

## **PART 1 - GENERAL**

### **1.1 RELATED SECTIONS**

- .1 Section 31 05 17 - Aggregates: General.
- .2 Section 31 23 33.01 - Excavating, Trenching and Backfilling.

### **1.2 REFERENCES**

- .1 American Society for Testing and Materials (ASTM)
  - .1 ASTM C 117-04, Standard Test Method for Materials Finer Than 0.075 mm (no.200) Sieve in Mineral Aggregates by Washing.
  - .2 ASTM D6928-10, Standard Test Method for Resistance of Coarse Aggregate to Degradation by Abrasion in the Micro-Deval Apparatus.
  - .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 698-12, 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 1883-07e1, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.
  - .7 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.

### **1.3 MEASUREMENT FOR PAYMENT**

- .1 The supply of labour, materials, plant and equipment for the placement and compaction of granular sub-base as indicated on the drawings will be measured by the cubic metre (m<sup>3</sup>) calculated from actual field measurements.

## **PART 2 – PRODUCTS**

### **2.1 MATERIALS**

- .1 Granular Sub-base Material: in accordance with Section 31 05 17 – Aggregates: General and following requirements:
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- .1 Crushed, pit run or screened stone, gravel or sand.
- .2 Gradations to be within limits specified when tested To ASTM C 136 and ASTM C 117. Sieve sizes to CAN/CGSB-8.1 AND CAN/CGSB-8.2.
- .3 Table:

Sieve Designation	% Passing
75 mm	100
50 mm	75 – 100
12.5 mm	38 – 70
4.75 mm	25 – 55
1.20 mm	12 – 35
0.300 mm	7 – 20
0.075 mm	3 – 8
- .4 Other Properties as follows:
  - .1 Liquid Limit: to ASTM D 4318, Maximum 25.
  - .2 Plasticity Index: to ASTM D 4318 Maximum 0.
  - .3 Los Angeles degradation: to ASTM C131. Max % loss by mass: 35.
  - .4 Crushed Particles: at least 50% of particles by mass retained on the 4.75 mm sieve to have at least one fractured face.
  - .5 Particles smaller than 0.02 mm: to ASTM D 422, Maximum 3%.
  - .6 Flat and elongated particles: maximum percent by mass: 15.

### **PART 3 - EXECUTION**

#### **3.1 INSPECTION OF UNDERLYING SUB-BASE**

- .1 Place granular sub-base after surface is inspected and approved by Departmental Representative.
- .2 Underlying material to be compacted to 100% of Standard Proctor Density to ASTM D698

#### **3.2 PLACING**

- .1 Place granular sub-base after subgrade is inspected and approved by Departmental Representative.
  - .2 Construct granular sub-base to depth and grade in areas indicated.
  - .3 Ensure no frozen material is placed.
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- .4 Place material only on clean, unfrozen surface, free from snow or ice.
- .5 Place granular sub-base materials using methods which do not lead to segregation or degradation.
- .6 Place material to full width in uniform layers not exceeding 200 mm compacted thickness. Departmental Representative may authorize thicker lifts (layers) if specified compaction can be achieved.
- .7 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
- .8 Remove and replace portion of layer in which material has become segregated during spreading.
- .9 Place and compact shouldering to 3% cross slope in reconstruction areas. In overlay sections, feather new shoulder material from top of new asphalt to rounding of shoulder slope.
- .10 Compacted shouldering to be flush with asphalt concrete surface.
- .11 Hand work will be required to form base for asphalt concrete gutters/offtakes.
- .12 Place, hand rake and compact new shoulder material under and behind guiderail.

### **3.3 COMPACTION**

- .1 Compaction equipment to be capable of obtaining required material densities.
  - .2 Compact to density of not less than 100% of Corrected Maximum Dry Density.
  - .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 to the satisfaction of the Departmental Representative.
  - .6 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.
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### **3.4 SITE TOLERANCES**

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

### **3.5 PROTECTION**

- .1 Maintain finished sub-base in condition conforming to this section until succeeding base is constructed, or until granular sub-base is approved by Departmental Representative.
- .2 Correct surface irregularities by loosening and adding or moving material until surface is within specified tolerance.
- .3 Shouldering to have 3% cross slope.