
PART 1 GENERAL

1.1 Work Included

- .1 The Work covered by this Section shall include the supply of all labour, material, and equipment to generate aggregates material as specified and stockpile materials for use by others as specified.

1.2 Related Sections

- .1 Section 31 23 33.01 – Trenching and Backfilling.
- .2 Section 32 11 23 – Roadway Grading.

1.3 Source Approval

- .1 Source of materials to be incorporated into Work or stockpiled requires approval. A Quarry Permit is required to remove any granular material. The Nunavut Impact Review Board must review the development of new quarries prior to issuing any Quarry Permits for these areas.
- .2 The Contractor shall not strip, excavate, or otherwise remove granular material for sale or for use from a lot or other parcel of land.
- .3 Where, in connection with the construction of a building or structure, there is an excess of granular material other than that required for grading and landscaping on a lot, such excess may be removed for sale or use.
- .4 Inform the Owner's Representative of the proposed source of aggregates and provide testing results by third party at least 2 weeks prior to commencing production.
- .5 If the materials from the proposed source do not meet or cannot reasonably be processed to meet specified requirements in the opinion of the Owner's Representative, the contractor shall locate an alternative source.
- .6 Should a change of material source be proposed during the Work, advise the Owner's Representative immediately and provide test results for new source materials.
- .7 Acceptance of a material at source does not preclude future rejection if it is subsequently found to lack uniformity, or if it fails to conform to requirements specified, or if its field performance is found to be unsatisfactory.

1.4 Product Sampling

- .1 Aggregate will be subject to continual sampling by a third party at the Contractor's expense during production. Samples shall be taken for every 500 tonnes produced per product.
- .2 At the Owner's Representative's request, provide the third party with ready access to source and processed material for purpose of sampling and testing at the Contractor's expense.
- .3 The Contractor shall bear the cost of sampling and testing of aggregates which fail to meet the specified requirements.

1.5 Reference Standards

- .1 ASTM International (ASTM)
 - .1 ASTM C88/C88M, Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.
 - .2 ASTM C117, Standard Test Method for Materials Finer Than 75 µm (No. 200) Sieve in Mineral Aggregates by Washing.
 - .3 ASTM C131/C131M, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
 - .4 ASTM C136/C136M, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .5 ASTM D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
 - .6 ASTM D1557, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
 - .7 ASTM D1883, Standard Test Method for California Bearing Ratio (CBR) of Laboratory-Compacted Soils.
 - .8 ASTM D4318, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
 - .9 ASTM D4791, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.
 - .10 ASTM E11, Standard Specification for Woven Wire Test Sieve Cloth and Test Sieves.
- .2 International Organization for Standardization (ISO)
 - .1 ISO 3310-1, Test Sieves – Technical Requirements and Testing – Part 1 Test Sieves of Metal Wire Cloth.

PART 2 PRODUCTS

2.1 Materials

- .1 Aggregate quality
 - .1 Sound, hard, durable material free from soft, thin, elongated particles, laminated particles, organic material, clay lumps, minerals, adherent coatings, injurious amounts of disintegrated pieces, and other deleterious substances.
- .2 Flat and elongated particles are those whose greatest dimension exceeds five times their least dimension.
- .3 Fine aggregates satisfying requirements of applicable Section shall be one, or a blend, of the following:
 - .1 Natural sand.
 - .2 Manufactured sand.
 - .3 Screenings produced in crushing of quarried rock, boulders, gravel, or slag.

- .4 Coarse aggregates satisfying requirements of applicable Section shall be one, or a blend, of the following:
- .1 Crushed rock or slag.
 - .2 Gravel composed of naturally formed particles of stone.
- .5 Conforming to the following gradations / classifications:

ASTM Sieve Designation	Percent Passing			
	Granular A	Granular B	Granular C	Sand
200 mm	-	-	100	-
100 mm	-	100	-	-
75 mm	-	95-100	-	-
50 mm	-	-	-	-
38.1 mm	-	-	-	-
25 mm	100	45-100	50-100	-
19 mm	85-100	-	-	-
12.5 mm	65-90	-	-	-
9.5 mm	50-73	-	-	100
4.75 mm	35-55	25-70	20-100	55-100
1.8 mm	15-40	-	10-100	30-100
0.425 mm	-	4-50	-	-
0.300 mm	5-22	-	2-65	10-50
0.075 mm	2-8	0-8	0-8	0-10

- .6 Gradations to be within the limits specified when tested to ASTM C136/C136M and ASTM C117 and are to have a smooth curve without any sharp breaks when plotted on a semi-log grading chart.
- .7 Granular A shall be crushed stone or crushed gravel having the following properties:
- .1 Minimum percent crushed: 60%
 - .2 Plasticity Index (ASTM D4318), Maximum: 0
 - .3 Los Angeles Abrasion (ASTM C131/C131M), Gradation "A"
Maximum % loss by weight: 60%
- .8 Granular B shall be crushed stone or crushed gravel having the following properties:
- .1 Plasticity Index (ASTM D4318), Maximum: 0
 - .2 Los Angeles Abrasion (ASTM C131/C131M), Gradation "A"

Maximum % loss by weight: 50%

- .9 Granular C shall be crushed stone or gravel or screened stone or gravel having the following properties:

- .1 Plasticity Index (ASTM D4318), Maximum: 0
 - .2 Los Angeles Abrasion (ASTM C131/C131M), Gradation "A"
- Maximum % loss by weight: 50%

2.2 Rip-Rap

- .1 Hard, with specified gravity no less than 2.65, durable quarry stone, free from seams, cracks, and other structural defects, to meet the following size distribution for use intended.
- .1 Size of individual stones 100-200mm.
 - .2 Supply rock spalls or cobbles to fill open joints.

2.3 Armour Stone

- .1 Armour stone shall be rock that is clean, hard, sound, durable, resistant to weathering and degradation in water, free of overburden, spoil, shale, and organic material, and having a density of not less than 2.6 tonnes per cubic metre. The rock material, if subjected to the Los Angeles Abrasion Test (ASTM C131/C131M), shall have a loss of not greater than 35%.
- .2 When tested for soundness, five cycles of magnesium sulphate (ASTM C88/C88M), the rock material shall have a loss of not greater than 15%.
- .3 Armour stones shall be of an angular shape and uniform gradation. The greatest dimension of any stone shall not exceed two (2.0) times the least dimension.
- .4 Rock with visible planes of weakness and/or subject to marked deterioration by water or weather will not be accepted.
- .5 Unless otherwise stated, the minimum armour stone dimension in any given direction shall not be less than 0.75 m.
- .6 The acceptability of the rock shall be determined by the Owner's Representative and/or by laboratory and/or field-testing procedures carried out by qualified personnel.
- .7 The approval of some rock fragments does not convey the Owner's Representative's approval of all rock fragments to be obtained at that quarry.

PART 3 EXECUTION

3.1 Processing

- .1 Process aggregates uniformly using methods that prevent contamination, segregation, and degradation.
- .2 Blend aggregates, if required, to obtain gradation requirements as specified. Use approved methods and equipment.
- .3 Blending to increase percentage of crushed particles or decrease percentage of flat and elongated particles is permitted.

- .4 Wash aggregates, if required, to meet specifications. Use only equipment approved by the Owner's Representative.

3.2 Handling

- .1 Handle and transport aggregates to avoid segregation, contamination, and degradation.

3.3 Stockpiling

- .1 Stockpile aggregates on Site in locations as indicated or as designated. Do not stockpile on completed pavement surfaces where damage to pavement may result.
- .2 Stockpiling sites shall be level, well drained, and of adequate bearing capacity and stability to support stockpiled materials and handling equipment.
- .3 Except where stockpiled on acceptably stabilized areas, provide compacted sand base not less than 300 mm in depth to prevent contamination of the aggregate. Stockpile aggregates on ground but do not incorporate bottom 300 mm of pile into the Work.
- .4 Separate different aggregates by substantial dividers or stockpile far enough apart to prevent intermixing.
- .5 Do not use intermixed or contaminated materials. Remove and dispose of rejected materials as directed by the Owner's Representative within 24 hours of rejection.
- .6 Uniformly spot-dump aggregates delivered to stockpile in trucks and build up stockpile as specified.
- .7 Coning of piles or spilling of material over edges of pile will not be permitted.
- .8 During winter operations, prevent ice and snow from becoming mixed into stockpile or into material being removed from stockpile.

3.4 Aggregate Stockpile Clean-up

- .1 Leave aggregate stockpile site in tidy, well drained condition, free of standing surface water.
- .2 Leave any unused aggregates in neat, compact stockpiles.
- .3 On completion of the Project, remove excess aggregates from the Site.

PART 4 BASIS FOR PAYMENT

- .1 Separate payment shall not be made for items in this Section. Included costs in related items.

END OF SECTION