

**Part 1 General****1.1 RELATED SECTIONS**

- .1 Section 32 11 23 – Aggregate Base Course
- .2 Section 31 23 33.01 – Excavation, Trenching, and Backfilling

**1.2 REFERENCES**

- .1 ASTM International
  - .1 ASTM D698- 07e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft³) (600kN-m/m³).
  - .2 ASTM D1557- 09, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft³) (2,700kN-m/m³).
- .2 Ontario Provincial Standard Specifications (OPSS) and Drawings (OPSD).
  - .1 OPSS 1001 – November 2013, Material Specification for Aggregates – General.
  - .2 OPSS.MUNI 1010 – November 2013, Material Specification for Aggregates – Base, Subbase, Select Subgrade and Backfill Material.

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 00 10 – General Instructions.

**1.4 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 00 10 – General Instructions.
- .2 Storage and Handling Requirements:
  - .1 Store materials in accordance with erosion and sedimentation control plan.
  - .2 Replace defective or damaged materials with new.

**Part 2 Products****2.1 MATERIALS**

Granular sub-base material:

- .1 Physical requirements to conform to OPSS.MUNI 1010 for Granular 'B' Type II.
- .2 Gradations to be within limits specified in OPSS .MUNI 1010 for Granular `B' Type II, when tested in accordance with OPSS 1001.

**Part 3 Execution****3.1 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 Departmental Representative.
  - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of approval to proceed from Departmental Representative.

**3.2 PLACING**

- .1 Proof roll the exposed subgrade in the presence of a department representative, any soft areas detected should be sub-excavated and replaced with approved on-site or imported material as directed by the Departmental Representative. On-site excavated sand from above the groundwater table with a moisture content within +/- 2 percent of the optimum value is considered acceptable as subgrade material. In case of lack of approved on-site material, use material which meets the requirement of MUNI.OPSS 1010 for Select Subgrade material (SSM).
- .2 Place granular sub-base after subgrade is inspected and approved by Departmental Representative.
- .3 Perform work as per item 3.2 Placing of Section 32 11 23 Aggregate Base Course.

**3.3 COMPACTION**

- .1 Compaction equipment to be capable of obtaining required material densities.
- .2 Compact to density of not less than 100 % maximum dry density in accordance with ASTM D698.
- .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 Departmental Representative.
- .6 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

**3.4 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 00 10 – General Instructions..
  - .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 00 10 – General Instructions..

**3.5 SITE TOLERANCES**

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

**3.6 PROTECTION**

- .1 Maintain finished sub-base in condition conforming to this section until succeeding base is constructed.

**END OF SECTION**



**Part 1 General****1.1 RELATED WORK**

- .1 Section 31 23 33.01 – Excavation, Trenching, and Backfilling

**1.2 REFERENCES**

- .1 American Society for Testing and Materials (ASTM International).
  - .1 ASTM D698-10 – Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft·lbf/ft<sup>3</sup>)(600 kN·m/m<sup>3</sup>).  
Method A for on-site material  
Method C for base and sub-base material
- .2 Ontario Provincial Standard Specifications (OPSS) and Drawings (OPSD).
  - .1 OPSS 1001 – November 2013, Material Specification for Aggregates – General.
  - .2 OPSS.MUNI 1010 – November 2013, Material Specification for Aggregates – Base, Subbase, Select Subgrade and Backfill Material.

**Part 2 Products****2.1 MATERIALS**

- .1 Granular base, Bedding material, & Surround material
  - .1 Physical requirements to conform to OPSS.MUNI 1010 for Granular 'A'.
  - .2 Gradations to be within limits specified in OPSS.MUNI 1010 for Granular 'A', when tested in accordance with OPSS 1001.

**Part 3 Execution****3.1 INSPECTION OF UNDERLYING SUB-BASE OR SUBGRADE**

- .1 Do not place granular base until finished sub-base surface is inspected and approved by the Departmental Representative.

**3.2 PLACING**

- .1 Place material only on clean unfrozen surface, properly shaped and compacted and free from snow and ice.
- .2 Begin spreading base material on crown line or on high side of one-way slope.
- .3 Place using methods, which do not lead to segregation or degradation of aggregate.
- .4 Place material to full width in uniform layers not exceeding 150 mm compacted thickness. Departmental Representative may authorize thicker lifts (layers) if specified compaction can be achieved.
- .5 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.

- .6 Remove and replace that portion of layer in which material becomes segregated during spreading.

### **3.3 COMPACTING**

- .1 Compact to density not less than 100% maximum standard proctor dry density in accordance with ASTM D698, Method C and D.
- .2 Shape and roll alternately to obtain smooth, even and uniformly compacted base.
- .3 Apply water as necessary during compacting to obtain specified density. If material is excessively moist, aerate by scarifying with suitable equipment until moisture content is corrected.
- .4 In areas not accessible to rolling equipment, compact to specified density with approved mechanical tampers.

### **3.4 FINISH TOLERANCES**

- .1 Finished base surface to be within plus or minus 10 mm of established grade but not uniformly high or low.
- .2 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

### **3.5 MAINTENANCE**

- .1 Maintain finished base in condition conforming to this section until succeeding material is applied.

**END OF SECTION**

**Part 1 General****1.1 REFERENCES**

- .1 American Society for Testing and Materials International (ASTM)
  - .1 ASTM D698-12, Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft·lbf/ft<sup>3</sup>)(600 kN·m/m<sup>3</sup>).
- .2 Ontario Provincial Standard Specifications (OPSS) and Drawings (OPSD)
  - .1 OPSS 302 - November 2007, Construction Specification for Priming Granular Base.
  - .2 OPSS 310.07 - November 2012, Specification for Hot Mix Asphalt – Construction.
  - .3 OPSS.MUNI 314.07 – November 2015, Construction Specification for Untreated Granular, Subbase, Base, Surface Shoulder and Stockpiling – Construction.
  - .4 OPSS 1103 – November 2012, Material Specification for Emulsified Asphalt.
  - .5 OPSS.MUNI 1151 – April 2007, Material Specification for Superpave and Stone Mastic Asphalt Mixtures.

**Part 2 Products****2.1 MATERIALS**

- .1 Aggregates to:
  - .1 Granular Base, Bedding material, and Surround material as per Section 32 11 23 Aggregate Base Course.
  - .2 Granular Sub-Base as per Section 32 11 16.01 Granular Sub-Base.
  - .3 Select subgrade material as per item 2.1.2 of Section 31 23 33.01, Excavating Trenching backfilling.
- .2 Prime coat: RC-30 or SS-1 to OPSS 1103.
- .3 Tack coat: SS-1 to OPSS 1103.
- .4 Asphalt concrete:
  - .1 For wear course SP 12.5mm, PG 58-34 to OPSS.MUNI 1150.
  - .2 For base course SP 19.0mm, PG 58-34 to OPSS.MUNI 1150

**Part 3 Execution****3.1 FOUNDATIONS**

- .1 Foundations for parking lots and laneway to comprise:
  - .1 150 mm compacted thickness of Granular Base.
  - .2 450 mm compacted thickness of Granular Sub-Base.
- .2 Construction of granular foundations: Specification 32 11 16.01, 32 11 23 & OPSS.MUNI 314.07

- .3      Compaction: compact each lift of granular material to 98% maximum density to ASTM D698. Maximum lift thickness: 150 mm.

### **3.2            PAVEMENT THICKNESS**

- .1      Pavements for parking/access areas:
  - .1          Wear course: 40 mm SP 12.5 mm, CAT-C PG 58-34.
  - .2          Base course: 50 mm SP 19.0 mm, CAT-C PG 58-34.

### **3.3            PAVEMENT CONSTRUCTION**

- .1      Application of prime coat: OPSS 302.
- .2      Construction of asphalt concrete: OPSS 310.07.

**END OF SECTION**