-06, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
  - .3 ASTM C 136-06, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
  - .4 ASTM D 422-63(2007), Standard Test Method for Particle-Size Analysis of Soils.
  - .5 ASTM D 698-07e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft<sup>3</sup>) (600kN-m/m<sup>3</sup>).
  - .6 ASTM D 1557-09, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft<sup>3</sup>) (2,700kN-m/m<sup>3</sup>).
  - .7 ASTM D 1883-07e2, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.
  - .8 ASTM D 4318-10, 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.

### **1.05 ACTION AND INFORMATIONAL SUBMITTALS**

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

## 1.06 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with 31 05 16 - Aggregates for Earthwork.
- .2 Storage and Handling Requirements:
  - .1 Handle material in such a way to not segregate.

## 2 PRODUCTS

### 2.01 MATERIALS

- .1 Granular sub-base to be Granular "B" in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling and Section 32 11 23 - Aggregate Base Courses.

## 3 EXECUTION

### 3.01 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrate previously installed under other Sections or Contracts are acceptable for granular sub-base installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of DR.
  - .2 Inform DR of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from DR.

### 3.02 PREPARATION

- .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 and walkways, according to requirements of authorities having jurisdiction.
  - .2 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

### 3.03 PLACING

- .1 Place granular sub-base after subgrade is inspected and approved by DR.
- .2 Construct granular sub-base to depth and grade in areas indicated.
- .3 Ensure no frozen material is placed.
- .4 Place material only on clean unfrozen surface, free from snow or ice.

- .5 Begin spreading sub-base material on crown line or high side of one-way slope.
- .6 Place granular sub-base materials using methods which do not lead to segregation or degradation.
- .7 For spreading and shaping material, use spreader boxes having adjustable templates or screeds which will place material in uniform layers of required thickness.
- .8 Place material to full width in uniform layers not exceeding 150 mm compacted thickness.
  - .1 DR may authorize thicker lifts if specified compaction can be achieved.
- .9 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
- .10 Remove and replace portion of layer in which material has become segregated during spreading.

### 3.04 COMPACTION

- .1 Compaction equipment to be capable of obtaining required material densities.
- .2 Compact to density of not less than 100% corrected maximum dry density in accordance with ASTM D 698.
- .3 Shape and roll alternately to obtain smooth, even and uniformly compacted sub-base.
- .4 Apply water as necessary during compaction to obtain specified density.
- .5 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by DR.
- .6 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

### 3.05 PROOF ROLLING

- .1 Proof roll sub-base with 10-ton roller or other means specified by DR.
- .2 Obtain written approval from DR to use non standard proof rolling equipment.
- .3 Proof roll at level in sub-base as indicated.
  - .1 If non standard proof rolling equipment is approved, DR will determine level of proof rolling.
- .4 Make sufficient passes with proof roller to subject every point on surface to three separate passes.
- .5 Where proof rolling reveals areas of defective subgrade:
  - .1 Remove sub-base and subgrade material to depth and extent as directed by DR.
  - .2 Backfill excavated subgrade with sub-base material and compact in

accordance with this section.

- .6 Where proof rolling reveals areas of defective sub-base, remove and replace in accordance with this section at no extra cost.

### 3.06 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

### 3.07 SITE TOLERANCES

- .1 Finished sub-base surface to be within 10 mm of elevation as indicated but not uniformly high or low.

### 3.08 PROTECTION

- .1 Maintain finished sub-base in condition conforming to this section until succeeding base is constructed, or until granular sub-base is accepted by DR.

END OF SECTION