

**Part 1            General**

**1.1                PRODUCTS INSTALLED BUT NOT SUPPLIED UNDER THIS SECTION**

- .1            Granular based material: supplied by contractor at pit.

**1.2                MEASUREMENT AND PAYMENT**

- .1            Measure granular sub-base by truck box measurement of material incorporated into Work and accepted by Consultant.
- .2            Measure compaction of granular sub-base in hours for particular compaction units employed as shown on approved recording devices.

**1.3                REFERENCES**

- .1            ASTM International
  - .1            ASTM C136-14, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
  - .2            ASTM D422, Standard Test Method for Particle-Size Analysis of Soils.
  - .3            ASTM D698-12e2, 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>).
  - .4            ASTM D1557-12e1, 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>).
  - .5            ASTM D1883-16, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.
  - .6            ASTM D4318-17, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.

**1.4                ACTION AND INFORMATIONAL SUBMITTALS**

- .1            Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2            Sustainable Design Submittals:
  - .1            Erosion and Sedimentation Control: submit copy of erosion and sedimentation control plan in accordance with authorities having jurisdiction.

**1.5                DELIVERY, STORAGE AND HANDLING**

- .1            Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2            Storage and Handling Requirements:
  - .1            Store materials in accordance with manufacturer's recommendations.
  - .2            Replace defective or damaged materials with new.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Granular sub-base material: in accordance with Section 31 11 23 - Aggregate Base Courses and following requirements:
  - .1 Crushed, pit run or screened stone, gravel or sand.
  - .2 The contractor is to provide a sieve analysis for locally supplied granular base and sub base material.
  - .3 Other properties as follows:
    - .1 Liquid Limit: to ASTM D4318, Maximum 25.
    - .2 Plasticity Index: to ASTM D4318, Maximum 6.

## **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 Consultant.
  - .2 Inform Consultant 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 Consultant.

### **3.2 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 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
  - .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

### **3.3 PLACING**

- .1 Place granular sub-base after subgrade is inspected and approved by Consultant.
- .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 Place material to full width in uniform layers not exceeding 150 mm compacted thickness.
  - .1 Consultant may authorize thicker lifts if specified compaction can be achieved.
- .8 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
- .9 Remove and replace portion of layer in which material has become segregated during spreading.

### **3.4 COMPACTION**

- .1 Compaction equipment to be capable of obtaining required material densities.
- .2 Equipped with device that records hours of actual work, not motor running hours.
- .3 Compact to density of not less than 98% maximum dry density in accordance with ASTM D698.
- .4 Shape and roll alternately to obtain smooth, even and uniformly compacted sub-base.
- .5 Apply water as necessary during compaction to obtain specified density.
- .6 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by Consultant.
- .7 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

### **3.5 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 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 – Construction Demolition Waste Management and Disposal.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

### **3.6 SITE TOLERANCES**

- .1 Finished sub-base surface to be within 15 mm of elevation as indicated but not uniformly high or low.

### **3.7 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 Consultant.

**END OF SECTION**