

PART 1 - GENERAL

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| <u>1.1 Measurement Procedures</u>              | .1 | Measure granular sub-base in Cubic meters of material incorporated into Work and accepted by Departmental Representative. The cost includes crushing, hauling, placing, grading, and compacting of sub base and subgrade material.  |
| <u>1.2 References</u>                          | .1 | American Society for Testing and Materials (ASTM)<br>.1 ASTM C 117-95, Standard Test Methods for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.<br>.2 ASTM C 131-96, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.<br>.3 ASTM C 136-96a, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.<br>.4 ASTM D 422-63(1998), Standard Test Method for Particle-Size Analysis of Soils.<br>.5 ASTM D 698-00a, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (600kN-m/m <sup>3</sup> ).<br>.6 ASTM D 1557-00, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (2,700kN-m/m <sup>3</sup> ).<br>.7 ASTM D 1883-99, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.<br>.8 ASTM D 4318-00, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils. |
|  | .2 | Canadian General Standards Board (CGSB)<br>.1 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.  |
| Disposal<br>Management and<br><u>1.3 Waste</u> | .1 | Divert unused granular material offsite in accordance with local and provincial   |

## PART 2 - PRODUCTS

- 2.1 Materials .1 Granular sub-base material: in accordance with Section 31 05 16 - Aggregate Materials and following requirements:
- .1 Crushed, pit run or screened stone, gravel or sand consisting of hard, durable, angular particles free from clay lumps, cementation, organic material, frozen material and other deleterious materials.
- .2 Gradations to be within limits specified when tested to ASTM C 136 and ASTM C 117. Sieve sizes to CAN/CGSB-8.2 and to have smooth curve without sharp breaks when plotted on semi-log graph chart.
- .3 Table

Sieve Designation	% Passing
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75 mm	100
25 mm	55-100
4.75 mm	25-70
2.00 mm	15-55
0.425 mm	4-30
0.075 mm	3-8

- .4 Other Properties as follows:
- .1 Liquid Limit: to ASTM D 4318, Maximum 25.
- .2 Plasticity Index: to ASTM D 4318, Maximum 6.
- .3 Los Angeles degradation: to ASTM C 131. Gradation A Max% Loss by mass: 50.
- .4 Particles smaller than 0.02 mm: to ASTM D 422, Maximum 3%.
- .5 Soaked CBR: to ASTM D 1883, Min40 when compacted to 100% of ASTM D 1557.

### PART 3 - EXECUTION

- 3.1 Placing
- .1 Place granular sub-base after subgrade is inspected and approved by Departmental Representative.
  - .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, properly shaped and compacted, and 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. Departmental Representative may authorize thicker lifts (layers) 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.
- 3.2 Compaction
- .1 Compaction equipment to be capable of obtaining required material densities.
  - .2 Compact to density of not less than 98% corrected modified maximum dry density.
  - .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
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| <u>3.2 Compaction</u><br>(Cont'd) | .5 | (Cont'd)<br>tamper approved by Departmental Representative.   |
|                                   | .6 | Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.  |
| <u>3.3 Site Tolerances</u>        | .1 | Finished sub-base surface to be within 20 mm of elevation as indicated but not uniformly high or low.   |
| <u>3.4 Protection</u>             | .1 | Maintain finished sub-base in condition conforming to this section until succeeding base is constructed, or until granular sub-base is accepted by Departmental Representative. |

PART 1 - GENERAL

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| <u>1.1 Measurement Procedures</u> | .1 | Measure 19 mm size and 50 mm size granular base material in cubic meters of material incorporated into Work and accepted by Departmental Representative. The cost includes crushing, hauling, placing, grading and compacting of material.   |
|                                   | .2 | Measure 19 mm size maintenance granular base material in cubic meters of material incorporated into Work and accepted by Departmental Representative. The cost includes crushing, hauling, and stockpiling of material at crushing site.   |
| <u>1.2 References</u>             | .1 | American Society for Testing and Materials (ASTM)<br>.1 ASTM C 117-95, Standard Test Methods for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.<br>.2 ASTM C 131-96, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.<br>.3 ASTM C 136-96a, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.<br>.4 ASTM D 698-00a, 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> ).<br>.5 ASTM D 1557-00, 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> ).<br>.6 ASTM D 1883-99, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.<br>.7 ASTM D 4318-00, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils. |
|                                   | .2 | Canadian General Standards Board (CGSB)<br>.1 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.   |
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| <u>1.3 Delivery, Storage, and Handling</u> | .1 | Deliver and stockpile aggregates in accordance with Section 31 05 16 - Aggregate Materials. Stockpile minimum 50% of total aggregate required prior to beginning placing operation. |
| <u>1.4 Waste Management and Disposal</u>   | .1 | Divert unused granular material from landfill to local quarry or facility in accordance with local and provincial regulation and as approved by Departmental Representative.        |

## PART 2 - PRODUCTS

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| <u>2.1 Materials</u> | .1 | Granular base: material in accordance with Section 31 05 16 - Aggregate Materials and following requirements: <ul style="list-style-type: none"> <li>.1 Crushed stone or gravel.</li> <li>.2 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117 and to have a smooth curve without sharp breaks when plotted on semi-log grading chart. Sieve sizes to CAN/CGSB-8.2.             <ul style="list-style-type: none"> <li>.1 Gradation Method # 1 to:</li> </ul> </li> </ul> |
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|----------|-------------|-------------|--------------|
|          | Sieve       | % Passing   |              |
|          | Designation | Base Course | Traffic Base |
|          |             | 50mm size   | 19mm size    |
| 50mm     |             | 100         |              |
| 38.1     |             | 75-100      |              |
| 19 mm    |             | 50-75       | 100          |
| 12.5 mm  |             | -           | 70-100       |
| 9.5 mm   |             | 40-65       | -            |
| 4.75 mm  |             | 30-50       | 40-70        |
| 2.00 mm  |             | 22-45       | 22-45        |
| 0.425 mm |             | 10-25       | 10-25        |
| 0.075 mm |             | 4-8         | 4-8          |
- .2 Liquid limit: to ASTM D4318, maximum 25
  - .3 Plasticity index: to ASTM D4318, maximum 6
  - .4 Los Angeles degradation: to ASTM C 131. Max. % loss by weight: 45
  - .5 Coarse Aggregate is Aggregate retained on 4.75 mm sieve and fine aggregate is aggregate passing 4.75 mm sieve when tested to ASTM C136
  - .6 Flat and elongated particles: to ASTM D4791, ( with length to thickness ratio greater than 5): Max by mass:15
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## 2.1 Materials (Cont'd)

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- .1 Granular base:(Cont'd)
- .2 (Cont'd)
  - .7 Crushed particles: at least 60% of particles by mass within each of following sieve designation ranges to have at least 1 freshly fractured face. Material to be divided into ranges using methods of ASTM C 136.

Passing		Retained on
25 mm	to	19.0 mm
19.0 mm	to	4.75 mm

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## PART 3 - EXECUTION

### 3.1 Sequence of Operation

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- .1 Place granular base after existing surface is inspected and approved by Departmental Representative.
  - .2 Placing
    - .1 Construct granular base to depth and grade in areas indicated.
    - .2 Ensure no frozen material is placed.
    - .3 Place material only on clean unfrozen surface, free from snow and ice.
    - .4 Begin spreading base material on crown line or on high side of one-way slope.
    - .5 Place material using methods which do not lead to segregation or degradation of aggregate.
    - .6 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.
    - .7 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
    - .8 Remove and replace that portion of layer in which material becomes segregated during spreading.
  - .3 Compaction Equipment
    - .1 Compaction equipment to be capable of obtaining required material densities.
  - .4 Compacting
    - .1 Compact to density not less than 100% corrected maximum dry density
    - .2 Shape and roll alternately to obtain smooth, even and uniformly compacted base.
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- 3.1 Sequence of Operation (Cont'd)
- .4 (Cont'd)
- .3 Apply water as necessary during compacting to obtain specified density.
- .4 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by Departmental Representative.
- .5 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.
- 3.2 Site Tolerances .1 Finished base surface to be within plus or minus 10 mm of established grade and cross section but not uniformly high or low. Finished surface not to have irregularities exceeding 10 mm when checked with a 4.5 m straight edge placed in any direction.
- 3.3 Protection .1 Maintain finished base in condition conforming to this Section until succeeding material is applied or until acceptance by Departmental Representative.

PROJECT No. R.015446.001 Eureka, Nunavat	Reshaping Existing Granular Surface	Section 32 15 10  2014-09-12
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#### PART 1 - GENERAL

1.1 Measurement for Payment	.1	No measurement will be made for reshaping existing surface. Include costs in items which require this work.
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#### PART 2 - PRODUCTS

2.1 Materials	.1	Granular sub base: material to Section 31 05 16 Aggregate Materials and Section 32 11 16.01- Granular Sub-base.
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#### PART 3 - EXECUTION

3.1 Scarifying and Reshaping	.1	Blade and trim material to elevation and cross section dimensions indicated or directed.
	.2	Scarify top 100 mm of existing materials to maximum 50 mm size.
	.3	Add and blend in existing excavated material or new granular sub base material as directed by Departmental Representative.
	.4	Remove and replace material which becomes segregated during reshaping.

3.2 Placing	.1	Place material in accordance with Section 32 11 16.01 - Aggregate Sub Base Courses.
	.2	Place material only on a clean unfrozen surface, properly shaped and compacted and free from snow and ice.
	.3	Begin spreading material on a crown line or on high side of a one-way slope.
	.4	Place using methods which do not lead to segregation or degradation of aggregate.
	.5	Place material to full width in uniform layers not exceeding 150 mm compacted thickness. Departmental Representative may

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| <u>3.2 Placing<br/>(Cont'd)</u>     | .5 | (Cont'd)<br>authorize thicker lifts if specified<br>compaction can be achieved.  |
|                                     | .6 | Shape to smooth contour and compact to<br>specified density before succeeding layer is<br>placed.  |
|                                     | .7 | Remove and replace that portion of layer in<br>which material becomes segregated during<br>spreading.  |
| <u>3.3 Compacting</u>               | .1 | Compact to a density not less than 98%<br>corrected maximum dry density in accordance<br>with Section - Aggregate Sub Base Courses.  |
|                                     | .2 | Shape and roll alternately to obtain smooth,<br>even and uniformly compacted surface.  |
|                                     | .3 | Apply water or aerate as necessary during<br>compaction to obtain specified density.   |
|                                     | .4 | In areas not accessible to rolling equipment,<br>compact to specified density with approved<br>mechanical means.   |
| <u>3.4 Repair of Soft<br/>Areas</u> | .1 | Correct soft areas by removing defective<br>material to depth and extent directed by<br>Departmental Representative. Replace with<br>granular Sub base material and compact to<br>specified density.                               |
| <u>3.5 Finish<br/>Tolerances</u>    | .1 | Finish surface shall be within $\pm 25$ mm of<br>design grade but not uniformly high or low.<br>Finished surface not to have irregularities<br>exceeding 25 mm when checked with a 4.5 m<br>straight edge placed in any direction. |
| <u>3.6 Maintenance</u>              | .1 | Maintain finished surface in a condition<br>conforming to this section until succeeding<br>material is applied or until acceptance.  |