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**Part 1        GENERAL**

**1.1        Description**

This section specifies requirements for excavating of retaining wall and grading for the placement of the launching ramp. This material may be acceptable on excavation for use on site with approval of *Departmental Representative* and can only be placed at a location determined by the *Departmental Representative*. Any material unacceptable by the *Departmental Representative* will become the property of the contractor to be removed to a location of acceptance of the *Departmental Representative*.

- .1        ASTM D698-12e2, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)).
- .2        AASHTO T99-15, Standard Method of Test for Moisture-Density Relations of Soils Using a 2.5 kg (5.5 lb) Rammer and 305 mm (12 in) Drop.

**1.2        Related Work**

- .1        Refer to other Specification Sections for related information.
- .2        Refer to Section 01 33 00 for Shop Drawing/Submissions requirements.

**1.3        Definitions**

- .1        Rock excavation: excavation of material from solid masses of igneous, sedimentary, or metamorphic rock which, prior to its removal, was integral with its parent mass, and boulders or rock fragments having individual volume in excess of 1.5 m<sup>3</sup>.
- .2        Common excavation: excavation of materials of whatever nature, which are not included under definitions of rock excavation including dense tills, hardpan, frozen materials, and partially cemented materials such as asphalt which can be ripped and excavated with heavy construction equipment.

**1.4        Protection of Existing Features**

- .1        Existing buried utilities and structures:
  - .1        Prior to commencing any excavation work, notify applicable owner or authorities, establish location and state of use of buried utilities and structures. Clearly mark such locations to prevent disturbance during work.
- .2        Existing buildings and surface features:
  - .1        Protect existing buildings and surface features which may be affected by work from damage while work is in progress and repair damage resulting from work.

**1.5        Shoring and Bracing**

- .1        Comply with applicable local regulations to protect existing features.

**1.6        Samples**

- .1        At least 2 weeks prior to commencing work, inform *Departmental Representative* of proposed source of fill materials and provide access for sampling.
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**1.7 Measurement For Payment**

- .1 Work performed under this Section will be incidental to work involved in other sections of this specification.

**Part 2 EXECUTION**

**2.1 Material**

**.1 Granular Backfill:**

Granular Backfill to consist of hard, durable, quarry or pit run material of an approved quality. The material will be free from frost, snow stumps, weeds, sod, roots, logs, silt, organic material, garbage, or any other waste materials and must be capable of being compacted to degree as specified herein and meeting approval of the Departmental Representative. Material to be uniformly graded having a stone size between 120 to 380 mm (R25 random riprap) on any dimension. Slate, sandstone or shale rock shall not be accepted. Specific gravity not less than 2.65 when tested to ASTM C127-12 (AASHTO T85-14).

- .1 Gradation to meet NBOT 'R25' Random Rip-Rap limits as follows:

ASTM SIEVE SIZE	% PASSING BY MASS
380 mm	100
330 mm	70 – 90
260 mm	40 – 55
120 mm	0 – 15

- .2 Where required, loose laid Riprap shall be laid to the lines and thickness as called for on the Plans or as directed by *Department Representative*.

**.2 Granular Base and Sub-Base:**

Rock, clear, hard durable, angular, crushed quarried rock aggregate free from silt, clay lumps, organic matter, foreign substances and free from splits, seams or defects. Specific gravity not less than 2.6 when tested to ASTM C127-12 (AASHTO T85-14).

- .1 Granular base Type 1 shall be composed of crushed and screened rock or gravel. The material shall be transported and placed upon the subbase and compacted up to 95%.

.1 Gradation:

Sieve Size mm	% Passing by Weight
20	100
14	50-85
5	20-50
0.160	5-12
0.080	3-8

.2 Physical Properties:

Property	Test Method	Limit
% Maximum Absorption	ASTM C 127	1.75
% Maximum Los Angeles Abrasion	ASTM C 131	40

Maximum Plasticity Index	ASTM D 4318	3
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- .2 Gradation – Granular Sub-Base (Type 2): Granular sub-base material to Section 31 05 17 and following requirements:

- .1 Crushed stone or gravel consisting of hard durable angular particles free from clay lumps, cementation, organic material, frozen material and other deleterious materials.
- .2 Type 2 granular material gradation will be within the following limits:

ASTM SIEVE SIZE	% PASSING BY MASS
56 mm	100
28 mm	60-80
5 mm	25-45
0.160 mm	0-10.

- .3 Physical Properties:

Property	Test Method	Limit
% Maximum Absorption	ASTM C 127	1.75
% Maximum Los Angeles Abrasion	ASTM C 131	40
Maximum Plasticity Index	ASTM D 4318	3

- .4 Backfill material shall be material removed during demolition and removal operations provided the material is sorted such that it is free of dredge spoils, timber debris or concrete pieces greater than 300 mm diameter and is approved by the Departmental Representative.
- .5 The use of additional backfill material other than the material on site is subject to the approval of the Departmental Representative and is to be free from rocks larger than 150 mm, cinders, ashes, sods, refuse, or other deleterious materials.

### Part 3 EXECUTION

#### 3.1 Site Preparation

- .1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.

#### 3.2 Stockpiling

- .1 Stockpile fill materials in areas approved by *Departmental Representative*. Stockpile granular materials in manner to prevent segregation.

#### 3.3 Dewatering

- .1 Keep excavations free of water while work is in progress.
- .2 Protect open excavations against flooding and damage due to surface run-off.

- .3 Dispose of water in a manner not detrimental to public and private property, or any portion of work completed or under construction.

### **3.4 Excavation**

- .1 Excavate to lines, grades, elevations and dimensions indicted or as directed by *Departmental Representative*.
- .2 Dispose of surplus and unsuitable excavated material in approved location off site.
- .3 Do not obstruct flow of surface drainage or natural watercourses.
- .4 Stockpile suitable excavated materials required for backfill in approved location.
- .5 Dispose of surplus and unsuitable excavated material off site.

### **3.5 Trench Bottom Preparation**

- .1 Where required due to removal of unsuitable material or unauthorized over-excavation bring bottom of excavation to design grade with approved material.
- .2 Compact trench bottom to density at least equal to density of adjacent surrounding soil.

### **3.6 Pre-Installation Inspection**

- .1 Excavations require inspection and approval prior to commencement of installation operations.

### **3.7 Backfilling**

- .1 Do not proceed with backfilling operations until *Departmental Representative* has inspected and approved for installations.
- .2 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.
- .3 Do not use backfill material which is frozen or contains ice, snow or debris.
- .4 Backfilling around installations:
  - .1 Place bedding and surround material as specified elsewhere.
  - .2 Place material by hand under, around, and over installations until 300 mm of cover is provided. Dumping material directly on installations will not be permitted.
- .5 Place backfill material in uniform layers not exceeding 150 mm in thickness up to subgrade elevation or top of trench. Compact each layer before placing succeeding layer.
- .6 Compact common backfills materials:
  - .1 In non-pavement areas, to a density at least equal to density of adjacent, undisturbed soil.
  - .2 In pavement areas, compact to a minimum of 90% for cohesive soils and 95% for cohesionless soils of corrected maximum dry density, maximum density ASTM D698, AASHTO T99, Method C.
- .7 Compact granular backfill material to a minimum 95% of corrected maximum dry density, maximum density AASHTO T99, Method C.
- .8 Compact using approved mechanical tamping devices, or by hand tamping to achieve specified compaction.

**3.8 Restoration**

- .1 Upon completion of work, remove surplus materials and debris and correct defects noted by *Departmental Representative*.
- .2 Clean and reinstate areas affected by work as directed by *Departmental Representative*.

**END OF SECTION**