

PART 1 - GENERAL

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| 1.1 Related Work | .1 | Section 32 11 19 - Granular Sub-Base |
| | .2 | Section 32 11 23 - Granular Base |
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| 1.2 Source Approval | .1 | Inform Department Representative of proposed source of aggregates and provide access for sampling at least 4 weeks prior to commencing production. |
| | .2 | If, in opinion of Department Representative, aggregate from the proposed source do not meet, or cannot reasonably be processed to meet, specified requirements, locate an alternative source or demonstrate that aggregate from source in question can be processed to meet specified requirements. |
| | .3 | Should a change of aggregate source be proposed during work, advise Department Representative 4 weeks in advance of proposed change to allow sampling and testing. |
| | .4 | Acceptance of an aggregate 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. |
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| 1.3 Sampling | .1 | Submit samples in accordance with Section 01 33 00 - Submittal Procedures. |
| | .2 | Allow continual sampling by Department Representative during production. |
| | .3 | Provide Department Representative with access to source and processed material for sampling. |
| | .4 | Install sampling facilities at discharge end of production conveyor, to allow Department Representative to obtain representative samples of items being produced. Stop conveyor belt when requested by Department Representative to permit full cross section sampling. |
| | .5 | Pay cost of sampling and testing of aggregates which fail to meet specified requirements. |

- 1.4 Measurement for Payment .1 No measurement for payment will be made under this section.

PART 2 - PRODUCTS

- 2.1 Materials .1 Aggregate quality: sound, hard, durable aggregate free from soft, thin, elongated or laminated particles, organic material, clay lumps or minerals, or other substances that would act in a deleterious manner for the use intended.
- .2 Flat and elongated particles of coarse aggregate: to ASTM D4791.
- .1 Greatest dimension to exceed three times least dimension.
- .3 Fine aggregate satisfying requirements of applicable section to be one, or a blend of 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 to be:
- .1 Crushed rock

PART 3 - EXECUTION

- 3.1 Development of Aggregate Source .1 Prior to excavating materials for aggregate production, clear and grub area to be worked, and strip unsuitable surface materials. Dispose of cleared, grubbed and unsuitable materials as directed by Department Representative.
- .2 Where clearing is required, leave a screen of trees between cleared area and roadways as per the Guidelines.
- .3 Clear, grub and strip area ahead of quarrying or

excavating operation sufficient to prevent contamination of aggregate by deleterious materials.

- .4 When excavation is completed dress sides of excavation to nominal 1.5:1 slope, and provide drains or ditches as required to prevent surface standing water.
- .5 Trim off and dress slopes of waste material piles and leave site in neat condition.

3.2 Stripping of Topsoil

- .1 Commence topsoil stripping of areas as indicated by the Guidelines and as directed by the Department Representative.
- .2 Avoid mixing topsoil with subsoil.
- .3 Stockpile in locations as indicated by the Guidelines. Stockpile height not to exceed 2 metres.

3.3 Processing

- .1 Process aggregate uniformly using methods that prevent contamination, segregation and degradation.
- .2 Blend aggregates, if required, to obtain gradation requirements, percentage of crushed particles, or particle shapes, as specified. Use methods and equipment approved by Department Representative.
- .3 Wash aggregates, if required to meet specifications. Use only equipment approved by Department Representative
- .4 When operating in stratified deposits use excavation equipment and methods that will produce uniform, homogeneous aggregate.

3.4 Handling

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

3.5 Stockpiling

- .1 Stockpile aggregates on site in locations as indicated unless directed otherwise by Department Representative. Do not stockpile on completed pavement surfaces.

- .2 Stockpile aggregates in sufficient quantities to meet project schedules.
- .3 Stockpiling sites to be level, well drained, and of adequate bearing capacity and stability to support stockpiled materials and handling equipment.
- .4 Except where stockpiled on acceptably stabilized areas, provide compacted sand base not less than 300 mm in depth to prevent contamination of aggregate. Stockpile aggregates on ground but do not incorporate bottom 300 mm of pile into work.
- .5 Separate different aggregates by strong, full depth bulkheads, or stockpile far enough apart to prevent intermixing.
- .6 Do not use intermixed or contaminated materials. Remove and dispose of rejected materials as directed by Department Representative within 48 hours of rejection.
- .7 Stockpile materials in uniform layers of thickness as follows:
 - .1 Maximum 1.5 metres for coarse aggregate and base coarse aggregate.
- .8 .1 Maximum 1.5 metres for other aggregate.
 - .2 Maximum 1.5 metres for fine aggregate and sub-base aggregate.
- .9 Uniformly spot-dump aggregates delivered to stockpile in trucks and build up stockpile as specified.
- .10 Do not cone piles or spill material over edges of piles.
- .11 Do not use conveying stackers.
- .12 During winter operations, prevent ice and snow from becoming mixed into stockpile or in material being removed from stockpile.

- 3.6 Aggregate Stockpile Cleanup
- .1 Leave aggregate stockpile site in tidy, well drained condition, free of standing surface water.
 - .2 Leave any unused aggregates in neat compact stockpiles as directed by Department Representative.
- 3.7 Source Abandonment
- .1 For temporary or permanent abandonment of aggregate source, rehabilitate source to condition meeting requirements of the Guidelines.

END

PART 1 - GENERAL

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| 1.1 Description of Work | .1 | Complete clearing and grubbing required, and summarized but not restricted, to:

.1 Removal of growth and vegetation within limits of roadway cut/back slopes, roadway embankment fills, site development etc. except for those areas designated to be protected.

.2 Removal of vegetation, stumps, roots and debris from the site. |
| 1.2 Definitions | .1 | Clearing consists of cutting off trees and brush vegetative growth to not more than a specified height above ground and disposing of felled trees and surface debris. |
| | .2 | Underbrush clearing consists of removals from treed area of undergrowth, deadwood and disposing of all fallen timbers and surface debris. |
| | .3 | Grubbing consists of excavation and disposal of stumps, roots, boulders and rock fragments to not less than a specified depth below original ground surface. |
| 1.3 Related Work Specified Elsewhere | .1 | Section 01 35 44 - Environmental Protection |
| | .2 | Section 31 23 10 - Excavation and Backfilling |
| 1.4 Protection | .1 | Subsurface investigation report is available from Department Representative. |
| | .2 | Prevent damage to natural features, bench marks, existing buildings, utility lines, site appurtenances, water courses, which are to remain. Make good damage. |

PART 2 - PRODUCTS

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| 2.1 Not Applicable | .1 | Not Applicable. |
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PART 3 - EXECUTION

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| 3.1 Preparation and Protection | .1 | Before commencing Work, ensure in examination of the site that the following are known in particular:

.1 Methods and means available for material handling, disposal, storage and transportation.

.2 Conformation and configuration of ground surfaces.

.3 Character, quality and quantity of growth on site.

.2 Review work to be performed in all its details at the site. Do not proceed without approval of Department Representative.

.3 Protect existing areas of the site which are to remain uncleared or undisturbed by encircling with Surveyors tape.

.4 Immediately repair damage to structures, buried and above-ground services, bench marks, and survey monuments should it occur as a result of Work of this Section. |
| 3.2 Clearing | .1 | Clear trees, shrubs, uprooted stumps and surface debris not designated to remain. Obtain approval from Department Representative of limits of Work before beginning clearing.

.2 Cut off trees, brush, and scrub as indicated or as directed at a height of not more than 300 mm above ground. |
| 3.3 Grubbing | .1 | Grub out stumps and roots to not less than 450 mm below original ground surface.

.2 Grub out visible rock fragments and boulders, greater than 150 mm in greatest dimension. |

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| 3.4 Removal and Disposal | .1 | Remove from the site daily all materials and debris resulting from Work of this Section, except as noted. |
| | .2 | Do not burn or bury any debris on site. |
| | .3 | Usable timber becomes property of Contractor. |
| 3.5 Finished Surface | .1 | Leave ground surface in a condition suitable for immediate grading operations and stripping of topsoil. |

END

PART 1 - GENERAL

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| 1.1 Description of Work | .1 | The work of this section includes:

.1 Excavation and Backfilling for the culvert replacements.

.2 Other demolition, removal, excavations as required. |
| 1.2 Related Sections | .1 | Section 31 23 13 - Rough Grading |
| | .2 | Section 31 24 13 - Roadway Embankments |
| | .3 | Section 33 42 13 - Pipe Culverts |
| 1.3 References | .1 | ASTM C117-13. Test Method for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing. |
| | .2 | ASTM C136-06. Method for Sieve Analysis of Fine and Coarse Aggregates. |
| | .3 | ASTM D698-12e1. Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft ³ (600 kN-m/m ³)). |
| 1.4 Definitions | .1 | Excavation: excavation of materials of whatever nature including dense tills, hardpan, frozen materials, boulders, bedrock, debris and all other materials encountered on the site. |
| | .2 | Borrow Material: material obtained from locations outside of the work area that meets of the specifications from NBDTI Borrow A1. |
| | .3 | Waste Material: excavated material unsuitable for use in the work. This material is to be removed from the site and become the Contractor's responsibility to dispose of such material in an appropriate manner. |
| | .4 | Low permeability Fill: The low permeability layer shall consist of clay and/or lean concrete. |
| 1.5 Protection of | .1 | Existing buried utilities and structures: |

Existing Features

- .1 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed. Carry out test digs as required to locate services, etc.

1.6 Shoring and Bracing

- .1 Comply with Section 01 35 28 Health and Safety Bracing Requirements and applicable local regulations.
- .2 Provide shoring and bracing as required to prevent movement, failure or settlement, to safeguard and maintain integrity of structures, utilities, earth, benchmarks, services and adjacent grades.
- .3 Engage services of qualified Professional Engineer registered in the Province of New Brunswick to inspect and approve shoring equipment required for work.

1.7 Samples

- .1 When requested submit samples in accordance with Section 01 33 00 - Submissions / Shop Drawings.
- .2 At least 4 weeks prior to commencing work, inform Department Representative of proposed source of bedding, backfill or cover materials and provide access for sampling.

PART 2 - PRODUCTS

2.1 Not Applicable

- .1 Not Applicable.

PART 3 - EXECUTION

3.1 Site Preparation

- .1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.
- .2 Ensure clearing and grubbing on side slopes is complete prior to excavation for embankment widening.

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- 3.2 Stockpiling
- .1 Stockpile fill materials in areas designated by Department Representative. Stockpile granular materials in manner to prevent segregation.
 - .2 Protect fill materials from contamination.
- 3.3 Shoring and Bracing
- .1 Construct temporary works to depths, heights and Bracing locations as indicated or directed by the Professional Engineer responsible for the design of the shoring or bracing.
 - .2 During backfill operation:
 - .1 Unless otherwise indicated or as directed by Department Representative, remove sheeting and shoring from excavations.
 - .2 Do not remove bracing until backfilling has reached that specified by the Professional Engineer responsible for the design of the shoring or bracing.
 - .3 Pull sheeting in increments that will ensure compacted backfill is maintained at an elevation at least 500 mm above toe of sheeting.
 - .3 When sheeting is required to remain in place, cut off tops at elevations as directed by Department Representative.
 - .4 Upon completion of substructure construction:
 - .1 Remove shoring and bracing.
 - .2 Remove excess materials from site and restore conditions indicated or as directed by Department Representative.
- 3.4 Dewatering
- .1 Conduct dewatering operations in accordance with Section 01 35 44 - Environmental Protection.
 - .2 Keep excavations free of water while work is in progress.
 - .3 Protect open excavations against flooding and damage

due to surface run off.

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

3.5 Excavation

- .1 Carry out excavations and removals. Excavate to lines, grades, elevations and dimensions as indicated.
- .2 Remove rubble and other obstructions encountered during excavation.
- .3 Dispose of surplus and unsuitable excavated material in approved location off site in accordance with NB Department of Environment and Local Government regulations.
- .4 Earth bottoms of excavations to be solid undisturbed soil, level, free from loose, soft or organic matter.
- .5 Notify Department Representative when soil at bottom of excavation appears unsuitable and proceed as directed by Department Representative.
- .6 Obtain Department Representatives approval of completed excavation.
- .7 Remove unsuitable material from trench bottom to extent and depth as directed by Department Representative.
- .8 Where required due to unauthorized over excavation, correct as follows:
 - .1 Fill with approved structural fill compacted to 95% Standard Dry Density. ASTM D 698
- .9 Hand trim, make firm and remove loose material and debris from excavations. Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil.
- .10 Obtain excavation permit prior to starting any on-site excavations.

- 3.6 Fill Types and Compaction .1 Use fill of types as indicated or specified below and in drawings. Compaction densities are percentages of maximum densities obtained from ASTM D698.
- 3.7 Backfilling .1 Do not proceed with backfilling operations until Department Representative has inspected and approved installation.
- .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 Do not backfill around or over cast-in-place concrete within 24 hours after placing of concrete.
- .5 Place layers simultaneously on both sides of installed work to equalize loading. Difference not to exceed 225 mm.
- .6 Where earth pressures are liable to develop permit concrete to cure for minimum 28 days to withstand earth and compaction pressures. Do not install earth or backfill until concrete has cured completely.
- .7 Place protective material layer under, around and over minor installations until 600 mm of cover is provided. Dumping material directly on installations will not be permitted.
- .8 Place backfill materials of earth fill around structure in uniform layers not exceeding 200 mm compacted thickness up to finish grade. Compact each layer replacing succeeded layer.

3.8 Inspection and
Testing

- .1 The Contractor shall submit gradation curves for proposed materials to demonstrate compliance with specifications. Pay all costs for gradation curves.
- .2 Testing of materials and compaction will be carried out by testing laboratory designated by Department Representative. Frequency of tests will be determined by Department Representative.
- .3 Department Representative will pay costs for initial inspection and testing. Refer to Section 01 45 00 - Testing Laboratory Services.
- .4 Where tests or inspections by designated testing laboratory reveal work not in accordance with contract requirements, Contractor shall pay costs for additional tests or inspections as Department Representative may require to verify acceptability of corrected work.

3.9 Restoration

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

END

PART 1 - GENERAL

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| 1.1 Description of Work | .1 | To complete rough and fine grading of the site. |
| 1.2 Related Work | .1 | Section 01 35 44 - Environmental Protection |
| | .2 | Section 31 23 10 - Excavation and Backfilling |
| | .3 | Section 31 24 13 - Roadway Embankments |
| 1.3 Site Conditions | .1 | Establish location of all services before commencing work. |
| 1.4 Scheduling | .1 | Schedule all construction with Department Representative. |
| 1.5 Protection | .1 | Prevent damage to natural features, bench marks, existing pavement, surface or underground utility lines which are to remain. Make good any damage. |

PART 2 - PRODUCTS

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| 2.1 Materials | .1 | Fill Material:

.1 Selected Backfill: common material from site excavation, free from stumps, trees, roots, sod, organics, rocks, boulders, and masonry larger than 150 mm in any dimension, and any other deleterious materials.

.2 Premium Borrow: well-graded material from Contractor's own sources meeting the NBDTI specification for select borrow free from lumps of clay and other deleterious material with a maximum particle size of 100 mm, and a maximum of 20% of the material passing the 4.75 mm sieve shall pass the 75 µm sieve. |
| | .2 | Obtain Department Representative's approval of excavated or graded material used as fill for grading work. Protect approved material from contamination. |

PART 3 - EXECUTION

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| 3.1 Removal of Topsoil | .1 Do not handle wet or frozen topsoil. |
| | .2 Remove topsoil from areas to be excavated or regraded. Strip topsoil when dry enough to prevent contamination with sub grade material. |
| 3.2 Grading | .1 Grade to levels, profiles, and contours allowing for surface treatment as indicated. |
| | .2 Grade as noted. |
| | .3 Prior to placing fill over existing ground, scarify surface to depth of 150 mm. Maintain fill and existing surface at approximately same moisture content to facilitate bonding. |
| | .4 All areas within the limits of the contract (i.e. paved areas) shall be proof-rolled with a 25t loaded truck. The Contractor shall, however, take extreme care to not damage existing underground services. Make good any damage at Contractor's cost. |
| 3.3 Testing | .1 Inspection and testing of soil compaction will be carried out by designated testing laboratory. |
| 3.4 Surplus Material | .1 Remove surplus material from site. |
| | .2 Remove material unsuitable for fill or grading from site as directed by Department Representative. |

END

PART 1 - GENERAL

- 1.1 Definitions
- .1 Topsoil: material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.
 - .2 Waste material: material unsuitable for use in embankment or surplus to requirements.
 - .3 Borrow material: material obtained from areas off site required for construction of embankments or for other portions of work.
 - .4 Shoulder Material:
 - .1 RAP obtained from asphalt removal elsewhere in the work.
 - .2 Contractor shall be responsible to supply material to the work.
 - .3 Contractor shall process the RAP to contain 100 passing the 50.0 mm sieve size, as determined by ASTM C-136, and shall be free of all lumps, clods, and soil.
 - .5 Pavement structure: combination of layers of unbound or stabilized granular sub-base, base, and asphalt or concrete surfacing.
 - .6 Subgrade elevation: elevation immediately below pavement structure.
- 1.2 Traffic Provisions
- .1 Provide and maintain roadways, walkways and detours, for vehicular and pedestrian traffic and access to fire hydrants, alarms and emergency telephones.

PART 2 - PRODUCTS

- 2.1 Materials
- .1 Embankment materials to approval of Department Representative.
 - .2 Borrow material: obtain from sources meeting the specifications of NBDTI Borrow A1 off site and to Department Representative's acceptance.
 - .3 Riprap: to NBDTI and Public Works specification size R-100.

PART 3 - EXECUTION

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| 3.1 Compaction Equipment | .1 | Compaction equipment must be capable of obtaining required densities in materials on project. |
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| 3.2 Water Distributors | .1 | Apply water with equipment capable of uniform distribution. |
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| 3.3 Embankments | .1 | Do not place material which is frozen nor place material on frozen surfaces. |
| | .2 | Maintain a crowned surface during construction to ensure ready runoff of surface water. Do not place material in free standing water. |
| | .3 | With material containing less than 25% by volume of stone or rock fragments larger than 100 mm: |
| | .1 | Place and compact to full width in uniform layers not exceeding 200 mm loose thickness. Department Representative may authorize thicker lifts if specified compaction can be achieved. |
| | .2 | Compact to a density of not less than 95% corrected maximum dry density in accordance with ASTM D698. |
| | .3 | Bring moisture content of soil to level required to achieve specified compaction. Add water or aerate as required. |
| | | |
| 3.4 Excavations | .1 | Excavate as required to install the new retaining wall. |
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| 3.5 Subgrade Compaction | .1 | After grading has been completed, scarify and mix subgrade surface to required depth of subgrade compaction. |
| | .2 | Remove unsuitable materials found during work. Replace with material approved by Department Representative. |
| | .3 | Bring moisture content of soil to level required to achieve specified compaction. Add water or aerate as |

required.

3.6 Finishing and
Tolerances

- .1 Shape and compact surfaces to within 30 mm of design elevations but not uniformly high or low.
- .2 Do scarifying, grading, compacting or other methods of work as necessary to provide thoroughly compacted roadbed shaped to grades and cross sections as indicated or as directed by Department Representative.
- .3 Finish edges and slopes of common material to neat condition, true to line and grade.
 - .1 Remove isolated boulders exposed in cut slopes and fill resulting cavities.
 - .2 Hand finish slopes that cannot be finished satisfactorily by machine.

3.7 Maintenance

- .1 Maintain finished surfaces in condition conforming to this section until acceptance.

END

PART 1 - GENERAL

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| 1.1 Description | .1 | This Section specifies requirements for recompacting and reshaping of existing subgrade, to lines, grades and typical cross-sections indicated or as established by Department Representative. |
| 1.2 Related Sections | .1 | Section 31 24 13 - Roadway Embankments |
| 1.3 References | .1 | ASTM D698-12e1. Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft ³ (600 kN-m/m ³)). |
| 1.4 Definitions | .1 | Reshaping subgrade: scarifying, pulverizing, blading, reshaping and recompacting existing subgrade surface. |
| 1.5 Measurement for Payment | .1 | Measurement for items of this section will not be made. Work of this section is to be considered incidental to this contract. |

PART 2 - PRODUCTS

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| 2.1 Not Applicable | .1 | Not Applicable. |
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PART 3 - EXECUTION

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| 3.1 Reshaping | .1 | Blade and trim material to elevation and cross section dimensions as indicated. |
| 3.2 Compacting | .1 | Compact to density not less than 95% corrected maximum dry density maximum dry density in accordance with ASTM D698. |
| | .2 | Shape and roll alternately to obtain smooth, even and uniformly compacted subgrade surface. |
| | .3 | Apply water as necessary during compaction to obtain specified density. |
| | .4 | If material is excessively moist, aerate by |

scarifying with suitable equipment until moisture content is corrected to value not greater than 2% moisture above optimum value for compaction in accordance with ASTM D698.

3.3 Site Tolerances .1 Reshaped compacted surface to be within plus or minus 10 mm of elevation as indicated.

3.4 Protection .1 Maintain reshaped surface in condition conforming to this section until succeeding material is applied or until Department Representative acceptance.

END

PART 1 - GENERAL

- 1.1 SECTION INCLUDES
- .1 Materials and installation of polymeric geotextiles used in revetments, breakwaters, retaining wall structures, filtration, drainage structures, roadbeds and railroad beds purpose of which is to:
 - .1 Separate and prevent mixing of granular materials of different grading.
 - .2 Act as hydraulic filters permitting passage of water while retaining soil strength of granular structure.
- 1.2 RELATED SECTIONS
- .1 Section 01 33 00 - Submittal Procedures.
 - .2 Section 31 23 10 - Excavating and Backfilling.
 - .3 Section 31 24 13 - Roadway Embankments.
- 1.3 MEASUREMENT PROCEDURES
- .1 Measure geotextiles in square metres of surface covered by material. No allowance will be made for seams and overlaps.
- 1.4 REFERENCES
- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM D 4491-99A, Standard Test Methods for Water Permeability for Geotextiles by Permittivity.
 - .2 ASTM D 4595-86 (2001), Standard Test Method for Tensile Properties of Geotextiles the Wide-Width Strip Method.
 - .3 ASTM D 4716-01, Test method for determining the (In-Plane) Flow Rate Per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant head.
 - .4 ASTM D 4751-99a, Standard Test Method for Determining Apparent Opening Size of a Geotextile.
 - .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-4.2 No. 11.2M89 (April 1997), Textile Test Methods - Bursting Strength - Ball Burst Test (Extension of September 1989).
 - .2 CAN/CGSB-148.1, Methods of Testing Geotextiles and Complete Geomembranes.
 - .1 No. 2-M85, Methods of Testing

Geosynthetics - Mass per Unit Area.
.2 No. 3-M85, Methods of Testing
Geosynthetics - Thickness of Geotextiles.
.3 No. 6.1-93, Methods of Testing Geotextiles
and Geomembranes - Bursting Strength of
Geotextiles Under No Compressive Load.
.4 No. 7.3-92, Methods of Testing Geotextiles
and Geomembranes - Grab Tensile Test for
Geotextiles.
.5 No. 10-94, Methods of Testing
Geosynthetics - Geotextiles - Filtration
Opening Size.

- .3 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-G40.20/G40.21-98, General Requirements
for Rolled or welded Structural Quality Steel/
Structural Quality Steel.
 - .2 CAN/CSA-G164-M92(R1998), Hot Dip Galvanizing of
Irregularly Shaped Articles.
- .4 New Brunswick Department of Transportation and
Infrastructure (NBDTI) Standard Specification.

1.5 SUBMITTALS

- .1 Submit samples in accordance with Section 01 33 00 -
Submittal Procedures.
- .2 Submit to Departmental Representative the following
samples at least 4 weeks prior to beginning work.
 - .1 Minimum length of 2 m of roll width of
geotextiles.
 - .2 Minimum of 1 m seam with at least 300 mm
geotextile on both sides of seam.
- .3 Submit to Departmental Representative copies of mill
test data and certificate at least 2 weeks prior to
start of Work, and in accordance with Section
01 33 00 - Submittal Procedures.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 During delivery and storage, protect geotextiles from
direct sunlight, ultraviolet rays, excessive heat,
mud, dirt, dust, debris and rodents.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of all packaging
materials at appropriate recycling facilities.

- .2 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
- .3 Fold up metal banding, flatten and place in designated area for recycling.

PART 2 - PRODUCTS

2.1 MATERIAL

- .1 Geotextile: woven or non-woven synthetic fibre fabric, supplied in rolls.
 - .1 Type as indicated.
 - .2 Composed of: minimum 85% by mass of polypropylene ethylene, ester, amide, or vinylidene - chloride with inhibitors added to base plastic to resist deterioration by ultra violet and heat exposure.
- .2 Physical properties:
 - .1 to NBDTI 601.2 AND Table 601-1.
- .3 Securing pins and washers: to CAN/CSA-G40.21, Grade 300W, hot-dipped galvanized with minimum zinc coating of 600 g/m² to CAN/CSA G164.
- .4 Factory seams: sewn in accordance with manufacturer's recommendations.
- .5 Thread for sewn seams: Equal or better resistance to chemical and biological degradation than geotextile.

PART 3 - EXECUTION

3.1 INSTALLATION

- .1 Place geotextile material by unrolling onto graded surface in orientation, manner and locations indicated and retain in position with securing pins/wrights.
- .2 Place geotextile material smooth and free of tension stress, folds, wrinkles and creases.
- .3 Place geotextile material on sloping surfaces in one continuous length from toe of slope to upper extent

of geotextile.

- .4 Overlap each successive strip of geotextile 600 mm over previously laid strip.
- .5 Protect installed geotextile material from displacement, damage or deterioration before, during and after placement of material layers.
- .6 After installation, cover with overlying layer within 4 h of placement.
- .7 Replace damaged or deteriorated geotextile to approval of Departmental Representative.
- .8 Place and compact soil layers in accordance with Section 31 23 10 - Excavating, Backfilling 02317 - Roadway Excavation Embankment and Compaction.

3.2 CLEANING

- .1 Remove construction debris from Project site and dispose of debris in an environmentally responsible and legal manner.

3.3 PROTECTION

- .1 Vehicular traffic not permitted directly on geotextile.

END OF SECTION

PART 1 - GENERAL

Not Applicable

PART 2 - PRODUCTS

- 2.1 Rock
- .1 Hard, with relative density (formally specific gravity) not less than 2.65, durable quarry stone, free from seams, cracks or other structural defects, to meet following size distribution for use intended:
 - .1 Rip Rap: as per sizes shown on Project Drawings.
 - .2 Rip Rap Mixed: Random Rip Rap shall be noted on the contract drawings as R# mixed and shall consist of random rip rap metered of the designated size (R#) thoroughly mixed with a pit run gravel subbase or salvaged river stone within the shown disturbed areas. Gravel's to be mixed at approximately 20% by weight to the Rip Rap material, to form a very dense material.

PART 3 - EXECUTION

- 3.1 Placing
- .1 Where rip rap is to be placed on slopes, excavate trench at toe of slope to dimensions as indicated.
 - .2 Fine grade area to be uniform, even surface. Fill depressions with suitable material and compact to provide firm bed.
 - .3 Place rip rap to thickness and details as indicated.
 - .4 Place stones in manner approved by Departmental Representative to secure surface and create a stable mass. Place larger stones at bottom of slopes.
 - .5 Hand or machine placing:
 - .1 Use larger stones for lower courses and as headers for subsequent courses.
 - .2 Stagger vertical joints and fill voids with rock spalls or cobbles.
 - .3 Finish surface evenly, free of large openings and neat in appearance.

END