



**RETURN BIDS TO:**  
**RETOURNER LES SOUMISSIONS À:**  
Bid Receiving Public Works & Government  
Services Canada/Réception des soumissions Travaux  
publics et Services gouvernementaux Canada  
1713 Bedford Row  
Halifax, N.S./Halifax,(N.E.)  
B3J 1T3  
Halifax  
Bid Fax: (902) 496-5016

**SOLICITATION AMENDMENT**  
**MODIFICATION DE L'INVITATION**

The referenced document is hereby revised; unless otherwise  
indicated, all other terms and conditions of the Solicitation  
remain the same.

Ce document est par la présente révisé; sauf indication contraire,  
les modalités de l'invitation demeurent les mêmes.

**Comments - Commentaires**

**Vendor/Firm Name and Address**  
**Raison sociale et adresse du**  
**fournisseur/de l'entrepreneur**

**Issuing Office - Bureau de distribution**  
Atlantic Region Acquisitions/Région de l'Atlantique  
Acquisitions  
1713 Bedford Row  
Halifax, N.S./Halifax, (N.E.)  
B3J 3C9  
Halifax  
Nova Scot

<b>Title - Sujet</b> CCGC Fire Roads	
<b>Solicitation No. - N° de l'invitation</b> EB144-172141/A	<b>Amendment No. - N° modif.</b> 003
<b>Client Reference No. - N° de référence du client</b> EB144-17-2141	<b>Date</b> 2017-01-05
<b>GETS Reference No. - N° de référence de SEAG</b> PW-\$PWA-121-5497	
<b>File No. - N° de dossier</b> PWA-6-76116 (121)	<b>CCC No./N° CCC - FMS No./N° VME</b>
<b>Solicitation Closes - L'invitation prend fin</b> <b>at - à 02:00 PM</b> <b>on - le 2017-01-10</b>	
<b>Time Zone</b> Fuseau horaire Atlantic Standard Time AST	
<b>F.O.B. - F.A.B.</b> <b>Plant-Usine:</b> <input type="checkbox"/> <b>Destination:</b> <input checked="" type="checkbox"/> <b>Other-Autre:</b> <input type="checkbox"/>	
<b>Address Enquiries to: - Adresser toutes questions à:</b> Russell (PWA), Alex	<b>Buyer Id - Id de l'acheteur</b> pwa121
<b>Telephone No. - N° de téléphone</b> (902) 496-5168 ( )	<b>FAX No. - N° de FAX</b> (902) 496-5016
<b>Destination - of Goods, Services, and Construction:</b> <b>Destination - des biens, services et construction:</b>	

**Instructions: See Herein**

**Instructions: Voir aux présentes**

<b>Delivery Required - Livraison exigée</b>	<b>Delivery Offered - Livraison proposée</b>
<b>Vendor/Firm Name and Address</b> <b>Raison sociale et adresse du fournisseur/de l'entrepreneur</b>	
<b>Telephone No. - N° de téléphone</b> <b>Facsimile No. - N° de télécopieur</b>	
<b>Name and title of person authorized to sign on behalf of Vendor/Firm</b> <b>(type or print)</b> <b>Nom et titre de la personne autorisée à signer au nom du fournisseur/</b> <b>de l'entrepreneur (taper ou écrire en caractères d'imprimerie)</b>	
<b>Signature</b>	<b>Date</b>

**Amendment 003 is raised for the following:**

**Question 3** – Would it be possible to get a site visit?

Answer 3 – The site may be viewed publically. Interested bidders should see the commissionaires at the front gate to request access.

**Specification**

**Division 31** – see attached full and complete document

***All other terms and conditions remain the same.***

**Part 1           General**

**1.1               RELATED REQUIREMENTS**

- .1       Section 01 74 11 – Cleaning.
- .2       Section 32 91 19.13 – Topsoil Placement and Grading.

**Part 2           Products**

**2.1               NOT USED**

- .1       Not Used.

**Part 3           Execution**

**3.1               TEMPORARY EROSION AND SEDIMENTATION CONTROL**

- .1       Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties according to requirements of authorities having jurisdiction.
- .2       Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3       Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

**3.2               STRIPPING OF TOPSOIL**

- .1       Ensure that procedures are conducted in accordance with applicable Provincial requirements.
- .2       Remove topsoil before construction procedures commence to avoid compaction of topsoil.
- .3       Handle topsoil only when it is dry and warm.
- .4       Remove vegetation from targeted areas by non-chemical means and dispose of stripped vegetation by composting.
- .5       Remove brush from targeted area by non-chemical means and dispose of through mulching.
- .6       Strip topsoil to depths as indicated.
  - .1       Avoid mixing topsoil with subsoil.
- .7       Pile topsoil in berms in locations as directed by Departmental Representative.
  - .1       Stockpile height not to exceed 2.5 - 3 m.
- .8       Dispose of unused topsoil in location as indicated by Departmental Representative.
- .9       Protect stockpiles from contamination and compaction.

- .10 Cover topsoil that has been piled for long term storage, with trefoil or grass to maintain agricultural potential of soil.

### **3.3 PREPARATION OF GRADE**

- .1 Verify that grades are correct and notify Departmental Representative if discrepancies are present.
  - .1 Grade area only when soil is dry to lessen soil compaction.
  - .2 Grade soil establishing natural contours and eliminating uneven areas and low spots, ensuring positive drainage.

### **3.4 PLACING OF TOPSOIL**

- .1 Place topsoil only after Departmental Representative has accepted subgrade.
- .2 Spread topsoil during dry conditions in uniform layers not exceeding 150 mm, over unfrozen subgrade free of standing water.
- .3 Establish traffic patterns for equipment to prevent driving on topsoil after it has been spread to avoid compaction.
- .4 Cultivate soil following spreading procedures.

### **3.5 SUB-SOILING**

- .1 Apply sub-soil, following spreading and cultivating procedures to designated areas to improve drainage and agricultural potential of soil.
- .2 Work sub-soil area following natural grade contour lines, with vibrating sub-soiler to depth of 40 cm.
- .3 Cross sub-soil the area following the first pass.
- .4 Cultivate the soil with a chain harrow to de-clod the soil.

### **3.6 CLEANING**

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1        Section 01 33 00 – Submittal Procedures.
- .2        Section 01 74 11 – Cleaning.
- .3        Section 31 23 33.01 – Excavating, Trenching and Backfilling.

**1.2                REFERENCES**

- .1        ASTM International
  - .1        ASTM D698-07e1, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN-m<sup>3</sup>).
  - .2        Nova Scotia Transportation and Infrastructure Renewal (NSTIR) Standard Specification for Highway Construction and Maintenance.

**1.3                ACTION AND INFORMATIONAL SUBMITTALS**

- .1        Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2        Erosion and Sedimentation Control: submit copy of erosion and sedimentation control plan for Departmental Representative approval in accordance with authorities having jurisdiction.

**1.4                EXISTING CONDITIONS**

- .1        Examine soil report bound to this specification.
- .2        Buried services:
  - .1        Before commencing work verify or establish location of buried services on and adjacent to site by careful test excavations. Location of services shown on utilities plan is approximate only and not deemed accurate.
- .3        Refer to dewatering in Section 31 23 33.01 - Excavating, Trenching and Backfilling.

**Part 2            Products**

**2.1                MATERIALS**

- .1        Fill material: Type 2 granular in accordance with NSTIR specifications.
- .2        Select (common) Fill: Common material from site which is free of stumps, trees, roots, organics, boulders and masonry larger than 200 mm in any dimension and other deleterious materials as approved by the Departmental Representative.

**Part 3 Execution**

**3.1 GRADING**

- .1 Rough grade to levels, profiles, and contours allowing for surface treatment as indicated.
- .2 Rough grade to depths as indicated.
- .3 Slope rough grade away from above grade structures as indicated.
- .4 Grade ditches to depth as required for maximum run-off as indicated.
- .5 Prior to placing fill over existing ground, scarify surface to depth of 150 mm minimum before placing fill over existing ground. Maintain fill and existing surface at approximately same moisture content to facilitate bonding.
- .6 Compact filled and disturbed areas to SPMDD to ASTM D698, as follows:
  - .1 85% under landscaped areas.
  - .2 95% under paved and walk areas.
- .7 Do not disturb soil within branch spread of trees or shrubs to remain.

**3.2 TESTING**

- .1 Contractor shall conduct quality control testing and provide results to Departmental Representative upon request.
- .2 Submit testing procedure and frequency of tests to Departmental Representative for approval.

**3.3 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

**3.4 PROTECTION**

- .1 Maintain access roads to prevent accumulation of construction related debris on roads during rough grading operations to the approval of the Departmental Representative.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1    Section 01 33 00 – Submittal Procedures.
- .2    Section 01 45 00 – Quality Control.
- .3    Section 31 14 13 – Soil Stripping and Stockpiling.
- .4    Section 31 32 19.01 – Geotextiles.

**1.2                REFERENCES**

- .1    American Society for Testing and Materials International (ASTM)
  - .1    ASTM C117-04, Standard Test Method for Material Finer than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.
  - .2    ASTM C136-05, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
  - .3    ASTM D422-632002, Standard Test Method for Particle-Size Analysis of Soils.
  - .4    ASTM D698-00ae1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN-m/m<sup>3</sup>).
  - .5    ASTM D1557-02e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (2,700 kN-m/m<sup>3</sup>).
  - .6    ASTM D4318-05, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- .2    Canadian General Standards Board (CGSB)
  - .1    CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.
- .3    Canadian Standards Association (CSA International)
  - .1    CAN/CSA-A3000-03, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
    - .1    CSA-A3001-03, Cementitious Materials for Use in Concrete.
  - .2    CSA-A23.1/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
- .4    Nova Scotia Transportation and Infrastructure Renewal (NSTIR) Standard Specification for Highway Construction and Maintenance.

**1.3                DEFINITIONS**

- .1    Excavation classes: two classes of excavation will be recognized; common excavation and rock excavation.
  - .1    Rock : solid material in excess of 1.0 m<sup>3</sup> and which cannot be removed by means of heavy duty mechanical excavating equipment with 0.95 to 1.15 m<sup>3</sup> bucket. Frozen material not classified as rock.

- .2 Common excavation: excavation of materials of whatever nature, which are not included under definitions of rock excavation.
- .2 Unclassified excavation: excavation of deposits of whatever character encountered in Work.
- .3 Topsoil:
  - .1 Material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.
  - .2 Material reasonably free from subsoil, clay lumps, brush, objectionable weeds, and other litter, and free from cobbles, stumps, roots, and other objectionable material larger than 25 millimeters in any dimension.
- .4 Waste material: excavated material unsuitable for use in Work or surplus to requirements.
- .5 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of Work.
- .6 Recycled fill material: material, considered inert, obtained from alternate sources and engineered to meet requirements of fill areas.
- .7 Unsuitable materials:
  - .1 Weak, chemically unstable, and compressible materials.
  - .2 Frost susceptible materials:
    - .1 Fine grained soils with plasticity index less than 10 when tested to ASTM D4318, and gradation within limits specified when tested to ASTM D422 and ASTM C136: Sieve sizes to CAN/CGSB-8.2.
    - .2 Table:

Sieve Designation	% Passing
2.00 mm	100
0.10 mm	45 - 100
0.02 mm	10 - 80
0.005 mm	0 - 45
    - .3 Coarse grained soils containing more than 20 % by mass passing 0.075 mm sieve.
- .8 Unshrinkable fill: very weak mixture of cement, concrete aggregates and water that resists settlement when placed in utility trenches, and capable of being readily excavated.

#### **1.4 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Quality Control: in accordance with Section 01 45 00 - Quality Control:
  - .1 Submit condition survey of existing conditions as described in EXISTING CONDITIONS article of this Section.
  - .2 Submit for review by Departmental Representative proposed dewatering methods as described in PART 3 of this Section.
  - .3 Submit to Departmental Representative written notice at least 7 days prior to excavation work.

- .4 Submit to Departmental Representative written notice when bottom of excavation is reached.
- .5 Submit to Departmental Representative testing results as described in PART 3 of this Section.
- .3 Preconstruction Submittals:
  - .1 Submit construction equipment list for major equipment to be used in this section prior to start of Work.
  - .2 Submit records of underground utility locates, indicating: location plan of existing utilities as found in field and location plan of relocated and abandoned services, as required.

### **1.5 QUALITY ASSURANCE**

- .1 Qualification Statement: submit proof of insurance coverage for professional liability.
- .2 Submit design and supporting data at least 2 weeks prior to beginning Work.
- .3 Design and supporting data submitted to bear stamp and signature of qualified professional Engineer licensed in the Province of Nova Scotia.
- .4 Keep design and supporting data on site.
- .5 Engage services of qualified professional Engineer who is licensed in the Province of Nova Scotia in which Work is to be carried out to design and inspect cofferdams, shoring, bracing and underpinning if required for Work.

### **1.6 EXISTING CONDITIONS**

- .1 Examine soil report bound to this specification.
- .2 Buried services:
  - .1 Before commencing work verify or establish location of buried services on and adjacent to site by careful test excavations. Location of services shown on utilities plan is approximate only and not deemed accurate.
  - .2 Arrange with appropriate authority for relocation of buried services that interfere with execution of work: pay costs of relocating services.
  - .3 Remove obsolete buried services within 2 m of foundations: cap cut-offs.
  - .4 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.
  - .5 Prior to beginning excavation Work, notify Departmental Representative and establish location and state of use of buried utilities and structures.
  - .6 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered.
  - .7 Where utility lines or structures exist in area of excavation, obtain direction of Departmental Representative before removing or re-routing. Costs for such Work to be paid by Owner.
  - .8 Record location of maintained, re-routed and abandoned underground lines.
  - .9 Confirm locations of recent excavations adjacent to area of excavation.

- .3 Existing buildings and surface features:
  - .1 Conduct, with Departmental Representative a condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, pavement, survey bench marks and monuments which may be affected by Work.
  - .2 Protect existing buildings and surface features from damage while Work is in progress. In event of damage, immediately make repair as directed by Departmental Representative.

**Part 2 Products**

**2.1 MATERIALS**

- .1 Backfill: Type 1 or Type 2 granular in accordance with NSTIR specifications.
- .2 Select (common) Fill: Common material from site which is free of stumps, trees, roots, organics, boulders and masonry larger than 200 mm in any dimension and other deleterious materials as approved by the Departmental Representative.
- .3 Utility/Pipe Bedding and Surround: Type 1 granular in accordance with NSTIR specifications.
- .4 19mm Clear Stone: Crushed and screened, hard, durable stone, free from clay and organic matter, and graded as follows:

Sieve Size (mm)	Percent Passing
28	100
19	90 – 100
9.5	0 – 40
4.75	0 – 10

- .5 Unshrinkable fill: proportioned and mixed to provide:
  - .1 Maximum compressive strength of 0.4 MPa at 28 days.
  - .2 Maximum cement content of 25 kg/m<sup>3</sup>.
  - .3 Minimum strength of 0.07 MPa at 24 h.
  - .4 Concrete aggregates: to CSA-A23.1/A23.2.
  - .5 Cement: Type GU.
  - .6 Slump: 160 to 200 mm.
- .6 Geotextiles: to Section 31 32 19.01 - Geotextiles.

**Part 3 Execution**

**3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL**

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties according to requirements of authorities having jurisdiction.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

**3.2 SITE PREPARATION**

- .1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.
- .2 Cut pavement or sidewalk neatly along limits of proposed excavation in order that surface may break evenly and cleanly.

**3.3 PREPARATION/PROTECTION**

- .1 Keep excavations clean, free of standing water, and loose soil.
- .2 Where soil is subject to significant volume change due to change in moisture content, cover and protect to Departmental Representative approval.
- .3 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage.
- .4 Protect buried services that are required to remain undisturbed.

**3.4 STRIPPING OF TOPSOIL AND STOCKPILING**

- .1 Do topsoil stripping and stockpiling in accordance with Section 31 14 13 – Soil Stripping and Stockpiling.

**3.5 COFFERDAMS, SHORING, BRACING AND UNDERPINNING**

- .1 Maintain sides and slopes of excavations in safe condition by appropriate methods and in accordance with the Provincial Health and Safety Act.
- .2 Obtain permit from authority having jurisdiction for temporary diversion of water course if required.
- .3 Construct temporary Works to depths, heights and locations as approved by Departmental Representative.
- .4 During backfill operation:
  - .1 Unless otherwise indicated or directed Departmental Representative, remove sheeting and shoring from excavations.

- .2 Do not remove bracing until backfilling has reached respective levels of such bracing.
- .3 Pull sheeting in increments that will ensure compacted backfill is maintained at elevation at least 500 mm above toe of sheeting.
- .5 When sheeting is required to remain in place, cut off tops at elevations as indicated.
- .6 Upon completion of substructure construction:
  - .1 Remove cofferdams, shoring and bracing.
  - .2 Remove excess materials from site.

### **3.6 DEWATERING AND HEAVE PREVENTION**

- .1 Keep excavations free of water while Work is in progress.
- .2 Provide for Departmental Representative approval the details of proposed dewatering or heave prevention methods, including dikes, well points, and sheet pile cut-offs.
- .3 Avoid excavation below groundwater table if quick condition or heave is likely to occur.
  - .1 Prevent piping or bottom heave of excavations by groundwater lowering, sheet pile cut-offs, or other means.
- .4 Protect open excavations against flooding and damage due to surface run-off.
- .5 Dispose of water in manner not detrimental to public and private property, or portion of Work completed or under construction.
  - .1 Provide and maintain temporary drainage ditches and other diversions outside of excavation limits.
- .6 Provide flocculation tanks, settling basins, geotubes or other treatment methods and facilities to remove suspended solids or other materials before discharging to storm sewers, watercourses or drainage areas.

### **3.7 EXCAVATION**

- .1 Advise Departmental Representative at least 7 days in advance of excavation operations.
- .2 Excavate to lines, grades, elevations and dimensions as indicated.
- .3 Excavation must not interfere with bearing capacity of adjacent foundations.
- .4 Do not disturb soil within branch spread of trees or shrubs that are to remain.
  - .1 If excavating through roots, excavate by hand and cut roots with sharp axe or saw.
- .5 For trench excavation, do not excavate more than 30 m of trench in advance of installation operations. All excavations shall be filled at end of work day prior to leaving site.
- .6 Keep excavated and stockpiled materials safe distance away from edge of trench as directed by Departmental Representative.
- .7 Restrict vehicle operations directly adjacent to open trenches.
- .8 Dispose of surplus and unsuitable excavated material in approved location.

- .9 Do not obstruct flow of surface drainage or natural watercourses.
- .10 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.
- .11 Notify Departmental Representative when bottom of excavation is reached.
- .12 Obtain Departmental Representative approval of completed excavation.
- .13 Remove unsuitable material from trench bottom including those that extend below required elevations to extent and depth as directed by Departmental Representative.
- .14 Correct unauthorized over-excavation as follows:
  - .1 Fill under bearing surfaces and footings with Type 2 granular fill compacted to not less than 100% of SPMDD.
  - .2 Fill under other areas with Type 2 granular or common fill compacted to not less than 95 % of SPMDD.
- .15 Hand trim, make firm and remove loose material and debris from excavations.
  - .1 Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil.
  - .2 Clean out rock seams and fill with concrete mortar or grout to approval of Departmental Representative.
- .16 Install geotextiles in accordance with Section 31 32 19.01 - Geotextiles.

### **3.8 FILL TYPES AND COMPACTION**

- .1 Use types of fill as indicated or specified below.
  - .1 Exterior side of structure walls: use Type 2 granular fill to subgrade level. Compact to 95% of SPMDD.
  - .2 Under concrete slabs: use Type 2 granular fill to underside of base course for concrete slabs. Compact to 98 % of SPMDD.
  - .3 Under concrete slabs: provide 150 mm compacted thickness base course of Type 1 granular fill to underside of slab. Compact base course to 98 % SPMDD.
  - .4 Place unshrinkable fill in areas as indicated.

### **3.9 BEDDING AND SURROUND OF UNDERGROUND SERVICES**

- .1 Hand place material in uniform layers not exceeding 150 mm compacted thickness as indicated.
- .2 Place bedding and surround material in unfrozen condition.

### **3.10 BACKFILLING**

- .1 Do not proceed with backfilling operations until completion of following:
  - .1 Departmental Representative has inspected and approved installations.
  - .2 Departmental Representative has inspected and approved of construction below finish grade.
  - .3 Inspection, testing, approval, and recording location of underground utilities.

- .4 Removal of concrete formwork.
- .5 Removal of shoring and bracing; backfilling of voids with satisfactory soil material.
- .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 Place backfill material in uniform layers not exceeding 150 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.
- .5 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.
  - .3 Place layers simultaneously on both sides of installed Work to equalize loading. Difference not to exceed 300 mm.
- .6 Place unshrinkable fill in areas as indicated.
- .7 Consolidate and level unshrinkable fill with internal vibrators.

### **3.11 TESTING**

- .1 Quality control testing of bedding, surround and backfill shall be carried out and paid for by the Contractor. Submit satisfactory compaction testing results to Departmental Representative for review and approval as results become available.
- .2 Departmental Representative may conduct quality assurance testing at own cost to verify testing results of contractor.

### **3.12 RESTORATION**

- .1 Replace topsoil as indicated.
- .2 Reinstate lawns to elevation which existed before excavation.
- .3 Reinstate pavements and sidewalks disturbed by excavation to thickness, structure and elevation which existed before excavation.
- .4 Clean and reinstate areas affected by Work as directed by Departmental Representative.
- .5 Use temporary plating to support traffic loads over unshrinkable fill for initial 24 hours.
- .6 Protect newly graded areas from traffic and erosion and maintain free of trash or debris.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1        Section 01 33 00 – Submittal Procedures.
- .2        Section 01 74 11 – Cleaning.
- .3        Section 31 23 33.01 – Excavating, Trenching and Backfilling.

**1.2                REFERENCES**

- .1        ASTM International
  - .1        ASTM A123/A123M-09, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  - .2        ASTM D4491-99a (2009), Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
  - .3        ASTM D4595-09, Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method.
  - .4        ASTM D4716-08, Standard Test Method for Determining the (In-Plane) Flow Rate Per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head.
  - .5        ASTM D4751-04, Standard Test Method for Determining Apparent Opening Size of a Geotextile.
- .2        Canadian General Standards Board (CGSB)
  - .1        CAN/CGSB-4.2 No. 11.2-2004, 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.

**1.3                ACTION AND INFORMATIONAL SUBMITTALS**

- .1        Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2        Product Data:
  - .1        Submit manufacturer's instructions, printed product literature and data sheets for geotextiles and include product characteristics, performance criteria, physical size, finish and limitations.

- .3 Test and Evaluation Reports:
  - .1 Submit copies of mill test data and certificate at least 4 weeks prior to start of Work.

## **Part 2 Products**

### **2.1 MATERIAL**

- .1 Geotextile: non-woven synthetic fibre fabric, supplied in rolls.
- .2 Properties:
  - .1 Weight: Minimum 136 g/m<sup>2</sup>.
  - .2 Grab Tensile Strength: Minimum 445 N.
  - .3 Grab Elongation: 50 %.
  - .4 Tear Resistance: Minimum 222 N.
  - .5 Puncture Resistance: Minimum 289 N.
  - .6 Mullen Burst: Minimum 1481 N.
  - .7 Permittivity: Maximum 2.0 Sec<sup>-1</sup>.
  - .8 Water Flow Rate: Maximum 5700 l/min/m<sup>2</sup>.
  - .9 Apparent Opening Size (AOS): 0.212 mm
  - .10 UV Stability: Minimum 70 % @ 500 hours.
- .3 Securing pins and washers: to CSA G40.21, Grade 300W, hot-dipped galvanized with minimum zinc coating of 600 g/m<sup>2</sup> to ASTM A123M.
- .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.
- .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 Join successive strips of geotextile by sewing.
- .6 Pin successive strips of geotextile with securing pins at midpoint of lap.
- .7 Protect installed geotextile material from displacement, damage or deterioration before, during and after placement of material layers.
- .8 After installation, cover with overlying layer within 4 hours of placement.

- .9 Replace damaged or deteriorated geotextile to approval of Departmental Representative.
- .10 Place and compact soil layers in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

### **3.2 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

### **3.3 PROTECTION**

- .1 Vehicular traffic not permitted directly on geotextile.

**END OF SECTION**