

**Part 1            General**

**1.1                ACTION AND INFORMATIONAL SUBMITTALS**

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

**Part 2            Products**

**2.1                NOT USED**

**Part 3            Execution**

**3.1                RESERVATION OF MATERIAL**

- .1            Whenever gravel, sand, topsoil, or any other material suitable for special use is encountered, it shall be deemed to be the property of the Waterton National Park and shall be stockpiled at Upper Compound.
- .2            Where layers of gravel or gravelly mixtures are encountered, suitable materials shall be excavated separately from other excavation and shall be stockpiled at Upper Compound, or incorporated into the work as base material.

**3.2                DISPOSAL OF MATERIAL**

- .1            Excavated materials shall be utilized as fill where required on any portion of the work being carried out under this Contract. If designated for reuse, the material may be stockpiled in the Park as directed/approved by the Departmental Representative. Where excavated material is not specifically directed to be used as fill or for any other purpose, the Contractor will be required to haul the material as part of his subgrade preparation work to an approved disposal site outside of Waterton Park. There is no separate payment for this work and is considered included in the subgrade preparation unit payment.
- .2            The excavated material shall be hauled and dumped at the fill area as part of the unit of subgrade preparation. Any materials required to be used in boulevard areas or for rounding at the base of cuts or fills shall be placed, spread in lifts not exceeding 150 mm, and fine graded as part of the unit of excavation. Compaction of 95% will be required.
- .3            All materials deemed to be in excess of requirements or unsuitable shall be disposed of appropriately by the Contractor outside of Waterton National Park.

**3.3                FINISHING AND COMPACTING SUBGRADE**

- .1            The excavated sections shall be ploughed to a depth of at least 150 mm below the surface of the subgrade and replaced and compacted to a minimum of ninety eight percent (98%) of Standard Proctor Maximum Dry Density. The cut shall be left sufficiently high so that the surface after compaction can be trimmed to the final grade, and any loose material resulting from this operation removed. All depressions caused by the finishing rollers shall be removed during the final blading operation.

- .2 Some areas may not require subgrade scarification, at the discretion of the Departmental Representative.

### **3.4 EXCAVATION BELOW GRADE**

- .1 Unsuitable Materials: When topsoil, muskeg, or other soft areas are encountered below the finished subgrade, which in the opinion of the Departmental Representative require removal, the area shall be undercut and the unsuitable material excavated, loaded and disposed of outside of Waterton National Park. These materials shall be replaced with suitable common excavation.
- .2 Placing Fill: Fill material shall be placed in successive horizontal layers not exceeding 150 mm. Suitable spreading and leveling equipment shall be kept in continuous operation at all times.
- .3 Compaction: Shoulders and subsoils shall be compacted prior to placing crushed gravel. Gravel shall be placed in 150 mm maximum lifts and compacted. Compaction is required to obtain a minimum density of 98% of Maximum Standard Proctor Dry Density in accordance with ASTM D698, unless otherwise stated in the specifications. Where it is necessary to add or remove moisture from the soil to obtain the compaction, it shall be done as part of the requirements of this section.
- .4 Finishing: After subgrade preparation, the Type 1 gravel will be placed such that the fill section shall be compacted to a level slightly above the finished grade, and cut back to the final elevation. All loose material shall be removed from the surface of the finished grade. Shoulder gravels shall be placed at a 10H:1V slope between the edge of pavement and the post. Maximum fill slopes behind the posts, where required, shall be no steeper than 2H:1V. Under asphalt surfaces, when the subbase is determined to be appropriate, a minimum of three inches levelling course is required (Des 2, Class 25 mm, AT Spec). A 250 mm granular base may be required under pavement, at the discretion of the Departmental Representative.

### **3.5 THE FOLLOWING TESTS SHALL BE EMPLOYED TO ESTABLISH COMPACTION PROCEDURES:**

- .1 The maximum dry density of the soil shall be determined by ASTM procedure D-698 (Moisture Density Relationships of soils), to be determined for each soil type. The optimum moisture content of the soil shall be determined from the laboratory compaction curve established.
- .2 The field density of soils shall be determined by ASTM D-2922 – Determining density of soil and soil aggregate in place by nuclear methods (shallow depth).

### **3.6 NORMAL COMPACTED THICKNESSES OF LIFTS**

Equipment Type	Cohesive Soils	Non-Cohesive Soils
Vibratory Sheepfoot Packer	300 mm	300 mm
Sheepfoot Packer	200 mm	--
Pneumatic Tire	200 mm	200 mm
Vibratory Roller	150 mm	300 mm
Pneumatic Tamper (contact area < 130 sq cm)	100 mm	100 mm

Pneumatic Tamper	100 mm	100 mm
(contact area > 130 sq cm)	100 mm	100 mm
Mechanical Tamper		
<u>(diesel or gas – jumping jack)</u>	<u>100 mm</u>	<u>200 mm</u>

- .1 Thickness of lifts for other equipment shall be determined by laboratory testing procedures during the construction process. The Departmental Representative may grant approval in writing to alter lift thicknesses upon evidence of satisfactory compaction at other lift thicknesses.

**END OF SECTION**